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Contemporary Language Education in China

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Preface

C. P. Snow's Rede Lecture at Cambridge in 1959, "The Two Cultures and the Scientific Revolution", is one of the most controversial talks ever given. He launched a new phrase "the two cultures" and initiated a durable discussion and even more heated debate about it. Snow's lecture has become an inescapable reference-point for all people who propose to reflect on the role of modern science in human civilization, and the relations between different areas of learning. Furthermore, it has addressed more practical questions in global contexts, such as how to design an education system and how to eliminate poverty. It has a focus on the distinctive nature of British society, yet also addresses general issues with universal implications. This September issue commemorates the 50th anniversary of Snow's lecture, aiming to reconsider the two cultures controversy and explore broader problems it presented.

Professor WU Guosheng from Peking University investigates the ethical problems present in contemporary Chinese science communication. The pluralism and equality he advocates in the communication of science represent a position beyond the limit of the two cultures.

As for medicine, which Snow identified as one variety of "a third culture" in 1963, Professor Hong Hai from Nanyang Technological University of Singapore, and Professor ZHANG Daqing and Associate Professor YANG Haiyan contribute their own arguments. Hong's paper compares the "paradigms" of the Chinese and Western medicines, effectively showing that Traditional Chinese Medicine uses many of the methods of science whilst maintaining consonance with its cultural and philosophical origins. The dialogue between ZHANG and YANG demonstrates the human side of medicine and advocates the necessity for medical humanities education among medical students.

In an interview with Guy Ortolano, Assistant Professor of history from New York University, he situates the "two cultures controversy" in the wider contexts of postwar Britain, by recasting this debate as an ideological conflict between competing visions of Britain's past, present and future. He also offers his own reflection on the "two cultures" events this year.

Discussions about "the two cultures" start with Snow, but always progress further. We hope the main topic of this issue can act as a platform for interdisciplinary and multidimensional debates.

Haiyan YANG
September 2009

The Ethical Problems in Science Communication of Modern China[1]

Guosheng WU*
Peking University

Abstract: Chinese science popularization career in the past several decades has its own characters: government as the director, scientists as the main actors, and the public as the passive receivers. The new currents of science communication advocate the position of pluralism and equality instead, although this emerging discipline and practice is encountering various oppositions. Through three widely discussed cases, this paper investigates the ethical problems in contemporary Chinese science communication: can the public participate in vital decision-making in science and technology as taxpayers? Should the public have the "right-to-know" as consumers? Should the local knowledge have the right of existence?

Key Words: science popularization, science communication, applied ethics

In contemporary China, science communication is carried on in the name of "science popularization". In the past several decades, the science popularization of China formed its own tradition and mode. This paper attempts to analyze the ethical problems present in China's science popularization career from the viewpoint of modern science communication.

I. Basic characters of China's science popularization career

The term "science communication" only appeared in China in recent years, and its appearance was mainly related to the activities of the Center for Science Communication, Peking University, where the author of this paper works. In the past several decades, those activities dealing with relationships among science, media and the public have been called "science popularization" in China. As activities promulgating science with Chinese characteristics, China's science popularization has its own distinct features.

First of all, China's science popularization career is an activity mainly led by the government all the time. This activity is assigned to a quasi-government organization which is named "China

[1] This article is based on a presentation given by Guosheng WU in "Applied Ethics: The Second International Conference" in Sapporo, 22-25 Nov. 2007, Hokkaido University

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Association for Science and Technology" to take charge, and the space left for the non-government organization is relatively small. Chinese government fully realizes that promoting people's science literacy is of great importance for the road of modernization, so it especially emphasizes the work of science popularization. Chinese president issued "Law of the People's Republic of China on Popularization of Science and Technology" in June of 2002, which confirmed status and significance of the work of science popularization in the form of law. It is unique around the world to do work of science popularization in a manner of legislation.

Secondly, science popularization in China is endowed with very strong Scientism. This kind of idea deems that the masses without scientific training are unintelligent and ignorant. Only through science popularization and science education could they get away from such ignorant situation. For the government, its main goal is helping the public grasp scientific knowledge as much as possible, and thus become qualified workers of the scientific era. Consequently, science popularization is a one-way road for scientific knowledge to be transmitted from top to bottom, namely, from people with scientific knowledge to people without it. Scientism still believes that all science and technology are good, which have only positive values. Because science popularization is considered to be a one-way road to transmit scientific knowledge, scientists are thought to be the principal part of science transmission, while at the same time the public are all receivers. The public has totally played a passive role in the course of science transmission.

Government as the director, scientists as the main actors, and the public as the passive receivers, are three basic characters of Chinese science popularization career in the past several decades.

II. The experiences of science communication in China

From the end of the last century, some young scholars in China attempt to substitute the traditional concept of "science popularization" for the concept of "science communication", but are encountered fierce oppositions.

There are great differences between the term "science popularization" and "science communication". One essential distinction between them is that science popularization is a one-way transmission course, and science communication is a two-way interacting process. By "two-way interaction" we mean on the one hand that scientists transmit scientific knowledge to the public, and on the other hand the public also participates in the creation process of scientific knowledge, participates in the constitution of scientific policy and scientific institution, and shapes the science's social role together with scientists. During the two-way interacting process, the public can understand and accept science better, and science can also better meet the needs of society and culture.

Proceeding from the idea of "two-way interaction", the advocators of "science communication" have introduced a series of new ideas into China. First, the audience of science communication is expanded in number. The audience of science communication is not only ignorant and illiterate people, or disadvantaged groups with respect to knowledge, such as teenagers, physical laborers, but all members of the public. Then the audience of science communication includes not only

teenagers, but also adults; not only illiterates and people without scientific knowledge, but also those experts in science and technology. Scientists also have much to learn other than their specialty knowledge, for the specialization of science has been strengthened and accelerated since the 20th century, hence communion and understanding between every field become necessary.

Secondly, science communication is not an activity with the single aim to extol science, but to reveal every aspect of science, including its positive influence and negative effects. After the World War II, various negative effects of science begin to be unveiled, such as the danger of nuclear weapons, and the deterioration of the environment. People begin to query whether science always brings blessing to the mankind. Can science, under the self-discipline of the scientific community, always play a positive role to society automatically? Understanding science means understanding both positive and negative values of science at the same time.

Thirdly, the public also have the right to participate in the constitution of scientific and technological policies, and to appraise science's positive influence and negative effects. Modern science is usually "big science" which relies on a nation's subsidization, so taxpayers have the right to query that why their money should be used for making a particle accelerator, or a spaceship, but not used for improving ecological environment and eliminating air pollution. The public have the right to decide what kind of science we need, and towards what direction should our science develop. The spread of Green Thought directly correlated with human future is an important organic part of contemporary science communication.

Fourthly, the government should not be the leading force of science communication. Social forces, especially the media industry, should become the principal part of it instead. Between the scientific community and the public, the media is an essential intermediary.

Advocacy of the term "science communication" and of a series of new ideas related to it has caused fierce oppositions. Generally speaking, the opposing voice comes from several sides as followed. First of all, opposition comes from the quasi-government organization called "China Association for Science and Technology". They hope to maintain the traditional pattern, namely, science popularization work is left to them to direct and organize, and the investment of the government in science popularization is up to them to control and administer. Consequently, from their own interests, they instinctively object to the disapproval of the government's leading status in science popularization.

Secondly, opposition comes from an old ideology, especially from the older generation of science popularization workers and journalists in area of science and technology. In Chinese traditional political culture, information monopolization, information control and one-way flow of information are a kind of normality. Information openness and sharing information equally among the public are never the requirements of Chinese mainstream culture. As the old verse goes, "The people can be let be, but not informed". So, the two-way communication which calls for the public's participation is not allowed by the traditional thought.

This one-way transmission tradition manifests itself in the Chinese translation of "communication" first of all. The real meaning of "communication" in English is "traffic, exchange, intercourse, or interaction", which originally includes the meaning of interflow mutually. It is very clear that bidirectional flow is communication's essential feature. However, "传播" in Chinese is often associated with "transfer, transmit, spread, diffuse, disseminate, or broadcast", which indicates a one-way "flow" of certain material, energy or information. It has no meaning of bidirectional flow. Therefore, when the English word "communication" is translated into the Chinese word "传播", its connotation of bidirectional flow is lost.

In fact, from my point of view, the translation of "communication" into "传播" and "传播学" is related to the cultural subconscious of the deep psychology of the translators and users. Chinese traditional culture in itself is not a culture to encourage information's bidirectional flow.

It is just because of the single-direction meaning of "传播" in Chinese, a lot of critics think that science communication is not something new and it only emphasizes the position of media in science popularization. They have not realized that the term of "communication" implicates the idea of pluralism.

It was not until the 1980s that communications was introduced into China. Before that, there was no communications in China; what existed then was only journalism. During the process of its introduction into China, communications has met very great resistance. The reason is that, for Chinese academia, communications is not only a new discipline which is a supplement to journalism, but also the representation of a new kind of ideas for journalism. It is exactly this new idea that promotes the journalism reform in China, and encounters suspicion, critique and resistance at the same time.

What kind of new ideas has the introduction of communications brought with it? First of all, communications has weakened the ideological function of journalism. In the past, news was regarded as the propaganda instrument of political parties, which was the mouthpiece of the party, and the tool of class struggle and proletarian dictatorship. However, with the introduction of communications, people have gradually begun to look on the media as neutral. News is regarded as the process of information transfer and receipt, and news institutions begin to be known as "communication media" or "mass media". Secondly, communications has imported the concepts of "disseminator" and "audience", and the idea of equal communication between disseminators and the audience. Consequently, such new ideas have strengthened news' affinity to the people, and have made the media begin to pay attention to the effects of propagation and the voice of the people. Generally speaking, communication represents the position of "pluralism, equality, openness and interaction", and it is the inherent requirement of a free and democratic social structure to operate smoothly.

However, the introduction of communications has caused long and sometimes even fierce dispute. Are news institutions information media or propaganda instrument? Does journalism have class character? What is the relationship between journalism and communications? Gratefully, all those disputes quenched finally. Take the last question for example. In the

international academia, as a discipline, journalism' range is far smaller than communications. However, in China, communications couldn't be included in the discipline catalogue. It was not until 1998 that the National Education Commission renamed "journalism" as "news communications" in undergraduate specialty catalogue of the universities. Because of various obstacles that communications have encountered, the course of establishing its own discipline status is relatively slow. Yet at last communications made it anyway, and it can be expected that journalism would be a branch of communications one day in the future, rather than communications being a branch of journalism as before.

The relationship between "science communication" and "science popularization" is very similar to that between "communications" and "journalism". For the colleagues of Center for Science Communication of Peking University, "science communication" which we advocate is not a fashionable name of "science popularization". And we are not merely introducing and applying new media tools in the traditional science popularization. What we really want to do in the first place is introducing the idea of "communication" into the understanding of "science", namely, understanding and treating science with the attitude of "pluralism, equality, openness and interaction".

The idea of science communication requires that the conception of discipline's "equal rights" be set up in the interdisciplinary exchange. It means that science communication objects to "Physics-centricism" and "Biology-centricism" of any kind. It requires equilibrium between "experimental science" and "rationalistic science", equilibrium between "mathematical-physical experimental science tradition" and "natural history science tradition", and equilibrium between guiding principles of "reductionism" and "holism". "Communication" within the scientific community means advancing exchange and dialogue among disciplines traditional and burgeoning, and among disciplines at centre and at frontier. In communication between science and other cultures, the position of pluralism and equality is needed too.

The proposition of all those ideas of pluralism has encountered various oppositions.

III. The ethical problems in contemporary Chinese science communication: several cases

1. Can the public participate in vital decision-making in science and technology as taxpayers? Take building a dam for example.

The principal idea clash which science communication brings is that whether the ordinary folks have the right to express an opinion in vital decision-making in science and technology. The general view prevailing in Chinese society in the past was that ordinary people did not understand science; hence they have neither the qualification nor the right to say something about science and technology. Science media is demanded to make explanations to the public according to the direction that scientists admits, and the public's opinion is not considered important. However, decision-making in science and technology is not totally scientists' business. Modern science and technology cost enormously, so the launch of some projects means that other

projects are denied. Such decision-making actually involves consideration and choice out of political and economic interests. The responsible science communication work should not only explain to the public the technical details of a certain project, but also reveal advantages and disadvantages behind the decision-making in science and technology.

In 2002, around the issue of whether to build a hydropower station on *Nujiang* of Yunnan Province of China, there was a very heated discussion initiated by the media. During the process of discussion, proponents and opponents both invoked scientific knowledge favorable to them. The proponents think economically, namely, they think that building a hydropower station is the only way for *Nujiang* people to shake off poverty. Yet the opponents think environmentally, namely, they think that water storage and immigration which the dam construction requires will lead to the lost of natural diversity and cultural diversity. However, people have more or less ignored the benefit distribution of the dam construction. There were very few articles pointing out that the biggest beneficiary is the electric power company, local government will also increase its fiscal revenues, but local residents are the victims who will suffer the most. But this kind of viewpoint faded away soon. Because the awareness as "citizen" and "taxpayer" of Chinese people is relatively weak, they don't realize that a lot of large scientific and technological projects are subsidized with their own taxes actually, therefore they don't know whether they have the right to participate in the discussion of scientific and technological issues. Hence, science and technology media should not be limited to scientific calculation while participating in the discussion of decision-making in science and technology, and should reveal the gain and loss of interests.

2. Should the public have the "right-to-know" as consumers? Take genetically modified foods labeling for example.

Because of strong pragmatism element in the main stream of Chinese culture, Chinese people show a natural favor to modern high technology, but they seldom know about the potential risks contained in it. One other reason is that science and technology media is always interested in imparting the positive effects of high technology, while omitting or telling only a little of its bad consequences and potential risks.

Compared to the European countries, the experience of commercial production of genetically modified foods (henceforth, GM foods) in China is relatively special. Generally speaking, GM foods encounter no resistance of any kind, for information is filtered and then truth is concealed. Therefore, the opposing voice is very faint in China, which is often heard in European countries on the contrary.

Some ingredients of GM foods come from genetically modified organisms (henceforth, GMOs), which involve the recombination of different species. This kind of man-made recombination will cause unforeseen consequences on environmental ecology and human health on the one hand, and artificially cause some ethical problems on the other. For example, vegetarians can not accept plant foods which have transferred genes from animals (for example, tomatoes with genes from deep-sea fishes). At the same time, Moslems can't tolerate that pigs' gene is mixed in

mutton, and Hindus can't tolerate bovine gene in their diet, etc. Therefore, from both aspects mentioned above, it is necessary for consumers to have the "right-to-know"; namely, the GM foods must be labeled. As to potential risks on environmental ecology and human health, customers can make judgment by themselves. A label will allow the public to choose to avoid consuming them, thus it can avoid man-made ethical problems described above.

Because there is dispute about long-term security of the GM foods, protecting consumers' right to know and to choose GM foods has already become an international common understanding. In June 2001, the State Council of the People's Republic of China issued "Regulations on the Security of Agricultural GMOs", stipulating that "Approved GM foods in market should be labeled". On January 7, 2002, Ministry of Agriculture of the People's Republic of China issued "Regulations on Labeling of Agricultural GMOs", effective since March 20, 2002. However, this regulation from Ministry of Agriculture has no sanction on pharmacy industry and environmental protection, especially on food processing. On April 8, 2002, Ministry of Health of the People's Republic of China released "Regulations on the Safety of GM Foods" which stipulated that after July 1, 2002, all foods and food additives made from raw materials which come from genetically modified animals, plants, microorganisms or their directly processed products must be labeled. But this rule was abolished in November of 2003, for that if raw materials were proved to be safe, it is then unnecessary to label processed foods.

Currently, 50% of soybeans in the Chinese market are imported transgenic soybeans, which mainly come from U.S.A. and Argentina. These soybeans are mainly used for extracting oil, but most of the public do not know that the edible oil they eat every day is extracted from transgenic soybeans. Though regulations on foods require labeling GM foods, a lot of trade companies don't conform to this regulation actually. Some authors even advocate strongly that there is no need to label GM foods, for label will evoke the public's unnecessary panic for GM foods, hence harmful to the development of transgenic technology in China. Whether the public's right-to-know should be sacrificed for the development of science is a serious ethical problem.

At present, China has already become the fourth largest transgenic crops production country in the world. There are 4 kinds of transgenic crops that China has already authorized commercialization: cotton, tomato, pimiento, petunia. Only two kinds of them, tomato and pimiento, are food. In 2006, pest-proof transgenic cotton planted by 6,800,000 small-scale peasant households cover 3,500,000 hectares in China, which accounts for 66% of the total cotton planting area of the whole nation. But the labeling problem of transgenic crops has not been solved yet. An investigation at the beginning of 2007 revealed that 65% of the interviewees choose non-transgenic products definitely, and 97% of the interviewees think that it is necessary to set up labeling system of GM foods.

3. Should the local knowledge have the right of existence? Take the traditional Chinese medicine (TCM) for example.

Local knowledge has double and somehow contradictory role in China. On the one hand, as a laggard and disadvantaged country in modern times, patriotism and nationalism are the leading

ideology in China. Therefore, Chinese local scientific knowledge has considerate right of existence. Especially in the era of Mao Zedong, folk knowledge including TCM was supported and developed by political authority. "Doing the job with indigenous methods" and barefoot doctors are all excellent examples. Because of Mao's support and advocacy, TCM has occupied half of China's medical undertaking.

On the other hand, the modernization project of China also classifies modernity's narrative as its own ideology. Especially since implementing the reform and open policy in 1978, Scientism associated with grand narrative of modernity has become the powerful ideology of the new era. For people who advocate Scientism, science means modern western science solely. This kind of strict monism has made the legitimacy of local knowledge more and more problematic. In addition, Mao's thoughts and policies have undergone overall reflection and criticism, thus more and more impugnment is heaped on TCM from the modern science's position. Recently, the opinion of abrogating TCM was put forward again, and attracted quite a number of supporters. Proponents and opponents had fierce debates on the media whereafter. Finally, the Chinese Government came out to declare that they are determined to support the development of TCM as before, thereby ended this media war by and large.

In this dispute, science disseminators on both sides would face ethical criticism, for neither of them comprehensively revealed the strong and weak points of Western medicine and TCM. People who advocate abrogating TCM usually hold a monistic Scientism. They merely eulogize modern scientific medicine based on modern biology, and could not confront its deficiencies and problems already exposed. At the same time, most of the people who support TCM show its strong points and hide its weaknesses from a nationalism position. This kind of ethical criticism only reaches the superficial level of the problem.

The deeper problem lies in issues of power and justice which are involved in the application of Western medicine and TCM. In present-day China, the cost of Western medicine is well-above that of TCM, hence putting down TCM will get the poor stuck in the situation of having no access to medical care. Likewise, queries to the legitimacy of TCM are related to the preference to certain distribution plans of social resources. For example, if TCM, as one kind of local knowledge, has no legitimacy, medical insurance will not cover the cost of TCM, and then doctors practicing it can't obtain legal guarantee.

Kuhn and the Two Cultures of Western and Chinese Medicine

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Abstract: Western medicine and Chinese medicine are different systems that have been influenced by the cultures and scientific traditions from which they developed. Each contains its own set of Kuhnian paradigms. Though possessing some superficial and structural similarities, these paradigms are in fact quite different. The longevity of traditional Chinese medicine as an ancient method of healing may be related to its compatibility with Eastern cultures that view the world in more holistic terms.

Key Words: Chinese medicine, Western medicine, paradigms, syndromes

Why has traditional Chinese medicine (TCM) survived and flourished after its erstwhile Western counterpart, Galenic medicine, has long disappeared? Is TCM no more than a folk medical practice, lacking in the rigours of modern science and incompatible with the scientific culture of modern medicine? Such questions have been asked since the 1930s in China when a major debate erupted over the scientific basis of Chinese medicine and a proposal was made for its total replacement by Western medicine. The debate has never been settled and indeed was revived with some vigour in recent years.[1]

One difficulty in the debate over Chinese medicine was agreement on what counts as "scientific". There appear to be no consensus among philosophers of science on this issue, but for the purpose of this paper I use that term in a way suggested by Thomas Kuhn, that a science must have conclusions that are "logically derivable from shared premises" and are testable.[2]

I address the questions raised earlier on TCM by viewing models and standard examples in medicine as "paradigms", a term used in a special way by Kuhn (1970), and by comparing the "paradigms" of the Chinese and Western medicines. I have chosen to talk about paradigms in medicine rather than theories because I believe paradigms provide more satisfactory explanations for how medicine is practiced. For one thing, paradigms more closely incorporate cultural differences of those who subscribe to them. I have borrowed Kuhn's framework for the nature of scientific explanation and scientific revolution, recognizing that many of his ideas remain controversial.

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[1] See, for example, Qu (2005) and Needham (2004: 65-66).

[2] Kuhn (1977), 276, n21.

My approach to explaining science of the kind found in TCM models and concepts may help to illuminate the controversy between, on the one side, those Western scientists under the influence of philosophical realism and Popperian notions of science who view TCM as pseudo-science akin to astrology, complete with meaningless metaphysical entities and, on the other side, defenders of TCM who declare that TCM is simply a different "paradigm", incommensurable with Western medicine and therefore not understood by Western doctors and scientists.

It is tempting to view this divide as akin to that between the two culture of C.P. Snow but, as I shall demonstrate, neither system of medicine is a paradigm *per se* in the way the later Kuhn used the term. More correctly, each system of medicine has its own set of paradigms, and the two systems in fact have some paradigms in common. I argue that it is possible for a person educated in modern science to practise TCM as a method of healing without conflict with his commitment to science. Some scientists and philosophers would find my approach unappealing: the naïve scientist steeped in the ideology of observability and testability would find TCM entities akin to fiction; the philosophical realist would find these same entities incapable of being defined by mathematical equations and parameters, or possessing of consistent observable correlates. Nevertheless, I hope that my approach will go some way to assuring both groups that the TCM is an empirically-based discipline that uses many of the methods of science whilst maintaining consonance with its cultural and philosophical origins. Most people of Eastern cultural origin, and some in the West, have little problem accepting its methods and deriving therapeutic and health benefits from its practice. It is indeed a different culture form Western medicine, and any attempt to assert the scientific superiority of one over the other may just be barking up the wrong tree. What would ultimately be more relevant is whether patients with illnesses feel better using one or the other as the method of therapy.

Medical Systems and Kuhnian "Paradigms"

The term "paradigm" acquired new meanings after Thomas Kuhn's *The Structure of Scientific Revolution* first appeared in 1962. *Structure's* contribution to the philosophy of science has been a matter of controversy. Following an historic encounter with critics including Karl Popper at the 1965 London School of Economics conference, Kuhn's views underwent several stages of metamorphosis, from re-defining the term in the 1969 postscript to *Structure*, to wishing to dispense with the term "paradigm" in "Second Thoughts on Paradigms" (1974) of his Princeton days, and finally to the unfinished thoughts in his final interview recorded in Athens in 1995.

Kuhn himself never used the term "paradigm" for the theories, models and practices of medicine, although others have done so in various ways, not only for modern medicine but also for ancient medical systems.[3] The later Kuhn of *The Essential Tension* (1977) was concerned with the

[3] For example, Unschuld refers to the "paradigms of systematic correspondence" in ancient Chinese medical theories when describing the yin-yang doctrine and the five-phase model. Harvey's discovery of the circulation of blood was seen as providing a new paradigm in physiology, replacing Galen's model of blood and pneuma flow and contributing to the rise modern medicine. See Unschuld (1985), 57 and Quin (1997), 225-6. Medical scholars in China, criticized for dealing in unscientific theories,

confusing uses to which the term "paradigm" was put by both supporters and detractors of *Structure*, and with Masterman's complaint that there were some 21 uses of the word "paradigm" in *Structure*.[4] Kuhn went on to limit it to two uses, the "disciplinary matrix" and the "exemplar". The disciplinary matrix is global, "embracing all the shared commitments of a scientific group"; the exemplar "isolates a particularly important sort of commitment". The exemplar is therefore a subset of the disciplinary matrix.[5]

The disciplinary matrix includes most or all of the objects of group commitment described in *Structure* as paradigms or paradigmatic. Four of these objects were highlighted by Kuhn: 1. symbolic generalisations (e.g. the Newtonian law of motion $f = ma$); 2. models, which provide preferred analogies such that of gas as a collection of billiard balls in random motion; 3. shared values, such as the value that predictions should be accurate and preferably quantitatively expressed; and 4. exemplars.[6]

Exemplars are a scientific community's standard examples, and they illustrate the main use of the term "paradigm" in *Structure* for laws, theories, applications and instrumentation providing models from which spring traditions of scientific research. Among the exemplars that Kuhn cited were Newtonian mechanics and theory of gravitation, Copernicus' theory of the solar system, and the theory of oscillations as exemplified by the pendulum. Kuhn emphasized that exemplars were the "central function" of the use of the term "paradigm" in *Structure*, and would have preferred that the term "paradigm" be used only to mean the exemplar.[7] In this essay, I follow Kuhn's preference and use the term "paradigm" exclusively for the exemplar. But the reader should be aware that many people continue to use the term "paradigm" to refer to other things, including disciplinary matrices.

On the scientific nature of the paradigm (exemplar), Kuhn dramatically recounts at his final interview held in Athens how Margaret Masterman's cryptic remark, "a paradigm is what you use when the theory isn't there", was dead on the mark: "And I sat there, I said, my God…she's got it right!"[8] Real science, some would contend, is paradigmatic through and through.[9] So is medicine. There is a lack of agreement among medical scientists on the cause of disease, on the definition of health, and on the best route to take for dealing with many non-infectious illnesses. A casual survey of medical literature shows that they do not agree even on the causes of

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sometimes seek refuge in the dubious proposition that Chinese and Western medicines are simply incommensurable paradigms. See He (2005) and Wang (2003).

[4] Kuhn (2000), 300.

[5] Kuhn (1977), 94.

[6] Kuhn (1970), Postscript 181-191; Kuhn (1977), 306-307.

[7] "Second Thought on Paradigms", Kuhn (1977), 307, n16.

[8] Conant and Haugeland (2000), 300.

[9] "A weaker version of this thesis … would claim that there is an established theoretical core to science, and it is only at the frontiers of research that, by definition, theory is somehow insufficient, and therefore paradigmatic examples are needed to guide problem solutions. Kuhn's stronger version is that the extensive agreement amongst scientists indicates that they do not even have to agree on this theoretical core; science, real science, is paradigmatic through and through." Forrester (2007), 818.

conditions like cancer, gastric ulcers and coronary thrombosis, or the best routes to take for their treatment. [10]

Systems of medicine would appear to have within them disciplinary matrices and paradigms as described by Kuhn. Cardiologists might fit Kuhn's description of "a particular community of specialists" characterized by "the fullness of their professional communication and the relative unanimity of their professional judgments", sharing a "disciplinary matrix" which "refers to the common possession of the practitioners of a particular discipline".[11] Within the disciplinary matrix can be found paradigms, models, values and symbolic generalisations described by Kuhn. The paradigms would include the blood circulation model in the human body, the immunological system, and theory of the role of blood cholesterol in vascular plaque formation.

Likewise, the methods of diagnosis and therapy in TCM, viewed as a disciplinary matrix, are linked to a number of paradigms (exemplars) comprising rules and explanatory models drawn originally from ancient texts, such the models of *yin-yang*, the five phases and the meridians used in acupuncture, though now subject to modern interpretation.

Models and Analogies

Models play key roles in Kuhn's disciplinary matrices and paradigms. For Kuhn, human cognition is governed fundamentally by rhetorical relations of similarity, metaphor, analogy and modeling rather than by rules and logic.[12]

The use of theoretical models in science has traditionally attracted greatly disparate views, ranging from that of Duhem, Mach and others that models are merely dispensable aids to theory construction and can be "detached and discarded when the theory is fully developed" to the position, enunciated by Campbell, that models are analogies that are essential parts of theories, as in the case of the theory of gases which uses the model of point particles moving at random in the vessel containing the gas.[13]

In the social sciences, particularly in economic science, models are extensively used to describe idealized situations that approximate to real economic conditions at particular places and times. Adam Smith's model of perfect competition, for example, holds true by virtue of the conditions defined for perfect competition to exist (free markets, no state intervention, perfect information, and the absence of transactions costs).

