INTRODUCTION

A few years back, a brilliant student from China began to work with me on questions of social psychology and reasoning. One day early in our acquaintance, he said, "You know, the difference between you and me is that I think the world is a circle, and you think it's a line." Unfazed by what must have been a startled expression on my face, he expounded on that theme. "The Chinese believe in constant change, but with things always moving back to some prior state. They pay attention to a wide range of events; they search for relationships between things; and they think you can't understand the part without understanding the whole. Westerners live in a simpler, more deterministic world; they focus on salient objects or people instead of the larger picture; and they think they can control events because they know the rules that govern the behavior of objects."

I was skeptical but intrigued. I had been a lifelong universalist concerning the nature of human thought. Marching in step with the long Western line, from the British empiricist philosophers such as Hume, Locke, and Mill to modern-day cognitive scientists, I believed that all human

groups perceive and reason in the same way. The shared assumptions of this tradition can be summarized with a few principles.

- Everyone has the same basic cognitive processes. Maori herders, IKung hunter-gatherers, and dot-com entrepreneurs all rely on the same tools for perception, memory, causal analysis, categorization, and inference.
- When people in one culture differ from those in another in their beliefs, it can't be because they have different cognitive processes, but because they are exposed to different aspects of the world, or because they have been taught different things.
- "Higher order" processes of reasoning rest on the formal rules of logic: for example, the prohibition against contradiction—a proposition can't be both true and false.
- Reasoning is separate from what is reasoned about. The same process can be used to think about utterly different things and a given thing can be reasoned about using any number of different procedures.

A dozen years before meeting my student I had coauthored with Lee Ross a book with a title that made my sympathies clear—*Human Inference.* Not Western inference (and certainly not American college student inference!), but *human* inference. The book characterized what I took to be the inferential rules that people everywhere

use to understand the world, including some rules that I believed were flawed and capable of producing erroneous judgments.

On the other hand, shortly before I met my new Chinese student, I had just completed a series of studies examining whether people's reasoning could be improved by teaching them new rules for thinking. Given my assumptions about universality and hard wiring, I had initially assumed the work would show that it is difficult, if not impossible, to change the patterns of reasoning I had been studying—even with immersion in long courses of study in fields such as statistics and economics. But to my surprise, I found substantial training effects. For example, people who have taken a few statistics courses avoid lots of errors in daily life: They're more likely to see that the "sophomore slump" in baseball could be due to statistical regression to the mean rather than to some mystical curse, and more likely to realize that an interview should be regarded as a small sample of a person's behavior and, therefore, that a wise hiring decision should be based on the larger sample of information in the application folder. Economists, it turns out, think differently about all sorts of things than the rest of us do—from deciding whether to remain at a boring movie to reasoning about foreign policy Moreover, I found it was possible to train people in brief sessions and change not only their thinking habits, but their actual behavior when we tested them surreptitiously outside the laboratory.

So I was willing to give the student—whose name is Kaiping Peng and who now teaches at the University of California at Berkeley—an attentive hearing. If it's possi-

ble to produce marked changes in the way adults think, it certainly seemed possible that indoctrination into distinctive habits of thought from birth could result in very large *cultural* differences in habits of thought.

I began reading comparative literature on the nature of thought by philosophers, historians, and anthropologists—both Eastern and Western—and found that Peng had been a faithful reporter. Whereas psychologists have assumed universality, many scholars in other fields believe that Westerners (primarily Europeans, Americans, and citizens of the British Commonwealth) and East Asians (principally the people of China, Korea, and Japan) have maintained very different systems of thought for thousands of years. Moreover, these scholars are in substantial agreement about the nature of these differences. For example, most who have addressed the question hold that European thought rests on the assumption that the behavior of objects—physical, animal, and human—can be understood in terms of straightforward rules. Westerners have a strong interest in categorization, which helps them to know what rules to apply to the objects in question, and formal logic plays a role in problem solving. East Asians, in contrast, attend to objects in their broad context. The world seems more complex to Asians than to Westerners, and understanding events always requires consideration of a host of factors that operate in relation to one another in no simple, deterministic way. Formal logic plays little role in problem solving. In fact, the person who is too concerned with logic may be considered immature.

As a psychologist, I found these assertions to be revolutionary in their implications. If the scholars in the humani-

ties and other social sciences were right, then the cognitive scientists were wrong: Human cognition is not everywhere the same. Without putting it in so many words, the humanities and social science scholars were making extremely important claims about the nature of thought. First, that members of different cultures differ in their "metaphysics," or fundamental beliefs about the nature of the world. Second, that the characteristic thought processes of different groups differ greatly. Third, that the thought processes are of a piece with beliefs about the nature of the world: People use the cognitive tools that seem to make sense—given the sense they make of the world.

Just as remarkably, the social structures and sense of self that are characteristic of Easterners and Westerners seem to fit hand in glove with their respective belief systems and cognitive processes. The collective or interdependent nature of Asian society is consistent with Asians' broad, contextual view of the world and their belief that events are highly complex and determined by many factors. The individualistic or independent nature of Western society seems consistent with the Western focus on particular objects in isolation from their context and with Westerners' belief that they can know the rules governing objects and therefore can control the objects' behavior.

If people really do differ profoundly in their systems of thought—their worldviews and cognitive processes—then differences in people's attitudes and beliefs, and even their values and preferences, might not be a matter merely of different inputs and teachings, but rather an inevitable consequence of using different tools to understand the world. And if that's true, then efforts to improve interna-

tional understanding may be less likely to pay off than one might hope.

My student's chance comment, together with my interest in cultural psychology and the resulting reading program he had encouraged, launched me on a new course of research. I began a series of comparative studies, working with students at the University of Michigan and eventually with colleagues at Beijing University, Kyoto University, Seoul National University, and the Chinese Institute of Psychology. The research shows that there are indeed dramatic differences in the nature of Asian and European thought processes. The evidence lends support to the claims of nonpsychologist scholars and extends those claims to many surprising new mental phenomena. In addition, surveys and observational research document differences in social practices that dovetail with the differences in habits of thought. The new research has provided us, as prior evidence could not, with enough information so that we can build a theory about the nature of these differences, including how they might have come about, what their implications are for perceiving and reasoning in everyday life, and how they affect relations between people from different cultures.

The research allows us to answer many questions about social relations and thought that have long puzzled educators, historians, psychologists, and philosophers of science. Neither common stereotypical views about East-West differences nor the more sophisticated views of scholars can answer these questions or deal with the new findings. The puzzles and new observations range across many different domains. For example:

Science and Mathematics Why would the ancient Chinese have excelled at algebra and arithmetic but not geometry, which was the forte of the Greeks? Why do modern Asians excel at math and science but produce less in the way of revolutionary science than Westerners?

Attention and Perception Why are East Asians better able to see relationships among events than Westerners are? Why do East Asians find it relatively difficult to disentangle an object from its surroundings?

Causal Inference Why are Westerners so likely to overlook the influence of context on the behavior of objects and even of people? Why are Easterners more susceptible to the "hindsight bias," which allows them to believe that they "knew it all along"?

Organization of Knowledge Why do Western infants learn nouns at a much more rapid rate than verbs, whereas Eastern infants learn verbs at a more rapid rate than nouns? Why do East Asians group objects and events based on how they relate to one another, whereas Westerners are more likely to rely on categories?

Reasoning Why are Westerners more likely to apply formal logic when reasoning about everyday events, and why does their insistence on logic sometimes cause them to make errors? Why are Easterners so willing to entertain apparently contradictory propositions and how can this sometimes be helpful in getting at the truth?

Where to look for the causes of such vastly different systems of thought? Do they lie in biology? Language? Economics? Social systems? What keeps them going today? Social practices? Education? Inertia? And where are we headed with the differences? Will they still be here fifty or five hundred years from now?