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[10] For example, the use of chelation for coronary blockages, contending theories on the causes of atherosclerosis, and the causes of and appropriate treatments for various forms of cancer.

[11] Kuhn (1970), 182.

[12] As Nickles (2003:8) points out: "Scientific thinking does not consist in applying purely logical rules so much as matching present perceptions and problems to domain-specific exemplars; and a great deal of scientific work consists in the construction and use of models."

[13] Hesse (1967), 357.

It is not always clear that a distinction can be drawn between a theoretical model and the theory of which it is a model. As Hesse points out, the model of the DNA molecule is practically synonymous with the theory of the molecular structure of the DNA: "it is not clear that there is any formal theory of which (the DNA molecule) is a model; the presumption is that a wave mechanics adequate to describe such complex structures as organic molecules would be such a theory. This example indicates that in science, unlike logic, the notion of model is not dependent on prior development of a formal theory."[14]

There is a limited sense in which models are true by definition, just as an ideal gas is by definition just what behaves in accordance with the ideal gas law.[15] This is not to say that the model states a tautology, but rather that it states an ideal and we postulate that certain natural phenomena approximate to it closely. Its usefulness must be measured by its ability to explain phenomena satisfactorily and its success in predictions. A simple harmonic oscillator is an idealized model system, basically a definition. When we relate it to real-world systems, as when we say that the motion of a pendulum is simple harmonic, in practice that is a good approximation.

Models in medicine are of this genre. For example, the modern physiological model of the excretory system of the human body comprises the kidney and bladder, which removes urea, salts and water; the lungs, which remove carbon dioxide; the skin, which removes urea and water through sweat glands; and the large intestine, which removes solid waste. This is true by definition as all materials removed through these channels are "excretions". The same can be said of the digestive, respiratory, circulatory, immunological systems. These models were arrived at through the study of anatomy and laboratory experiments on physiological processes; their accuracy increases over time as they are improved to incorporate new findings of the functioning of the human body. As we shall see later, TCM has an equivalent albeit simpler set of models based, not on the human anatomy, but its own system of functional taxonomy.

Paradigms of Western Medicine

Western medicine evolved from distant antiquity before the *Hippocrates Corpus* (circa 350BCE). A paradigm shift occurred when disease and their cures, previously thought to be linked to spirits, demons and the Gods, were regarded as disorders caused either by external environmental factors or internal disruptions within the body. *The Nature of Man*, for example, states:

> When a large number of people all catch the same disease at the same time, the cause must be ascribed to something common to all and which they all use; in other words to what they all breathe…However, when many different diseases appear at the same time, it is plain that the regimen [that is, diet and exercise] is responsible in individual cases.[16]

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[14] ibid, 356

[15] Rosenberg (2000), 99.

[16] Lloyd (1983), 22-23.

This insight presaged the distinction in modern medicine between diseases caused by infectious and environmental factors and illnesses caused by factors internal to the body

The medical sect known as the Methodists provided the dominant medical theory for the Roman world for at least three centuries from the time of its putative founder Themison (123-43 BC) to the time of the emperor Marcus Aurelius (161-180 AD) and beyond.[17] Hippocratic medicine had earlier tied together the seat or the part affected by disease and the etiological theory supposed to explain the disease, thereby allowing the physician to ascertain indications for therapy. As a result, conventional diseases diagnosed by Hippocratic medicine were "at once nebulous and rigidly compartmentalized".[18] The Methodists created a paradigm shift in Greco-Roman medicine by rejecting this epistemological approach and insisting that good medicine was simply effective therapeutic practice and it was not necessary to search for the hidden causes of disease.[19] Thus Methodists spoke of "affections" (*pathe*) rather than disease (*nosoi*), having in mind forms of *koinotetes* rather than disease entities in the traditional sense. They were free from etiology, and were convinced that a good doctor should never concern himself with the causes of disease.[20]

Galen (129-216CE), whose ideas were to dominate Europe up to the end of the 16th century, rejected Methodism. He drew inspiration instead from Aristotle and the *Hippocratic Writings* to view organized bodies, like bodies of nature, as composed of the four elements of fire, water, earth and air, while the four qualities of these four elements are heat, moisture, dryness and cold. Disease consists in abundance, scarcity or change taking place in the humours, comprising blood, phlegm, and yellow and black bile. Hence diseases are classified according to which humour is in excess, scarcity, or suffers a defect in its movements and accordingly requires a different therapeutic means.[21]

Ancient and medieval medicine in Europe were focussed on understanding the conditions of human bodies in the grip of disease, the progression of these conditions (pathogenesis), and appropriate therapies for healing. There was less emphasis on epistemological issues of causation – what made the patient to fall ill in the first place. Before the 19th century, the notion of disease causation in Europe revolved largely around moral and social factors. Etiological discussions of most diseases included references to such factors as drunkenness, intemperance, gluttony, and dissipation. In his account of diabetes, for example, Bardsley (1845) identified causes like indulgence in excessive amounts of cold fluid when the system has been over-heated by labour or exercise, poor living, sleeping out the whole of the night in the open air in a state of intoxication, checking perspiration suddenly, mental anxiety and distress.

The Scientific Revolution of 16-17th century Europe laid the groundwork for transformations in

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[17] Nutton (2004), 188.

[18] Tecusan (2004), 10.

[19] Nutton (2004), 190.

[20] Tecusan (2004), 4, 10-11.

[21] Nutton (2004), 202-215; Cumston (1926), 137.

the classical and mathematical sciences and the introduction of Baconian experimental science that would have profound effects on science and medicine. Kuhn saw a systematic merging of the classical and the experimental sciences in the 19th century – "the mathematization of a number of Baconian fields" – for example, the transformation of the Baconian science of heat into an experimental-mathematical thermodynamics.[22] In the second half of the 19th century, systematic experimentation also took root in medicine, particularly in physiology, and the profession of medicine "gained new institutional forms, more rigid and with intellectual standards more exclusive than any they had known before."[23] Scientific medicine took a large step forward, leveraging state resources for scientific research.

The French Revolution and its aftermath moved hospitals from the Church to the State and saw the emergence of Paris hospital medicine "characterized by scientific observation and raised on pathological anatomy, the paradigm of the lesion, quantification and, not the least, sublime faith in its own superiority."[24] This paradigm shift from holistic stress on humoral balance to the new "anatomico-pathological" model would eventually lead to the pathbreaking discoveries of modern etiology.

A major step forward was made with research on childbed fever (*puerperal sepsis*), common in the 18th and early 19th centuries. In 1846, Semmelweis's observations of mortality rates of women after childbirth under various hygiene conditions led to the conclusion that childbed fever was caused by decaying matter. Semmelweis used a hypothesis-testing methodology to infer that childbed fever was caused by putrid matter derived from living organisms: "In order for childbed fever to occur, it is a *conditio sine qua non* that decaying matter is introduced into the genitals…every case of childbed fever, without a single exception, *has only one cause*, namely incorporation of decaying organic matter."[25] Some 40 years later, a monocausal model of disease was proposed by Pasteur and Koch who had ushered in the age of bacteriological discovery with the isolation of the tubercle bacillus. The key ideas were captured in the paradigm of the Henle-Koch Postulates which stated that the parasite occurs in every case of the disease in question and occurs in no other disease as a fortuitous and non-pathogenic parasite[26]. Koch called this approach to disease causation "*the etiological standpoint*", which Carter characterizes as "the belief that diseases are best controlled and understood …by causes that are universal and necessary".[27]

Bacteriology opened up the vision of finding biological agents to destroy them. The notion of "antibiosis" – one kind of organism driving out another in a Darwinian survival process – gave a lead to research for antidotes, and eventually to Fleming's development of the antibiotic penicillin, a natural by-product from moulds.

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[22] Kuhn (1977), 63; Sakar and Pfeifer (2005), 268.

[23] Kuhn (1977), 60.

[24] Porter (1999), 306.

[25] Hempel (1967), 3-8; Gyory (1905), 94.

[26] Evans (1993), 30.

[27] Carter (2003), 1.

The use of antibiotics to combat disease-causing bacteria was a new paradigm in curing disease. Using medicines that destroy bacteria instead of allowing the body to overcome it with its own defences was a radical departure from Galenic medicine (and Chinese medicine) that used medicine to restore balance or to resolve internal obstructions.

By the beginning of the 20th century, the etiological standpoint in its wider sense drove much of medical research. However, other important diseases defied such explanations. One such disease was beriberi, whose cause required a new deficiency theory of disease. The etiological standpoint had to be widened to include deficiency of certain organic chemicals essential to the body.

Viruses also presented a new set of problems. Although the existence of viruses was discovered in the late 19th century, it was not until the first half of the 20th century that the influenza and polio viruses were isolated and cultured, and not till the second half of that century that large numbers of disease-causing viruses were isolated. With viruses, medical scientists found that causes of disease were more complex and less definitive than could be explained by the simple etiological standpoint of Koch. For example, rhinoviruses are associated with only 20-25% of the common cold syndrome and are active mostly in the fall. Furthermore, many viral infections are asymptomatic. Viruses are also thought to be linked to some forms of cancer, and probably play a role in the induction of about 10% of all fatal malignancies in the US. Looking at the broad range of diseases, a single cause can result in a spectrum of clinical syndromes, and the same effect could result from several different causes, depending on the nature of the causative agent, the environment in which it operates, and the characteristics of the involved host. In the case of chronic (non-infectious) illnesses like heart disease, the complexity is such that epidemiologists prefer to talk about "risk factors" rather than causes.[28]

The situation gets more complex with subclinical epidemiology. Subclinical illnesses occur not only in infectious diseases, but also in chronic diseases. The occurrence of infection without disease is also well recognized in subclinical infections. A multitude of new virological, immunological and genetic advances yielded new insights into pathogenesis. The noted Yale epidemiologist Evans concludes: "Many of the causes of disease are so ubiquitous that almost everyone has been exposed to them...What then makes disease develop in some who have been exposed, but not in others? It is the search for a clinical illness promotion factor, 'a third ingredient', that I urge epidemiologists to pursue. It may be external or internal to the host, it may vary from disease to disease, and it may vary within a single disease in various epidemiological settings"). [29] This recognition of the complexities of disease causation, represents a paradigm shift from the etiological standpoint of Koch. Philosophers of medicine have since developed "causal pie" and other models to attempt to deal with complex disease causation.[30]

Another important Western paradigm is "evidence-based medicine" (EBM), which emphasizes

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[28] Evans (1993), 1, 46, 107.

[29] *ibid*, 213.

[30] Rothman (2002), 10.

the use of randomized controlled trials for testing the efficacy of therapies.[31] Although not without its methodological problems[32], EBM has become standard procedure for new drugs and new therapeutic methods

Other paradigms of Western medicine include surgery, which repairs body parts and removes lesions and tumours, and chemotherapy which uses chemical substances to attack abnormal cells associated with cancerous tumours. Neither surgery nor chemotherapy are to be found in TCM which, like Greek medicine, emphasizes internal balance and removal of obstructions as the way to recover from illness.

Paradigms of Traditional Chinese Medicine

Like Greek medicine, Chinese medicine in distant antiquity was dominated by the belief that illness was caused by spirits and demons and required the intervention of witches and mediums to effect cures. A paradigm shift occurred in the Han dynastry (206 BCE-200 CE) when the medical classic *Huangdi Neijing* (*The Yellow Emperor's Canon of Medicine*) made a break with this tradition by refusing to attribute disease causation to numinous agents. The *Neijing* focused instead on environmental conditions and emotional factors as the causes of illness and the importance of natural laws in their explanation.[33] In particular, the *Neijing* brought to medicine the ancient Chinese philosophical ideology of "systematic correspondence" by which all tangible and abstract phenomena could be categorized as manifestations of the *yin-yang* principle and the five-phase model.[34]

Different schools of thought introducing new paradigms flourished from the Han dynasty to modern times, but they shared some core paradigms which comprised, besides the *yin-yang* principle and the five-phase model, the related five-organ system (*zangxiang* 臟象), the system of channels and collaterals (meridians), and the central role of *qi* in human health and body processes.[35]

Shanghan Lun (*Treatise on Febrile Diseases*) by the legendary late-Han physician Zhang Zhongjing (150-219) postulated that harm caused by climatic influences such as cold ("cold damage") and dampness travelled along (acupuncture) meridians and brought about progressive stages of pathogenes.

The Song dynasty (960-1279) saw the emergence a Neo-Confucianism that absorbed concepts of Daoism and Buddhist and stimulated the development of new medical doctrines. Late Song and the ensuing Jin-Yuan dynasty saw vigorous contention among "a hundred schools" of medical thought. Among the influential schools were those associated with Liu Yuansu (1120-1200) who

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[31] Guyatt et al. (1992), Shahar (1998), 277.

[32] Worrall (2002).

[33] Unschuld (2003), 319.

[34] Unschuld (1985), 5, 54.

[35] Ren Yinqqiu (1986: 5-6), who started the study of "schools of thought in medicine" (中医各家学说) in the 1950s, emphasizes that contending schools did not depart from the core models of the *Neijing*.

founded the "school of cooling" (*hanliang pai* 寒凉派), which stressed cooling the body to overcome the tendency to excess heat; Li Gao (1180-1251) who regarded the digestive system as the fundamental basis for good health, hence founding the "spleen-stomach school" (*piwei pai* 脾胃派); and Zhu Danxi (1281-1358) who founded the "*yin*-nourishing school" (*ziyin pai* 滋阴派) which claimed that man's body by nature tends to be deficient in *yin*, hence nourishing *yin* must the basis of good health. These contending schools introduced competing paradigms in Chinese medicine that were in tune with the times and places in which they flourished.

Late Ming and early Qing saw further development of medical thought, notably studies of infectious diseases common in spring and summer in the south by the "warm disorders school" (*wenbing xuepai* 温病学派）led by Wu Youxing (1582-1652). This was a competing paradigm to the cold-damage model of the *Shanghan Lun* from the Han dynasty. Understandably the former was more appropriate to "delicate southerners" in warmer regions and the latter to "robust northerners" of China.[36]

In the dying decades of the Qing dynasty, China suffered humiliation by foreign powers which annexed territories and extracted war indemnities. Shortly after the founding of the Republic in 1912, the May 4th Movement of 1919 marked an historic turning point when the country adopted Western science and technology as the only practical way of strengthening itself.[37] From the 1920s, young scholars returned from studies abroad with the mission to modernize Chinese science. Chinese medical paradigms came under attack for being unscientific. In 1929 a Japanese-educated Western doctor Yu Yan 余岩 in the government health administration called for the abolition of Chinese medicine. This met with a robust response from Chinese physician and scholar Yun Tieqiao 恽铁樵. A stormy debate ensued.[38] Western-trained scientists followed a line of thinking similar to that of logical positivists in Vienna and Karl Popper in Vienna/London, deeming unobservables in Chinese medicine as metaphysical hence meaningless and Chinese medical theory to be unverifiable (or unfalsifiable) hence unscientific. Chinese physicians defended their profession by citing its successful clinical record and appealing to the wisdom of ancient Chinese philosophy on which it was based. The first defense was difficult for Western doctors to dismiss, as many of them acknowledged *prima facie* evidence of the efficacy some Chinese medications and of acupuncture. But they insisted that the efficacy of Chinese methods be subjected to the rigours of Western evidence-based medicine. Invoking the wisdom of an ancient philosophical system, however, convinced few detractors.

The debate was interrupted by civil war (1935-49) that culminated in the ascendancy of Mao and the founding of the People's Republic of China in 1949. Early in his rule, Mao directed that the country should preserve the "treasure trove" of Chinese medicine and modernize it by absorbing relevant knowledge from Western science and medicine.[39]

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[36] Hanson in Hsu (2001), 262-292.

[37] Schwartz (1986).

[38] Qu (2005) and Lei (1999).

[39] Taylor (2005).

Chinese medicine henceforth became known as "Traditional Chinese Medicine" (TCM) to refer to the state-sanctioned practice of Chinese medicine.[40] *It was "traditional" only in the sense of having originated from the classics of Chinese medicine* and being a different system from modern Western medicine. But in fact it was a new system that reflected the social and political milieu of modern China.

Following Mao's edict to modernize TCM, textbooks were written in plain Chinese prose (*baihua* 白话) as distinct from terse formal classical Chinese, systematically laying out the principles of TCM for the training of a new generation of Chinese doctors, in contrast to the old way of apprentices memorizing the classics and learning at the foot of experienced practitioners. These texts were written by hand-picked leading scholars, mostly from TCM colleges set up for the first time in Beijing, Chengdu, Guangzhou, Nanjing and Shanghai.

The first national textbook appeared in 1958, titled *Outline of Chinese Medicine* (*Zhongyixue gailun* 中医学概论).[41] It was superseded by other specialized texts covering foundational theory, diagnostics, acupuncture and moxibustion, *material medica*, prescriptions, internal medicine, pediatrics, gynecology, skin diseases so forth. The structural similarity of these textbooks to their Western medical counterparts was obvious and deliberate. The textbooks constituted a massive systematization of medical theory and practice, the first to appear in Chinese history.

Regulation of TCM practice is by licensing of medical practitioners at the state level with common national examinations. Prescribed textbooks currently comprise a series published by Shanghai Science and Technology Press 上海科技出版社, which have also been adopted in Hong Kong and Singapore. Chinese medicine as practiced in Taiwan and Malaysia follows a similar pattern, as does Korean medicine, basically an indigenized version of Chinese medicine.[42] [In this paper, I have used *Basic theory of Traditional Chinese Medicine* published in a Chinese-English bilingual version by the Shanghai University of Chinese Medicine as a reference (Wu, 2002).]
TCM colleges in China require about 40% of the student's time be spent on studying Western medicine. Degree graduates can practice basic Western medicine in addition to TCM: he can read modern diagnostic test results, prescribe Western drugs and perform simple surgical procedures. Researchers in Chinese medical colleges publish in academic journals, and there are extensive Master and doctoral programs. While the academic rigour of research and publications on TCM has yet to catch up with those of leading Western medical institutions, the existence of these programs and publications is testimony to a decisive paradigm shift: the recognition that the theories and therapies of TCM can be put to tests used in evidence-based medicine rather than just invoke the authority of ancient Chinese philosophy.

Referring to the simplification and systematization of Chinese medicine over the last two

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[40] *ibid*, ch.4. Scheid (2002:3) avoids this term because he thinks it implies Chinese medicine is unchanging.

[41] Scheid (2002:74). A 1972 text *The Revised Outline of Chinese Medicine* 新编中医学概要 was translated by Sivin (1987).

[42] Kim (2006) prefers to use the general terms "East Asian medicine" for Chinese, Korean and Japanese medicines.

millennia, Sivin opines that such change had been "most decisive over the past generation, with unmistakable influence from modern medicine."[43] Scheid (2002) notes that the transition was not without its controversies and contends that despite the apparent uniformity forced upon the TCM community by state-sanctioned textbooks and clinical practices, there remains a plurality of views among scholars and practitioners. Scheid's observation is especially pertinent considering conservative scholars like Liu Lihong (2003) who, despite having undergone training in systematized TCM, regard the classics as the ultimate authority on medicine and modern systematized TCM as having been adulterated and distorted by Western interpretation.

The decisive move towards systematic formalization of Chinese medical theory and the education of TCM physicians in Western medicine constituted a deep paradigm shift with far-reaching consequences for the future direction of TCM. Perhaps the most important new paradigm to emerge was the principle of *bianzheng lunzhi* 辩证论治 which literally means "syndrome differentiation and consideration of the appropriate therapy accordingly". It involves classifying the pathological conditions of the body (such as depletion and repletion) through its external manifestations and determining the treatment accordingly.[44]

Paradigms of Contemporary TCM

Among the paradigms (exemplars) of contemporary TCM, I choose seven that are mos relevant for comparison with those of Western medicine.

1. The *Yin-Yang* Principle
2. The Five Phases Model
3. The Organ Systems
4. The Mind-Body Relationship Model
5. Channels and collaterals ("meridians')
6. Basic entities in the body – *qi* 气, *jinye* 津液 and blood
7. Diagnosis and treatment of syndromes (*bianzheng lunzhi*)

1. The **yin-yang principle** lays out the dynamics of *yin* and *yang* characteristics in the body. They reflect the intrinsic duality of nature: *yin* is soft, dark, cool, wet, and subtle, whilst *yang* is hard, bright, warm, dry and transparent. *Yin* and *yang* oppose and restrain each other, but are also interdependent. Harmony in nature requires that they be in balance. These relationships are captured in a symbol that shows *yin* (in black) and *yang* (in white) wrapped around each other, mutually dependent for existence, but restraining each other (Figure 1).

[43] Sivin (1987), 124.

[44] *Bianzheng lunzhi* is not dealt with in older works on TCM written in the West because it did not appear in Chinese medicine as a core paradigm until the systematization of Chinese medicine in the 1950s. Scheid (2002:106-115) notes its "non-existence" before 1950, although similar ideas were already there since early times.

Yin Yang

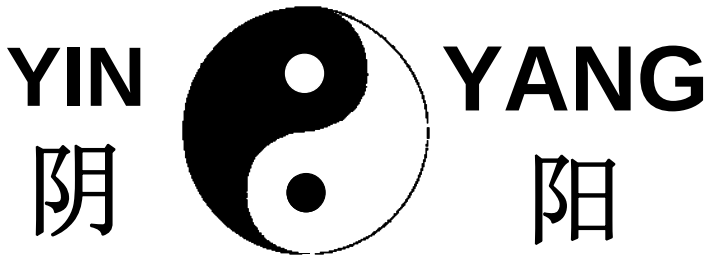

Figure 1

2. The **five-phase model** (*wuxing* 五行), also known as the "five-element" model, was borrowed from ancient Chinese cosmology and moral theory, relating five basic functions represented by wood, fire, earth, metal and water.[45] The succession sequence consists of one activity producing the next (*xiangsheng* 相生): wood produces fire, which produces earth, and so on (Figure 2). There is also a notion of restraint (*xiangke* 相克) for every other phase (two phases apart): wood restrains earth, fire restrains metal, etc. The permutations of production and restraint define relationships among the five phases.

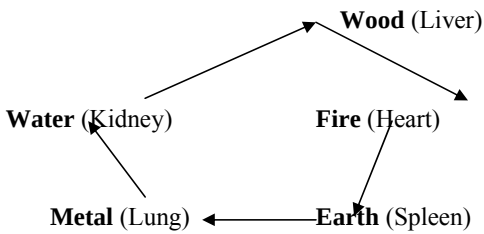

Figure 2 The Five-Phase Model

3. The **Organ Functional Systems** model (*zang xiang* 臧象) divides *physiological functions* of the body into five groups, each named after an anatomical organ: the liver, heart, spleen, lung and kidney functional systems. Each of these systems has a number of functions associated with it and, while they have some similarity to organ functions in Western medical physiology, they are in fact quite different. For example, the "spleen" system covers the digestive functions of the

[45] See Lloyd and Sivin (2002), 259-261 and Needham (1978), 254-261 for differing moral and cosmological theories of the origins of the five-phase model.

body; the "kidney" system is involved in excretion but also in sexual functions, growth and ageing.[46] The five systems constitute a taxonomical model corresponding to the five-phase model. By relating each organ system to one of the five phases (for example, the liver to wood, and the heart to fire – see Fig 2), the model defines the dynamic interactions of the five organ systems, strengthening and restraining one another to maintain body balance.

4. The **mind-body relationship model** is a core paradigm of Chinese medical theory. It associates each organ system with a specific emotion that harms it: anger harms the liver, grief the lung, fear the kidney, anxiety the spleen, and excessive joy (indulgence) the heart. Combined with climatic influences like heat, cold, dampness, dryness and wind, they constitute the fundamental causes of illness (pathogens) as laid out in the *Neijing*. Modern TCM texts now add germs, toxic chemicals and poor diet to the list.

5. The **channels and collaterals** ("meridians") are a network that connect the organ systems and also transmit external influences (including acupuncture needle stimuli) to the internal organs. The physical nature of these meridians has been a matter of intense research but has never been satisfactorily elucidated. Lu and Needham report that attempts to demonstrate a physical or sub-anatomical substratum for the system were inconclusive[47]. Leung et al cite other hypotheses, including one postulating them as low electrical impedance paths. [48]

6. Of the **three basic entities** in the body[49], *qi* is the most complex and multi-faceted. It flows along the body surface to protect it against hostile influences and works within organs to bring about digestion and metabolism. It is also an agency of transmission that connects mind and body. Thus, when a person is angry, *qi* carries the emotion to his liver to cause damage. Generally, any kind of change or movement in the body involves *qi*. If *qi* is blocked, this results in repletion; if *qi* is deficient, the body suffers from depletion.[50] *Jinye* is a general term for dispersed body fluids, covering all normal moisture and fluids in the body.[51] "Blood" in TCM has nourishing functions and bears a close relationship to *qi*: blood produces *qi,* and *qi* drives blood.[52] Deficiency and stagnation of blood are pathological depletion and repletion conditions respectively.

7. **Diagnosis and Therapy based on Syndromes**: The foregoing six paradigms are interlinked and integrated into the overarching doctrine of *bianzheng lunzhi*, or "syndrome differentiation and therapy determination".

The term "syndrome" has a different meaning from that used in Western medicine.[53] It is the standard translation for "zheng" 证 (as in *bian<u>zheng</u> lunzhi*) in bilingual Chinese textbooks.[54]

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[46] This system is combined with another set of viscera which complements it; in this abbreviated treatment, we do not go into the details.

[47] Lu and Needham (1980), 186.

[48] Leung, et al (2003), 176-177.

[49] Wu (2002), 102-129.

[50] Kuriyama (1999), 221.

[51] Sivin (1987), 243.

[52] Wu (2002), 124-126.

[53] Oxford (2007): "a combination of signs and/or symptoms that forms a distinct clinical picture indicative of a particular disorder", eg. chronic fatigue syndrome.

Some Western scholars prefer the translation "pattern" or "manifestation" rather than "syndrome".[55]

Syndromes differ from symptoms (*zhenghou* 症候), which are signs experienced by the patient or determined by the doctor's diagnosis. The syndrome is also different from disease (*bing* 病), which comprises "a group of symptoms with a coherent and recurring etiology".[56] It should be noted in passing that the term "disease" has strong Western medical nosological connotations. In my view, it is preferable to use the more neutral term "illnesses" for *bing* in TCM.[57]

Scheid notes that while the differentiation of syndromes was discussed in various parts of *Neijing* and *Shanghan*, and were used at various times in the history of Chinese medicine, there was also emphasis on diseases and symptoms rather than syndromes. It was only in the Republican era that, under the influence of classifications seen in biomedicine, TCM underwent the wide-scale "systematization of the presentation of diseases, patterns and symptoms and signs" that was needed to make *bianzheng lunzhi* the defining feature of contemporary Chinese medicine.[58] The syndrome characterizes a pathological process; it may be associated with more than one disease. As an example, tuberculosis is a disease, with symptoms of blood in the cough, daily fevers, lassitude, and loss of weight. A person with the disease would exhibit different (TCM) syndromes (for example, *yang* deficiency, *qi* blockage) at different stages of the progression of the disease that may require different treatment regimens.

The syndrome concept can be meaningfully described only in relation to the Chinese framework of *ba gang* 八纲 ("The Eight Rubrics"), the *locus* of the illness, and the *flow* of *qi* and blood in the body.[59] Four pairs of opposing characteristics make up the "eight rubrics": *yin-yang*, depletion-repletion (*xu-shi* 虚实), cold-hot (*han-re* 寒热), and surface-internal (*biao-li* 表里). The notions of depletion and repletion are similar to those used in Greek medicine, with depletion being associated with deficiency, and repletion with excess, or with *qi* blockage. Hot and cold are *not* temperature states: a body is hot if the face is flushed, the tongue red, the patient feels dry in the throat and prefers cold drinks; it may or may not be accompanied by an elevated temperature (hence it is not a Western-defined fever). The body is in cold state if the patient is afraid of wind and chills, is not thirsty, and his tongue is pale and may have a white fur over it. The illness can be at the *surface* level near the skin, or it could be *internal,* deeper down in the muscles and blood. Illnesses caused by external pathogens start at the surface level and progress deeper if left unchecked. Its locus could also be at one or more of the organs.