My research has led me to the conviction that two utterly different approaches to the world have maintained themselves for thousands of years. These approaches include profoundly different social relations, views about the nature of the world, and characteristic thought processes. Each of these orientations—the Western and the Eastern—is a self-reinforcing, homeostatic system. The social practices promote the worldviews; the worldviews dictate the appropriate thought processes; and the thought processes both justify the worldviews and support the social practices. Understanding these homeostatic systems has implications for grasping the fundamental nature of the mind, for beliefs about how we ought ideally to reason, and for appropriate educational strategies for different peoples.

Perhaps most important of all, the book has implications for how East and West can get along better through mutual understanding of mental differences. Many people in Eastern countries believe with some justice that the past five hundred years of Western military, political, and economic dominance have made the West intellectually and morally arrogant. This book will have achieved its purpose for Western readers if it causes them to consider the possibility that another valid approach to thinking about the world exists and that it can serve as a mirror

with which to examine and critique their own beliefs and habits of mind. The book will have served its purpose for Asian readers if it encourages them to consider the complementary possibility—though the need is perhaps less urgent for them because most Eastern intellectuals are already familiar to a considerable degree with Western ways of thinking.

To establish the contention that very different systems of perception and thought exist—and have existed for thousands of years—I draw on historical and philosophical evidence, as well as modern social science research, including ethnographies, surveys, and laboratory research. In chapter 1, Aristotle and Confucius are presented as examples of two different systems of thought. Undoubtedly those philosophers also served to entrench habits of thought that were already characteristic of their societies, but chapters 2 and 3 are intended to show that the social-practice differences found in modern societies would tend to sustain or even to create those different patterns even if they had not been present in ancient times. The heart of the book is contained in chapters 4 to 7. They present evidence that fundamental beliefs about the nature of the world, as well as the ways of perceiving it and reasoning about it, differ dramatically among modern peoples. The evidence is based in good part on laboratory research that I have conducted with students and colleagues using a variety of tests to examine how people perceive, remember, and think. Chapter 8 spells out some of the implications for psychology, philosophy, and society of the deep differences in systems of thought we have discovered. The epilogue speculates about where we are headed—toward

convergence or toward continued or even intensified separation.

To set the stage a bit for the research that follows: When I speak of East Asia I mean China and the countries that were heavily influenced by its culture, most notably Japan and Korea. (I will sometimes abbreviate "East Asian" to "Easterner" and sometimes to "Asian.") When I speak of Westerners I mean people of European culture. When I speak of European Americans I mean blacks and whites and Hispanics—anyone but people of Asian descent. This somewhat odd usage can be justified by the fact that everyone born and raised in America is exposed to similar, though of course not by any means identical, cultural influences. This is true of Asian Americans too, obviously, but in some of the research discussed they are examined as a separate group because we would expect them to be more similar to Asians than we would expect other Americans to be—and in fact this is what we find.

Finally, I wish to apologize in advance to those people who will be upset to see billions of people labeled with the single term "East Asian" and treated as if they are identical. I do not mean to suggest that they are even close to being identical. The cultures and subcultures of the East differ as dramatically from one another as do those of the West. But the broad-brush term "East Asian" can be justified. In a host of social and political ways the cultures in that region are, in some general respects, similar to one another and different from Western countries. This will not satisfy some people who are highly knowledgeable about the East, but I ask them to bear with me. Some generalizations are justified despite the myriad differences. An

analogy can be drawn to the study of language groups. Indo-European languages differ from one another in countless ways, and East Asian languages differ at least as much. Nevertheless, generalizations about the differences between Indo-European languages and East Asian languages taken as a group are possible and meaningful. And, as will be seen, some of those high-level generalizations are remarkably similar to some of the differences in perceptual and thought processes examined in this book.

CHAPTER 1

THE SYLLOGISM AND THE TAO

More than a billion people in the world today claim intellectual inheritance from ancient Greece. More than two billion are the heirs of ancient Chinese traditions of thought. The philosophies and achievements of the Greeks and Chinese of 2,500 years ago were remarkably different, as were the social structures and conceptions of themselves. And, as I hope to show in this chapter, the intellectual aspects of each society make sense in light of their social characteristics.

THE ANCIENT GREEKS AND AGENCY

There is an ancient theater at Epidaurus in Greece that holds fourteen thousand people. Built into a hillside, the

theater has a spectacular view of mountains and pine trees. Its acoustics are such that it is possible to hear a piece of paper being crumpled on the stage from any location in the theater. Greeks of the classical period, from the sixth to the third century **B.C.,** traveled for long periods under difficult conditions to attend plays and poetry readings at Epidaurus from dawn till dusk for several days in a row.

To us today, people's love of the theater and their willingness to endure some hardship to indulge it may not seem terribly odd. But among the great civilizations of the day, including Persia, India, and the Middle East, as well as China, it is possible to imagine only the Greeks feeling free enough, being confident enough in their ability to control their own lives, to go on a long journey for the sole purpose of aesthetic enjoyment. The Greeks' contemporaries lived in more or less autocratic societies in which the king's will was law and to defy it was to court death. It would not have been in a ruler's interest to allow his subjects to wander about the countryside even if his subjects' ties to the land and the routines of agriculture had allowed them to imagine going on a long journey for purposes of recreation.

Equally astonishing, even to us today, is that the entire Greek nation laid down its tools—including its arms if city-states were at war with one another—to participate in the Olympics as athletes or audience.

The Greeks, more than any other ancient peoples, and in fact more than most people on the planet today, had a remarkable sense of personal *agency*—the sense that they were in charge of their own lives and free to act as they chose. One definition of happiness for the Greeks was that

it consisted of being able to exercise their powers in pursuit of excellence in a life free from constraints.

A strong sense of individual identity accompanied the Greek sense of personal agency. Whether it is the Greeks or the Hebrews who invented individualism is a matter of some controversy, but there is no doubt that the Greeks viewed themselves as unique individuals, with distinctive attributes and goals. This would have been true at least by the time of Homer in the eighth or ninth century **B.C.** Both gods and humans in the *Odyssey* and the *Iliad* have personalities that are fully formed and individuated. Moreover, the differences among individuals were of substantial interest to Greek philosophers.

The Greek sense of agency fueled a tradition of debate. Homer makes it clear that a man is defined almost as much by his ability to debate as by his prowess as a warrior. A commoner could challenge even a king and not only live to tell the tale, but occasionally sway an audience to his side. Debates occurred in the marketplace, the political assembly, and even in military settings. Uniquely among ancient civilizations, great matters of state, as well as the most ordinary questions, were often decided by public, rhetorical combat rather than by authoritarian fiat. Tyrannies were not common in Greece and, when they arose, were frequently replaced by oligarchies or, beginning in the fifth century **B.C.,** by democracies. The constitutions of some cities had mechanisms to prevent officials from becoming tyrants. For example, the city of Drerus on Crete prohibited a man from holding the office of *kosmos* (magistrate) until ten years had gone by since the last time he held the office.

As striking as the Greeks' freedom and individuality is their sense of curiosity about the world. Aristotle thought that curiosity was the uniquely defining property of human beings. St. Luke said of the Athenians of a later era: "They spend their time in nothing else but to tell or to hear some new thing." The Greeks, far more than their contemporaries, speculated about the nature of the world they found themselves in and created models of it. They constructed these models by categorizing objects and events and generating rules about them that were sufficiently precise for systematic description and explanation. This characterized their advances in—some have said invention of—the fields of physics, astronomy, axiomatic geometry, formal logic, rational philosophy, natural history, and ethnography. (The word "ethnocentric" is of Greek origin. The term resulted from the Greeks' recognition that their belief that their way of life was superior to that of the Persians might be based on mere prejudice. They decided it was not.)

Whereas many great contemporary civilizations, as well as the earlier Mesopotamian and Egyptian and the later Mayan civilizations, made systematic observations in all scientific domains, only the Greeks attempted to explain their observations in terms of underlying principles. Exploring these principles was a source of pleasure for the Greeks. Our word "school" comes from the Greek *schole,* meaning "leisure." Leisure meant for the Greeks, among other things, the freedom to pursue knowledge. The merchants of Athens were happy to send their sons to school so that they could indulge their curiosity.