Pathological conditions are defined through the eight rubrics, the locus of the illness and impediments to the free flow of *qi* and blood, though not all need to be specified in any

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[54] Wu (2002), 218.

[55] See Farquhar (1994), Scheid (2002), 201 and Sivin (1987), 109.

[56] Sivin (1987), 106.

[57] Lloyd (2003:1) prefers to use "disease" for what the doctor finds, and illness for what the patient feels.

[58] Scheid (2002), 207, 228.

[59] Sivin (1987), 330-31.

syndrome. For example, if the *yang* of the kidney system has been damaged by excessive sexual indulgence, the patient suffers from the syndrome of "depletion of the kidney yang" or *shen yang xu* 肾阳虚. It is an *internal* syndrome, since it occurs deep down at the organ level; the patient typically suffers from dull chronic backache, his tongue is pale, his pulse weak, his face gaunt, and he suffers from lassitude and loathes wind and cold.

A person's body that succumbs to an external chill might react with symptoms of heat at the "surface" level. His pulse is quick and "floating", his tongue red and it may have a light yellowish fur on it, his face is flushed, and he feels warm (even though by Western clinical signs he may not have an elevated temperature), and he prefers cool drinks to warm ones. His syndrome is that of heat at the surface level or *biaore zheng* 表热证.

The principle of therapy is to move the body back into a state of balance. In our two examples, body heat is treated with cooling drugs, and *yang* depletion with *yang* tonics for the kidney:

	Syndrome	**Treatment**
1.	Depletion of kidney *yang*	*Yang* tonic for the kidney
2.	Heat at the surface level	Resolving surface heat with drugs that induce sweating

The syndrome is differentiated by examination (*bianzheng*) and the appropriate therapy can then be determined (*lunzhi*).

In practice a patient often suffers from a number of syndromes at the same time, hence the physician needs to continually make judgmental decisions on which syndrome receives priority in the treatment process. For example, a person with weakness in the *qi* of the spleen would sometimes have weakness in the *yang* of the kidney. Depending on the condition of the patient seen from other symptoms exhibited, the physician may decide to treat the spleen first and tackle both spleen and kidney after improvement has been achieved with the spleen weakness. Syndromes are in a dynamic state. Each time the physician sees the patient, the syndromes would have evolved further, partly as a result of treatment received, and the next treatment has to be adjusted accordingly. The treatment process is thus *customized* and *iterative*, with adjustments made as the condition responds to treatment. If this sounds somewhat like trial and error, it indeed is, not in an unguided haphazard way, but with medical judgment exercised at each stage based on accepted principles within TCM.

This is not unlike the management of national economies, when a set of stimulatory measures for an economy in morbid recession may have be adjusted periodically as the economy responds to the stimulus; other problems of the economy like a weakening currency or labour union action will also have to be dealt with as one goes along, and sometimes dampening anti-inflationary measures may have to be introduced if the stimulus is overdone. The manger of the economy has to be flexible and continuously exercise judgment as he nurses the economy back to health.

In Western medical practice, the patient is more likely to be put on one set of drugs over an extended period, based on the notion that he suffers from a certain disease for which drugs have

been specifically developed. Of course, it is also possible for the patient to be treated by several Western specialists at the same time, in which case there would be a need to coordinate and manage their treatments, something not easily achieved in practice.

Science and Culture in Medicine: Comparing Chinese and Western Paradigms

The paradigms of Chinese medicine developed from ancient cosmological models like *yin-yang* and *wuxing*; such models permeate many aspects of Chinese ethical and political culture as well. At the same time, the Chinese empirical tradition embodied in the *Neijing*, which attributed illness to natural and emotional causes, required these models to be consonant with empirical observations of effective therapies based on them. The wellspring of the Western medical tradition was the analytical and logical cultural tradition of ancient Greece and Roman, brought to their full bloom following the Scientific Revolution in 16-17th century Europe. While the paradigms of these systems of medicine occasionally show superficial similarities, they are largely incommensurable paradigms in the sense of Kuhn and attempts to find ways of transforming one paradigm to another are likely doomed to failure. A comparison of these paradigms as briefly outlined below is beyond of scope of this essay. I merely provide a list to interest the reader in the superficial similarities and the stark differences. However a preliminary discussion comparing *bianzhenglunzhi* with western etiology and therapeutics will be attempted here as it hints at the cultural differences that contributed to their acceptance within each system of medicine.

Table 3
Comparing Paradigms

TCM	**Western**
Models and Theories:	
1. Yin Yang Principle	Homeostasis: physiological process by which internal systems of the body are maintained in equilibrium
2. The Five-Phase Model	No equivalent paradigm
3. The Five Organ Systems	Organs and functions in human physiology
4. The Mind-Body Model	Psychosomatic medicine
Concepts and Entities:	
5. Channels and collaterals	Nervous system and circulatory system
6. *Qi, jinye* and blood	Blood, cells, lymphatic fluids, secretions
Diagnostic and Therapeutic Principles:	
7. *Bianzheng lunzhi*: diagnose & treat syndromes; Holism	Etiology; diagnosis and disease treatment Cellular biology; human genome model
Examination by questions, visual inspection, olfaction and palpation	Examination by questions, stethoscopic visual examination, and laboratory tests

The seventh TCM paradigm — diagnosis of syndromes and therapy aimed at resolving these

syndromes (*bianzheng lunzhi*) — stands in marked contrast to its Western counterpart, and may contain one of the explanations for the longevity of TCM.

TCM techniques of examining patients is based on "the four examinations" or *si zhen* 四诊 (望闻问切) — visual (face, tongue) and olfactory observations, asking questions, and pulsation.[60] It may be viewed as a mapping process: each question on the patient's feelings of tiredness, cold or warmth, bladder and bowel movements, appetite, dietary and sexual habits, and every detail from inspection of the face and tongue and from pulsation, is a point on the map that eventually differentiates the syndrome. Western clinical examinations involve less detailed visual and tactile inspection, and relies somewhat on laboratory diagnostic tests. At the basis of the difference is the Chinese principle of holism and Western reduction of etiology to the cellular level. TCM views illnesses as imbalances and/or *qi* blockages, discernible from how the patient's condition presents itself externally, whereas Western medicine reduces it to the microscopic level.

The Chinese holistic approach is reflected in a dictum taught to students on the advantage of TCM: "Chinese medicine differentiates syndromes, Western medicine differentiates diseases" (*zhongyi bian zheng, xiyi bianbing* 中医辨证, 西医辨病).[61] Sivin and Farquhar both see this Chinese focus on patterns (syndromes) as a medical practice built around dynamic processes as illness develops in the body rather than, as in Western medicine, the manipulation of nosological "bounded structures".[62]

Kuhn's remark in *Structure* on scientific revolution may be pertinent here: "*The man who first saw the exterior of the box from above later sees its interior from below*"[63] Seeing from above gives the holistic view in medicine in traditional medicine, from below the microscopic view of Western medicine.

Advocates of Chinese medicine also see pattern differentiation in TCM as an advance over (Western) medicine based exclusively on treating symptoms without an underlying explanatory theory (advocated by Empiricists of the Hellenistic era) or the abstract and theoretical nosology of modern biomedicine.[64]

My view is that differences between the Chinese and Western paradigms are real but exaggerated. In the first place, the modernization and systematization of Chinese medicine, culminating in the grand paradigm of *bianzheng lunzhi* in the 20th century, was a response to compelling science in Western medicine. In fact, Western physicians had an input into the formulation of *bianzheng lunzhi*.[65] Second, Western medicine also has a holistic aspect: the practice of family medicine requires the physician to look at the patient as a whole and identify inter-linked problems, including emotional states and daily living habits that do not always catch the attention of the

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[60] Sivin (1987), 291-327.

[61] Scheid (2002), 202.

[62] Sivin (1987), 105-117, Farquhar (1994), Scheid (2002), 201.

[63] Kuhn (1970), 111.

[64] Farquhar (1994: 70, n11) comments that *bianzheng lunzhi* represents "a very deep epistemological divide" between Western and Chinese medicine.

[65] Scheid (2002), 281.

specialist. Nor is contemporary TCM invariably holistic: a Chinese physician who discovers a malignant tumour in a patient would usually refer him to an oncologist for surgery and chemotherapy or radiotherapy and think about treating the patient for new syndromes only following Western treatment.

The major difference between the two paradigms lies in how the physician organizes information available to him to fit patterns that accord with his medical models. For example, a patient with influenza is seen by the Western doctor as having a virus and might be treated with an anti-viral drug (such as Tamiflu) to shorten the life of the virus, but usually is offered only symptomatic relief: expectorants for cough, and analgesics for pain and fever. The TCM physician maps the patient's symptoms, sees heat, phlegm, and a dominant *yang* in his lungs, and classifies his as a lung *shi* (repletion) heat syndrome, to be treated with heat-reducing and dampness–resolving drugs.

A patient given either method of treatment usually recovers from the virus. He then enters a post-flu stage when he feels drained and suffers from a lingering cough, sometimes for weeks. Many TCM physicians feel that it is at this second stage that the TCM physician comes into its own. The Western physician deems the flu virus gone and the illness over, and prescribes a cough suppressant to make the patient more comfortable and advises him to get more rest. The TCM physician sees a new syndrome: the patient's *qi* level and the *yin* of his lung have been damaged, causing lassitude and a dry cough. He now exhibits the lung *qi* depletion syndrome. The treatment is *yangyin yiqi* 养阴益气: nourishing the *yin* to improve secretions in his throat and repletion with a *qi* tonic.

Another practical difference between the two paradigms is reflected in the Chinese principle, "*yibing tongzhi, tongbing yizhi*" 异病同治，同病异治 (Same treatment for different diseases, and different treatments for the same disease). Thus a patient with a chronic cough and another with stomach dyspepsia could be treated with the same prescription like *shenlingbaizu san* 参苓白术散, a tonic for the *qi* of the spleen. This is because the patient suffers from splenetic *qi* depletion. Depending on each patient's constitution, in one case it leads to dyspepsia, in the other (through the five-phase relationship) to a cough. After ruling out bacterial infections through throat swabs, Western treatment would likely offer the first a cough syrup and the second antacids and anti-spasmodic drugs. TCM physicians would view Western treatment as only suppressing the symptoms and waiting for the patient's own system to overcome it. They regard the Chinese treatment as addressing the root cause of weakened *qi* and offering a more lasting cure.

The Longevity of Chinese Medicine

Holism and *bianzheng lunzhi* may be a key reason for the survival of TCM in the face of tremendous advances in biomedicine in the last century. TCM commands a significant following

in China and many countries that are no longer technologically backward.[66] Thriving TCM practices are also increasingly to be found in the bastions of Western medicine like Australia, the UK, Germany and the US. Why has TCM survived when Galenic medicine all but disappeared a century ago?

The legacy of Greek spirit of inquiry into the ultimate nature of things led to great scientific advances and the rise of modern Western medicine. TCM, on the other hand, stagnated at diagnosis based on external manifestations of body conditions detectable by visual and tactile observation and detailed questions. This was the main method open to the TCM physician in ancient times, given his ignorance of biomedicine, but it provided him with a holistic framework.

Ironically, it even could lend him an advantage treating many commonplace ailments for which the modern Western doctor, distracted by his formidable arsenal of high technology diagnostic equipment, may not see the whole picture presented by the patient. As the old adage intimates: 不知庐山真面目，只缘身在此山中 (I cannot know the true face of Mount Lu, but only because I am in the midst of that mountain.)[67]

Where Western medicine, in its preoccupation with the cellular level, sometimes misses the overall picture, TCM fills a gap by relating the whole picture to underlying syndromes. At least from the patients' perspective, TCM has been able to treat some illnesses well enough to retain a significant role not only in China but also in more economically advanced cultures like those of Japan and Korea.

Based on anecdotal evidence provided by patients who visit TCM clinics, TCM treatment has been sought after for troublesome ailments like the irritable bowel and chronic fatigue syndromes, chronic dry coughs, difficulty in achieving pregnancy owing to body imbalance, and immune systems ravaged by chemotherapy.[68] TCM is likely to continue to provide an alternative method of treatment for common ailments that do not require surgical intervention or the use of special drugs targeting specific germs like the tubercle bacillus. By emphasizing the importance of body balance to prevent illness, it finds followers who want simpler formulas to maintain health in the face of vast and sometimes confusing information offered by biomedicine. There may be some evidence of this in the growing practices of Chinese physicians and acupuncturists in Australia, Europe and the United States.

In the West, it is customary to place TCM in the category of "alternative medicine" together with homeopathy, naturopathy, aromatherapy, and chiropractics. But even Ernst at the University of Exeter, described as "the world's first professor of complementary medicine" and co-author of a recent book that labels most alternative medicines "bogus", hesitates tarring TCM with same

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[66] In 2007 there were 206,842 registered TCM physicians in China; with supporting staff, they made up 10.01% of healthcare employees (Source: China Ministry of Health).

[67] Sudongpo's *Ti xi lin bi.*

[68] Most of its claimed success is anecdotal, but in the last 25 years there have been many academic studies suggesting TCM's efficacy for various ailments, eg. Zheng (1985) and Chen, et al (2008).

brush: "TCM is difficult to evaluate. Some elements may be effective..."[69] He is not alone in this. The effect of Mao's policy to preserve TCM has spawned dozens of colleges of Chinese medicine in China and other countries staffed by researchers well trained in the modern sciences. Their research programmes have not led to sweeping conclusions about TCM.

> In this regard, Feyerabend's citing of the success of acupuncture in the West and his warning 25 years ago against the arrogance of imposing the norms of Western science indiscriminately is still relevant[70]

Historical and sociological explanations for the longevity of TCM may well be equally important. Among these would be government policy in China to preserve Chinese medicine and integrate it with Western medicine and the state resources that TCM enjoyed as a result. In countries like Korea, Japan and Singapore, TCM is holding its own against Western medicine, albeit not as the mainstream mode of health delivery. This could be partly because the language and concepts of Chinese medicine are derived from Chinese philosophy and East Asia countries have in one way or another been influenced by Buddhist, Confucian and Daoist philosophies embedded in their languages and cultural practices. Hence their peoples are better able to relate to explanations by TCM physicians of their illnesses and treatments given. Confidence in the physician and understanding of what he does is half the battle won for the patient.

The fact that TCM continues to have a worldwide following is no protection against its being eventually supplanted. Over half a century after Mao ordered it to be preserved and modernized by combining it with Western medicine, TCM is facing what looks like Kuhnian crisis for some of its key paradigms. The debates that raged in the 1930s have been revived in China and there are renewed calls for the phasing out of TCM, preserving only those therapies like acupuncture and selected herbal remedies that appear effective, but subjecting them to the rigours of biomedicine and evidence-based medicine.[71] Some of these studies have begun to throw doubt on accepted wisdom in TCM, including the efficacy of acupuncture for treating pain.[72]
One of the core paradigms of TCM, the five-phase model, has been the subject of criticism. Originally, it was attacked by Western-trained doctors who complained that it implied so many mutual interactions that "it could explain everything but really explained nothing."[73] But more

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[69] Singh and Ernst (2008), 328. Recently the NHS in the UK has recognized the efficacy of acupuncture for treating back pain (*The Times*, 27.5.09).

[70] "We have become acquainted with methods of medical diagnosis and therapy which are effective (and perhaps more effective than the corresponding parts of Western medicine) and which are yet based on a ideology that it radically different form the ideology of Western science…phenomena such as … acupuncture may eventually be absorbed into the body of science and may therefore be called 'scientific'. But note that this happens after a long period of resistance….(When) the Chinese communists refused to be intimidated by the judgment of experts and ordered traditional medicine back into universities and hospitals there was an outcry all over the world that science would now be ruined in China. The very opposite occurred: Chinese science advanced and Western science learned from it." Feyerabend (1974), 60.

[71] See, for example, Zhang Gongyao 张功耀 (2006) and Fang Zhouzi 方舟子 (2007).

[72] Singh and Ernst (2008),67-88

[73] Qu (2005),113

recently, even prominent TCM scholars, including Ren Yingqiu and Deng Tietao, have called for its review as some of the correspondence relationships prescribed by the model do not accord with observations of clinical practice.[74] Deng suggests replacing the five-phase model with a list of empirically-observed organ relationships that have been found useful in clinical practice, which would effectively exclude more than half the permutations of relationships implied by the model. The displacement of the five-phase model would strike at the heart of TCM theory, and could in turn call into question the five-organ paradigm that is an important basis for the differentiation of syndromes.

Should some of TCM's major paradigms fall and be replaced by new ones that draw on modern knowledge in the biological sciences, as they eventually must, Thomas Kuhn could be quietly pleased.

References

Baltas, A., Gavroglu, K. and Kindi, V. (1997), 'A Discussion with Thomas S. Kuhn: A Physicist Who Became a Historian for Philosophical Purposes', *Neusis*, 6
(Spring–Summer 1997): 145–200.

Bardsley, James L. (1845), Diabetes, in Dunglison, Robley, ed. (1845), Cyclopaedia of Practical Medicine, American edition, vol 1, 606-625. Philadelphia: Lea and Blanchard (cited in Cordell Carter (2003) 1:11, 20.)

Barnes, B. (2003), 'Thomas Kuhn and the Problem of Social Order in Science' in
Nickels (ed) (2003).

Barnes, B., Bloor, D. And Henry, J. (1996), Scientific Knowledge: A Sociological Analysis, London.

Carter, K. C. (2003), The Rise of the Causal concepts of Disease, Ashgate.

Chang Cunku (2004), History of Chinese Medicine, Zhongguo yiyao chubanshe.

Chen, R , Moriya J, Yamakawa, J et al. (2008), "Traditional Chinese Medicine for Chronic Fatigue Syndrome", Evidence- Based Complementary and Alternative Medicine., eCam advanced access, February 27, 2008.

Clow, B. (2001), 'Who's Afraid of Susan Sontag? or, the Myths and Metaphors of Cancer Reconsidered', Social History of Medicine (14) 2:293-312.

Conant, J. and Haugeland, J. (2000), editors: Kuhn, T. The Road to Structure, Chicago.

[74] Deng (1988); 张军 (2005) writing on Ren Yingqiu

Cumston C G (1926), 'An Introduction to the History of Medicine', London: Kegan, Paul, Trench, Trubner & Co Ltd.

Cullen, C. (2001), 'Yi'an: the origins of a genre of Chinese medical literature' in Elizabeth Hsu, editor, Innovation in Chinese Medicine, Cambridge University Press, 2001.

Deng Tietao (1988), Lue lun wuzang xiangguan qudai wuxing xueshuo (On replacing Wuxing theory with the Theory of Five-organ Relationships), Journal of the Guangzhou University of Chinese Medicine, 1988 (2).

Deng Tietao (2004), Yian yu yanjiu (Medical Cases for Research), Renmin weisheng chubanshe.

Edelstein, L. (1967), "The Methodists". See Temkin and Temkin, 173-191.

Evans, Alfred S. (1993), Causation and Disease: A Chronological Journey. New York: Plenum Publishing.

Fang Zhouzi (2007), Piping zhongyi (A Critique of Chinese Medicine), China Xiehe Medical University Press.

Farquhar, J. (1994), Knowing Practice: The Clinical Encounter in Chinese Medicine. Boulder: Westview Press.

Feyerabend, P. (1974), "How to Defend Society against Science, " speech to the Philosophy Society of Sussex University, Nov. 1974; revised and published in Klemke, E.D., Hollinger, R. and Rudge, D.W. Introductory Readings in the Philosophy of Science, Prometheus Books, 1998.

Forrester, J. 91996), 'If p, then what? Thinking in cases', History of the Human Sciences 9 No.3, 1-25.

Forrester, J. (2007), 'On Kuhn's Case: Psychoanalysis and the Paradigm', Critical Inquiry, Summer 2007, 782-819.

Grmek, M. D., ed. (1998), Western Medical Thought from Antiquity to the Middle Ages, Harvard.

Guyatt, G., Cairns, J., Churchill, D. et al (1992), 'Evidence-based Medicine', Journal of the American Medical Association, 268, 2420-2425.

Gyory, T. von (1905), Semmelweis' gesammelete werke, Jena: Gustav Fischer: 94, cited by Carter (2003:49).

Hacking, I. (1992), 'Style for Historians and Philosophers' Studies in History and Philosophy of Science, 23 (1992): 1-20.

He Jing (2005), Problems in the development of traditional Chinese medicine from the point of view of Kuhn's model of scientific change," Journal of the Guizhou College of TCM, 2005, 27(1):7-10.

He Yuming (2005), Treatise on the Methods of Chinese Medicine, China Xiehe Medical University Press, 2005.

Hempel, Carl G. (1968) Philosophy of Natural Science. Prentice-Hall:3-8.

Henle (1844), 'Medicinische Wissenschaft und Empire', Zeitschrift fur rationale Medizin, 2:287-412.

Hesse, M. (1967), 'Models and Analogies' in Paul Edwards (ed), Encyclopedia of Philosophy, Macmillan.

Huangdi Neijing ("Neijing") trans Wu, N. and Wu, A. (1997), The Yellow Emperor's Canon of Internal Medicine, China Science and Technology Press.

Huang Jianping (1995), Methodology of Traditional Chinese Medicine, Beijing: New World Press.

Johnston, I (2006), Galen: On Diseases and Symptoms, Cambridge, 2006.

Kuhn, T. (1970), The Structure of Scientific Revolutions, revised edition, Chicago.

Kuhn, T. (1974), "Second Thought on Paradigms," reprinted in The Essential Tension (1977), 293-319.

Kuhn, T. (1977), The Essential Tension. Chicago, 1977.

Kuhn, T. (2000), The Road to Structure. J. Conant and J. Haugeland, eds, Chicago.
Kuriyama, S (1999), The Expressiveness of the Body, New York: Zone Books.

Lei, S. (1999), "When Chinese Medicine Encountered the State, 1910–1949, PhD dissertation, U of Chicago, 1999.

Lei, S. (2002), How Did Chinese Medicine Become Experiential? The Political Epistemology of Jingyan, Positions 10:2, Fall 2002, 335-338.

Liu Lihong (2003), Shikao Zhongyi (Thoughts on Chinese Medicine), Guangxi daxue chubanshe.

Lloyd, G. E.R. (ed) (1983), Hippocratic Writings. Penguin classics, 1983. Introduction by G.E.R. Lloyd.

Lloyd, G.E.R. (1996), Adversaries and Authorities, Cambridge, 1996.

Lloyd, G.E.R. (2003), In the Grip of Disease, Oxford 2003.

Lloyd, G.E.R. (2007), Cognitive Variations, Cambridge, 2007.

Lloyd, G.E.R. (2006), Principles and Practices in Ancient Greek and Chinese Science, Ashgate.

Lloyd, G.E.R. and Sivin, N (2002), the Way and the Word, Yale University Press, 2002.

Lo, V. (2002), Introduction to Lu and Needham (1980), Celestial Lancets, reprinted by Routledge, 2002.

Lu Gwei-Djen and Needham, J. (1980), Celestial Lancets, reprinted by Routledge (2002) with an introduction by Vivienne Lo.

Needham, J (1978), Science and Civilisation in China, Cambridge, 1978, Vol II.

Needham, J (2004), Science and Civilisation in China, volume 6 Part VI: Medicine, Sivin, ed., Cambridge.

Needham, J. and Lu Gwei-Djen (1975), Problems of Translations and Modernisation of Ancient Chinese Technical Terms, Annals of Science, 32 (1975), 491-501.

.

Nickles, T. (1998), 'Kuhn, Historical Philosophy of Science, and Case-Based Reasoning' Configurations 6.1 (1998), 51-85.

Nickles, T. (ed.) (2003), Thomas Kuhn, Cambridge.

Nickles, T. (2003), 'Normal Science: From Logic to Case-Based and Model-Based Reasoning' in: Nickles (ed.) Thomas Kuhn, Cambridge, 2003.

Nutton, V (2004), Ancient Medicine, London, 2004.

Quin, C.E. (1997), 'The ideas of Thomas Kuhn in relation to medical advances in the sixteenth and seventeenth centuries,' Journal of the Royal Society of Medicine, Volume 90, April 1997.

Oxford Concise Medical Dictionary (2007), 4th edition, Oxford.

Popper, K. (2002), The Logic of Scientific Discovery, Routledge.

Porter, R. (1999), The Greatest Benefit to Mankind: A Medical History of Humanity from Antiquity to the Present, Fontana Press.

Qu Jiecheng (2005), Dang zhongyi yushang xiyi (When Chinese Medicine Meets Western Medicine), Sanlian shudian.

Reid, D. (2001), Traditional Chinese Medicine, Periplus.

Ren Yingqiu ed. (1986), Zhongguo Gejia Xueshuo (Schools of Thought in Chinese Medicine), Shanghai kexuejishu chubanshe.

Rothman, Kenneth J. (2002), Epidemiology. Oxford University Press, 9-10.

Sivin, N (1987), Traditional Medicine in Contemporary China, U of Michigan Press.

Rosenberg, A. (2005), Philosophy of Science, Routledge.

Sankey, H. (2008), Scientific Realism and the Rationality of Science, Ashagate.

Sontag, S. (1990), Illness as Metaphor and AIDS and Its Metaphors, New York.

Shahar, E. (1988), 'Evidence-based medicine: a new paradigm or the Emperor's new clothes?' Journal of Evaluation in Clinical Practice, 1988: 4, 227-282

Scheid, V. (2002), Chinese Medicine in Contemporary China: Plurality and Synthesis, Duke University Press.

Schwartz, V. (1986), The Chinese Enlightenment, University of California Press.

Singh, S. and Ernst, E. (2008), Trick or Treatment?: Alternative Medicine on Trial, Bantam.

Stebhens, William E. (1992), Causality in Medical Science with Particular Reference to Heart Disease and Atherosclerosis. Perspectives in Biology and Medicine, 36:97-119.

Stevens, R. (1983), Law School: Legal Education in America from the 1850s to the 1980s. Chapel Hill: University of North Carolina Press.

Taylor, K. (2005) Chinese Medicine in Early Communist China, 1945-63, New York: Routledge Curzon.

Tecusan, M (2004), The Fragments of the Methodists, Leiden: Brill, 2004.

Temkin, O and Temkin, C.L., eds. (1967), Ancient Medicine: Selected Papers of Ludwig Edelstein, Johns Hopkins, "The Methodists", 173-191

The Times (2009), 'Complementary therapies for back pain should be on NHS, says NICE', 27th May 2009.

Unschuld, Paul U. (1985), Medicine in China: A History of Ideas, California, 1985.

Unschuld, Paul U. (2003), Huang Di Nei Jing Su Wen, U of California Press, 2003.

Wang Xinhua ed. (2001), Zhongyi Jichulun (The Basic Theory of Traditional Chinese Medicine), Renmin weisheng chubanshe.

Wang Zhipu (2005), Qun jing jian zhi lu, Fujian kexue jishu chubanshe, 2005.

Wang Zhongshan (2003), The development of TCM from the point of view of Kuhn's theory of paradigms, 医学与社会 (Medicine and Society), Beijing: Ministry of Education: 2003, 16(2).

Wittgenstein, L. (1953), Philosophical Investigations, Oxford: Blackwells.

Worrall, J. (2002), 'What Evidence in Evidence-Based Medicine', Philosophy of Science, September, 2002.

Worrall, J. (2003), 'Normal Science and Dogmatism, Paradigms and Proress: Kuhn versus Popper and Lakatos' in: Nickles (ed.) Thomas Kuhn, Cambridge.

Wu Cangguo, ed. (2002), Basic Theory of Traditional Chinese Medicine, Shanghai U of CM Publishing House, 2002 (Chinese with English translation).

Zhang Gongyao (2006), 'Farewell to Traditional Chinese Medicine', Medicine and Philosophy, Zhongguo kexue jishu xiehui, 2006: (4).

Zhang Jun (2005), ('On Ren Yingqi's views on yin-yang and five phases on the development of modern TCM'), 1.9.2005.

Zheng Xian (1985), 'Observation of 42 cases of entero-susceptible syndrome treatetraditional Chinese medicine differentiation of symptoms and signs', Journal of Traditional Chinese Medicine, 1985; 26(2):36-37.

Humanism in Medicine[1]

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Y: Today the issue we will be discussing is concerned with the humanism in medicine. This issue is not only originated from a variety of puzzles in this special field, but it is also grounded in some wider intellectual tradition and the current status of society. In the present time, some passionate discussions about the health system reform in China are engaged more from the economic perspective and rest on the level of political decision and institutional design, and yet ignore the humanistic dimension in medicine which is arguably of much more importance. Given the dominance of ideas over people's mind and action, it would be seriously incomplete and halfway to ignore the dimension in question while reflecting on and discussing the issues present in the field of medical and health care.

Z: We insist that the health system reform should be reflected from the perspective of the humanism. That insistence is virtually to inquire into the final goal of the reform in question, for example, whether it is to increase the quality of medical service or strengthen the economic management in hospitals, whether it is to decrease the medical cost or improve people's health? Of course, it may be said that all these goals are interrelated to each other. However, we can still subtly discern the value orientation of different reform plans from the arrangement of various actual reforms of health system.

Y: If the establishment and reform of a health system had not yet fully taken into account the special requirements of the humanism in medicine, then it would give rise to huge problems. Now once medicine is mentioned, what one can usually has in mind is the high-tech medical equipments, ICU, laboratories, and so on – in a word, all those things that are brought to close to the field of science and technology. Accordingly, the humanistic dimension is becoming increasingly remote.

The relationships between the humanities and science & technology have incited many

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discussions either at home or abroad. And the humanism in medicine can be understood by placing it into this wide background. An important theme involved in these discussions is the birth and evolution of humanism. It is obvious that the theme cannot be fully covered by the short dialogue between us, and thus what we can do is only sort out several significances from this intellectual tradition of full vital force to discuss the humanism in medicine and its actual absence.

Ⅰ. Humanitarianism

Z: It seems to me that the first significance, namely, the most general one, is humanitarianism which may be understood as beneficence and universal love. Given the intrinsic nature and purpose of medicine, it may be said that it is a subject full of humanitarian tradition, and practicing medicine is also a profession filled with human kindness. Medicine provides help for people who endure bodily diseases and suffer from mental pains, and doctors' work rescues people from sufferings directly. Therefore, medicine is called "the art of beneficence" from the antique China, and is regarded as "the most beautiful and noble one in all techniques" in the west. The beneficence and universal love embedded in medicine is hardly directly embodied and reached in all other subjects.

Y: Sun Si-Miao, the most famous doctor in the ancient China, holds that a great doctor must first of all possess the deepest and widest heart of beneficence, and that such a doctor must swear to rescue the folk from diseases and sufferings. He feels himself in the same state when seeing that the patient is plagued because of disease, and he holds a deep sympathy for the patient from his inner heart. He must assume a universal love for every patient, whatever position the patient is in, whether rich or poor the patient is, whether beautiful or ugly the patient is. In diagnosing and treating the patient's disease, he should not consider his own gains and losses; instead he should save the patient with his whole-heart and all his skills. These remarks from Sun Si-Miao fully reflect his commitment to and endorsement of the humanitarianism implied in the medical profession.

Z: With the development of industrialization and urbanization, and corresponding growth in population, the beneficence and universal love in medicine is also extended from individuals to groups, from sparse personal service to the development of a social institutionalization. Especially, since the eighteenth century, humanitarianism has played the keynote for the foundation of the health system. The problem concerning the health of citizens was no longer simply a matter of the citizen's own, rather it was incorporated into the range of responsibilities of the state or the society, and thus securing the health of citizens also became a goal the government must seek for. Some scholars have established three most basic ethical principles as those which the state's health system must follow, namely, providing medical services on the basis of the needs, emphasis on securing the interest of the disadvantaged groups with respect to the distribution of medical resources, and respecting the right of citizens to health.

Y: However, I think that the sympathy and beneficence characteristic of medicine are not unlimited too, and in fact cannot be completely well done because of the limited resources.

Insofar as the issue of health is concerned, and especially since many diseases are closely related to the eating habits and the ways of living, it is also very important to insist on the responsibility one should take for one's own health. The new humanist Irving Babbitt once used a quite proper metaphor to describe the fantasy to solve all problems merely relying on the benevolent behavior: Doing so is much like grasping one's own hairs to leave the earth – it is practically infeasible, and it is even incompatible with justice.

Z: However, the modern government's responsibility for the basic medical security for all citizens cannot be weakened. Medical security is an important constituent of the whole system of social security, and it is also the basic precondition for promoting a harmonious society. In fact, according to the German pathologist Rudolf Virchow, politics is, in its widest sense, nothing but medicine.

Y: Exactly. When we evaluate the success or failure of the health system reform in China, we will have to ask the question: whether the government has taken its own responsibility for the reform or not? Recently the officials in the Ministry of Health acknowledged that the health service in China still doesn't meet the growing demands of people, and the gap between cities and rural areas with regard to the health service is still huge. The development in the cause of health service is seriously left behind the economic and other social causes, and thus faced with serious challenges.

Z: From this it can be seen that in the present discussion of the health system reform in China, the administrative departments in question have come to realize that improving the health of the whole citizenry is an important goal of national economy and social development, and it is also an incumbent and inviolable duty for the cause of health service.

Ⅱ. Cultivation of Ideal Humanity

Y: In tracing the significances of humanism, we can sort out another meaning of it from the rich and yet confusing literal senses of its Latin's origin word "*humanitas*", namely, recondite learning, good upbringing, delicate taste, balanced awareness, deliberate conduct, and so on.

Z: Hippocrates，the father of medicine, once held that a doctor should possess all the qualities an excellent philosopher has, such as altruism, ardor, noble performance, the ability to do serious thinking and make cool judgment, leading a pure and simple life, having all the knowledge useful and necessary for living, lack of jealousness, and the like.

Y: This is a demand for an integral personality, and also a description of ideal humanity. Then, how can a doctor meet the demand? The answer, I think, lies in the education of the humanities.

In fact, the term '*humanitas*' borrows its very sense from the Greek word '*paideia*' which is related to the upbringing and training of humanity, and somehow similar to the ancient Chinese understanding of the '*Renwen*', which means the cultural cultivation of human beings in Chinese. The appeal to humanism in the Renaissance contains the study and education of classical

humanities. In talking about the term of the humanities, it refers roughly to such subjects as literature, history and philosophy, which occupy a very less weight in the curriculum of the students majoring in science, engineering and medicine in China today. This gives rise to a very serious problem, embodied in the fact that those students do not concern themselves with the relationships between their majors and general culture, and between their majors and social problems. Consequentially, they are universally lacking in the humanistic concern. This problem is especially serious for those who are either medical students or medical professionals, for medicine does not simply have the character of natural science, but it is also filled with the humanistic dimension in itself. In fact, this dimension is internalized in the research and practice of this subject.

Z: It is for this reason that in the recently revised edition of *Cecil Textbook of Medicine*, medicine is described as a humanitarian profession which calls for erudite learning. In the WHO's guidelines for the quality of the education of medical students, medical humanities are listed as core courses in contemporary medical education.

The demands of contemporary medicine for doctors are constantly increasing. Since 1970s, the transformation from biomedical model to bio-psycho-social model has begun to change people's views about health, disease, life and death in a fundamental way. In the scenarios of contemporary medicine, a doctor does not simply plays the role of providing medical and health care, that is, providing medical services on the basis of the diagnosis, treatment and healing of patients. In addition, a doctor should play the following important roles: decision-maker, namely, making comprehensive consideration and rational choice of new medical technologies from the perspectives concerning morality, cost, and so on; health-educator, that is, a doctor is not merely to diagnose and treat disease, but he/she should take the task of health education, effectively strengthening people's awareness of protecting their health; community-leader, namely, the ability to participate in making decisions about community health care, balance and coordinate the requirements of individuals, community and society for health care; service-administer, that is, promoting the development of the cause of heath service in conjunction with medical departments and other social institutions.

The "five-star" standard for doctors actually reflects the whole quality the new medical model requires doctors to have. In other words, only those doctors who possess both solid and wide knowledge and humanistic concern can win the patients' trust, and undertake the social responsibility of contemporary medicine.

Y: It is evident that such a "five-star" doctor will not only immerse himself/herself in clinic, sickroom, and labs; instead he/she will be self-consciously concerned with social reality, and has his/her own voice to speak out in such events as the health system reform since it is what he/she is supposed to do.

The change in medical model you just mentioned is indeed an important event in the development of medicine. The new model requires not only that a doctor have the whole quality mentioned before, at the same time it also requires that the doctor regard the patient as one of

integrity to deal and treat with. I remember that Prof. Wu Jie-Ping once said that what doctor seeks to look after is "a *person* with disease", not merely "the disease a person suffers from".
Z: This remark is very incisive. In fact, it is common to the ancient eastern and western medical thinking to insist on the integrity of human body, and on the harmonious unification between human body and nature. A doctor not only should take care of the diseased part, but he/she also should promote the healing of the patient from a holistic point of view. Because the discomfort in the patient's body can also result in mental pains, the patient will suffer from double oppressions both in body and in mind. So, doctor's comforting of the patient's mental pressure will also be helpful for the healing of the patient's bodily disease. Ancient doctors emphasize that curing disease is inseparable from caring for patient. Since medical resources in ancient times are very limited, such emotional concern as sympathy, care and comfort for the patient will be more important.

On the other hand, insofar as diseases are themselves concerned, the factors influencing their occurrence, development and crisis are multiple-dimensional. Hippocrates holds that climates, terrains, and natural environments can have great influences on human constitution and health. In the ancient Chinese medical classics *Huang Ti Nei Ching*, it is also indicated explicitly that diseases are influenced by such factors as seasons, ways of living, emotions, chaos caused by wars, and so on. Thus, Sun Si-Miao holds that one needs to have many-aspect knowledge in order to become an excellent doctor – one needs to have some deep understanding of not only medical classics and herbal books, but also general history, philosophy and culture.

Y: Therefore, in order to increase the integral quality of doctors, at the present, many medical schools in China have begun to put emphasis on the education of medical humanities which include the history of medicine, philosophy of medicine, medical ethics, and so on.

Z: Exactly. However, insofar as the current status of medical education in China is concerned, the education of medical humanities should not be seen as a kind of decoration, instead it should be viewed as something urgent and mandatory. The tensions, controversies and lack of trust between doctor and patient can be attributed to the indifference to the humanism in medicine. The deeper reason of the indifference can be traced back to some philosophical assumptions in modern medicine, which we can make some further inquiry into.

Ⅲ. The Self-Understanding of Human Beings

Y: By "modern medicine", it is meant the medicine subsumed under the paradigm of modern science, namely, the so-called 'scientific medicine'. The Scientific Revolution occurring in Europe during the sixteenth century and the seventeenth century founded the basic framework of modern science, and at the same time offered a mechanized picture of the world. In Newton's eye, the world is no longer an organism that is in the process of constant change and generation, instead it is a huge machine that operates in accordance with natural laws. This metaphor covers the whole organic world, including human beings.

The Cartesian thesis that the human body is an automatic mechanism and the dual distinctions,

resulted from his dualism, between mind and matter, reason and emotion, freedom and necessity, create a series of philosophical puzzles. However, for the new science built on mathematical and experimental basis, it seems that things are so evident, and human reasons are so thorough in uncovering the secrets of nature. Alexander Pope's exciting poem is repeatedly incited to applaud that the appearance of Newton makes everything evident as light.

Francis Bacon, a forerunner just important as Descartes, proposed the view that the value of knowledge growth consists in its use for human beings. The acquisition of knowledge is not only for the purpose of discovering the secrets of nature, but it also should help human beings to control and manipulate nature, so that it can provide comfortable and pleasant lives for human beings.

Owing to the gradual combination of science and technology after the Scientific Revolution, and the unification and socialization of science and technology brought about by the "big science" of the twentieth century, human efforts to make use of nature by controlling and altering it on the basis of the power of high-techs seem to have achieved unprecedented success.

Z: It is these ideas and practices above mentioned that ground the birth, development and existence of modern medicine: it is a quantified and precise science; it is built on the basis of experiments; it rests on and advocates the power of high-techs. Before that, diagnosis of disease merely drew on doctors' techniques of diagnosis. By contrast, in the last two centuries, huge changes have occurred in medicine, and various modernized instruments have become the foundation of medial diagnosis. Doctors' reliance on these instruments becomes more and more strong, and their focus of attention is transmitted from a holistic person to the local lesion and the related changes in data. The establishment of special disciplines and sub-disciplines in clinical medicine according to different situations or types of disease reduces a integral patient to the impairment or malfunctioning of some part of organism, and thus treats the patient as biological machine which is in the need of repairing and changing components. The reductionist approach of thought makes death seen as the deconstruction of molecules, disease as the abnormity of cells or molecular structures.

The development of specification of medicine is further embodied as the decomposition of medical procedure. In the terminology of modern medicine, the word "patient" is decomposed into such single word factors as causes, characteristics, and symptoms of disease, and the pain of the patient is transformed into quantified data and images in test results. Consequentially, the patient taken as a whole gradually disappears from the procedure of modern medical diagnosis and treatment. Even though the concern for patient is still mentioned, it has become a matter outside of the category of medical sciences. This is the leading reason why the humanistic concern in medicine becomes indifferent or even completely absent.

Y: In fact, in the Renaissance, early in the fourteenth century, Francesco Petrarch, who carried forward the humanistic tide of thought, had indicated in his "Charge of Doctors" that "if you are a machinist, then do what you are supposed to do, go to repair human body, as long as you can succeed." He criticized the doctors' attempt to "make the art of freedom subject to the art of

mechanism." The hope to have genuine understanding of human beings themselves and the concern with the human experience of living constitute the essential characteristic of early humanists. However, what the new science did is precisely the isolation and abstraction of human beings by means of using its universalized principles and methods and a series of dualist categories. A person is understood as characterized by universal and abstract reason, which is seen as what makes human beings as *human* beings, and which is thought to ascribe human beings the power to manipulate and control nature, human beings themselves included. However, reason is susceptible to becoming a purely instrumental power once reason is separated from special cultural context, and human beings are peeled off from the concrete traditions in which they live and from the emotional attachments which reason despises.

Z: Doctors pay more attention on the body of the patient and ignore the feelings of the patient, precisely because the matters of body can be measured while the matters of emotion cannot. Moreover, doctors believe that if the former kind of issues has been solved, then all other issues will also be solved. Rapidly renewed techniques of diagnosis and treatment make doctors spend more time immersing in labs, instead of listening to the statements of patients and talking with them beside their beds. The operating procedures in hospitals are rarely concerned with the feelings of patients, which may be attributed to the fact that the instruments that can effectively measure fears, plagues and disfavors have not yet invented. Medicine has been transformed from the art of talk into the application of silent skills. Even what are manifested from the patient's informed consent are also doctors' skills and strategies, and the written statement of this consent becomes a mere contract written in a paper which provides a procedural protection for doctors. This is the manifestation of the fact that instrumental reason dominates everything, while the so-called value reason is hidden out.

Y: In addition to reason, another key word we need to talk about is 'progress'. During and after the Scientific Revolution, mathematics, physics, chemistry, and biology all found what Kant calls "the secure path", and thus alternately step onto the royal road of progress. Scientific medicine, as distinguished from empirical medicine before it, also becomes an exemplar of progress. The world as understood in the ancient civilization is the one which constantly repeats itself in a circle or is in the process of constant degeneration and corruption. When the Scientific Revolution brings a brand-new climate, people feel that they can finally escape from the pessimistic taste which the old worldview brought. Time no longer, as Horace holds, derogates the value of the world; instead it promises a beautiful future for human beings: human beings can constantly make progress along a certain direction by means of their own power, and will finally entertain the conditions of universal happiness. Coupled with some rough and distorted understanding of biological evolutionism and constantly flourishing material life, this prospect ascribes progress with some inherent necessity in history on the one hand, and endows the necessity of progress with the humanity itself on the other. This is a modern understanding of humanity, and this understanding binds human beings to the roaring forward chariot with the sharp arms of science and technology, challenging and conquering nature. However, it can never self-consciously stop for a while, asking about the direction and the aim of going forward and the resulting consequences.

Z: In medical field, we are faced with the same thing. The thesis of technology perfectibilism, which is formed with the rapid development of medical technology, blocks people into the ambitious fantasy of medicine: everything that can be done must be done. It is held that human beings can win over all sufferings, all organs in a human being can be replaced after impaired just as components of a machine, and human being will finally be able to countermine death. In the war metaphor of modern medicine, disease, deformation and death are all enemies. But this metaphor ignores the fact that those things are closely intermingled with life itself, and intrinsic to the natural unfolding of life.

Y: The optimistic idea arose after the Second World War when several kinds of infectious disease were successively controlled under the use of antibiotics and vaccines. It is thought we can acquire the power to destroy disease with the constant progress in science & technology and the constant development in economy. However, the expectation in question, just as other expectations of progress in wider domains, breaks down like soap bubbles.

In the present, the spectrum of diseases has changed a lot. In many areas of the world, the morbidity and mortality of non-infectious diseases such as cancers, hypertension, diabetes, and depression are rising. The appearance of aged society makes it that a large portion of social members is in the state of extending their life with disease. Certain infectious diseases which had been under control now begin to arise from the dead ashes, and at the same time new infectious diseases constantly emerge. Insofar as the prevention and treatment of infectious diseases are concerned, if we were to continue to use the war metaphor, then there would always be some arms race between human beings and pathogenic microorganisms. Given the evolutional advantage of microorganisms, what we can say at the moment is only that this is a war whose success or failure cannot be foreseen. Modern means of diagnosis and treatment are indeed much richer than before, yet we will still feel our nail-biting in the face of the current status of development in the spectrum of diseases.

Z: This reminds me of the saying that “sometimes to cure, and often to help, and always to comfort”, which got its birth from the past times when the means of diagnosis and treatment are seriously limited, and yet which is, in my view, also applicable to the present. Helping those who are disabled and dying and who are prolonging their lives with diseases to adapt to their limited lives, requires medical workers to give patients emotional care and humanistic concern.

Ⅳ. In the Name of Innovation

Y: “Progress” as the inherent historical inevitability is after all a dazzling illusion, just like a beautiful myth. Genocide, power politics, terrorism, ecological crises, social injustice, gap between the rich and the poor still live with us, and even become more and more serious in some aspects. All these aspects constitute direct or indirect threat to human health and life. In 1977, the World Health Conference made the strategic goal of “all people for health in 2000”, and yet the goal is still far way from its realization thus far. The universal happiness promised by the idea of progress is so remote that it has been seen as an idea in its thorough death.

Nevertheless, an alternative surfaced in the last decades of the twentieth century – innovation. In nowadays, information technology and biological technology are two areas with the greatest investment. We are encircled by various new play-things that are highly priced and dazzling so that we cannot recognize ourselves clearly. Elites in these areas drive their chariots rushing forward, seek for such goals as technological breakthrough, stock coming into market, corporation development, and so on. In the field of medicine, companies of biological technology and pharmaceutical ones are being busy in studying high-tech new products. What the brand of innovation brings is a huge space of profits.

Z: Modern health system is transforming itself into "medical-industrial complex" which is controlled by those companies in question together with the medical circle, whose goal is "high-techs – high costs – high profits". A potential motivation for advocating the high-techs is for the purpose of seeking greater economic profits. Some western scholars point out that medicine is "led by elite that sometimes seems primarily interested in extending its technical prowess, with scant regard for ends and values, or even the individual sufferer". According to another sharp criticism, just as we don't believe that ammunition industry is aimed to protect the security of the state, we will also hardly believe that the industry of medical and health care is aimed to promote people's health.

Y: Recently the question is repeatedly emphasized in the UN Development Report of Human beings: why are the technological improvements and innovations that can help the poor always so sparse? Technological elites seem to have never considered the question; on the contrary, they are quite satisfied to see that the gulf between the need of the ordinary people and technological innovations become more and more huge.

Z: It should noticed that at the present certain 'high-techs' that are extremely cried up are in fact neither brilliant nor highly effective – they are only highly priced. American famous medical scientist Louis Thomas calls them 'half-way technology'. For example, after a bypassing operation, the coronary artery frequently narrowed down again, thus does not increase the living quality of the patient. According to a report from US, 30% – 40% of the total operations should not have been performed; among thousands upon thousands drugs, only 10% is effective, 30% is dispensable, and 60% is completely ineffective. A similar investigation in UK shows that there are only 15% medicaments that are really effective. The partial propaganda of medical advertisement and the demands under the doctors' inducement lead to a modern superstition. To break down such superstition, the government's policy orientation and some necessary protective intervention will be needed in order to assure that the right of the public to basic health care is not impaired.

Y: It is noticeable that relying on medical equipments blindly without undertaking comprehensive examination of patients and inquiring into their medical history often leads to the misdiagnosis. I learn from some statistical data in China that the rate of misdiagnosis is basically ranged between 30% and 40%, which has no big difference from the data one hundred years ago.

Z: In addition, in the face of the patients who are dying in the ward, with artificial respirator and

various catheters inserted to their body, people cannot help but ask: are these costly high-techs prolonging their life or their death? Even if medical cost is positively proportional to the survival time of life to some extent, it will not necessarily improve the quality of life and the conditions of health. Medicine should keep a reasonable tension between overcoming death with any price and accepting the fact that death is the fate of human beings. People have begun to realize that it is flawed to protect and prolong life merely by relying on medical technologies, and doing so will result in the abnormal development of the cause of health care, and creates unbearable economic burdens on the patient and society as well.

Y: We are faced with medical crisis, as Daniel Callahan so calls it: medical costs are running up year after year, while people's demands for health are far away from satisfied. What especially makes people feel uneasy is that the vulnerable groups in the society are not guaranteed with regard to their basic medical care. Loss of universal sympathy, abandonment of responsibility, partial understanding of human nature and so on; all these things suggest that the humanism in medicine is being lost. At the same time, they are revealing some dilemma with which the humanism is faced. We have to reexamine such crucial notions as reason and progress, which bring human beings into the modern era, and characterize this era. We are looking forward to a possible solution to these issues, and perhaps such a solution lies in our ideas and practices.

Two Cultures and Beyond

Interview with Guy Ortolano

Guy ORTOLANO*
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Haiyan YANG*
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GO: Guy Ortolano
YH: Yang Haiyan

YH: First of all, would you please introduce yourself to the readers of JCS and why you choose to study history?

GO: I teach modern British history and the history of science at New York University. I grew up in Stone Mountain, Georgia (notoriously home to the Confederate Mount Rushmore, now part of the endless suburbs around metropolitan Atlanta), and went to college at the University of Georgia. I bounced around between majors during my first year, until I became fascinated by a survey of modern European history. The professor of that survey was Kirk Willis, a specialist in British intellectual history, and when I carried on in the major, eventually writing an undergraduate thesis, I continued working with Dr. Willis. My thesis examined the British reaction to the news of the atomic bombings of Japan at the end of World War II (a reaction that was remarkably optimistic, with grandiose predictions of atomic cookers and cars, despite the destructive nature of atomic energy's debut), and this topic stimulated an interest in public attitudes towards science and scientists more generally. I applied to graduate school to study modern British history, cultural and intellectual history, and the history of science, a combination that led almost inevitably to Northwestern University (just north of Chicago). There I had the chance to learn from a remarkable group of scholars and teachers: Bill Heyck in modern British history, Ken Alder in the history of science, John Bushnell in European history, David Joravsky in intellectual history, and Alex Owen, Sarah Maza, and Ed Muir in cultural history. I completed my dissertation in 2005, and taught at Washington University in St. Louis and the University of Virginia, before arriving at NYU in the fall of 2009.

YH: Which are your main interests in this field?

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GO: My general interests include modern Britain, science and technology, and cultural and intellectual history, and more specifically I am interested in such topics as the 1960s (better understood, perhaps, as "the Sixties," since the developments it refers to reach into the following decades), the New Left, neo-conservatism, meritocracy, and the problem of national "decline" (about which I'll say more in a moment). I am now becoming interested in certain aspects of urban history, especially in the intersection between state planning and Modernist aesthetics during the twentieth century, and I continue to work on the history of academic disciplines such as history, literary studies, and, currently, modernization theory. Looking over that list, it's not obvious what connects it all together, except to say that one of my preoccupations is the way that the history of the recent past can look surprisingly unfamiliar – and that is the case, I think, in the history of the "two cultures" controversy, the subject of my first book, and the history of British New Towns, the subject of my current research.

YH: This year Cambridge University Press published your book *The Two Cultures Controversy: Science, Literature and Cultural Politics in Postwar Britain*. Congratulations! What are your main arguments then?

GO: The book's main arguments address three objects of study. The first is the notorious controversy between the scientist-turned-novelist C. P. Snow and the literary critic F. R. Leavis, which began with Snow's Rede Lecture in Cambridge, *The Two Cultures and the Scientific Revolution*, in 1959, reached new heights of acrimony with Leavis's Richmond Lecture, *Two Cultures? The Significance of C. P. Snow*, in 1962, and continued intermittently until a final exchange in the *Times Literary Supplement* in 1970. The question I pose is how a topic as familiar as the relationship between the arts and the sciences could have generated such controversy at this particular moment, and I answer that question by depicting their argument as an ideological conflict about competing visions of the past, present, and future. Then, having identified, described, and named those rival positions – namely, as competing versions of a meritocratic liberalism, one radical and one technocratic – I track the conflict between them in arguments over the mission of the university, the methodology of social history, the problem of national "decline," the future of the former British Empire, and the meaning of the Sixties. This is what I mean by "cultural politics" in the title of the book – the way that advocates of rival ideological positions competed to shape the interpretation of a whole range of issues – and, since these efforts took place between 1959 and 1970, this interpretation of the "two cultures" controversy also reveals the stakes of cultural politics in Britain during the 1960s more generally.

The second object of study is this period of postwar British history – roughly speaking, the three decades following the Second World War. This is not something that I initially intended to generalize about, but in writing the book I noticed fundamental similarities between Snow, Leavis, and their respective allies, and these similarities became even more evident as the 1960s turned into the 1970s. By that time the arguments and persons that had recently commanded widespread respect were becoming marginalized, giving the impression that they belonged to another era altogether. In their later writings and lectures Snow and Leavis responded to this development in identical ways, denouncing what they viewed as a modish concern for equality, and unfashionably insisting upon the need for elites of all sorts – indeed, this argument (rather

than the discussion of disciplines) comprised the majority of Snow's final statement on the "two cultures" controversy in 1970. Now, if you are thinking that this shift from remarks about disciplines to the defense of elites requires some explanation, I entirely agree – and in fact, making sense of this development emerged as one of the most interesting challenges in writing the book. Snow and Leavis had been born outsiders to the intellectual class, and as a result they emerged equally committed to meritocratic principles that promised to open institutions to individuals of talent. While this similarity is striking, the difference between them is crucial: Snow believed that modern society as it existed in Britain facilitated the realization of the individual's talents, while Leavis insisted that that very society threatened to eradicate the capacity for excellence altogether. Nevertheless, both Snow and Leavis believed that society should be reformed so to better identify and train intellectual talent, and in this regard they shared widespread assumptions about society and culture during the third quarter of the twentieth century – a period that I refer to as the "meritocratic moment" in British history. During the Sixties these meritocratic commitments came to be challenged by the advocates of more egalitarian ideals (for instance, in the areas of secondary and university education), and the currency gained by these arguments contributed to the eclipse of the reputations and arguments of meritocratic elitists like Snow and Leavis. They responded by adopting steadily more embattled tones over the course of the 1970s, and meanwhile a new generation of liberals required an alternative explanation for the fact of social inequality: an explanation they found, I suggest, in the marketplace thinking that flourished during the final quarter of the century.