THE ANCIENT CHINESE AND HARMONY

While a special occasion for the ancient Greek might mean attendance at plays and poetry readings, a special occasion for the Chinese of the same period would be an opportunity to visit with friends and family. There was a practice called *chuan men,* literally "make doors a chain." Visits, which were intended to show respect for the hosts, were especially common during the major holidays. Those who were visited early were perceived as more important than those who were visited later.

The Chinese counterpart to Greek agency was *harmony.* Every Chinese was first and foremost a member of a collective, or rather of several collectives—the clan, the village, and especially the family. The individual was not, as for the Greeks, an encapsulated unit who maintained a unique identity across social settings. Instead, as philosopher Henry Rosemont has written:"... For the early Confucians, there can be no me in isolation, to be considered abstractly: I am the totality of roles I live in relation to specific others . . . Taken collectively, they weave, for each of us, a unique pattern of personal identity, such that if some of my roles change, the others will of necessity change also, literally making me a different person."

The Chinese were concerned less with issues of control of others or the environment than with self-control, so as to minimize friction with others in the family and village and to make it easier to obey the requirements of the state, administered by magistrates. The ideal of happiness was not, as for the Greeks, a life allowing the free exercise of distinctive talents, but the satisfactions of a plain coun-

try life shared within a harmonious social network. Whereas Greek vases and wine goblets show pictures of battles, athletic contests, and bacchanalian parties, ancient Chinese scrolls and porcelains depict scenes of family activities and rural pleasures.

The Chinese would not have felt themselves to be the helpless pawns of superiors and family members. On the contrary, there would have been a sense of *collective agency.* The chief moral system of China—Confucianism—was essentially an elaboration of the obligations that obtained between emperor and subject, parent and child, husband and wife, older brother and younger brother, and between friend and friend. Chinese society made the individual feel very much a part of a large, complex, and generally benign social organism where clear mutual obligations served as a guide to ethical conduct. Carrying out prescribed roles—in an organized, hierarchical system—was the essence of Chinese daily life. There was no counterpart to the Greek sense of personal liberty. Individual rights in China were one's "share" of the rights of the community as a whole, not a license to do as one pleased.

Within the social group, any form of confrontation, such as debate, was discouraged. Though there was a time, called the period of the "hundred schools" of 600 to 200 **B.C.,** during which polite debate occurred, at least among philosophers, anything resembling public disagreement was discouraged. As the British philosopher of science Geoffrey Lloyd has written, "In philosophy, in medicine, and elsewhere there is criticism of other points of view . . . [but] the Chinese generally conceded far more

readily than did the Greeks, that other opinions had something to be said for them . . ."

Their monophonic music reflected the Chinese concern with unity. Singers would all sing the same melody and musical instruments played the same notes at the same time. Not surprisingly, it was the Greeks who invented polyphonic music, where different instruments, and different voices, take different parts.

Chinese social harmony should not be confused with conformity. On the contrary, Confucius praised the desire of the gentleman to harmonize and distinguished it from the petty person's need for conformity. The *Zuozhuan,* a classic Confucian text, makes the distinction in a metaphor about cooking. A good cook blends the flavors and creates something harmonious and delicious. No flavor is completely submerged, and the savory taste is due to the blended but distinctive contributions of each flavor.

The Chinese approach to understanding the natural world was as different from that of the Greeks as their understanding of themselves. Early in their study of the heavens, the Chinese believed that cosmic events such as comets and eclipses could predict important occurrences on earth, such as the birth of conquerors. But when they discovered the regularities in these events, so far from building models of them, they lost interest in them.

The lack of wonder among the Chinese is especially remarkable in light of the fact that Chinese civilization far outdistanced Greek civilization technologically. The Chinese have been credited with the original or independent invention of irrigation systems, ink, porcelain, the mag-

netic compass, stirrups, the wheelbarrow, deep drilling, the Pascal triangle, pound locks on canals, fore-and-aft sailing, watertight compartments, the sternpost rudder, the paddle-wheel boat, quantitative cartography, immunization techniques, astronomical observations of novae, seismographs, and acoustics. Many of these technological achievements were in place at a time when Greece had virtually none.

But, as philosopher Hajime Nakamura notes, the Chinese advances reflected a genius for practicality, not a penchant for scientific theory and investigation. And as philosopher and sinologist Donald Munro has written, "In Confucianism there was no thought of *knowing* that did not entail some consequence for action."

ESSENCE OR EVANESCENCE?

PHILOSOPHY IN GREECE AND CHINA

The philosophies of Greece and China reflected their distinctive social practices. The Greeks were concerned with understanding the fundamental nature of the world, though in ways that were different in different eras. The philosophers of Ionia (including western Turkey, Sicily, and southern Italy) of the sixth century **B.C.** were thoroughly empirical in orientation, building their theories on a base of sense observation. But the fifth century saw a move toward abstraction and distrust of the senses. Plato thought that ideas—the *forms*—had a genuine reality and that the world could be understood through logical

approaches to their meaning, without reference to the world of the senses. If the senses seemed to contradict conclusions reached from first principles and logic, it was the senses that had to be ignored.

Though Aristotle did not grant reality to the forms, he thought of attributes as having a reality distinct from their concrete embodiments in objects. For him it was meaningful to speak not just of a solid object, but of attributes in the abstract—solidity, whiteness, etc.—and to have theories about these abstractions. The central, basic, sine qua non properties of an object constituted its "essence," which was unchanging by definition, since if the essence of an object changed it was no longer the object but something else. The properties of an object that could change without changing the object's essence were "accidental" properties. For example, the author is sadly lacking in musical talent, but if he suddenly were to have musical talent, you would still think he was the same person. Musical talent, then, is an accidental property, and change in it does not constitute change in the person's essence. Greek philosophy thus differed greatly from Chinese in that it was deeply concerned with the question of which properties made an object what it was, and which were alterable without changing the nature of the object.

The Greek language itself encouraged a focus on attributes and on turning attributes into abstractions. As in other Indo-European languages, every adjective can be granted noun status by adding the English equivalent of "ness" as a suffix: "white" becomes "whiteness"; "kind" becomes "kindness." A routine habit of Greek philosophers was to analyze the attributes of an object—person, place,

thing, or animal—and categorize the object on the basis of its abstracted attributes. They would then attempt to understand the object's nature, and the cause of its actions, on the basis of rules governing the categories. So the attributes of a comet would be noted and the object would then be categorized at various levels of abstraction—*this* comet, *a* comet, a heavenly body, a moving object. Rules at various levels of abstraction would be generated as hypotheses and the behavior of the comet explained in terms of rules that seemed to work at a given level of abstraction.

But still more basic to Greek philosophy is its background scheme, which regarded the object *in isolation* as the proper focus of attention and analysis. Most Greeks regarded matter as particulate and separate—formed into discrete objects—just as humans were seen as separate from one another and construed as distinct wholes. Once the object is taken as the starting point, then many things follow automatically: The attributes of the object are salient; the attributes become the basis of categorization of the object; the categories become the basis of rule construction; and events are then understood as the result of objects behaving in accordance with rules. By "objects" I mean both nonhuman and human objects, but in fact the nature of the physical world was of great concern to Greek philosophers. Human relations and ethical conduct were important to the Greeks but did not have the consuming interest that they did for the Chinese.

A peculiar but important aspect of Greek philosophy is the notion that the world is fundamentally static and unchanging. To be sure, the sixth-century philosopher

Heraclitus and other early philosophers were concerned with change. ("A man never steps in the same river twice because the man is different and the river is different.") But by the fifth century, change was out and stability was in. Parmenides "proved," in a few easy steps, that change was impossible: To say of a thing that it does not exist is a contradiction. Nonbeing is self-contradictory and so nonbeing can't exist. If nonbeing can't exist, then nothing can change because, if thing 1 were to change to thing 2, then thing 1 would not be! Parmenides created an option for Greek philosophers: They could trust either logic or their senses. From Plato on, they often went with logic.

Zeno, the pupil of Parmenides, established in a similar way that motion was impossible. He did this in two demonstrations. One is his famous demonstration with the arrow. In order for an arrow to reach a target, it first has to go halfway toward the target, then halfway between that and the target, and then halfway between *that* and the target, etc. But of course half of a half of a half . . . still leaves the arrow short of the target. Ergo, visual evidence to the contrary notwithstanding, movement can't occur. The other "proof" was even simpler. Either a thing is in its place or it is not. If it is in its place, then it cannot move. It is impossible for a thing not to be in its place; therefore nothing moves. As communications theorist Robert Logan has written, the Greeks "became slaves to the linear, either-or orientation of their logic."

Not all Greek philosophers were logic-choppers out to prove change impossible, but there is a static quality even to the reasoning of Aristotle. He believed, for example, that all celestial bodies were immutable, perfect spheres

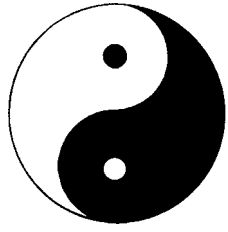
and though motion occurs and events happen, the essences of things do not change. Moreover, Aristotle's physics is highly linear. Changes in rate of motion, let alone cyclical motion, play little role in Aristotle's physics. (It is partly for this reason that Aristotle's physics was so remarkably misguided. Gordon Kane, a physicist friend of mine, has identified a large number of physical propositions in Aristotle's writings. He maintains that the great majority of them are wrong. This is especially puzzling because Aristotle's Ionian predecessors got many of them right.)

The Chinese orientation toward life was shaped by the blending of three different philosophies: Taoism, Confucianism, and, much later, Buddhism. Each philosophy emphasized harmony and largely discouraged abstract speculation.

There is an ancient Chinese story, still known to most East Asians today, about an old farmer whose only horse ran away. Knowing that the horse was the mainstay of his livelihood, his neighbors came to commiserate with him. "Who knows what's bad or good?" said the old man, refusing their sympathy. And indeed, a few days later his horse returned, bringing with it a wild horse. The old man's friends came to congratulate him. Rejecting their congratulations, the old man said, "Who knows what's bad or good?" And, as it happened, a few days later when the old man's son was attempting to ride the wild horse, he was thrown from it and his leg was broken. The friends came to express their sadness about the son's misfortune. "Who knows what's bad or good?" said the old man. A few

weeks passed, and the army came to the village to conscript all the able-bodied men to fight a war against the neighboring province, but the old man's son was not fit to serve and was spared.

The story, which goes on as long as the patience of the audience permits, expresses a fundamental of the Eastern stance toward life. The world is constantly changing and is full of contradictions. To understand and appreciate one state of affairs requires the existence of its opposite; what seems to be true now may be the opposite of what it seems to be (cf. Communist-era Premier Chou En-lai's response when asked whether he thought the consequences of the French Revolution had been beneficial: "It's too early to tell").



The sign of the Tao.

Yin (the feminine and dark and passive) alternates with yang (the masculine and light and active). Indeed yin and yang only exist because of each other, and when the world is in a yin state, this is a sure sign that it is about to be in a yang state. The sign of the Tao, which means "the

Way" to exist with nature and with one's fellow humans, consists of two forces in the form of a white and a black swirl. But the black swirl contains a white dot and the white swirl contains a black dot. And "the truest yang is the yang that is in the yin." The principle of yin-yang is the expression of the relationship that exists between opposing but interpenetrating forces that may complete one another, make each comprehensible, or create the conditions for altering one into the other.

From the I *Ching:* "... For misery, happiness is leaning against it; for happiness, misery is hiding in it. Who knows whether it is misery or happiness? There is no certainty. The righteous suddenly becomes the vicious, the good suddenly becomes the bad" (*I Ching,* xxx).

From the *Tao Te Ching:* "The heavy is the root of the light . . . The unmoved is the source of all movement" (Chapter 26).

Returning—moving in endless cycles—is the basic pattern of movement of the Tao.

> *To shrink something*
> *You need to expand it first*
> *To weaken something*
> *You need to strengthen it first*
> *To abolish something*
> *You need to flourish it first*
> *To take something*
> *You need to give it first* (Tao Te Ching, *Chapter 36)*

Aside from Taoism's teachings about opposition, contradiction, change, and cycles, it stood for a deep apprecia-

tion of nature, the rural life, and simplicity. It was the religion of wonder, magic, and fancy, and it gave meaning to the universe through its account of the links between nature and human affairs.

Taoism is the source of much of the philosophy behind the healing arts of China. Physiology was explained on a symbolic level by the yin-yang principle and by the Five Elements (earth, fire, water, metal, and wood), which also provided the explanations behind magic, incantations, and aphrodisiacs. The ubiquitous word was *ch'i,* meaning variously "breath," "air," or "spirit."

Confucius, who lived from 551 to 479 **B.C.,** was less a religious leader than an ethical philosopher. His concern was with the proper relations among people, which in his system were hierarchical and strictly spelled out. Each member of each of the important relationship pairs (husband-wife, etc.) had clear obligations toward the other.

Confucianism has been called the religion of common sense. Its adherents are urged to uphold the Doctrine of the Golden Mean—to be excessive in nothing and to assume that between two propositions, and between two contending individuals, there is truth on both sides. But in reality, Confucianism, like Taoism, is less concerned with finding the truth than with finding the Tao—the Way—to live in the world.

Confucianism stresses economic well-being and education. The individual works not for self-benefits but for the entire family. Indeed, the concept of self-advancement, as opposed to family advancement, is foreign to cultures that are steeped in the Confucian orientation. A promising young man was expected to study for the government

examinations with the hope of becoming a magistrate. If he did, his whole family benefited economically from his position. Unlike most of the world until very modern times, there was substantial social and economic mobility in China. Everyone who lived long enough would see families rise far higher than their origins and others sink far lower. Perhaps partly for this reason, Confucians have always believed, far more than the intellectual descendants of Aristotle, in the malleability of human nature.

Confucianism blended smoothly with Taoism. In particular, the deep appreciation of the contradictions and changes in human life, and the need to see things whole, that are integral to the notion of a yin-yang universe are also part of Confucian philosophy. But the dominant themes of nature and the rural life are much more associated with Taoism than with Confucianism, and the importance of the family and educational and economic advancement are more integral to Confucianism. These thematic differences are reflected in paintings on porcelains and scrolls. Characteristic Tao-inspired themes would include a picture of a fisherman, a woodcutter, or a lone individual sitting under trees. Confucian-inspired themes would center on the family, with pictures of many people of different ages engaging in shared activities. Different individuals in ancient China, and for that matter in contemporary China, would likely emphasize one of the orientations more than the other. This might depend in part on station in life. There is an adage holding that every Chinese is a Confucianist when he is successful and a Taoist when he is a failure.

Buddhism came to China from India hundreds of years

after the classical period we are discussing. The Chinese readily absorbed congenial aspects of Buddhism, including what had been missing in Chinese philosophy, notably an epistemology, or theory of knowledge. All three orientations shared concerns about harmony, holism, and the mutual influence of everything on almost everything else. These orientations help explain why Chinese philosophy not only lacked a conception of individual rights but, it sometimes seems (at least after Buddhism began to exert an influence), an acknowledgment of individual minds. A twelfth-century neo-Confucian wrote, "The universe is my mind and my mind is the universe. Sages appeared tens of thousands of generations ago. They shared this mind; they shared this principle. Sages will appear tens of thousands of generations to come. They will share this mind; they will share this principle."

The holism common to the three orientations suggested that every event is related to every other event. A key idea is the notion of *resonance.* If you pluck a string on an instrument, you produce a resonance in another string. Man, heaven, and earth create resonances in each other. If the emperor does something wrong, it throws the universe out of kilter.