The book's third object of study is the historical tradition discussing the relationship between the humanities and the sciences. Familiar installments in that tradition include the argument between Matthew Arnold and Thomas Huxley in the 1880s, and the so-called "science wars" of the 1990s, but there are many others – indeed, the conversation is very nearly constant, even if its tone only occasionally rises to the level that transforms it into a controversy. The Snow-Leavis debate represents one of those moments, and its significance within this longer history is that Snow provided the language through which this tradition came to be understood: as a conflict between "two cultures." The "two cultures," of course, are the sciences and humanities (or literature, or the arts – it changes over time), but that label is problematic because it organizes our understandings of a complicated and various tradition into a tidy dispute about disciplines. I have already suggested why I don't think that characterization explains even the argument between Snow and Leavis during the 1960s, much less those of Victorian Britain, 1920s China, late twentieth-century America, or anywhere else. So my argument regarding the relationship between "two cultures" and this historical tradition is at once negative and positive: *negative* because I argue against the adoption of "two cultures" terms as a way of explaining distinct episodes within that tradition, but at the same time *positive* because the frequent invocation of the "two cultures" can remind us to consider what else might be going in an argument ostensibly about disciplines.

Those are the three most general arguments of the book, but in addition each chapter makes a more specific argument. The first two chapters, on Snow and Leavis, argue that we should understand their arguments not primarily as the expressions of disciplinary loyalties, but rather in the context of more general ideological positions: for Snow, a technocratic liberalism, and for

Leavis, a radical liberalism. The third chapter situates their dispute within Cambridge micropolitics at the time, showing that Snow and Leavis both sought to use this moment of university transformation to translate their ideological visions into institutional forms; and it further shows that their contrary tactics in these efforts – Snow's clandestine maneuvering, Leavis's obstreperous defiance – were shaped by their contrary conceptions of how politics works. The fourth chapter identifies links between this controversy and the simultaneous revolution in social history, showing that certain methodological choices (such as whether the discipline of history should become more or less like a quantitative social science) were grafted onto prior political commitments. The fifth chapter relates the controversy to arguments about Britain's economic decline; it argues that "decline" is just one – and by no means the best – way of understanding postwar British history, one that adopts the assumptions not of disinterested economic analysis, but rather of a technocratic social critique. The sixth chapter relates the controversy to discussions about the future of the former British Empire, arguing that the new nation states of Asia and Africa could function in these conversations as imagined terrain: that is, as intellectual sites where arguments about Britain's past, the West's present, and the world's future all met in one place. And the seventh chapter follows Snow and Leavis as they encountered and resisted egalitarian demands, showing that they responded with equivalent discomfort, but contrary results, to challenges to their meritocratic commitments: Snow's response led down a path taken by the neo-conservative right, while Leavis's longstanding critique of marketplace thinking rendered his social critique available to the cultural and political left.

Generally speaking, then, the main arguments are the ideological (more than disciplinary) interpretation of the debate, the meritocratic (rather than declinist) interpretation of postwar Britain, and the deconstruction (rather than replication) of the "two cultures" tradition.

YH: Since the first wave of debate shortly after C. P. Snow's lecture, there has been a large accumulation of publications over the last five decades. What make your book different with them?

GO: The accumulation has indeed been enormous, and it shows no sign of abating: I would estimate that there were scores (if not hundreds) of commentaries in the early 1960s alone, and this year – the 50th anniversary of Snow's lecture – has seen yet another burst. I have written elsewhere about the differences between these approaches and my own (*Studies in History and Philosophy of Science* 39, 2008), which I would summarize by saying that my approach is *historical*. That is, many commentators engage with Snow by adopting, rejecting, or recasting the "two cultures" categories, and/or they engage with the exchange between Snow and Leavis by defending one side or the other. These approaches might superficially seem different, in that some endorse Snow while others denounce him, but from my perspective they are functionally similar because they all enter the discussion in which Snow and Leavis took part. I don't want to enter that discussion, I want to analyze it; I am interested not in the ways that Snow speaks to our world, but rather in the ways that he testifies to his world. I would not want to insist that this is the only sensible approach, but I do think it represents an improvement upon a half-century of clichés claiming that the two cultures pose a crisis, or that today's two cultures are this-and-that,

or that some new technology promises to bridge the two cultures, or that there are actually some other number of cultures (usually one or three). Snow's formulation has undeniably succeeded as a springboard for such discussions, but my hope is that a historical perspective might nudge those discussions forward rather than recycling their claims.

That is the situation regarding what we might think of as journalistic treatments of the controversy, but the difference between my book and most academic accounts is more easily specified. Again, the question I began with was, "Why did this familiar topic ignite such impassioned argument at this particular moment?" There are two predominant answers to that question. The first seeks to explain the controversy by adopting Snow's categories, arguing that this was a dispute between advocates of the arts on one side and the sciences on the other, but this explanation immediately begins to buckle: by the fact, for instance, that Snow's supposedly pro-scientific, anti-arts argument was championed in such places as the *TLS* (a literary periodical) and challenged in such places as *Nature* (a scientific journal); or by the fact that Leavis's supposedly anti-scientific, pro-arts argument was championed by the scientists Michael Yudkin and Michael Polanyi, and challenged by the writers William Gerhardi and Edith Sitwell. In other words, there must be some explanation other than a collision between disciplinary interests, and so a second predominant answer to my initial question situates Snow and Leavis within a longer tradition discussing the arts and the sciences. This explanation has rather more going for it, but it cannot be the whole story, not least because the very existence of this tradition itself begs the question of why the topic should have exploded into such rancor at this particular moment. I conclude, therefore, that disciplinary tensions inflamed the debate, and that the historical tradition informed the debate, but also that something more was going on in the Snow-Leavis controversy. That "something more," I suggest, is politics.

So of all that has been written about Snow, Leavis, and the "two cultures" controversy in the past fifty years, I situate my approach in the company of five scholars in particular. Without going into detail on the arguments of each (something I discuss in the *Studies* essay cited above), I would identify David Cannadine, Stefan Collini, David Edgerton, David Hollinger, and Ian MacKillop as the scholars from whom I have learned the most. I locate my book in relation to their work, and in that context perhaps its most immediate contribution – in addition to its characterizations and explanations of the ideological positions in the debate – is its archival approach. By drawing from private papers in a dozen collections on both sides of the Atlantic, my book shows how the positions in the "two cultures" debate structured alliances and arguments across a whole range of issues at the same time. The result is in part a history of the argument between Snow and Leavis, but it also uses their argument to contribute to our understandings of the larger issues that I mentioned above: university expansion, discipline formation, the "decline" debate, post-imperial Britain, and the Sixties. This kind of analysis only becomes possible once the "two cultures" terms are historicized rather than adopted, and for that reason I find the work of these five scholars especially insightful and generative.

YH: What is the relation between Snow-Leavis controversy and Arnold-Huxley debate, Science-Metaphysics debate (1923-24, China), and the more recently, the Science Wars? Are they variations of one single theme, or totally different concerns and intentions?

GO: You have identified exactly the right poles, between variations on a theme and totally different concerns, and if neither extreme is satisfactory the question becomes how we negotiate between them. Because of what I think is a tendency among intellectual historians to err on the side of the former – that is, to treat the exchange between Snow and Leavis as an iteration (often an unseemly iteration) of a larger discussion – it is imperative to begin by insisting on the distinctions between debates taking place in very different times and places (and the 1920s debate in China testifies to the importance of that distinction more clearly still). For example, if we want to understand the Anglo-American controversy over Alan Sokal's hoax at the expense of cultural studies during the 1990s, it is not especially helpful to relate Professor Sokal's argument to Snow's work for the Labour Party during the 1960s – which is an extreme way of saying that superficial similarities between very different episodes should not distract attention from the ways that these arguments reflect the concerns of their own time and place. Once that point is acknowledged, and distinct arguments are not collapsed together, we can turn to consider the ways that the memories of past disputes shape the form and interpretation of subsequent installments. So neither variations on a theme (which would be ahistorical), nor totally different concerns (which would ignore the existence of a tradition), but rather historically distinct episodes whose content and interpretation are informed by the tradition of which they are a part.

There is actually a parallel here in the historiography of European revolutions. I remember being asked on my comprehensive examination in graduate school whether the Russian Revolution was the logical culmination of the French Revolution. The notion of "logic" in this context strikes me as ahistorical, because it presumes a norm or sequence according to which events unfold, whereas the events in St. Petersburg amid the exigencies of the Great War were of course distinct from the events that unfolded in Paris in the summer of 1789. But then again, while there is no revolutionary *logic* that exists outside of history, there is a revolutionary *script* that is inherited from history. That is, the participants in the Russian Revolution (as well as its subsequent historians) were well aware of the tradition that provided the backdrop for their actions (and interpretations), and there are numerous ways in which that tradition shaped their behaviors (and our histories). So while there is no abstract "logic" that explains the radicalizations of 1789 and 1917, there are ways in which the events of the former influenced the latter: for instance, when contemporaries (and, later, historians) understood Stalin's terror as intrinsic to the revolution, because it accorded with a revolutionary narrative they had inherited from the example of France. Returning to your initial terms, these paired events – whether France in 1789 and Russia in 1917, or Huxley-Arnold in the 1880s and Snow-Leavis in the 1960s – were related to each other neither as variations on a theme, nor as entirely different concerns, but rather as historically specific episodes that unfolded against the backdrop of, and were informed by, inherited understandings of events that came before.

YH: The year 2009 marks the 50th anniversary of Snow's original lecture, which offers a good occasion for us to reflect on this topic. What activities did you participate in? What is your experience and impression?

GO: You're right, there were a great number of "two cultures" events this year. I myself participated in events at the New York Academy of Sciences, the JFK School at Harvard, and the

CRASSH program in Cambridge, and I know of discussions that took place (or are soon to take place) at the Tate Modern, the London Science Museum, the Royal Society, Michigan State University, and the University of Maryland at Baltimore County – and I'm sure there are still others. This remarkable upsurge of interest testifies to the fact that, whatever faults we might register with Snow's thesis or the way it has been discussed, *The Two Cultures* clearly raised a subject that people want to engage – and not only did Snow raise the subject, he also provided the terms through which these conversations continue to take place. That is a significant achievement, one that shows no signs of abating, and in that sense Snow's place in intellectual history seems secure.

As for the actual content of these discussions, it is not obvious how they relate to one another. They were each excellent events, but they struck me as so different from each other that it is difficult to say what connected them at all – other than the fact that they took Snow and *The Two Cultures* as their touchstone. For instance, the conference at the New York Academy was primarily a discussion about science, science education, and public policy in the United States, whereas the events at Harvard and Cambridge were more academic affairs about the relationships among disciplines. In fact, this tendency has been the most consistent feature of "two cultures" discussions since 1959: they begin by citing Snow and his lecture, before going on to discuss entirely different things. And that dynamic helps to answer the question of how Snow's lecture commanded – and continues to command – such widespread attention: it identifies a topic that captures people's attention, and then leaves them free to discuss whatever they want.

In this sense the "two cultures" is, to paraphrase the historian Joan Scott's famous essay on gender, both an empty and an overflowing category of analysis: *empty* because it carries no fixed and specific content, *overflowing* because it consequently has been (and continues to be) filled with an endless number of meanings. As a historian attending these events, I am interested not in participating in discussions that make claims about the meaning or significance of the two cultures, but rather in identifying the ways that just such claims have long proliferated and functioned. (An inclination that can have the result, I'm afraid, of making me a somewhat unwelcome guest.)

YH: What do you think of the role of 'public intellectuals'? Do you think Snow is a good public intellectual? According to your opinion, which role should or could public intellectuals play in a modern society?

GO: Stefan Collini's *Absent Minds* is the indispensable book on this subject, but I would say that the term can have its use if defined in the right way. The wrong way would be to contrast public intellectuals, who address broad audiences, against narrow specialists, who merely swap jargon, as if all scholars (indeed, all professionals) did not function in each capacity at different times of nearly every day. So the term is problematic if used as a weapon, to disparage scholars who possess specialized knowledge and employ technical language, but it can also have its use if it refers to figures who parlay their standing in a particular area to address broader topics of concern – which is precisely what C. P. Snow sought to do in his Rede Lecture.

But Snow actually poses a challenge as a public intellectual, one that helps to explain the resentment that his pronouncements inspired. When he delivered the Rede Lecture in 1959, Snow's stature rested upon his work as a novelist, and in fact he had not practiced science for nearly a quarter of a century. So his license to speak derived from his literary reputation, yet the enthusiastic reception his lecture met partly owed to his image as a *scientific* intellectual. His standing to pronounce on science was thus wobbly, which is why scientists such as Yudkin and Polanyi so quickly distanced themselves from this man who presumed to speak for them, and why Leavis was tactically correct to aim his fire not at Snow's claims about science, but at his work as a novelist – an assault that Leavis, one of the most distinguished literary critics of the twentieth century, was on solid ground to deliver. So Leavis's attack may have been astonishing in its content and tone, but its focus on Snow's fiction testifies to the fact that its author understood the workings of the function of what we have since come to call a "public intellectual."

Two Cultures no Two Cultures

Review of Guy Ortolano, The Two Cultures Controversy: Science, Literature and Cultural Politics in Postwar Britain (Cambridge: CUP, 2009)

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Mercifully and emphatically this is *not* a book about the supposed division between the "two cultures" of the arts and sciences. Rather it is by far the most comprehensive attempt to situate the "Two Cultures debate" in the wider contexts of British post-war historiography, politics, educational reform and science theory. This rejection of the Two Cultures *thesis* has the odd status of being both an aside and the book's primary message. It takes up almost no space, but it is crucial, particularly as the consensus grows that C.P. Snow's 1959 Rede Lecture cannot be taken seriously unless it is duly historicized, and the Two Cultures *debate* instead used as a powerful lens with which to view '50s and '60s concerns. This is the approach that was pursued vigorously though briefly by David Edgerton in his *Warfare State: Britain, 1920–1970* (2006). There the crudity of the basic categories, the naivety of the historiography employed and the weird denunciations of literary types were laid bare, and the verdict now looks final. As Edgerton pointed out, to reject Snow is to side with F.R. Leavis, who, it must be remembered, was not merely the other interlocutor in the debate, but rather offered the most prominent early rejection of the terms of the debate as set by Snow. Historians of the period — and indeed of whatever real splits there are and have been between artists and sciences, the humanities and the sciences, the literary and the technical, etc. — should doubtless follow Ortolano, who seeks here to "dislodge the 'two cultures' as a category of analysis." (p. 26)

In the absence of the "two cultures" themselves, Ortolano uses the debate as a way in to explorations of a series of interrelated cultural-historical themes. The basic move made here is as follows: "what has previously been read as a *disciplinary* dispute about the arts and the sciences was actually an *ideological* conflict between competing visions of Britain's past, present, and future." (p. 1, italics in original) This ideological analysis can be split into two main parts: first, Ortolano presents the particular "worldviews" of Snow and Leavis — these are the "technocratic liberalism" of the former, and the "radical liberalism" of the latter. Ortolano uses these tags to highlight the key similarities and differences between the protagonists. Both were mired in what Ortolano terms the "meritocratic moment" dated c. 1945–c. 1975. Snow held that a new class of experts could bring about a bureaucratic revolution, replacing politics with "management" and therefore securing a role for upwardly mobile civil servants like himself. Leavis' attitude towards meritocracy was more complex; his generally oppositional stance makes any stable characterisation difficult. Like Snow, Leavis viewed the niche he had carved for himself as paradigmatic. To resolve the ills of modern society, the literary critic was to preserve the primacy of language and the embodiment of an ethical order in the realm of literature. The meritocracy of this lies mainly in the cultivation of a sort of priestly connoisseurship. The second part of

Ortolano's treatment of ideology explores the ways in which these idiosyncratic worldviews applied to and were forged from four major contemporary themes: the nature of higher education, and specifically the academic study of English; the formalisation of a new social history; the notion of national decline; and the potential (or lack thereof) for England to act as a world leader via development and/or modernisation.

All of these large themes are, of course, marshalled around the playing out of the debate around Snow's lecture, the narrative of which is dealt with smartly and without unnecessary flourish. The support and dissent that the thesis garnered and the vicious response by Leavis three years later easily bear the weight of analysis, and the extremely complex issues listed above receive deft treatment. Although Snow's and Leavis' stances appear nothing if not predictable, that is at least in part due to the clarity of Ortolano's exposition. Two passages in particular stand out as set-pieces: first, the chapter whose title I found least promising, 'A tale of two colleges', recounts the attempts by both men to create a university setting and ultimately a literary criticism in their own image — Churchill English for Snow and Downing English for Leavis. These two projects, in their audacity and egotism alone, are stunning. Snow sought nothing less than the vitiation of the entire modernist project (at least in his limited understanding of what *that* meant). His own brand of stolid realism would be shown to have vanquished the proto-Fascist experimentalists of the early-twentieth century, all in the setting of a college set up expressly to train a new scientific elite. (It is worth dwelling on the perversity of Snow's attack on the very modernism that was concomitant with the architecture and fabric of his beloved college — one unrealised vision of which adorns *The Two Cultures Controversy*'s jacket.) Leavis, meanwhile, and with far greater theoretical subtlety and zeal, hoped that Downing would be the centre of his own Lit. Crit. empire, working tirelessly to establish and maintain the "great tradition" of books that preserved the vitality of Language made Life. The second set-piece comes much later, in the analysis of narratives of national decline, which Ortolano shows to have been of dubious veracity but of unending rhetorical elasticity. For Snow this meant transforming the success of his Two Cultures thesis into a case for political reform. In a remarkable passage he is shown to have made it almost all the way to the top, influencing policy for a brief time in the late 1950s through the "Gaitskell Group", led by the industrialist Marcus Brumwell and counting P.M.S. Blackett, Solly Zuckerman, J.D. Bernal and Jacob Bronowski amongst their number (in addition to the Labour heavyweights Harold Wilson, Jim Callaghan, Richard Crossman and, naturally, the leader himself Hugh Gaitskell). This addition to our understanding of the origins of the "white heat" moment of Labour/scientific & technological ascendency is exceedingly interesting and beautifully pitched. More broadly, Ortolano's use of the Two Cultures debate to examine the various narratives of decline is masterly.

But we should pause at that list of scientific big cheeses. There, and dotted throughout the book, is the core of an earlier generation of left-wing scientists and science theorists. J.D. Bernal is of especial interest, given his status as the great ideologue of *The Social Function of Science* (1939), who not only prefigured many of Snow's arguments about a technocratic elite but also planned a book on the historical interrelations between the arts and sciences. Keeping this in mind, I would like now to turn to my few slight reservations about *The Two Cultures Controversy*. The first is, I think, largely superficial. It concerns the political terminology used, primarily the word "liberal".

That Snow and Leavis both emerge as "liberal" should already raise some suspicion. The term is mainly used here to imply a staunch individualism, and there is evidence that both Leavis and Snow used it in that way and in relation to themselves at various times. However, individualism is not the only concept captured by "liberalism", especially in light of the progressive politics and convoluted history of the Liberal Party. The best one can say is that then, as now, the term was hotly contested. But that fact is only brought out implicitly by Ortolano, and should have been stated boldly, not least because it justifies his using the term with such flexibility. In any case, the theories of both Snow and Leavis do emerge in all their peculiar glory (perhaps in spite of rather than because of the terminology employed).

But then that fact leads me to a further observation, again terminological, this time concerning "ideology". The overall structure of the book is, as I have mentioned, determined by continual recourse to a comparative analysis of Snow's and Leavis' "worldviews", in order to approach more general ideological concerns in the period. This creates a general feeling of what I can only describe as claustrophobia. Ortolano states early on that he is not going to attempt either genealogical or structural history — neither intellectual nor social history, but rather a form of cultural history that draws on those two other traditions. The result, focussed so closely on the patterns of thought of two highly eccentric individuals, left me somewhat unsatisfied in two specific and closely related respects. First, it lays too much emphasis on the internal coherence of the worldviews under consideration. Snow, for his part, seems at times to draw heavily on the work of the left-wing scientists who receive only brief mention; yet he violently uproots their views for his own purposes — taking, for example, the morally neutral conception of science that J.D. Bernal had formulated in defence of a similarly 'neutral' Marxism in the 1930s, but deploying that idea to further the aims of a strictly hierarchical social structure, albeit one based on merit rather than class. Leavis, meanwhile, is granted a richer intellectual heritage, largely thanks to the undeniable importance for his later thinking of the journal *Scrutiny*, which he edited with his wife Q.D. Leavis between 1932 and 1953. But even here we are still left with only tantalising glimpses of the origins of his thought in earlier intellectual climes. In addition, the fact of both men's thoroughgoing but completely different rejections of Marxism surely warrants closer study in a work dealing with ideology *and* realpolitik.

Now, in a work in which the biographical component was not so overbearing it would not be an adequate criticism to claim that the contradictory and idiosyncratic origins of a worldview need explaining. The mere existence of various worldviews could perfectly well be deployed in order to show their mutual dependence on some other historical factor, or their ultimate origins and fates could be discussed, or any number of other things. But here, as no genealogies are offered for Snow's and Leavis' schemes, it appears either that they were formed out of the materials of post-war cultural politics (which we know to be incorrect chronologically) or that the worldviews appeared fully formed in their minds and were deployed with or against the current of the Two Cultures debate as it reached its widest arena. This last option may contain a grain of truth, but it cannot be the whole story when dealing with a cast of characters that does, as we have seen, include those earlier ideologues. It is a commonplace to observe that in the period of the Cold War countless people — even groups or 'schools' and large philosophical and artistic movements — appeared to lose their earlier political commitments. Snow at least is surely a part of that story,

and in that context Ortolano's rejection of the genealogical approach seems unduly limiting. Naturally, as we begin to leave the period of the Two Cultures debate proper the benefits of the genealogical approach emerge, for example in the bizarre appropriation of Michael Polanyi's account of seventeenth-century science and critique of disinterested observation by an increasingly embattled Leavis. The rough texture of this exchange of ideas is welcome after the all-too-smooth characterisation of the origins and development of the two local ideologies under consideration.

I should note that this particular problem only comes to affect the latter chapters, and then mildly. The move from personal to general ideology is otherwise deftly handled; it is merely the constant recourse to the Snow-then-Leavis take on such-and-such phenomenon that becomes stretched.

Returning to the aside/thesis of the book, the notion that the two cultures debate can only properly be treated historically serves at once to condemn and then recover Snow, to praise and then lose interest in Leavis. It is to side with Leavis on the (ir)relevance of the two cultures tag itself, but as I have suggested it is Snow's worldview that is the more historically revealing, appearing, as it does, paradigmatic of so many intellectual currents in the post-war era. The heightened interest of the patently wrong is a well-known historiographical trope, miring us in an equally important struggle with the sheer difficulty of justifying agreement with past historical actors. Here, for example, the persistence of Leavis in the narrative is tricky — as Snow's political posturing becomes more telling, the role of Leavis becomes unclear. We have agreed with him, effectively, that the debate should continue along other lines, but there he is, still offering a point of comparison for Snow, the narrative staunchly sticking to its original course. This does him a disservice. *Some* of his views have great contemporary relevance, but those views concern the development and debasement of language, a non-Marxian critique of false-consciousness and the development of capitalism, and so on. As Ortolano notes, neither Snow nor Leavis would be particularly happy with their present Two Cultures reputation — at least a book of this subtlety and range offers them hope, avoiding as it does the now thankfully terminable rehashing of the Two Cultures debate itself.

Research on the Establishment of Environment Protection Division in Chinese Court

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Abstract: The critical condition of the environment and the fact that lots of environmental disputes can't be solved effectively by means of filing lawsuit, show that Chinese judicial system hasn't fulfilled people's expectation of the functions that the environment protection should have. There are many reasons, such as the lack of judicial sources, the difficulties in producing proof by victims, the limits of the plaintiff's standing and the interregional pollution not be ruled by the territorial jurisdiction. Recently, in order to deal with the serious environmental condition, some district courts set some specialized environment protection divisions. These divisions have the broad jurisdiction including civil jurisdiction, administrative jurisdiction and criminal jurisdiction. They are also positively trying to accept public lawsuits and get some typical cases. The establishment of environmental division is the innovation of Chinese environmental judicial mechanism. However, while the environment protection divisions are getting great achievements, they also meet many difficulties such as the lack of cases, the legal crisis met by environmental public lawsuit, incompetence of the territorial jurisdiction in coping with the interregional pollution, the difficulty of fixing the environmental damages and the difficulty of the judgments implementing. On the way to pursue the specialization of environmental lawsuit, the environment courts in New Zealand, New South Wales in Australia and Memphis in the USA have done great exploration. The successful experience of these courts may be used as useful reference to promote the innovation of the Chinese environmental judicial mechanism. In order to bring into play the functions of the justice in environment protection and solve the difficulties that are met by the environment protection divisions, China should set environment courts and give them broad exclusive jurisdiction. Meanwhile, we should absorb some environmental professors to hear the cases, apply the open plaintiff system, and make some innovations in the aspects of evidence rule and judgments implementing mechanism.

Keywords: environment court, environment protection division, judicial system, Mechanism innovation

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On the aspect of environment protection, "the state law and the international law always lag behind the development of the situation. Today, with the rapidly accelerating and expanding impact on the basis of the environment, the legal system has already been lagged far behind, the urgent need is ……to strengthen the existing methods which are used to prevent and solve the environment issues, and develop new methods." [1] The setting of environment protection divisions in some district courts in China is an act for the "situation development". What effects do these environment protection divisions have? What problems do they have? Do they suit the need of the serious environment situation entirely? The community hasn't got any answers to these questions. This thesis will begin at analyzing the difficulties which Chinese environment judicial system meets and the reasons. Through introducing and analyzing the practice of Chinese environment protection divisions and the foreign environment courts, this paper will point out the problems that the practice of Chinese environment protection divisions has and give suggestions to the innovation of the Chinese environment judicial mechanism.

Ⅰ.The difficulties that Chinese environment judicial mechanism meets and its reasons

According to the uncompleted statistics, the environment issues in China have increased over 20% every year since 1998. In recent years, the tendency developed more and more seriously that it increases 29% each year. [2]Report on China's 2007 Environmental Status published by Ministry of Environment Protection showed that the original State environment Protection Administration received 110 sudden environment incidents, one incident every two workdays on average. According to the statistics made by the original State environment Protection Administration, from 2002 to 2006, the average growth rate of the report because of the environment problems was 87%. Contrarily, the environment cases didn't increase accordingly. In 2004, there were 4453 cases of environment pollution while there were only 1545 cases in 2005 and 2146 cases in 2006. [3]It is estimated that the disputes which went to the courts were less than 1% of the disputes which happened actually. On the one hand, the serious environment condition needs judicial system provides legal support, and lots of acute environment disputes need to be solved through judicial proceeding in time. On the other hand, the environment problems are more and more severe, many environment cases are not within the jurisdiction of courts and many environment disputes are not solved for a long time.

The above condition shows that Chinese judicial system hasn't fulfilled people's expectation of the functions that the environment protection should have. There are four reasons:

Firstly, the existing environment judicial resources can't response to the specialized environment problems. The reasons for environment pollution are very complex. After the pollutants enter into environment, they will make the physical, chemical and biological reactions such as

[1] The world environment and development committee Wang Zhijia and Ke Jinliang translate "our common future" Jilin university press 1997 version page 430-431

[2] Xi Jianrong "The pollution case of Kunming Yangzong sea may promote the fifth environment protection division to establish" published on "China News" Nov. 7th 2008, G03 version

[3] Wu Jing "Another sword over the polluters' head" published on "The People's Daily" May 8th 2008, 005 version

toxicological and pathological transformation, diffusion, absorption. The reaction process is also quite complex. Even the existing science and technology can't get right and complete knowledge on the influence way and the harmfulness of the harmful things. [4]However, most of judges are lack of professional knowledge and can not solve the cases well. Nowadays, the trail of environment cases is distributed in civil division, administrative division and criminal division. It makes the limited environment judicial resources become more decentralized. There is also an absence of the lawyers who are proficient in environment problems and are familiar with environment law. The lack of the environment judicial resources is bound to influence the efficiency and fairness of the trail of environment cases.

Secondly, the difficulty of collecting evidence for victims causes the scarcity of the environment cases. For the environment tortious actions contain many complex professional knowledge, collecting the evidence of the tortuous reasons needs some relevant scientific knowledge and equipments, which the common victims don't have. For the environment damage are long-lasting, latent and widespread, it is difficult to collect evidence. In practice, the polluter are always the enterprises which get the power of economy, science and information, while the victims are always the common people who are lack of fudge ability and resistance capability. The polluters are always in a strong position, and they always take the firsthand information for the environment damage. However, they often take the excuse of business secretes to refuse to provide the information which is relevant to the pollution and damages. This brings more difficulties for collecting evidence. The difficulty of collecting evidence makes the low exception of winning the suits for victims and influences the motive of filing lawsuits.

Thirdly, the existing rules which set strict limits for the plaintiff's standing cause the environment dispute settlement mechanism unsmooth. The environment pollution is widespread that one pollution source may cause damage to hundreds of people, and watershed pollution will involve more victims. Some common victims do not dare to suit because of the lack of the capability of collecting evidence, and the others don't want to suit because of the low sense of the rights. Moreover, the procurator organ and some environment protecting communities and persons bring environment suits but without legal ground. The strict limits to the plaintiff's capability as a subject exclude many latent environment cases out of the proceedings, and this is also a disguised form of indulging the environment pollutions.

Fourthly, the existing judicial mechanism is not beneficial to the trail of pollution cases involving two or more administrative regions and two watersheds. Nowadays, the courts always hear the environment cases within the jurisdiction based on the administrative division. For the polluters often are the major tax payers, the trail of environment cases are often interfered by regional protectionism. There is phenomenon that the courts in different regions shuffle the cases onto another. This causes the disputes can't be solved for a long time. Even if the environment protection departments have the environment suit capability, they also don't have enough zeal of dealing with the cases through the judicial proceedings, because they might be found a failure to supervise if they put the pollution enterprises onto the courts. Therefore, trailing environment

[4] Song Zongyu "Research on the civil liability of environment tort" Chongqing university press 2005 version, page 118

cases based on administrative division is not beneficial for the courts providing judicial support to the management of the cross-regional and watershed pollutions.

Ⅱ. The practice of the environment protection division in China

With the serious environment condition, the innovation of the environment judicial mechanism in China becomes very urgent. Recently, the establishment of the specialized environment protection division[5] in some district courts, which is considered as the first innovation of the Chinese environment judicial mechanism, is accepted by the theoretical circles and practical circles. [6]The first specialized environment protection division is the environment protection trial division of Guiyang Intermediate People's Court and the environment protection division of Qing Zhen people's court, set on Nov. 20th, 2007. The second is the environment protection trial division of Wuxi Intermediate People's Court, which is set in May 6th, 2008. The next one is the environment protection trial division in Kunming. It is said that some district courts in the Huaihe river and Chaohu lake basin also establish some specialized environment protection division.[7]

ⅰ.The establishment background and the jurisdiction

The establishment of the environment protection division in Guiyang aims directly at the serious situation in Guiyang that the "two lakes (Hongfeng lake, Baihua lake) and one reservoir (Aha reservoir)" are changed from "jar" into "dye vat" because of the interregional pollution, and it has threatened the drinking water security of several million people in Guiyang. The blue algae event of Taihu lake in May, 2007 directly precipitated the establishment of the environment protection division in Wuxi. The establishment of the environment protection division directly related to the Yangzong Sea pollution event which happened in October golden week. It can be said that the above four environment protection divisions are all established at the distress time.

All the above four divisions deal with the environment cases with the "three-in-one" trial type including civil trial, administrative trial and criminal trial, and they have the powers to enforce the valid judgments. Although the four divisions are set up because of water pollution events, the jurisdictions of the four divisions are not only water pollution cases but also the cases about the

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[5] Twenty years ago, the supreme people's court in hubei province put forward the idea of establishing environment protection division. At that time, the response of the supreme people's court is that environment court is different from people's court, and there is no legal basis for establishing environment protection division in grassroots courts.(see "The answer to the report of Wuhan Qiaokou people's court establishing environment division" from the supreme people's court. Recently, the environmente protection circuit courts which are established by some district courts for helping the environment protection department deal with environment administrative execution problems are not the specialized environment protection divisions, therefore this paper will not discuss it.

[6] See Chen Yuanyuan "Environment protection division expects to break down the development bottleneck", published on "China's environment" Sep 25th 2008, 003 version Wan Exiang "The speech of Wan Exiang vice president on the opening ceremony of seminar about the judicial protection for water resources

[7] Wan Exiang "The speech of Wan Exiang vice president on the opening ceremony of seminar about the judicial protection for water resources http://www.sina.com.cn, 2008-06-19.

protection of forest resources and land resources. To solve the trans-regional pollution problems, the jurisdiction of Guiyang environment protection division isn't limited in its jurisdiction. The environment protection trial division of Guiyang Intermediate People's Court can try the first instance civil and administrative cases involving the environment protection, management of the "two lakes and one reservoir " water resources and torts against the "two lakes and one reservoir " water resources out of Guiyang jurisdiction, according to the designated jurisdiction decision by the supreme court in Guizhou province. The environment protection cases in Guiyang jurisdiction are trialed first by Qing Zhen environment protection division designated by Guiyang Intermediate Court. The criminal cases with incidental civil action are also tried by Qing Zhen people's court together.

On the jurisdiction of the environment divisions, they have broader authority than the other divisions in the court. All the cases about the environment pollution are trialed by the environment division, which has broken down the traditional division of work on the civil cases, administrative cases and criminal cases. Moreover, theses divisions have the executive powers to the valid judgments. Except some executions of the criminal judgments, the executive power has been the exclusive power of the executive division for a long time. Even if the intellectual property divisions and the juvenile divisions which are established before have no special execution power. It is clear that the environment divisions are given the special authority and independence that any other divisions don't have. Theoretically speaking, from the beginning of the case trial to putting the polluters into the prison, the environment division doesn't need the help of the other divisions.

In addition, another light spot of the environment division is that it has a try of the public interest lawsuit without the clear law regulations. Guiyang environment division give the standing to sue of the environment public interest lawsuit to four units including the administration of the "two lakes and one reservoir", the envoronment protection agency, the forestry bureau and the procuratorate. Wuxi environment protection trial division not only regulates the procuratorate and the environment protection administration have the subject qualification for the environment public interest lawsuit, but also absorb the environment protection organizations and the property management sectors in residents communities.

ⅱ. The operation effect and the typical cases

According to statistics, there are more than sixty pollution sources at the basin of the "two lakes and one reservoir", discharging all kinds of waste water in 220 million cubic meters every year. Quite a lot of pollution sources are out of the administration jurisdiction of Guiyang. The relevant departments have invested more than one billion to manage pollution but without any effects. However, the severity of the pollution suffered by the "two lakes and one reservoir" is quite dissymmetrical to the number of the environment cases which are accepted. From 2006, the two levels courts in Guiyang have trialed seven cases in all, and all the cases are civil cases. In 2006, there are two cases are completed. From January to September in 2007, five cases were accepted and three cases are tried with a amount of 149'000 RMB involved. On the aspect of environment administrative lawsuit, the courts in the city almost didn't try one case recently. On the aspect of criminal cases, only Qing Zhen court tried a criminal case about catching aquatic

products illegally in 2007 (one case three persons).[8]

It is said that Qing Zhen environment division has tried about 90 environment protection cases in 10 months after it was founded, [9]including no less than 32 cases which are out of Qing Zhen popedom. [10]The efficiency of the two courts in Guiyang is very high. The rate of announcing the judgment at the court session gets to 90.48% from the beginning to July in 2008, and the rate of accepting the first instance judgments gets to over 90%. [11]It is strange that 85% of the 90 cases tried by Qing Zhen environment protection division are illegal act against forest, and the cases involved water pollution are only 5%. It is very dissymmetrical to the original intention of the foundation for water and the situation of water pollution in Guiyang. [12]

In the past 3 years, the two levels courts in Wuxi have accepted 18 environment protection lawsuits, 273 administrative review cases and 104 execution cases.[13] According to statistics, from the foundation in May 2008 to the middle of September, the environment protection division of Wuxi court have tried 192 cases. The number of cases is far more than the number of the 181 cases[14] of the courts in the whole city in the past whole year. However, most of the cases tried by the environment protection division of Wuxi court are administrative execution cases. So far, there is no report about the division accepting the environment protection public interest case or the environment criminal cases.

There are many reports about the cases tried by Guiyang environment protection division. The following are three typical cases:
(1) The trans-regional pollution cases of the Administration of the "two lakes and one reservoir" in Guiyang v. Guizhou Tianfeng Chemical Co,.Ltd. The defendant locates out of Guiyang popedom, and it stacked the phosphogypsum waste residue, which are discharged by it, near the upper stream of Hongfeng Lake in the past 10 years. On Dec.27th, 2007, the administration of the "two lakes and one reservoir" in Guiyang filed the environment public interest suit to Qing Zhen environment protection division. The division made a decision against the defendant and asked the defendant to stop using the spoil area immediately and adopt measures to exclude the hindrance of the spoil area to the environment and eliminate the danger in limited time. It is

[8] Zhang Shiyan "Guiyang sets up environment protection divison", "Legal system life", Nov.26th 2007, 018 version

[9] Wang Zhiqiu "Environment protection division expects to break down the development bottleneck", published on "People's News", Sep.18th 2008, 015 version

[10] Shu Taifeng "Whether the environment protection division can keep a land" published on "Government legal system", article 20, 2008, page 26-27

[11] Zhang Wei "Escort for establishing ecological civilization city" published on "Guiyang Daily" July 9th 2008 A03 version

[12] Wang Zhiqiu "Environment protection division expects to break down the development bottleneck", published on "People's News", Sep.18th 2008, 015 version

[13] Wu Jing "Another sword over the polluters' head" published on "The People's Daily" May 8th 2008, 005 version

[14] Xi Jianrong "The pollution case of Kunming Yangzong sea may promote the fifth environment protection division to establish" published on "China News" Nov. 7th 2008, G03 version

reported that the defendant has performed the judgment. [15]This case is the first case after Qing Zhen environment protection division foundation. There are two features of the case. Firstly, the case is a trans-regional pollution case which tried and executed by court. Secondly, this case is an environment public interest lawsuit and it is also the first environment public interest lawsuit tried by common court.

(2) The case of Lang Xueyou cutting trees unlawfully. The defendant cut 29 trees owned collectively by the village from Oct. 20th to Nov. 19th,2007. The direct economic losses are 6453.50 RMB. On Dec. 28th, 2008, Qing Zhen environment protection division found the defendant Lang Xueyou guilty of illegal logging of trees, and sentenced 2 years' imprisonment and 1000RMB fine and economic compensation loss of 6453.50 RMB. Meanwhile, the environment court found that the compensation which the defendant paid is not enough to compensate the ecological economic value damage caused by his criminal act, so the court asked the defendant to plant 145 trees at the place where the crime is committed in 90 days after the judgment took effect. This case has two obvious features. Firstly, this is the first criminal public interest suit attached with civil suit supported by the national procurator organ. [16]ISecondly, For the first time the court has paid attention to the ecological value of the trees and asked the defendant to plant trees to compensate the damage caused by his criminal act.

(3) The case of Guiyang People's Procuratorate v. Xiong Jinzhi, Lei Zhang and Chen Tingyu destroying vegetation. About in September in 2006, the three defendants contracted the Wugui mountain in zhulin Village, Xiaohe district to develop project of tourism and catering trade. The three defendants began the construction without declaring the program, land using formality and construction formality to any departments and caused the destroy of tortoise mountain massif damage of 2000 square meters vegetations on the mountain. The plaintiff prosecuted that the three defendants built houses and ancillary facilities without any approval from any administrative department, their actions seriously violated the Water Pollution Control Act and other related laws and regulations, therefore, the plaintiff requested the court to ask the defendants to stop ceasing the infringing act, blackout the houses built on the tortoise mountain of the Aha reservoir and recover the 2000 square meters vegetation which were damaged by them. On Nov.26th, 2008, through the mediation by Qing Zhen environment protection division in court, the two parties reached the mediation agreement. The defendant agreed to blackout the houses built on the tortoise mountain of the Aha reservoir and recover the vegetation on the tortoise mountain in 30 days after signing the agreement. [17]The feature of this case is that it is an environment public interest lawsuit filed by procurator organ as a civil plaintiff. It is the first case in the whole country.

The environment protection divisions have got many achievements, but at the same time, they

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[15] Yan Zhijiang "We have eliminated a pollution source at the upstream of Guiyang Hongfeng lake" published on "Legal System Daily", Agu.11th, 2008, 005 version

[16] Zhang Wei "Escort for establishing ecological civilization city" published on "Guiyang Daily" July 9th 2008 A03 version

[17] Yan Zhijiang "Guizhou procuratorate files the environment public lawsuit for the first time" published on "Legal System Daily", Nov.27th, 2008, 005 version

also face some problems, such as the lack of cases, the validity danger suffered by the environment public lawsuits, the interregional pollution not be ruled by the territorial jurisdiction, the difficulty of fixing the environmental damages and the difficulty of the case implement and so on. [18]It is said that other people's good quality or suggestion whereby one can remedy one's own defects. The environment courts set up by some foreign countries to solve the environment problems may provide some new thoughts for the innovation of the environment judicial mechanism in China.

Ⅲ. Environment Court System of Other Countries

Currently, some countries have established environment courts, such as Australia, New Zealand, America, South Africa, Switzerland, Pakistan, Kuwait, Bangladesh etc., of which the Environment Court of New Zealand, the Land and Environment Court of New South Wales and the Environment Court of Memphis are of longer history and more mature. They will be introduced respectively as following.

ⅰ.Environment Court of New Zealand

From 1925 to 1995, at least 60 laws regulating contamination had been enacted in New Zealand, while the environmental pollution was spreading at the same time. The reason is that these laws are lack of coordination and systematic, as Geoffrey Palmer, former New Zealand Minister of Environment, said these acts are" uncoordinated and non-unified ode"[19].The agencies processing environmental disputes are non-unified, and the internal organizations of these agencies are of various sorts[20].From the 80th of the last century, the legal system of resources and environmental management in New Zealand is going through a series reform, the most significant achievement of which is the Resource Management Act of 1991.This act, up to 400 pages, took the place of about 60 unassociated previous environment laws. It establishes a comprehensive framework to promote sustainable management of resources. This framework includes three basic subjects: (1) sustainable management, (2)effects-based management, and (3) public participation. The Resource Management Act of New Zealand is regarded as the first piece of legislation in the world designed to achieve sustainable development[21]. While New Zealand is also considered as the first country in the world definitely adopt the environmental management system based on the theory of sustainable development[22].

The Environment Court of New Zealand deals with the disputes mainly according to the

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[18] See Shen Zhengrong and Su Faxuan "Why there is no people for the environment public lawsuit" published on "Xinhua Daily", July3th, 2008, A06 version; Zhang Wei "Escort for establishing ecological civilization city" published on "Guiyang Daily" July 9th 2008 A03 version; Chen Yuanyuan "Environment protection division expects to break down the development bottleneck", published on "China's environment" Sep 25th 2008, 003 version; Yan Zhijiang "Environment protection division asks administrative departments to resolve differences" published on "Legal System Daily", Feb.14th , 2008, 005 version

[19] Geoffery Palmer,1995, Environment: the international challenge, Vicoria University Press,p.150.

[20] Geoffery Palmer,1995, Environment: the international challenge, Vicoria University Press,p.150.

[21] Stephen Higgs：“Mediating Sustainability: The Public Interest Meditor in the New Zealand Environment court”，Environmental Law, Winter, 2007, p.61.

[22] Bret C. Birdsong：“Adjudicating Sustainability: New Zealand's Environment Court ”，Ecology Law Quarterly ,2002, Vol.29, p. 6.

regulation of the Resource Management Act, but the court is not the creation of the act. Its predecessor is Planning Appeal Board which established in 1953 to deal with the land-use controversy. At that time, the New Zealand Parliament sought to establish a specialized court to ensure the justice between citizens and the planning department,[23]which bring the Planning Appeal Board to real. It had the jurisdiction over land-use disputes in rural areas, residential areas, commercial areas, industrial areas and nature reserves. Because of the nature of the disputes, the scope of the review, as well as the expertise used in dealing with the affairs, the board was considered having a special status by many commentators. For instance, R.J. Bollard, retired judge of Environment Court, hold that the decisions of the Planning Appeal Board had a more far-reaching significance than those of ordinary courts, as they involves the issue of a wide range of public interest, precedent value, as well as the tremendous amount.[24]Although the board was officially named as the Environment Court until 1996 in the amendment of the Resource Management Act, the most power of the court comes from the delegation of Resource Management Act of 1991.

The court consists of environment judge, alternate environment judge, environment commissioner and deputy environment commissioner.[25]

The environment judge is appointed by the Governor-General, and enjoys the life appointment. The environment commissioner needs to have the appropriate knowledge and skills in the areas associated with the environment disputes, including business, economics and local government affairs, planning and resource management, environmental science, architecture and engineering, as well as alternative dispute resolution, etc. The environment commissioner is appointed by the Governor-General, and the term is 5 years. The Environment Court is composed of environment judges and environment commissioners just to ensure it is "not only with comprehensive knowledge but also expertise" to handle the affairs it will face.[26]The cases are usually heard by the full court made up of 1 environment judge and 1-2 environment commissioners. While in the situation of applying warrant, it is heard by only 1 environment judge.

According to the delegation of the Resource Management Act, virtually all matters involving environmental issues are under the jurisdiction of the environment court. It has the power to make a specific legal statement,[27]review the administrative decisions made by local authorities,[28]and enforce the parties to fulfill the obligations prescribed in the Resource Management Act through civil or criminal procedure.[29]During the exercise of its jurisdiction, the

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[23] David Sheppard：“Forty Years of Planning Appeals”, Resource Mgmt. News, May/June 1995, p. 20.

[24] R.J. Bollard, The Important Role of Town and Country Planning Boards, N.Z. L.J. 233 (June 5, 1973).

[25] At present,there are 8 environment judges, 5 alternate enviorment judges,15 environment commissioners,and 6 deputy environment commissioners in the court. See the website of New Zealand Environment Court:http://www.courts.govt.nz/environment/judges-commissioners/default.asp,01-16-2009.

[26] see the Resource Management Act of New Zealand,section 253.

[27] see the Resource Management Act of New Zealand,section 310-313.

[28] see the Resource Management Act of New Zealand,section 120.

[29] see the Resource Management Act of New Zealand,section 314-321.

environment court has the same status and power as the ordinary trial courts,[30]but it is not bound by ordinary procedure and evidence rules prescribed in the law set for other courts in New Zealand.[31]In New Zealand, the level of the Environment Court is equivalent to the District Court, and the parties against the its decisions may appeal to the High Court .But the High Court will only review the legal matters of the First instance judgments,[32]but leave the fact and policy matters. Such wide range of power causes the Environment Court to play a crucial role in envoronment protection and sustainable use of resources in New Zealand. A researcher said "Establishing the environment and resource management on the basis of sustainability and giving the specific court a wide range of power to review and make environmental policies, in trying such a kind of integrated management system, New Zealand made a ground-breaking step."[33]

The prominent feature of the Environment Court is not only its extensive and exclusive jurisdiction, but also its productive mediation system. In addition to ruling, the Environment Court also encourages both parties to settle disputes through two other channels, that is judicial settlement conferences[34] and alternative dispute resolution (ADR).Judicial settlement conference is an important approach, which helps to identify and define issues, clarify views, and find ways to reach a consensus of both parties.[35]ADR includes mediation, reconciliation or other procedures useful for resolving problems before or during the course of the hearing.[36]Initially, the mediation procedure was hardly used. Until recent years, it has been utilized extensively and effectively, and each year there are hundreds of successful mediation cases, which usually involve significant environmental impacts.[37]It is noted that the mediation in Environment Court is under the auspices of the Environment Commissioner, and the parties do not have to pay additional costs Environment Commissioner presiding over the mediation can ensure the legality of mediation agreement, and help the parties to explore and choose more sustainable agreements. The researchers believe that the mediation under Environment Commissioner contributes to the protection of public interest.[38]

ii. Land and Environment Court of New South Wales in Australia

Before 70's of the 20th century, the environment and planning affairs in New South Wales were

[30] see the Resource Management Act of New Zealand,section 247 and 278.

[31] see the Resource Management Act of New Zealand,section 269 no.1 and 2, section 276 no.1 and 2.

[32] see the Resource Management Act of New Zealand,section 299.

[33] Bret C. Birdsong：“Adjudicating Sustainability: New Zealand's Environment Court”，Ecology Law Quarterly ,2002, Vol.29, p. 70.

[34] see the Resource Management Act of New Zealand,section 267.

[35] R.J. Bollard & S.E. Wooler, Court-Annexed Mediation and Other Related Environmental Dispute Resolution, N.Z. L. Rev. 707, 707 (1998) at 711.

[36] see the Resource Management Act of New Zealand,section 268.

[37] From June 2004 to June 2005,the Environment Court dealt with more than 1368 cases,350 of which the parties chose the court-annexed mediation(26% of the sum).See Env't Court, E. 49: Report of the Registrar of the Environment Court for the 12 Months Ended 30 June 2005, at 6 (2005). p 8.

[38] Stephen Higgs：“Mediating Sustainability: The Public Interest Meditor in the New Zealand Environment court”，Environmental Law, Winter, 2007, p.61.

regulated by many laws, and many different courts and administrative division had jurisdiction over them. The jurisdiction of these institutions overlapped in many areas, causing confusion in practice. During 70's of the 20th century, a series of reforms in legislation and litigation system had been carried out in the state. The establishment of the Land and Environment Court was a part of the early reform of the environmental law in New South Wales. The significant increase of the comprehensive and specialized environmental legislation in the field of planning and environmental pollution made the establishment of a special court with specialized knowledge and skills to be necessary. The legislative information showed that the Land and Environment Court was established to "straighten out a wide range of the jurisdiction of the current courts or divisions on the land use and development, land evaluation and tax, as well as the implementation of these laws."[39]

The Land and Environment Court was established under the delegation of Land and Environment Court Act 1979, and it replaced the former Land and Valuation Court of New South Wales and local government appeals divisions. The level of the court is inferior to the High Court of Australia and New South Wales Court of Appeal, and at the same level of the Supreme Court of the state. The Land and Environment Court consist of 5 judges and 9 illegal technical commissioners. The selection and term of the judge is same to the judges in other courts. The term of illegal technical commissioners is 7 years, and they are required to have special knowledge, experience or appropriate qualifications satisfying the Minister of Planning and Environment in the areas of local management or urban plan, environmental science, envoronment protection or assessment, land evaluation, construction, engineering, surveying or building construction, natural resource management and etc.

The Land and Environment Court has exclusive jurisdiction based on a large number of environmental and planning laws. It can deal with civil disputes in the field of environment and planning, review administrative decisions on the planning and construction aspects, as well as accept the criminal complaint doing harm to the environment. The judges can hear all kinds of cases, while the illegal technical commissioners can only review administrative decisions.[40]The parties against the decisions of the commissioners may appeal to the judges of the court, but the appeals are only limited to legal error, and can not point to the commissioner's value review results of administrative decisions. The parties against the judge's decisions in the Land and Environment Court can appeal to the Court of Civil Appeal of the state's Supreme Court, if the decisions are of civil aspects, while they can appeal to the Court of Criminal Appeal of the state's Supreme Court, if they are judgments in criminal matters.

The Land and Environment Court has made important contributions to the development of environmental law in New South Wales since it was set up. During the practice of nearly 30 years, the court has developed case law in a series of key areas, including the polluter-pays, serious environmental offenders sentenced to imprisonment, open proceedings in the public

[39] Landa, D.P.:1979, 17 April, Hansard, NSW Legislative Assembly, p.3349-3350.

[40] see M. L. Pearlman:“The Land and Environment Court of New South Wales: A Model for Environment Protection”, Water, Air, and Soil Pollution, 2000, Vol123, p396.

interest litigation, cross-border pollution, and the principles of ecological sustainable development which includes the precautionary principle .For example, in the case Environment Protection Authority v. Gardner in 1997,the judge of the Land and Environment Court Lloyd sentenced Gardner harming the environment 12 months imprisonment and fined $25,000.[41]This is the first sentence of imprisonment in respect to the environmental crime in New South Wales. In another example, according to the provisions of Chapter 25 in the Environmental Offences and Penalties Act 1989,if a violation of law will cause or threaten to cause environmental damage, anyone have the right of access to the Land and Environment Court to stop the act. In the case Brown v. Environment Protection Authority, the plaintiff hold that the permit issued to the paper mill by the defendant was invalid, for the paper mill discharged the untreated sewage directly into the river. After reviewing the explanation of the Environmental Offences and Penalties Act, the Land and Environment Court hold that the plaintiff had standing.[42]The Chief Judge of the Land and Environment Court M. L. Pearlman believed" a large number of legal principles developed by the court is critical to the reform of environmental law"[43].

On the aspect of procedure, the basic idea of the Land and Environment Court is to settle the dispute quickly and effectively through minimizing unnecessary form bound as far as possible. For example, the value review proceeding of an administrative decision does not apply evidence rules. Meanwhile, the court strives to shorten the cycle of litigation by defining controversial points before the trial, as well as the procedure of the evidence collation and service. In addition, the court also provides comprehensive mediation service, and the parties may choose a trained mediator to mediate the dispute between them.[44]In November 2002, the Land and Environment Court set up Internet-based computer system, the e-court system, for the litigants and their agents. The parties and their agents can submit petitions initiate proceedings and track the progress of litigation via internet. As a part of the e-court, the telephone conference equipment has been applied successfully. The judges and commissioners can use the system to deal with the urgent applications in proceeding or conduct litigation guidance and call pre-trial conference. M. L. Pearlman said "The Land and Environment Court is a great success, not only in terms of cost, efficiency and justice, and especially in the innovation of environmental law, which becomes a model of other states".[45]Queensland established the Planning and Environment Court in 1990,and South Australia established the Environment Court in 1993.The jurisdictions of the two courts, however, are quite different from that of the Land and Environment Court in New South Wales.

iv.Environment Court of Memphis in America

Since more than one century ago the government of Memphis had tried to control environmental

[41] Environment Protection Authority v. Gardner: 1997, 7 November, Justice Lloyd, NSWLEC.

[42] Brown v Environment Protection Authority and Anor: 1992a, 78 LGRA, 119.

[43] M. L. Pearlman:“The Land and Environment Court of New South Wales: A Model for Environmente Protection”, Water, Air, and Soil Pollution, 2000, Vol123, p398.

[44] see the Land and Environment Court Act,section 5a.

[45] M. L. Pearlman:“The Land and Environment Court of New South Wales: A Model for Environmente Protection”, Water, Air, and Soil Pollution, 2000, Vol123, p406.

damages through implement of the environmental code and the court's punitive measures, but this effort did not succeed. The reasons are as following: (1)The cost of breaking the law was low, while the cost of abiding by the law was relatively high.(2)The efficiency of dealing with cases in Memphis District Court was low. Usually, a case had to go through a number of courts from the beginning to the end, and the proceedings cycle was quite long.(3)Generally, the importance of these environmental cases had been covered by a large number of criminal cases piled up in the courts, thus the judges had no time to spend a lot of energy on hearing environmental cases.(4)As a result of independent functions of various departments, the implementation process of the cases was of low efficiency.[46]

In 1982, more than 700 reports of attacks by rats and 44 cases of rat bites were happened in Memphis. There were thousands of illegal rubbish dumps in Memphis and Shelby in 1982.Given the severe situation, in the early 80s of last century, in order to strengthen enforcement of environmental code, Memphis began with the reform. Eventually, they learned from the model of the Indianapolis Environment Court, and established the Environment Court of Memphis. The court has the jurisdiction of the toxic waste and illegal dumping cases, as well as the cases of the rodent, sexually transmitted diseases, food contamination, construction safety, wild animals and so on.[47]

The establishment of the Environment Court makes the judges to concentrate their efforts on studying environmental laws and focus on the cases of violation environmental laws. The efficiency of the court is quite high. Under normal circumstances, the cases will get into the proceedings during 1 to 2 weeks. While under emergency situations, the cases will enter the proceedings within 24 to 48 hours. The court has also developed its own jurisprudence, and innovative mechanisms actively, such as giving the defendants a reasonable time to correct the violations through on-site appearances by the judge system, enforcing the defendants to restore the environment as soon as possible through the judge remitting hefty fines. The successful operation of the Environment Court leads to the rapid improvement of the environment in Memphis.[48]The court was recognized as a specialized court by American Bar Association in 1992.Nowadays,the model of the Environment Court is adopted in the other cities of the United States.