The concern with abstraction characteristic of ancient Greek philosophy has no counterpart in Chinese philosophy. Chinese philosophers quite explicitly favored the most concrete sense impressions in understanding the world. In fact, the Chinese language itself is remarkably concrete. There is no word for "size," for example. If you want to fit someone for shoes, you ask them for the "big-

small" of their feet. There is no suffix equivalent to "ness" in Chinese. So there is no "whiteness"—only the white of the swan and the white of the snow. The Chinese are disinclined to use precisely defined terms or categories in any arena, but instead use expressive, metaphoric language.

> In Chinese literary criticism there are different methods of writing called "the method of watching a fire across the river" (detachment of style), "the method of dragonflies skimming across the water surface" (lightness of touch), "the method of painting a dragon and dotting its eyes" (bringing out the salient points).

For the Chinese, the background scheme for the nature of the world was that it was a mass of substances rather than a collection of discrete objects. Looking at a piece of wood, the Chinese philosopher saw a seamless whole composed of a single substance, or perhaps of interpenetrating substances of several kinds. The Greek philosopher would have seen an object composed of particles. Whether the world was composed of atoms or of continuous substances was debated in Greece, but the issue never arose in China. It was continuous substances, period. Philosopher of science Joseph Needham has observed: "Their universe was a continuous medium or matrix within which interactions of things took place, not by the clash of atoms, but by radiating influences."

So the philosophies of China and Greece were as different as their respective social life and self-conceptions.

And the philosophical differences are reflective of the social ones, in several respects.

Greeks were independent and engaged in verbal contention and debate in an effort to discover what people took to be the truth. They thought of themselves as individuals with distinctive properties, as units separate from others within the society, and in control of their own destinies. Similarly, Greek philosophy started from the individual object—the person, the atom, the house—as the unit of analysis and it dealt with properties of the object. The world was in principle simple and knowable: All one had to do was to understand what an object's distinctive attributes were so as to identify its relevant categories and then apply the pertinent rule to the categories.

Chinese social life was interdependent and it was not liberty but harmony that was the watchword—the harmony of humans and nature for the Taoists and the harmony of humans with other humans for the Confucians. Similarly, the Way, and not the discovery of truth, was the goal of philosophy. Thought that gave no guidance to action was fruitless. The world was complicated, events were interrelated, and objects (and people) were connected "not as pieces of pie, but as ropes in a net." The Chinese philosopher would see a family with interrelated members where the Greek saw a collection of persons with attributes that were independent of any connections with others. Complexity and interrelation meant for the Chinese that an attempt to understand the object without appreciation of its context was doomed. Under the best of circumstances, control of outcomes was difficult.

Science and mathematics, as we'll see next, were fully consistent with both social behavior and philosophical outlook.

CONTRADICTION OR CONNECTION?

SCIENCE AND MATHEMATICS IN GREECE AND CHINA

The greatest of all Greek scientific discoveries was the discovery—or rather, as philosopher Geoffrey Lloyd put it, the invention—of nature itself. The Greeks defined nature as the universe minus human beings and their culture. Although this seems to us to be the most obvious sort of distinction, no other civilization came upon it. A plausible account of how the Greeks happened to invent nature is that they came to make a distinction between the external, objective world and the internal, subjective one. And this distinction came about because the Greeks, unlike everyone else, had a clear understanding of subjectivity arising from the tradition of debate. It makes no sense for you to try to persuade me of something unless you believe that there is a reality out there that you apprehend better than I do. You may be able to coerce me into doing what you want and even into saying that I believe what you do. But you will not persuade me until I believe that your subjective interpretation of some state of affairs is superior to mine.

So, in effect, objectivity arose from subjectivity—the recognition that two minds could have different representations of the world and that the world has an existence

independent of either representation. This recognition was probably aided for the Greeks because, due to their position as a trading center, they regularly encountered people with utterly different notions about the world. In contrast, Chinese culture was unified early on and it would have been relatively rare to encounter people having radically different metaphysical and religious views.

The Greeks' discovery of nature made possible the invention of science. China's failure to develop science can be attributed in part to lack of curiosity, but the absence of a concept of nature would have blocked the development of science in any case. As philosopher Yu-lan Fung observes, "Why" questions are hard to ask if there is no clear recognition that there are mental concepts that somehow correspond to aspects of nature, but which are not identical to them.

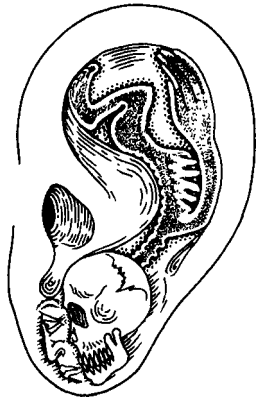
The Greeks' focus on the salient object and its attributes led to their failure to understand the fundamental nature of causality. Aristotle explained that a stone falling through the air is due to the stone having the property of "gravity." But of course a piece of wood tossed into water floats instead of sinking. This phenomenon Aristotle explained as being due to the wood having the property of "levity"! In both cases the focus is exclusively on the object, with no attention paid to the possibility that some force outside the object might be relevant. But the Chinese saw the world as consisting of continuously interacting substances, so their attempts to understand it caused them to be oriented toward the complexities of the entire "field," that is, the context or environment as a whole. The notion that events always occur in a field of forces would

have been completely intuitive to the Chinese. The Chinese therefore had a kind of recognition of the principle of "action at a distance" two thousand years before Galileo articulated it. They had knowledge of magnetism and acoustic resonance, for example, and believed it was the movement of the moon that caused the tides, a fact that eluded even Galileo.

In the desert of western China are buried bodies of tall, red-haired people, astonishingly well preserved, of Caucasian appearance. They found their way to that part of the world some thousands of years ago. Aside from the way they look, they are different from the peoples who lived in the area in another interesting respect. Many of them show clear signs of having been operated on surgically. In all of Chinese history, surgery has been a great rarity.

The reluctance of the Chinese to perform surgery is completely understandable in light of their views about harmony and relationships. Health was dependent on the balance of forces in the body and the relationships between its parts. And there were, and are for many East Asians today, relationships between every part of the body and almost every other part. To get a feel for this vast web of interconnections, look at a modern acupuncturist's view of the relations between the surface of the ear and the epidermis and skeleton. An equally complex network describes the relations between the ear and each of the internal organs. The notion that the removal of a malfunctioning or diseased part of the body could be beneficial, without attending to its relations to other parts of the

body, would have been too simple-minded for the Chinese to contemplate. In contrast, surgery has been practiced in many different Western societies for thousands of years.



Representation of epidermis and skeleton on the surface of the ear for purposes of acupuncture.

The Chinese tendency to focus on relationships in a complex, interconnected field is exemplified by the practice of feng shui, still continued in the East. When someone wishes to build a building, it is essential to call in a feng shui master. This person takes account of a seemingly limitless number of factors such as altitude, prevailing wind, orientation toward the compass, proximity to various bodies of water, and gives advice on where to locate the structure. This practice has had no real counterpart in the West, but the most modern skyscraper in Hong Kong will have had its feng shui workup before being built.

The Chinese conviction about the fundamental relat-

edness of all things made it obvious to them that objects are altered by context. Thus any attempt to categorize objects with precision would not have seemed to be of much help in comprehending events. The world was simply too complex and interactive for categories and rules to be helpful for understanding objects or controlling them.

The Chinese were right about the importance of the field to an understanding of the behavior of the object and they were right about complexity, but their lack of interest in categories prevented them from discovering laws that really were capable of explaining classes of events. And for all that the Greeks tended to oversimplify and to be satisfied by pseudo-explanations involving nonexistent properties of objects, they correctly understood that it was necessary to categorize objects in order to be able to apply rules to them. Since rules are useful to the extent that they apply to the widest possible array of objects, there was a constant "upward press" to generalize to high levels of abstraction so that rules would be maximally applicable. This drive toward abstraction was sometimes—though not always—useful.

The Greek faith in categories had scientific payoffs, immediately as well as later, for their intellectual heirs. Only the Greeks made classifications of the natural world sufficiently rigorous to permit a move from the sorts of folk-biological schemes that other peoples constructed to a single classification system that ultimately could result in theories with real explanatory power.

A group of mathematicians associated with Pythagoras is said to have thrown a man overboard because it was dis-

covered that he had revealed the scandal of irrational numbers, such as the square root of 2, which just goes on and on without a predictable pattern: 1.4142135. . . . Whether this story is apocryphal or not, it is certainly the case that most Greek mathematicians did not regard irrational numbers as real numbers at all. The Greeks lived in a world of discrete particles and the continuous and unending nature of irrational numbers was so implausible that mathematicians could not take them seriously.

On the other hand, the Greeks were probably pleased by how it was they came to know that the square root of 2 is irrational, namely via a proof from contradiction. One posits two whole numbers, *n* and m, such that the square root of 2 = *n/m* and shows that this leads to a contradiction.

The Greeks were focused on, you might even say obsessed by, the concept of contradiction. If one proposition was seen to be in a contradictory relation with another, then one of the propositions had to be rejected. The principle of noncontradiction lies at the base of propositional logic. The general explanation given for why the Greeks, rather than some other people, invented logic, is that a society in which debate plays a prominent role will begin to recognize which arguments are flawed by definition because their structure results in a contradiction. The basic rules of logic, including syllogisms, were worked out by Aristotle. He is said to have invented logic because he was annoyed at hearing bad arguments in the political assembly and in the agora! Notice that logical analysis is a kind of continuation of the Greek tendency to decontextualize. Logic is applied by stripping away the meaning of statements and leaving only their formal struc-

ture intact. This makes it easier to see whether an argument is valid or not. Of course, as modern East Asians are fond of pointing out, that sort of decontextualization is not without its dangers. Like the ancient Chinese, they strive to be reasonable, not rational. The injunction to avoid extremes can be as useful a principle as the requirement to avoid contradictions.

Chinese philosopher Mo-tzu made serious strides in the direction of logical thought in the fifth century **B.C.,** but he never formalized his system and logic died an early death in China. Except for that brief interlude, the Chinese lacked not only logic, but even a principle of contradiction. India did have a strong logical tradition, but the Chinese translations of Indian texts were full of errors and misunderstandings. Although the Chinese made substantial advances in algebra and arithmetic, they made little progress in geometry because proofs rely on formal logic, especially the notion of contradiction. (Algebra did not become deductive until Descartes. Our educational system retains the memory trace of their separation by teaching algebra and geometry as separate subjects.)

The Greeks were deeply concerned with foundational arguments in mathematics. Other peoples had recipes; only the Greeks had derivations. On the other hand, Greek logic and foundational concern may have presented as many obstacles as opportunities. The Greeks never developed the concept of zero, which is required both for algebra and for an Arabic-style place number system. Zero was considered by the Greeks, but rejected on the grounds that it represented a contradiction. Zero equals nonbeing

and nonbeing cannot be! An understanding of zero, as well as of infinity and infinitesimals, ultimately had to be imported from the East.

In place of logic, the Chinese developed a type of ***dialecticism.*** This is not quite the same as the Hegelian dialectic in which thesis is followed by antithesis, which is resolved by synthesis, and which is "aggressive" in the sense that the ultimate goal of reasoning is to resolve contradiction. The Chinese dialectic instead uses contradiction to understand relations among objects or events, to transcend or integrate apparent oppositions, or even to embrace clashing but instructive viewpoints. In the Chinese intellectual tradition there is no necessary incompatibility between the belief that A is the case and the belief that not-A is the case. On the contrary, in the spirit of the Tao or yin-yang principle, A can actually imply that not-A is also the case, or at any rate soon will be the case. Dialectical thought is in some ways the opposite of logical thought. It seeks not to decontextualize but to see things in their appropriate contexts: Events do not occur in isolation from other events, but are always embedded in a meaningful whole in which the elements are constantly changing and rearranging themselves. To think about an object or event in isolation and apply abstract rules to it is to invite extreme and mistaken conclusions. It is the Middle Way that is the goal of reasoning.

Why should the ancient Greeks and Chinese have differed so much in their habits of thought or, at any rate, why should this be true of the intelligentsia, who are the only ancient peoples whose mental life is known

to us at all? And why should there be such "resonance" between the social forms and self-understandings on the one hand and the philosophical assumptions and scientific approaches on the other? Answers to these questions have implications for understanding the differences between Eastern and Western thought that exist today.

CHAPTER 2

THE SOCIAL ORIGINS OF MIND

I once asked a Chinese philosopher why he thought the East and the West had developed such different habits of thought. "Because you had Aristotle and we had Confucius," he replied. He was joking—mostly. Although Aristotle and Confucius had enormous impact on the intellectual, social, and political histories of the peoples who followed, they were less the progenitors of their respective cultures than the products. And they couldn't have had the impact they did if they hadn't reflected the societies they lived in. In fact, a kind of "proof" of this is that Greece did have its philosophers, like Heraclitus, who were more nearly Eastern in spirit than Western, and China had its philosophers, like Mo-tzu, who shared many of the concerns of Western philosophers. But despite receiving a good deal of attention from contemporaries,

the maverick philosophies died on the vine, and it is the Aristotelian tradition that continues in the West and the Confucian that continues in the East.

Scholars who have addressed the question of why ancient China and Greece differed so much have come up with several plausible reasons.

Greece differed from all contemporary civilizations in the development of personal freedom, individuality, and objective thought. These qualities seem partly explainable by the political system that was unique to Greece, namely the city-state and its politics, especially the assembly, in which people had to persuade one another by dint of rational argument. The city-state was also important because it was possible for intellectual rebels to leave one location and go to another, thereby maintaining a condition of relatively free inquiry. Indeed, members of the intelligentsia who were personae non gratae in a given city-state would sometimes be sought out by other city-states for the prestige they would bring. Socrates' followers begged him to leave Athens and go somewhere else rather than allow the death sentence against him to be carried out. He would have been welcomed elsewhere and there would have been no stomach for pursuit of him by his fellow citizens.

Another factor sometimes invoked to explain Greece's uniqueness is that its maritime location made trading a lucrative occupation, which meant that there was a substantial mercantile class who could afford to have their sons educated. That the merchants would have wished to have their sons educated requires explanation in itself, of course, especially because, unlike in China, education was

not a route to power and wealth. The drive toward education was apparently the result of curiosity and a belief in the value of knowledge for its own sake. The curiosity characteristic of the Greeks may in turn be explained in part by the location of the Greeks at a crossroads of the world. They were constantly encountering novel and perplexing people, customs, and beliefs. For any Greek living near the coasts (and that would have been the great majority), encountering people representing other ethnicities, religions, and polities would have been common. Athens itself would have been rather like the bar in *Star Wars.*

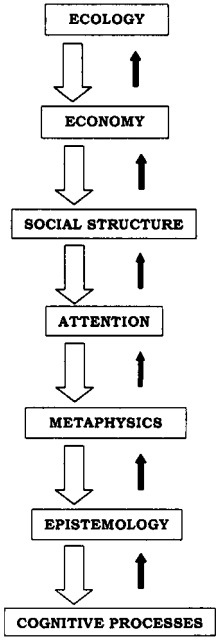
An obvious consequence of the different practices and beliefs swirling around the Greeks would have been the necessity of dealing with contradiction. They would have been constantly confronting situations where one person was asserting that A was the case and another was contending that not-A was the case. Contradiction coming from the opinions of outsiders, as well as freely expressed contradiction among insiders' views in the assembly and the marketplace, might have forced the development of cognitive procedures, including formal logic, to deal with the dissonance.