Ⅳ. The reference value of the foreign environment court system to Chinese environment judicial mechanism

Seeing the establishment background of the foreign environment courts, almost all the environment courts are set under the situation that environment problem is very serious but the traditional judicial system does not meet the reality need, so environment courts are set to try the

[46] see Larry E. Potter：“The Environment Court of Memphis, Shelby County, Tennessee: The Past, The Present, and The Future”，Georgia Law Review Winter, 1995, Vol.29,p. 314-315.

[47] see Larry E. Potter：“The Environment Court of Memphis, Shelby County, Tennessee: The Past, The Present, and The Future”，Georgia Law Review Winter, 1995, Vol.29,p. 316-318.

[48] see Larry E. Potter：“The Environment Court of Memphis, Shelby County, Tennessee: The Past, The Present, and The Future”，Georgia Law Review Winter, 1995, Vol.29,p. 323.

environment case and provide judicial support to the environment protection. It can be said that the foreign environment courts, as well as Chinese environment protection divisions, are set up at the hard time. Because the political system and judicial tradition are different, there are many differences among the foreign environment courts, such as organization system, jurisdiction and operational mechanism. Although China cannot imitate some country's pattern, the following common characteristics of the foreign environment courts can give the reference value to the innovation of Chinese environment judicial mechanism.

ⅰ.Setting up the environment court and entrusting with it broad and exclusive jurisdiction
The foreign environment courts always have broad and exclusive jurisdiction, so that all the case related with environment protection, from the mouse raiding the human to the environmental pollution accident, are all under the environment court's jurisdiction. Because of the exclusive jurisdiction of the environment court, it can concentrate the environment cases which are submerged in other kinds of cases. That has strong public influence so that to display the guide and education function of the justice to the society. Because the environment courts try environment protection cases specially, they can concentrate judges who are familiar with environment law and have some professional environment knowledge, so they don't need to request all the judges who are possible to try environment cases to have related knowledge structure. It is advantageous for centralizing of the judicial resources and reducing the judicial cost.

The Chinese environment protection divisions have deal with the civil, administrative and the criminal cases which are involved in the environment protection. The scope of jurisdiction is quite broad. However, the environment protection divisions don't have the exclusive jurisdiction of the environment case, and they are only a helpless choice of the district courts in integrating the judicature resources, facing the serious environment problems. Because environment protection division's jurisdiction to environment protection cases is not clearly authorized by law, but it comes from the attribution of the court, thus the jurisdiction area of the environment protection divisions will be influenced by the transformation of the court. Therefore, the jurisdiction of the environment protection divisions and even the existence of environment protection divisions are unstable. At the same time, because of the benefit of interior division in court, many environment protection cases are possibly submerged in other cases with the other forms, which is not favor to the centralized jurisdiction to the environment protection cases; or it may make some cases which have environmental factors but not belong to environment protection cases enter into the trial procedure of environment protection division, which will affect the efficiency of environment protection division and will cause the jurisdiction confliction of between the environment protection division and other divisions. Moreover, the shift of cases among the divisions will also affect the efficiency of the case trial.

Because of the small jurisdiction of environment protection divisions and the low status, it is difficult for justice to play the function of harnessing the interregional pollution and the basin pollution in the form of environment protection division. The environment protection division tries the interregional pollution case mainly in the form of the designated jurisdiction decision from the higher court. It has no doubt to be able to guarantee the environment protection

divisions to trial some interregional pollution cases through designated jurisdiction, however, because the transmission of the cases among different divisions has wasted time, it has affected cases trial efficiency. Moreover, because of the existence of regional protectionism, some environment protection case also possibly submerged in other cases in the form of other subject matters of the cases, thus they cannot enter the trial procedure of the environment protection divisions smoothly. Therefore, designated jurisdiction is only a temporary action but not the long effective system.

Above all, we think that China should set up the environment courts, and entrust them with widespread and exclusive jurisdiction to the environment cases. The environment courts are not set up according to the administrative regionalization, and their jurisdiction area should be deterred according to the region and basin. Only this can centralize the judicial resources in the wider range, can make the professional environment case be trialed by professional environment courts effectively and fairly, and can have the stronger public influence. At the same time, it can also remove the influence of the regional protectionism, and display the function of the justice in the management of the region and the basin fully. Certainly, setting up the environment division has no legal basis now, so it needs the legislature to summarize the current practice of environment protection divisions promptly and enact the legislation about the establishment of the environment courts when the time is ripe.

Presently, the maritime courts also have jurisdiction to the cases of the pollution of sea area from the land source and the cases of the navigation waters. The key jurisdiction of the maritime courts is the cases of Bohai Sea from the land pollution source and the Yangtze River waters from the land pollution source. [49]Some experts suggested to set up the environment protection division in maritime courts.[50] We believe that it is better for the maritime courts to manage the sea pollution cases which are caused by the ships emissions, divulging, leaning drains the oil or other deleterious substances, the marine production, the work or open the ship, and the ship building work, because in the aspect of the environment protection case, the maritime courts are less professional than the environment protection divisions. Moreover, if we set the environment protection divisions in maritime courts in future, then how to coordinate the relations between the maritime courts and the environment protection divisions is also a problem.

ii. Absorbing environment expert to participate in the case trying

The environment experts are skilled in the environment profession and have the related experience. They realize environment questions profoundly. Absorbing expert to participate in the case trial can make up the deficiency of the judge's knowledge structure. The environment experts in foreign environment protection courts participate the case trial procedure directly, not only provide the advisory opinions. It is helpful for the environment experts to learn the cases comprehensively and factually, guaranteeing that the cases are trialed effectively and fairly. Moreover, because of environment expert's specialized knowledge and the skill as well as the

[49] See "Some opinions about the development of navigation trail from the supreme court"

[50] Zhou Zixun "Environment protection division suffers legal short board" published on "Environment", 2008, 09 version, page 82

rich experience, they play the influential role in the court's mediation procedure and in the substitution dispute solution.

About how to absorb the environment expert to participate the case trial, there are mainly three kinds of patterns: environment special commissioner pattern, juror pattern and expert Inquiry board pattern. In view of China's actual situation, we consider that the juror pattern and the expert Inquiry board pattern may be useful, and the juror pattern is better. The juror pattern uses China's jury system directly. The environment experts as the juror hear the litigants' statement and participate the case investigation directly, which is advantageous for the environment expert to learn the cases and is beneficial to enhance the trial efficiency of the cases. As for expert inquiry board pattern, because the experts will not participate the trial of cases directly, and they just learn the cases through judge's descriptions, which obviously does not favor to the effective and fair trial of the cases. Moreover, we may consider to set up the neutral environment protection experts pool. The environment protection experts evaluate the litigant's loss and the reasons, and provide the expert advice to the litigants for referring. Then, the litigants decide to choose either the lawsuit or other disputes solution way.

ⅳ. Using the open plaintiff qualification system

As for the problem that the environment protection divisions have no enough cases to try , on one hand, it is because it is difficult to provide the proof in the environment cases, as well as people are lack of environment rights-defending awareness, and on the other hand is that the plaintiff qualification is limited strictly by the law. The environment problems are social problems, any individual and organization should be authorized to file a lawsuit to relieve their own rights and protect the public interest. If any person is authorized to file the environment lawsuit for the public welfare, it means that there are millions of eyes who stare at the polluters momentarily, so that to make them dare not to act rashly. Simultaneously, the environment protection institutions will also exercise their responsibilities positively, because polluting enterprises in their jurisdiction are sued also means their omission. So it's necessary to establish the environment public welfare lawsuit system.

Presently, only Chinese "Marine environment Protection law" has entrusted the department which exercises marine environment surveillance authority with the qualification to claim the civil injury compensation against the liable person who violates marine resource. As for the environmental pollution in other areas, there is no law to entrust the rights with any subject to file the environment protection public welfare lawsuit, but the law requests the plaintiff to have the direct relation with this case. Therefore the practice of the environment protection divisions to give some organizations such as the procurator agency, the environment protection department, the environment protection organizations the qualification to file the environment protection public welfare lawsuit is actually illegal. However, the practice of the current environment protection public welfare lawsuit has not criticized by the legal supervision institution. On the contrary, it obtains the community widespread commending and support. This shows fully that there is common sense of establishing the environment public welfare lawsuit system in China. In view of the important meaning of the environment protection public welfare lawsuit to the management environment pollution and the Chinese stern environment protection condition, the

legislature should speed up the legislative step and establish the environment protection public welfare lawsuit system as soon as possible. There are problems of the insufficient cases in the practice of the environment protection divisions, and the environment protection public welfare lawsuit is the important way to solve the problems. The environment protection public welfare lawsuit is indeed a systematic project, however, at least we should permit its existence legally first, and then practice as well as study and perfect.

ⅳ. Carrying on the mechanism innovation positively

The foreign environment courts have the positive innovative spirit, like the electron court system in New South Wales land and environment court, the system of Memphis Environment Division's judge dealing the cases at spot, the mediation procedure of New Zealand Environment Division and so on. The positive innovation spirit of environment courts perhaps because of the characteristic of specialization and the small scale as well as the independence. Because of their spcialization, they have profound realization to the involved area, having the innovation initiative. Because of the small scale and the independence, their transformation's resistance is small and the cost is low.

The environment protection divisions which are initially established in China have already displayed the positive innovative spirit in practice. For instance, the Wuxi environment protection division is trying the practice of accepting, trying and implementing a case within one day. [51]The Qing Zhen environment protection division invites administrative organ to participate the mediation to solve disputes, Kunming environment protection division participate environment enforcement joint conference and so on. However, the innovation of the Chinese environment judicature system can not satisfy the practical needs. Moreover, these innovations are only the fragmentary cases, not form the system. For instance, because it is difficult for the polluter to presented evidence so they are remiss to file the lawsuit, which causes the environment protection divisions have few cases to try, it needs us to have the innovation urgently in the environment lawsuit evidence rules. We suggest to use the causal relation estimation rule in the environment lawsuit, including the indirect counter-evidence rule, the epidemic disease study rules of causation and so on, which are specially suitable for the evidentiary rules in the environment lawsuit. These evidentiary rules are widely used in the developed industrialized country's environment infringement suit. The purpose is lightening plaintiff's proof burden. Moreover, the emphasis of the environment protection cases decisions and the executions is not punishing the polluter, but is recovering the ecological environment. All the measures which are advantageous to recover the ecological environment can be used in decision and the execution. For instance, the environment protection division of Qing Zhen City judged the woods damager to plant trees is worth promoting. In practice, if the polluter is willing to take the positive effective measure to recover the damage which is caused by his illegal activity, we may consider to reduce fine and use the suspension of sentence, even reduce the prison term and so on.

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[51] See Zhao Zhenghui "Wuxi strengthens the environment protection" published on "People's Court News", May 7th, 2008, 001 version; Pu Minqi "The first environment protection court in Jiangsu is established" published on "China National News", May 23rd, 2008, D01 version

A Study on How to Promote the Business Environment Competitiveness of China's Household Appliance Export Enterprises —— Take the Example of "Haier"

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Abstract: The competitive business environment can be regarded as advantages such as in environment protection, environment adaptation and environment compatibility from the business products' market access. It can be defined as the sum of commercial viability and sustainable development capacity, meanwhile it is a synthesis of composition and impact of the environmental factors in core competitiveness of products. As the world's fourth largest home appliance manufacturer, the advantages and disadvantages of Haier's competitive business environment can provide a certain degree of references for the related household appliances enterprises in China.This essay will firstly critically evaluate Haier's competitive business environment by using the criteria of product characteristics, production process, business management and product life cycle. Then it will propose a series of countermeasures for China's household appliances enterprises from the perspective of government, guild and enterprises.

Keywords: Environmental competitive power; Electrical household appliances; Haier; China

1. Introduction

Frexell as a famous American managerialist put forward the original concept of competitiveness business environment. He suggests that the constant decreasing of natural resources together with heightened environment deterioration leading more twists and turns on the road to social-economic development. The contradictions between social-economic development and environment protection have become increasingly acute which results in a certain degree of puzzle choosing path of economic development. Furthermore, it increased the management of enterprises cost and finally reduce the profit space which fundamentally, weakened the competitiveness of enterprises. Subsequently, Frexell and his partner Vryza (2000) adopted new concept named "competitiveness business environment" instead of "eco-competitiveness strategy" in their findings. Their greatest contributions are firstly, putting forward the concept of

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competitiveness business environment and some relatively. Moreover, they use plenty of case study and empirical study to explain the importance of "competitiveness business environment" to enterprises. Nevertheless, there exist certain limitations to both Frexell and Vryza's study in "competitiveness business environment". Namely, they still defined "competitiveness business environment" as "green marketing strategy" which shows a certain degree of narrow positioning. Subsequently, Blomquist (2003) firstly set forth the logical relationship between "competitiveness business environment" and "core competitiveness of products" by using cost control theory and econometrics method. Nonetheless, the Blomquist's study was criticized because he lumped these two concepts together to confuse matters (Blomquist, 2003).

Interiorly, Doctor Shi (2003) can be regarded as the first person who systematically stated the general relationship between competitiveness business environment and price/non-price competitiveness. However, Doctor Shi's study not comprehensive enough and later, Xu Fang (2005) stressed that enterprise competitiveness must be under eco-strategy. Furthermore, by analyzing the eco characteristics such as non-symmetry, crowding effect and competitive exclusion, enterprises could gain a competitive edge through strategy K and strategy R.

It is clearly that the characteristics of competitiveness business environment can be concluded as following: firstly, experts' concern to "competitiveness business environment" issue started relatively late, only about nearly ten years. Secondly, relative studies are not systemic and mature enough.

Actually, challenges have been encountered during the increasingly stringent requirements for imports by western developed nations. Haier as the world's fourth largest home appliance manufacturer, across green barriers successfully and therefore, should be studied carefully to provide a certain degree of references for the related household appliances enterprises in China.

2. Haier's Competitive Business Environment Analysis

The competitive business environment can be regarded as the sum of commercial viability and sustainable development capacity, meanwhile it is a synthesis of composition and impact of the environmental factors in core competitiveness of products (Zhao Jianfang, 2007). The implications inside could be the combination of value creation, innovation, social responsibility and harmony. The influence factors about competitive business environment are complex and can be conclude as four parts, namely, product characteristics, production process, business management and product life cycle.

Considering above four factors, this essay evaluates Haier's competitive business environment through a series of specific items (see Table 1). There are four degrees as conclusion, namely, "excellent=90", "good=80", "general=60" and "worse=40". Meanwhile, for the purpose of computing, finally, this essay counts results using weighting and reach a relatively objective evaluation.

Table1 Haier's Competitive Business Environment Evaluation Index System

No.	Item	Weighted Ratio	Details	Weighted Ratio
1	Product Characteristics	0.3	Raw Material	0.3
			Packaging	0.2
			Patent Technique	0.2
			Performance	0.3
2	Production Process	0.15	Manufacturing Process	0.6
			"Three Wastes" Treatment	0.4
3	Business Management	0.3	ISO14001 Certification	0.4
			Enterprise Management System	0.3
			Corporate Culture	0.3
4	Product Life Cycle	0.25	Design	0.25
			Manufacturing	0.25
			Marketing	0.25
			Recycling	0.25

2.1 Product Characteristics

Since customers always choose products with better environment protection requirement, product characteristics can be regarded as the most important factor.

2.1.1 Raw Material

Recently, western developed countries increasingly focus on components inside products. Namely, the "Green Material" is emphasized by global trade. It can be exemplified that Haier follow close to the line of Restriction of Hazardous Substances Directive (ROHS) by European Union. From design proposal to suppliers, any component do not meet the environment protection requirement couldn't be adopted.

2.1.2 Packaging

The "Green Package" is an environmental friendly package. According to Gu Xiaoyan (1999), the green package should meet the environment protection requirement at whole product life cycle. Actually, Haier's products satisfy the ISO14001 certification strictly and use green package easily for recycling.

2.1.3 Patent Technique

It is clearly that more patent technique can promote an enterprise's competitive business environment. As illustrated by article, Haier's patent technique accumulatively reaches 7000 (including patent invention 1234) by November 2007. Meanwhile, Haier won the honor for "Best Supplier" and "Exemption Supplier". However, compared with well-known abroad enterprises, Haier still need strengthens.

2.1.4 Performance

The majority of Haier's products pass the European A++ Energy Efficiency Standard. By the end of November 2007, Haier's fridges reached latest China Energy Efficiency Rating. Compared

with other fridges, Haier fridges could save 182.5KWL one year which means 100RMB electric charge. Moreover, from the view from society, it means reducing nearly 181.9KG carbon dioxide pollution. Additionally, as one of the 2008 Beijing Olympic suppliers, Haier developed the concept of "Green Olympics" and pushed home appliance products updating and upgrading by its independent R&D.

Table2 Haier's Competitive Business Environment Evaluation Results – Product Characteristic

Item	Criteria	Haier's Situation	Conclusion	Mark
Product Characteristics	ROHS	Strictly Followed	Excellent	90
Product Packaging	Green Package	Strictly Followed	Excellent	90
Patent Technique	Patent Invention	Reach 1234 Patent Invention	Good	80
Performance	European A++ Energy Efficiency Standard	Pass A++	Excellent	90

According to Table 1 and Table 2, the Haier's competitive business environment –product characteristic can be computed as:

$$0.3\times90+0.2\times90+0.2\times80+0.3\times90=88$$

To sum up, Haier's competitive business environment –product characteristic is "good".

2.2 Production Process

A good production process means not polluting environment or polluting little which including the preparation of raw material and manufacturing supervision. Furthermore, the "Three Wastes" treatment and recycling process should also follow the relative requirement.

2.2.1 Manufacturing Process

Along with sharpening of contractions with resources, the strategy of sustainable development was introduced as humans' long-term development strategy. Since the quality environment provides necessary resources to social-economic activities, the "Clean Production" method emerged as demand. "Clean Production" utilizes "prevention" measure to achieve least environment impact, least resources waste and best management. Haier promotes the "Clean Production" actively and strictly in line with China's Clean Production Law. Nevertheless, since the highest standard of product process means completely pollution-free, Haier still need to upgrade.

2.2.2 "Three Wastes" Treatment

Recent years, there exists acceleratory growth of E-waste. China has already been one of the most important electronic products imported and exported countries. However, China also has largest E-waste. Haier as a large-scale international enterprise group enjoyed high reputation in the world and always working for the products' environmental performance. Actually, by the end of 2007, 34 leading products of Haier passed the Clean Production examination and reduced waste-water emissions 15,000 tons and carbon dioxide emissions nearly 300 tons. Nonetheless, experts suggest that more effective solutions can be made through technological innovation.

Table3 Haier's Competitive Business Environment Evaluation Results –Production Process

Item	Criteria	Haier's Situation	Conclusion	Mark
Manufacturing Process	China Clean Production Law	In line with China Clean Production Law	Good	80
"Three Wastes" Treatment	China Environment Protection Law & Regulations	Basically in line with China Environment Protection Law & Regulations	General	60

According to Table 1 and Table 3, the Haier's competitive business environment –production process can be computed as:

0.6×80+0.4×60=72

To sum up, Haier's competitive business environment –production process is "general".

2.3 Business Management

Business Management as an important factor of competitive business environment requires enterprises owning environmental certification and establishing a series of sound scientific management systems which including approach determination, document system creation and training.

2.3.1 ISO14001 Certification

Enterprises should establish a series of sound scientific management systems. Additionally, by accessing to third party certification, prove to outside world. Since ISO14001 Certification can benefit enterprises such as impressing customers, saving energy and increasing competitiveness, it is regarded as "Green Passport" to international market. Haier passed ISO14001 Certification in the early 1997 which helped Haier dealing with foreign green barrier effectively.

2.3.2 Enterprise Management System

"Green Management" requires enterprises blend the idea of environment protection into business management and production activities. Haier has always been focused on the introduction of new equipments, new technology and new process which helped Haier creating its green brand.

2.3.3 Corporate Culture

Corporate culture can be regarded as the sum of views and knowledge about the enterprise's growth formed in a long creating process by the combination of the enterprise and employees. Haier focuses on staff quality improvement and publicly release messages about ecological

design, resources recycling and the public good. Generally, Haier perfectly combine "public marketing" and "green marketing" and create green corporate culture successfully.

Table 4 Haier's Competitive Business Environment Evaluation Results –Business Management

Item	Criteria	Haier's Situation	Conclusion	Mark
ISO14001	ISO14001 Certification	Passed ISO14001 Certification	Excellent	90
Enterprise Management System	Scientific Management System	A series of sound scientific management systems	Excellent	90
Corporate Culture	Green Corporate Culture	Good green corporate culture	Good	80

According to Table 1 and Table 4, the Haier's competitive business environment –business management can be computed as:

0.4×90+0.3×90+0.3×80=87

To sum up, Haier's competitive business environment –product characteristic is "good".

2.4 Product Life Cycle

A product called "strong" product life cycle means the product's raw material is "green" and in line with China environment protection regulations and related international regulations.

2.4.1 Design

Despite considering the function, quality and development cycle and cost of a product, a variety of related factors should be optimized. Then, the product can comply with the requirement of environmental protection. Haier adopts a series of green design such as extending life of products and reducing environmental impact. Meanwhile, Haier has been a leading corporate of fluorine-free alternative products to contribute the environment.

2.4.2 Manufacturing

Actually, green manufacturing is required by circumstance. The goal of green manufacturing is highlight the utilization rate of resources and to coordinate economic benefit and social benefit. Haier controls the level of Lead, Mercury, Cadmium, PBDE, PBB in final products and packages strictly and enhances the environmental performance of products continuitely.

2.4.3 Marketing

Green Marketing means the demand of "Green Consume". Enterprises can achieve their own profits by satisfying customers' green consumer demand. Recently, the spirited competition pushes Haier developed a green strategy to green marketing and set up "green count" and "green shop" to promote Haier's products.

2.4.4 Recycling

Recycling economy is a kind of eco economy. It can be regarded as the result of profound of understanding of the relationship between human beings and nature. Today's traditional economy should be changed into resource-conserving and environmental friendly economy. Actually, it is an inevitable choice. When Haier's products meeting the end of life stage, these products can be recycled by process technique such as CRT utilization, metal and plastic separation. Additionally, Haier establishes the first national used appliances utilization model base and the first green education model base in February 2007. However, the recovery rate seems not excellent which is about 45% to 55% and need to be promoted.

Table 5 Haier's Competitive Business Environment Evaluation Results –Product Life Cycle

Item	Criteria	Haier's Situation	Conclusion	Mark
Design	Green Design	Adopt some green design	Good	80
Manufacturing	Green Manufacturing	Adopt some green manufacturing	Good	80
Marketing	Green Marketing	Adopt a series of green marketing	Good	80
Recycling	Sound Recovery System	Relatively sound recovery system	General	60

According to Table 1 and Table 5, the Haier's competitive business environment –product life cycle can be computed as:

$$0.25\times80+0.25\times80+0.25\times80+0.25\times60=75$$

To sum up, Haier's competitive business environment –product life cycle is "general".

3. Overall Appraisal of Haier's Competitive Business Environment

It is clearly that Haier attaches great importance of products' competitive environment. It is the most valuable brand in China and won a number of honors of environmental protection. Therefore, from the view of products characteristic, Haier has relative strong competitive business environment. Furthermore, there is a great deal to be said in support of Haier's competitive business environment factor of product process. On the other hand, Haier owns environmental certification and establishes a series of sound scientific management systems which means Haier also has a strong business management. However, the product life cycle part still needs progress.

According to above evaluations, the final evaluation is listed in Table 6.

Table 6 Haier's Competitive Business Environment Final Evaluation

No.	Item	Weighted Ratio	Conclusion	Mark
1	Product Characteristic	0.3	Good	88
2	Product Process	0.15	General	72

3	Business Management	0.3	Good	87
4	Product Life Cycle	0.25	General	75

According to Table 1 and Table 6, the Haier's competitive business environment final evaluation can be computed as:

0.3×88+0.15×72+0.3×87+0.25×75=82

To sum up, Haier's competitive business environment final evaluation is "good".

4. Countermeasures to Promote Competitive Business Environment

China's home appliances enterprises should draw lessons from the evaluation of Haier's example. By evaluating Haier's advantages and drawbacks, other home appliances enterprise should employ their own advantages to create new results. Meanwhile, it is important to know the underlying cause of disadvantages.

4.1 The full-play of government policy guidance

Government as enterprises guide should give full play of policy guidance. Government can try carrying out the "exports preferential policy" to some environmental home appliances enterprises. Moreover, government can grant environmental subsidies which help home appliances enterprises reducing unit cost. For example, the foundation of Green Incentive Fund and the preferentially fiscal and monetary policy can help these home appliances enterprises promoting competitive business environment effectively.

4.2 Actively performing the functions of Guild

Since China joined WTO, government-to-business management functions have been generally weakening while the role of guild has been increasing important.

Firstly, the regulatory function is important and should be performed strictly according to China's Environmental Protection Act by Guild of Home Appliances. In addition, more deeply communication with abroad environmental organizations is needed to improve China's home appliances exports' environmental standard. Moreover, enterprises cannot blindly raise environmental standard since the level of technology and environmental foundation at home should be considered carefully. Over period, China's home appliances enterprises could pass the transition period and join with international standard.

Secondly, the Guild of Home Appliances should carry out a series of research work about related regulations and acts based on existing scientific research institution. Then, related legislative branches can use this information as references to introduce legislation.

Finally, the Guild of Home Appliances should establish relative perfect public information system which can offer the latest marketing information about movement of home appliances products (material, procedure). Then, China's home appliances enterprises can follow the leading edge of technology closely.

4.3 Enterprises are supposed to develop product with green package

The "Green Package" is an environmental friendly package. Enterprises should the use green

package meeting the environment protection requirement at whole product life cycle and easily for recycling. Enterprises should accelerate the technical innovation and develop new packaging materials.

4.4 Enterprises are supposed to implement cleaner production

On the one hand, "Clean Production" utilizes "prevention" measure to achieve least environment impact, least resources waste and best management. On the other hand, enterprises should study and implement the "green governance". This thought can be concluded as "five principles", namely, research, reduce, recycle, rediscover and reserve. Furthermore, enterprises should do some environment awareness and establish a corporate image of environmental protection .

4.5 Enterprises are supposed to improve comprehensive utilization efficiency

Enterprises should try their best to improve comprehensive utilization efficiency. Actually, some waste-gas can also be potential resources. The rational use of these waste-gases could reduce production cost and increase economic benefit. China's household appliances enterprises should minimize the production of waste and industry refuse. Meanwhile, improving the "three waste" utilization efficiency.

References

G.E.Fryxell. 'Does the selection of ISO14001 registrarmatter'? Regis-trar reputation and environmental policy statemer[J] Journal of Environmental Management,2004,(71):45-57.

G.E.Fryxell, M.vryza.Managing 'environmental issue across multiple funcitions:an empirical study of corporate environmental departments and functional co-ordination.Journal of Environmental Mana-gement[J]'. Journal of Environmental Management,1999(55):39-56.

G.C.Blomquist, Michael A New someb, 'Measuring principals values for environmental budget management:anexploratory study[J]'. Journal of Environmental Management,2003,(68):83-93.

Ralph (Skip) Luken, Ann-Christin Freij. 'Cleaner industrial production in developing countries: market opportunities for developed countries and potential cost savings for developing countries[R]'. Environment and Energy Branch Industrial Sectors and Environment Division United Nations Industrial Development Organization Vienna, Austria.1994.

Samuel B. Moore, Larry W. Ausley. 'Systems thinking and green chemistry in the textile industry: concepts, technologies and benefits[J]' .Journal of Cleaner Production.2004, (12):585–601.

C.Gertosio, N.Mebarki，A.Dussauchoy. 'Modeling and simulation of the control framework on a flexible manufacturing system[J]'. Int. J. Production Economics. 2000, (64): 285-293.