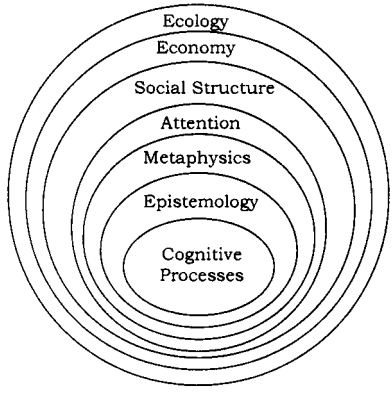
In contrast, even today 95 percent of the Chinese population belongs to the same Han ethnic group. Nearly all of the country's more than fifty minority ethnic groups are in the western part of the country. A Chinese person living in the rest of the country would rarely have encountered anyone having significantly different beliefs or practices. The ethnic homogeneity of China seems at least partly explicable in terms of the centralized political control. In

addition, the face-to-face village life of China would have pressed in the direction of harmony and agreed-upon norms for behavior. Seeing little difference of opinion, and finding disagreement sanctioned from above or from peers where it did exist, the Chinese would have had little use for procedures to decide which of two propositions was correct. Instead, finding means to resolve disagreements would have been the goal. Hence, the push to find the Middle Way.

HOMEOSTATIC SOCIO-COGNITIVE SYSTEMS

At base, all of these explanations rest on one fact: The ecologies of ancient Greece and China were drastically different—in ways that led to different economic, political, and social arrangements. The left side of the illustration that follows shows an account of the differences between Greek and Chinese thought that makes sense to me. It is essentially a distillation of the views of many people who have tackled the question of the origin of mentalities. The right side of the illustration is the same account, but drawn by a Chinese American student, who told me she felt that a circular presentation made more sense than my linear one]





Schematic model of influences on cognitive processes.

The account is at base materialistic: That is, it attempts to explain cultural facts in terms of physical ones. This approach is currently out of fashion in some circles partly because it is assumed, mistakenly, that materialistic accounts are deterministic. But materialism need not imply inevitability—just that, other things equal, physical factors can influence to some degree economic factors and consequently cultural ones. The account is not at all materialistic in one sense: The critical factors influencing habits of mind are social and important social facts can be generated and sustained by forces that are not economic in nature.

Ecology —> Economy and Social Structure The ecology of China, consisting as it does primarily of relatively fertile plains, low mountains, and navigable rivers, favored agriculture and made centralized control of society relatively easy Agricultural peoples need to get along with one another—not necessarily to like one another (think of the stereotype of the crusty New England farmer)—but to live together in a reasonably harmonious fashion. This is particularly true for rice farming, characteristic of southern China and Japan, which requires people to cultivate the land in concert with one another. But it is also important wherever irrigation is required, as in the Yellow River Valley of north China, where the Shang dynasty (from the eighteenth to the eleventh century **B.C.)** and the Chou dynasty (from the eleventh century **B.C.** to 256 **B.C.)** were based. In addition to getting along with one's neighbors, irrigation systems require centralized control and ancient China, like all other ancient agricultural societies, was ruled by despots. Peasants had to get along with their neighbors and were ruled by village elders and a regional magistrate who was the representative of the king (and after the unification of China, of the emperor). The ordinary Chinese therefore lived in a complicated world of social constraints.

The ecology of Greece, on the other hand, consisting as it does mostly of mountains descending to the sea, favored hunting, herding, fishing, and trade (and—let's be frank—piracy). These are occupations that require relatively little cooperation with others. In fact, with the exception of trade, these economic activities do not strictly require living in the same stable community with other people. Settled agriculture came to Greece almost

two thousand years later than to China, and it quickly became commercial, as opposed to merely subsistence, in many areas. The soil and climate of Greece were congenial to wine and olive oil production and, by the sixth century **B.C.,** many farmers were more nearly businessmen than peasants. The Greeks were therefore able to act on their own to a greater extent than were the Chinese. Not feeling it necessary to maintain harmony with their fellows at any cost, the Greeks were in the habit of arguing with one another in the marketplace and debating one another in the political assembly.

Social Structure and Social Practice —> Attention and Folk Metaphysics The Chinese had to look outward toward their peers and upward toward authorities in the conduct of their economic, social, and political lives. Their relations with others provided both the chief constraint in their lives and the primary source of opportunities. The habit of looking toward the social world could have carried over to a tendency to look to the field in general; and the need to attend to social relations could have extended to an inclination to attend to relations of all kinds. As social psychologists Hazel Markus and Shinobu Kitayama put it, "If one perceives oneself as embedded within a larger context of which one is an interdependent part, it is likely that other objects or events will be perceived in a similar way." "Folk metaphysics"—beliefs about the nature of the social and physical world—would therefore both have been generated by one fact: the Chinese were attending closely to the social world. The sense that the self was linked in a network of relationships and social obligations might have made it natural to view the world in general as continuous

and composed of substances rather than discrete and consisting of distinct objects. Causality would be seen as being located in the field or in the relation between the object and the field. Attention to the field would encourage recognition of complexity and change, as well as of contradiction among its many and varied elements.

But the Greeks had the luxury of attending to objects, including other people and their own goals with respect to them, without being overly constrained by their relations with other people. A Greek could plan a harvest, arrange for a relocation of his herd of sheep, or investigate whether it would be profitable to sell some new commodity, consulting little or not at all with others. This might have made it natural for the Greeks to focus on the attributes of objects with a view toward categorizing them and finding the rules that would allow prediction and control of their behavior. Causality would be seen as due to properties of the object or as the result of one's own actions in relation to the object. Such a view of causality could have encouraged the Greek assumptions of stability and permanence as well as an assumption that change in the object was under their control.

So the folk metaphysics of the two societies could have arisen directly from the targets of attention: the environment or field in the case of the Chinese and the object in the case of the Greeks. The scientific metaphysics of each society would have been just a reflection of the folk views.

Folk Metaphysics —» Tacit Epistemology and Cognitive Processes Folk metaphysics can be expected to influence

tacit epistemology, or beliefs about how to get new knowledge. If the world is a place where relations among objects and events are crucial in determining outcomes, then it will seem important to be able to observe all the important elements in the field, to see relations among objects and to see the relation between the parts and the whole. Processes of attention, perception, and reasoning will develop that focus on detecting the important events and discerning the complex relationships among them. If, on the other hand, the world is a place where the behavior of objects is governed by rules and categories, then it should seem crucial to be able to isolate the object from its context, to infer what categories the object is a member of, and to infer how rules apply to those categories. Processes would then develop to serve those functions.

Finally, social practices can influence thinking habits directly. Dialectics and logic can both be seen as cognitive tools developed to deal with social conflict. We would not expect that people whose social existence is based on harmony would develop a tradition of confrontation or debate. On the contrary, when confronted with a conflict of views, they might be oriented toward resolving the contradiction, transcending it, or finding a "Middle Way"—in short, to approach matters dialectically. In contrast, people who are free to argue might be expected to develop rules for the conduct of debate, including the principle of noncontradiction and formal logic. It is an easy step from logic to science, as physicist and historian of science Alan Cromer has observed: "Science, in this view, is an extension of rhetoric. It was invented in Greece, and only in

Greece, because the Greek institution of the public assembly attached great prestige to debating skill. ... A geometric proof is ... the ultimate rhetorical form."

An important implication of this view of the causes of Greek and Chinese mental differences is the implied homeostasis. So long as economic forces operate to maintain different social structures, different social practices and child training will result in people focusing on different things in the environment. Focusing on different things will produce different understandings about the nature of the world. Different worldviews will in turn reinforce differential attention and social practices. The different worldviews will also prompt differences in perception and reasoning processes—which will tend to reinforce worldviews.

There is no reason to assume that the sequence ending in cognitive processes must begin with ecology. There can be many different economic reasons that might make some societies or groups more attentive to their fellow humans and many reasons that could make them more attentive to objects and their own goals with respect to them. For example, modern businesses and bureaucracies, and certainly entrepreneur-run businesses, do not necessarily require attention to a wide range of peers and a large number of supervisors. Instead, they require people to focus on a relatively narrow set of goals and to pursue them independently., Performance may actually be better if other people are largely ignored rather than attended to closely. The sequence need not even begin with economics. There can be many different reasons that could prompt attention to other people: for example, member-

ship in a tightly knit religious community having strict rules for conduct. Similarly, many factors could cause people to focus primarily on objects and their goals with respect to them.

LATTER-DAY SUPPORT FOR THE ORIGIN THEORY

This economic-social account of cognition happens to fit with some important historical changes in the West. As the West became primarily agricultural in the Middle Ages, it became less individualistic. The European peasant was probably not much different from the Chinese peasant in terms of interdependence or freedom in daily life or in a rationalist approach to reasoning. And in terms of intellectual and cultural achievement, Europe had become a backwater. While Arab emirs discussed Plato and Aristotle and Chinese magistrates displayed their proficiency in all the arts, European nobles sat gnawing joints of beef in damp castles.

Toward the end of the Middle Ages, though, developments in European agriculture (notably the invention of the horse collar, which made possible the horse-drawn plow) created enough excess wealth that new trading centers, much like the old Greek city-states, appeared. The Italian city-states, and later the northern city-states, were to a very substantial degree autonomous and for the most part not subject to the authority of despots. Many of them also had a somewhat democratic, or at least oligarchic, character. And of course rebirth of the city-state form with its wealthy merchant class was associated with a renais-

sance of individualism, personal liberty, rationalism, and science. By the fifteenth century, Europe had awakened from its millennium of torpor and began to rival China in almost every domain—philosophy, mathematics, art, and technology.

An event that took place in the early fifteenth century is revealing about the differences between Europe and China. This was the voyage of the Grand Eunuch, on which hundreds of ships (technologically vastly superior to the *Pinta,* the *Nina,* and the *Santa Maria)* sailed from China to South and Southeast Asia, the Middle East, and Western Africa loaded with wealth and wonders. The voyage achieved its primary goal, which was to convince the nations bordering on the Indian Ocean, the Persian Gulf, and the Red Sea that China was superior in virtually every way to their own societies. But the Chinese were quite uninterested in seeing anything that those societies might have produced or known about—including even a giraffe that their African hosts showed them. The Chinese merely contended that the animal was known to them as a *qi lin,* a creature whose appearance was expected at the time of important events, such as the birth of a great emperor.

This lack of curiosity was characteristic of China. The inhabitants of the Middle Kingdom (China's name for itself, meaning essentially "the center of the world") had little interest in the tales brought to them by foreigners. Moreover, there has never been a strong interest in knowledge for its own sake in China. Even modern Chinese philosophers have always been far more interested in the pragmatic application of knowledge than with abstract theorizing for its own sake.

The intellectual advances that characterized Europe at an increasing rate from the fifteenth century to the present seem to me to require more than an ecological or geopolitical explanation of the sort offered by some recent macrohistories, including Jared Diamond's brilliant *Guns, Germs, and Steel* While it is true that despotism and the consequent suppression of opinion and initiative would have been easier to carry off on ecological grounds in China than in Europe, it seems to me to be a mistake to limit accounts of freedom of inquiry and scientific advance in Europe to purely physical factors. Well before the fifteenth century, these values and the mentality that goes with them had been implanted in the European mind. Martin Luther launched his Ninety-Five Theses against the abuses and tyranny of the Church not just because it was easy for him to get away with it geographically, but because the history of Europe had created a new sort of person—one who conceived of individuals as separate from the larger community and who thought in terms imbued with freedom. Galileo and Newton made their discoveries not just because they could not be readily suppressed, but because of their curiosity and critical habits of mind.

Now of course the East is drawing on the Western stockpile of ideas at an ever-increasing rate. What effect these ideas will have on the East, what they will look like after being passed through an Eastern filter, and which modifications may be adopted by the West can be guessed at by looking at differences in the mental habits of contemporaries.

As history, the account I am proposing for why Greece and China diverged as they did is speculative. It is nevertheless a scientific theory—because it leads to predictions that can be tested, and tested moreover in the psychological laboratory.

Twentieth-century psychologists have provided evidence that economic and social factors can affect perceptual habits. Herman Witkin and his colleagues showed that some people are less likely than others to separate an object from its surrounding environment. They called their dimension "field dependence"—referring to the degree to which perception of an object is influenced by the background or environment in which it appears. Witkin and his colleagues measured field dependence in a variety of ways. One of these was the Rod and Frame Test. In this test the participant looks into a long box at the end of which is a rod with a frame around it. The rod and frame can be tilted independently of each other and the participant's task is to indicate when the rod is completely vertical. The participant is accounted field dependent to the extent that judgments of the rod's vertically are influenced by the position of the frame. A second way of testing field dependence is to place people in a chair that tilts independently of the room in which it's placed. In this test, called the Body Adjustment Test, the participant is accounted field dependent to the extent that judgments of the verticality of the participant's own body are influenced by the tilt of the room. A third way, and the easiest to work with, is the Embedded Figures Test. In this test, the job is to locate a simple figure that is embedded in a much more complex figure. The longer it takes people to find

the simple figure in its complicated context, the more field dependent they are assumed to be.

An implication of the idea that economic factors can affect cognitive habits is that agricultural peoples should be more field dependent than people who earn their living in ways that rely less on close coordination of their work with others, such as hunting animals and gathering plants. And in fact this is the case. We might also expect that traditional farming peoples would be more field dependent than people living in industrial societies, where personal goals can be pursued without close attention to a network of social roles and obligations. And this is also the case. In fact, hunter-gatherers and people in industrial societies are about equally field dependent.

If the key difference between agricultural peoples on the one hand and hunter-gatherers and modern, independent citizens of modern industrial societies on the other has to do with degree of attention to the social world, then it would be reasonable to expect that subcultures within a given society that differ in degree of social constraint should differ in degree of field dependence, as well. To test this hypothesis, personality psychologist Zachary Dershowitz examined the field dependence of Orthodox Jewish boys, who, he argued, live in families and social settings where role relations are spelled out quite explicitly and social constraints are substantial. He compared their performance with that of secular Jewish boys, who, he maintained, are subject to more lax social controls, and to that of Protestant boys, who, he believed, were exposed to even looser constraints. As expected, Dershowitz found the Orthodox boys to be more field dependent than the

secular Jewish boys, who in turn were more field dependent than the Protestant boys.

There is no reason to assume that field dependence can only be the result of social constraints imposed from the outside. We might expect that interest in other people, whatever its origin, would be associated with field dependence. And in fact relatively field dependent people like to be with other people more than relatively field independent people do. Field dependent people also have better memory for faces and for social words ("visit," "party") than relatively field independent people do. And, when given their choice, field dependent people like to sit closer to others than relatively field independent people do.

IMPLICATIONS FOR THOUGHT IN THE MODERN WORLD

But the implications of the view I am proposing extend far beyond the confines of a particular style of perceiving objects in relation to the environment. If something like my account of the relation between social factors and thought processes is correct—and if the social differences between East and West today resemble those of ancient times—then we can make some rather dramatic predictions about cognitive differences between contemporary East Asians and Westerners. We might expect to find differences in:

- Patterns of attention and perception, with Easterners attending more to environments and

Westerners attending more to objects, and Easterners being more likely to detect relationships among events than Westerners.

- Basic assumptions about the composition of the world, with Easterners seeing substances where Westerners see objects.
- Beliefs about controllability of the environment, with Westerners believing in controllability more than Easterners.
- Tacit assumptions about stability vs. change, with Westerners seeing stability where Easterners see change.
- Preferred patterns of explanation for events, with Westerners focusing on objects and Easterners casting a broader net to include the environment.
- Habits of organizing the world, with Westerners preferring categories and Easterners being more likely to emphasize relationships.
- Use of formal logical rules, with Westerners being more inclined to use logical rules to understand events than Easterners.
- Application of dialectical approaches, with Easterners being more inclined to seek the Middle Way when confronted with apparent contradiction and Westerners being more inclined to insist on the correctness of one belief vs. another.

At any rate, these are the expectations about habits of mind that follow if it is really the case that Easterners and Westerners have fundamentally different ways of seeing themselves and the social world.