Wai Ki Ching, Anthony W. Loh. 'Iterative methods for flexible manufacturing systems[J]'. Applied Mathematics and Computation .2003, (141) : 553–564.

Chris van Rossem, Naoko Tojo, Thomas Lindhqvist. 'Extended Producer Responsibility---An examination of its impact on innovation and greening products[R]'.Brussels, Belgium: Friends of the Earth Europe; European Environmental Bureau (EEB).2006.

Sissel A. Waage, Ken Geiser,Frances Irwinc, etal .'Fitting together the building blocks for sustainability:a revised model for integrating ecological, social,and financial factors into business decision-making[J]'. Journal of Cleaner Production . 2005, (13):1145-1163.

Wufan Ni. 'The influence of environmental competitiveness on enterprise competitiveness and countermeasure[J]'. Market Modernization，2004，（12）：29-30. In Chinese

Wufan Ni. 'The investigation of China's business environmental competitiveness level and empirical evaluation ----Take the textile industry for example [J]'. Jiangsu Commercial Forum.2008，（2）：119-121. In Chinese

Wufan Ni. 'The measure model of China's business environmental competitiveness and upgrading strategy[J]'. Commercial Research.2007，（6）:49-53. In Chinese

Macroeconomic Effects of Carbon Dioxide Emission Reduction：Cost and Benefits

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Abstract: Global climate change is hitherto the most serious environmental problem, and China's CO_2 emissions reductions have been one of the hottest problems discussed in the world. This paper quantifies the impacts of different abatement policies on economy based on a modified MACRO model. The empirical results show that CO_2 direct emissions control with the most serious GDP loss is the most effective strategies in term of mitigating CO_2 emissions, and carbon tax on coal with great effects and less economic loss is the most suitable strategy for China.

Keywords: CO_2 emissions, Modified MACRO Model, Energy efficiency, Greenhouse gases

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Ⅰ. Introduction

Emissions of global warming gases continue to rise as the world burns ever more coal, oil and gas for energy. From the data of Institute for Environmental Studies, the effects of emissions of CO_2 and other greenhouse gases on the global climate are becoming visible, causing the changes in temperature, sea level rise, atmospheric circulation patterns, ecosystems and so on(see Table 1).

Table 1. The influence of climate change caused by greenhouse gas

Objects	Phenomenon
Global average surface temperature	Rised 0.6℃ in 20 Century
Global Sea Level	Increased 0.1 to 0.25 meter
The extent and thickness of Arctic ice	Reduced by 10-15% in spring and summer
Precipitation in the high latitudes of the Northern Hemisphere	Increased 0.5%-1.0% annually, and frequency of heavy rain rised 2%-4%
Total global economic losses from natural disasters	Increased by 10 times over the past 40 years

The risk of destabilizing the Earth's climate system is growing every day. There is evidence that economic damage as a result of extreme weather events has greatly increased over past few decades. Such events take a heavy toll on social economies. Few things can be more pressing for the protection of ecosystems and the well-being of society than avoiding the catastrophic effects of global warming. In 1998, drought and widespread wildfires caused by extreme weather conditions resulted in US $276 million worth of damage. In the same year, floods along the Yangtze River in China induced 4,000 deaths and US $30 billion economic losses. Compared losses in 1950s with losses in the 1990s, Munich Re(2000) and Francis(1998) concluded a large part of the increase in losses was resulted from extreme weather events. Taken inflation, insurance penetration and price effects into account, while real global GDP increased by a factor of three since 1950, the total sum of extreme weather-related damage increased by a factor of eight.

Table 2. The costs of natural disasters (Munich Reinsurance Company, 2000)

Year	Times	Insured Losses (million US$)	Economic Losses (million US$)
1983	1	2,200	3,500
1987	1	4,700	5,600
1989	1	6,300	12,700
1990	4	13,200	19,100
1991	2	9,100	15,700
1992	2	22,800	40,300
1993	2	3,200	24,400

1994	1	17,600	50,600
1995	4	7,700	120,600
1996	1	1,800	5,700
1998	4	7,150	45,700
1999	7	13,685	36,500

Based on Kyoto Protocol, China, India, and other developing countries were not included in any numerical limitation of the Kyoto Protocol because they were not the main contributors to the greenhouse gas emissions during the pre-treaty industrialization period. However, even without the commitment to reduce according to the Kyoto target, developing countries do share the common responsibility that all countries have in reducing emissions. China, as the world's second largest emitter of carbon dioxide, its attitude and actions will become the focus of the coming negotiations. For developing countries, to choose which kinds of policies will depend on their economic development, carbon dioxide emissions, energy supply, and the political structure and so on. On the one hand, China's attitude would influence the international negotiations; on the other hand, study the favorable policy will help to do the suitable selection. This proposal will study the cost and benefit of different emission reduction policies, in order to provide the guide and reference.

Ⅱ. Methodology

There are many mature energy-economy-environment models used throughout the world. The research on the influence of Carbon Dioxide Emission Reduction mainly based on these models to analyze the combined effects of Carbon Dioxide Emission Reduction on environment improvement and the national economy. The impact of carbon emission reduction policy is a relatively new research area, thers is not a generally accepted energy-economic-environment model, though a variety of existing models and their improved ones have certain degree of usage. Table 3 shows several typical models.

Table 3. The several typical models

	Methods	Typical Models	Typical Literature
Top-down models	Econometrics, general equilibrium theory and linear programming theory	3Es-Model MACRO GEM	Arvydas (2000) Toshihiko (2004) Lim (1998) Proost (1992) Robinson (1999)
Bottom-up models	Linear programming and nonlinear programming theory	MARKAL EFOM AIM I/O	Dolf (2001) Hannele (2004) Mikiko (2000) Casler (1998)

Nowadays, Macro Model, CGE model, MARKAL model and 3ES model have become the primary models for academic analysis of the effects on carbon dioxide emission reduction policy.

As a macroeconomic model, MACRO describes the relationship of energy consumption, capital, labor force, and GDP by production function. Its objective function is the total discounted utility of a single representative producer-consumer. The maximization of this utility function determines a sequence of optimal savings, investment and consumption decision. Moreover, we can obtain the carbon dioxide emission from the energy consumption, and the relationship between the GDP and carbon dioxide emission. Therefore, this proposal will use MACRO model to analyze the different emission reduction policies on the impact of macroeconomics, and the data can be obtained from the World Bank and the Bureau of Statistics.

This proposal constructs a modified model to evaluate possible effects for mitigating carbon emission for China. According to the simulation of this study, there are 6 scenarios for modeling strategies: Carbon Tax (including 4 scenarios), CO_2 emissions direct control, Carbon intensity decline. Based on a modified MACRO model, we establish a dynamic relationship. At the national level, the total effect of a country's economic activities can be expressed as follow,

$$GDP_t = aK^{\alpha} L^{\beta} \left(\sum E_{i,t} \right)^{\gamma} \tag{1}$$

Here, we use Cobb-Douglas production function, rather than the usual of Constant Elasticity Substitution production function in Markal-Macro Model, because the result of the former is more applicable to a dynamic iterative model, and has better statistical predictability. And the constraints as follows,

$$L_{t+1} = (1+r)L_t \tag{2}$$

$$GDP_t = C_t + I_t + Ec_t \tag{3}$$

$$K_{t+1} = K_t + I_t - \varepsilon_t K_t \tag{4}$$

$$K_T \le I_T \tag{5}$$

$$E_{i,t} = b_0 + b_1 * GDP_t + b_2 * E_{i,t-1} + \sum_{i=1}^{3} b_{3,i} * p_i \tag{6}$$

$$CO_{2t} = \sum E_{i,t} \mu_i \tag{7}$$

$$Ec_t = \sum_{i=1}^{3} p_{i,t} * E_{i,t} \tag{8}$$

During which GDP_t is the gross national product in *t* period, α, β, γ is the output flexibility of capital, labor and energy, a is the coefficient of the CD production function, E_i is the energy inputs of coal, oil, natural gas and others Ec_t is the energy costs in the *t* period, ε_t is the depreciation of assets in the *t* period, C_t is the consumer in the *t* period, I_t is the investment in

the *t* period，$p_{i,t}$ is the price of the i kinds of energy, r_t is the annual growth rate of economics, μ_i is the coefficient of carbon dioxide emission of the i kinds of energy，CO_{2t} is the carbon dioxide emission in the *t* period. Fig. 2 shows the dynamic process.

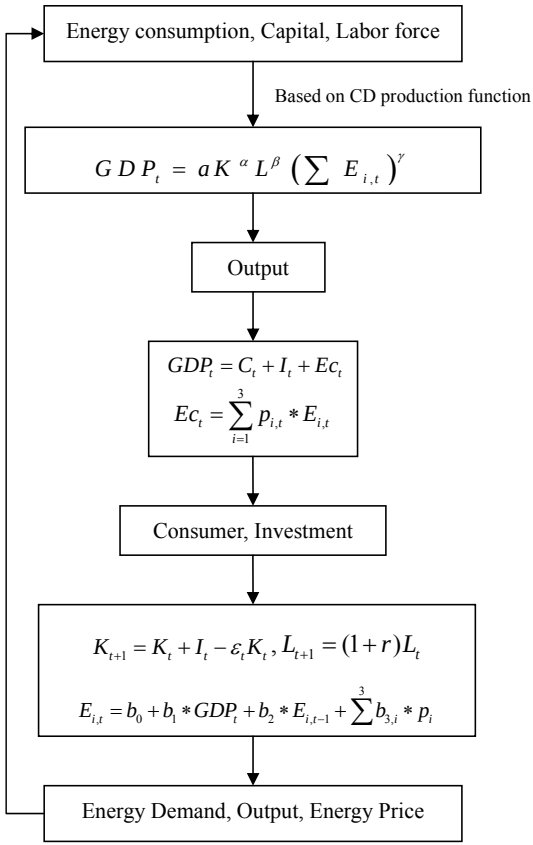

Figure. 1 The dynamic process of a modified MACRO model

In the modified model, (2) represents the labor force growth; (3) is the balance equation, assuming that all the current output used for current consumption, investment and energy costs; (4) is the dynamics of accumulation equation of the fixed capital stock, assuming that the capital stock combined the beginning of the current capital stock with investment minus depreciation; (5) is the limited conditions, considering that the final investment is bigger than a capital stock; (6) is the energy demand function, determined by GDP as well as former energy consumption and energy prices which is given by equation (8); (7) is the carbon dioxide emissions function. The overall model includes 13 variables and eight dynamic equations, and its dynamic relationship is completed by capital accumulation and energy demand. In the study of macroeconomic model, the data covers over 20 years. Also in 2012, China will join the carbon emission reduction

program. So we assume that 2000 is the initial period, and 2022 is the end period to study social cost and benefit if China will implement carbon emission reduction in 2022.

Ⅲ. Results

Based on regression analysis over the year 1990-2005, we obtain the Cobb-Douglas production function as below:

$$GDP(t) = \exp(-10.29) K(t)^{0.57} L(t)^{0.71} * \left(\sum_i E_i(t) \right)^{0.64} \quad (9)$$

From the above results, nearly 15 years China's growth trend shows increasing returns to scale, $0.57 + 0.71 + 0.64 > 1$. In the subsequent calculations, we will use the price in 1990 to obtain the value of GDP in order to remove the inflation effect. At the same time, we mainly consider energy consumption of coal, petroleum and natural gas. Using the consumption and price indices of these three kinds of energy as dependent variable, the demand functions in 1980-2001 are obtained respectively based on price indices of industrial products in 1990 under the method of time serie.

$$Coal = -1.32 * Oil(-1) - 0.006865 * Pc + 10135.812 + 0.002244 * Po + 1.22 * Coal(-1) \quad (10)$$

$$Oil = 0.001117 * Pg + 0.28 * GDP - 0.000258 * Po + 0.60 * Oil(-1) \quad (11)$$

$$Gas = 563.25 - 0.0000279 * Pc + 0.036 * GDP + 0.54 * Gas(-1) \quad (12)$$

Where Coal, Oil and Gas are the demand in the *t* period, *Pc*, *Po* and *Pg* are the price of there three different kinds of energy, *Coa*l(-1), *Oil*(-1) and *Gas*(-1) are the demand in the last period.

Table 4. Energy demand function

Variables		Coefficient	Variance
Coal Dmand function	Oil(-1)	-1.3154980	0.634571
	Pc	-0.0068654	6.215876
	Constant	10135.812	67.54982
	Po	0.0022436	2.563271
Petroleum Dmand function	Coal(-1)	1.2239084	0.287736
	Pg	0.0011167	2.175302
	GDP	0.2838123	0.263829
	Po	-0.0002582	1.117563
Natural gas demand function	Oil(-1)	0.5985618	0.385547
	Constant	563.25463	17.23554
	Pc	-0.0002794	1.142753
	GDP	0.0362279	0.102194
	Gas(-1)	0.5394788	0.472312

Without taking any measures to reduce carbon dioxide emissions, GDP, energy demand and other economic indicators during 2000-2020 is shown in Table 5 under the assumption that the

potential economic growth rate is 6.5%. Using these results as the benchmark, the influence of different emission reduction polices on economic indicators is obtained as Table 6 shown.

Table 5. Economic indicators forecast without CO2 emission reduction

	2000	2005	2010	2015	2020
Final comsuption(billion)	3125.14	4260.79	6103.80	6641.33	5611.91
Investment(billion)	1497.80	1621.27	1790.01	1976.32	2182.01
GDP(billion)	5261.11	6908.91	9858.37	13826.88	19392.91
Coal（Million tons of standard coal）	880.99	1017.97.34	120903.3	143595.2	170546.05
Petroleum (Million tons of standard coal)	327.84	412.19	558.98	679.73	808.38
Natural gas(Million tons of standard coal)	36.43	46.88	65.41	60.28	36.43
Energy(Million tons of standard coal)	1245.26	1477.04	1833.42	2175.96	2550.26
CO_2(Million tons of standard carbon)	766.26	905.46	1117.03	1328.25	1563.92

Table 6. The social costs and emission reduction effect of different emission reduction policies

Policies	Loss rate of GDP growth	The proportion of CO_2 reduction in 2020	The social cost of emission reduction(Yuan/ton)
Direct emissions control	-19.28%	42%	10084
Emissions intensity control	-1.27%	6.67%	4185
Holland carbon tax	-2.32%	7.12%	7679
Sweden carbon tax	-11.22%	25.69%	9744
Progressive carbon tax	-2.93%	23.0%	4025
Carbon tax on coal only	-1.87%	22.52%	2719

In the post-Kyoto, China's CO_2 emissions reductions will be remarkable and will always be the one of the hottest problems. If China will commit to cut its greenhouse gases emissions in the

future, then what effects will occur? In order to achieve this object, a modified MACRO model is constructed to evaluate possible effects for mitigating carbon emissions for China. According to the simulation of this study, the following conclusions are obtained:

1) Energy has a great contribution on production output by a weight of 0.63. This means that China's economic growth depends on energy consumption. Therefore, the constraint of carbon dioxide emissions induced by fossil fuels has a negative impact on the economy.

2) All emissions reduction policies have adverse effects on the economy. China is in the period of rapid economic growth. So to control energy consumption and carbon dioxide emissions, the economic development will face a big loss.

3) Different emissions reduction policies have marginal different social cost. There are 6 scenarios for modeling strategies: carbon tax(including 4 scenarios), CO_2 emission intensity control and CO_2 direct emissions control. The empirical results show that GDP will suffer a loss in all these scenarios. The above results in Table 6 shows the emission direct control is the most effective strategies in terms of mitigating CO_2 emissions but will induce the greatest GDP loss, follow by Sweden carbon tax and progressive carbon tax. And the emissions intensity control and carbon tax on coal cause the small GDP loss, but effects on emission reduction are not as good as the others. From an economic point of view, it is not quite suitable to stabilize the China's carbon dioxide emissions at current levels. China is a developing country. Although it has responsibility to reduce carbon emission, the economic development is equally important.

Based on the overall conclusions above, we suggest that China should not commit to directly cutting CO_2 emissions on the current emissions level. Also, the economic loss caused by carbon tax on coal in all scenarios is very small, and the effect on emission reduction is great effect. Considering the balance on less GDP loss and more CO_2 emissions reduction, we suggest that China should select carbon tax on coal which has small GDP loss but great CO_2 reduction.

Ⅳ. Conclusion

G1obal climate change is hitherto the most serious environmental problem，and is also one of the most complicated challenges in the 21st century. As the largest developing country and the second largest CO_2 emissions source next to the US, China's CO_2 emissions reductions have been one of the hottest problems discussed by academe, environmental administers and all governments in the world. It is of great importance to analyze China's CO_2 emissions, which is beneficial to China's sustainable development, but also can contribute to mitigate the global climate warming. Therefore, this paper quantifies what impacts possible different abatement policies will have on economy in the future based on a modified MACRO model. In our research, although CO_2 direct emissions control has the great effect on reducing the CO_2 emission, it causes a great loss on GDP. Combined the GDP loss and effect on CO_2 emissions reduction, the empirical results show the carbon tax on coal will be the best strategy for China.

Reference

Arvydas Galinis, Marko J. Van Leeuwen(2000). 'A CGE Model for Lithuania: The Future of Nuclear Energy', Journal of Policy Modeling, 22(6): 691-718.

Toshihiko Nakata(2004). 'Energy-economic Models and the Environment', Progress in Energy and Combustion Science, 30(4): 417-475.

Chae Young Lim, Byong Whi lee, Kun Jai lee(1998). 'Nuclear Energy System for the Global Environmental Regulation in KOREA Energy-Economy Interaction Model Analysis', Progress in Nuclear Energy, 32(3-4): 273-219.

Proost, S. and van Regemorter, D(1992). 'Economic effects of a carbon tax: with a general equilibrium illustration for Belgium, Energy Economics', Vol. 14, pp.136–149.

Robinson, S. et .al.(1999). 'From Stylized to Applied Models: Building Multi-sector CGE Models for Policy Analysis', The North American Journal of Economics and Finance, 10: 5-38.

Dolf Gielen, Chen Changhong(2001). 'The CO2 Emission Reduction Benefits of Chinese Energy Policies and Environmental Policies: A Case Study for Shanghai, Period 1995~2020', Ecological Economics, 39(2): 257-270.

Hannele Holttinen, Sami Tuhkanen(2004). 'The Effect of Wind Power on CO2 Abatement in the Nordic Countries', Energy Policy, 32(14): 1639-1652.

Mikiko Kainuma, Yuzuru Matsuoka, Tsuneyuki Morita(2000). 'The AIM/end-use Model and Its Application to Forecast Japanese Carbon Dioxide Emissions', European Journal of Operational Research, 122(2): 416-425.

Stephen Casler, Adam Rose(1998). 'Carbon Dioxide Emission in the U.S. Economy', Allegheny College, The Pennsylvania State University, Environmental and Resource Economics, 11(3): 349-363.

Munich Re(2000), Natural Catastrophes Service: Significant Natural Disasters in 1999.

Why did the New and Environmental-friendly Construction Factories Suffer? - A Survey on Zhejiang Yangtze Delta Building Materials Co. Ltd. *

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Abstract: Products of building materials are made from sand, stones, cement, powdered coal ash and constructive rubbish. These products have not been looked as good ones by many constructive institutes and businessmen and consumers. Therefore, factories dedicated to such products find it very hard to survive in the market. The main causes for the above are as follows. First, some departments of local governments and some constructive institutes do not look it as an important thing. The second is that our country makes relevant law and rule behind time. The third is that it is not serious for some local governments to do something according to the relevant law and rule. The fourth is the price of raw material is higher than normal but the price of product being the same as before. Government should regard it as an important matter, and promote it for publicity. It is necessary for us to turn the thoughts of building construction into new ideas which are use of ecologic constructive materials in their buildings among constructive institutes and businessmen and consumers.

Key Words: resource recycling; problems; survey; policies

Introduction

Due to the sustainable development, Chinese Government has already prohibited the traditional production and use of clay bricks, which has caused a revolution in the building material industry in China. In May 2003, Huzhou Silk Goods & Materials Co., Ltd invested more than 10 million dollars to establish Zhejiang Yangtze Delta Building Materials Co., Ltd with American G. F. T. Transnational Inc. Zhejiang Yangtze Delta Building Materials Co., Ltd is not only one of the present largest production base of new building materials in China, but also the one with most advanced technology and equipment, and the most complete in the product varieties. Comparing with the traditional clay bricks, Zhejiang Yangtze Delta Building Materials are made from sands, stones, cement, powdered coal ash, with the adoption of international leading production productive technology to produce bricks meticulously approaching the goal of Zero-Emission. This kind of brick producing from the recyclable resource have been used widely in America, Japan and European countries, as well as the north of China. However, the use rate is low in the South which owns great potential. That is why we paid visit to Zhejiang Yangtze Delta Building Materials Co., Ltd.

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1. The Adoption of Recyclable Resources

1.1 Technical Innovation

With latest technical support in the field of bricks from U.S and Japanese companies, the company also concentrates on its self-innovation and research development.

(1) Processing Technology. First, the company adopts electronic measurement which can guarantee the accuracy and stability of quality. In the process of measurement, it changes the traditional conveyer belt into electronic measurement by using the sensor which is a highly commercialized product on the international market. To keep pace with this cutting-edge technology, the company invested about 400,000 RMB on technical reform to make the producing process accurate, stable, and clean. Second, the company also stresses on soundproof effect, recycle and zero-emission. For example, the soundproof panels are placed around the machine so that noise from the machine will be reduced. Third, it uses fragment of mining rock instead of sand and the rate of substitution is between 35%-55%. Fourth, waste materials are reused which contributes to zero-emission.

(2)The Independent Research and Innovation of the Company. It owns a series of cutting edge techniques, for example, chain slope protection, segmental retaining wall technology and some special form of retaining wall series. Based on the innovation, it launches many new products emphasizing on energy-saving and environmental protection.

1.2 Products

(1) Wall Bricks Series. The product of wall furring series which are shaped by one step has many excellent features, e.g. outstanding load-bearing ability, heat preservation, graceful outline, soundproof effect and the use of natural material which drastically saved the use of raw materials and that of energy. The houses in northern part of China are required to achieve three-step energy-saving standard, two-step energy-saving standard are required in the region which have characteristic summer and winter. As a matter of fact, architecture interlayer wall produced by the company greatly exceeds the two-step energy-saving standard (saving by about 50%), and has virtually reached the three-step energy-saving standard (saving by about 65%). In addition, the comprehensive cost is lower than the normal two-step energy-saving wall's. The company invested 600,000 RMB in the construction of the display floor to verify the unique properties of the product and has invited the experts and scholars from Zhejiang University for the testing. Although architecture interlayer wall has been adopted in Northern China for about 10 years, the company is the first large-scale manufacturer in the Yangtze Delta. At present, the technology is more mature in Europe and U. S. It also plays an important role in the north of China. According to the company's budget report, the use of the comprehensive range of products can save the cost by 15%.

(2)Tile Series. According to the general experience of road-paving, rigid basis would be used accompanied by flexible pavement. The defect of this method is that permeability is weak so it is easy to contain water on the ground. Contrarily the use of flexible basis for a flexible pavement is very difficult to solve the contradiction between the road-load-bearing ability and its density.

This is because the stronger the water permeability is, the less the brick density is. To solve this problem, the company has done numerous experiments and end up with a new kind of high-strength concrete slabs with excellent features in water permeability and load-bearing ability, which can reach 30Mpa. Through the use of this new technology, the surface water seeps under the ground mixing with groundwater, which could then reduce not only the urban water-logging chances after heavy rain, but also the heat transfer, noise, heat island effect and the investment in drainage systems.

There are a lot of series tile varieties, such as pavement bricks, load-bearing bricks, planting grass bricks, etc. Among these products, the paving brick and planting grass brick focus on the ecological effect and load-bearing brick is usually used in airports, ports, docks and related areas for its bearing capacity and anti-power features. The equipment and technology of tile series has reached the advanced level in the international market. At present, the R&D division is trying to work out the lightweight concrete block to enhance its performance.

(3)Scenic and Hydraulic Brick Series. Scenic and hydraulic bricks are mainly used at scenery parks, small gardens, slope protection, water conservancy. These kind of bricks have strong commonality. The products have reached the US ISTM Standard which also have two promotion technologies i.e. chain slope protection and segmental retaining wall. The feature of the products are high water permeability, effective reduction of water flow pressure and improvement of water drainage. Further, plants growing among the holes of bricks improve the durability and stability of the pavement.

1.3 The Traits and Achievements of the Company

Presently the company is one of the highest-utilization of industrial waste R&D base, specialized in researching and developing concrete. The main raw materials are mineral slag, building junk, coal ash, silicon powder and so on. In 2006 and 2007, the amount of waste usage reached 16 tons. The minimum infiltration rate of waste in the products is between 35%~37%, in some products this rate has reached 56%~57%, ranking first rate in China. The company reached an annual output capacity of 400,000 cubic meters.

2. The Problems in the development of the company

2.1 The government doesn't pay adequate attention to energy saving and emission reduction and some departments of local government do not see energy saving as an important matter. New building materials were not widely used in South China and the publicity and promotion in this aspect is not sufficient. On the other hand, many local government authorities and major department officials are not familiar with the concept. All the above mentioned causes counteract the widely use of the new building materials in the southern area.

2.2 The prices of raw materials are increasing constantly but the prices of products are the same as before. Influenced by the macro economy of the country, the cost of the labor force and the prices of raw material which make the building bricks are much higher. The price of mining debris was 10 RMB/ton in 2004, however, it rose to 40 RMB /ton in 2008. Nevertheless the prices of the products kept the same all the time and those reduce the company's profits.

2.3 Some design institutes don't identify with the concept. First, they don't have great demand for the new business because they have enough other traditional business. Second, they can't accept the products completely. In order to develop this new business they need to learn new technology, purchase new design software and recalculate the structure data of the products, so they refuse to have a try. Third, it's risky. The products have not been accepted completely, and there are some difficulties to promote the new products. Fourth, some experts can't accept the new concept, they believe infiltration, leakage, cracking will appear while using these blocks.

2.4 Law-making and enforcement lags behind, some local governments don't take the relevant law and rules seriously. For example, in 2001, the Ministry of Construction promulgated a standard of energy-saving design for the residential building at hot-in -summer and cold-in-winter area, and this standard was to be implemented since October 1, 2001. However, due to inadequate supervision, very few units in Zhejiang Province implemented this project actually. There are other factors in our country's constructive market, that is the builders have the right to purchase the raw materials. In order to reduce the cost, builders will purchase the unqualified bricks from some small factories, so that the roof may have infiltration, leakage, cracking while using these bricks, like what has happened at Daqing in Northeast China some years ago. But in US, Japan and European countries, there problems won't appear for the law in these countries forbid builders to purchase raw materials.

3. Policies and Measures

3.1 The Government needs to pay more attention to energy saving and emission reduction, promoting it through media and leading the public, especially constructive institutes and businessmen and consumers, to new ideas which are the use of ecologic constructive materials in their buildings,. It will make the public realize the urgency of using ecologic constructive materials. In the north of China, the new concept of building construction has been widely used. Hence, it is necessary for constructive institutes and businessmen to visit the North. At the same time, promoting the new ideas among the public would let the consumers know the excellent features of the new building materials. In order to change the bias of constructive institutes, the identification by authority is indispensable too. Accordingly, the sample communities supported by government policies using the new building materials can also demonstrate its unique character.

3.2 In order to promote the development of energy saving and emission reduction, government can give more support to the relevant enterprises. Taxation relief and financial subsidies could be considered as solutions to support the enterprises, for example, relieving the Value-Added Tax, reducing the Operation Tax or subsidizing the energy saving projects to reduce the cost.

3.3 The related departments of government should concentrate on legislation and law enforcement, preventing the unqualified products from flowing into the market and setting up some compulsory enforcing criteria, which can put the sustainable development of energy-conservation and environment-protection into effect.

Conclusion

In order to set up a harmonious society, under the conditions for one to maintain constructive quality, it is important for us to turn waste materials into useful building materials. Local governments should help factories which have been regarded as cutting edge in environmental protection and 3R in order to lead industry in the right direction. Relevant departments of local governments should better do something according to relevant law and rule.

Reference

Hejie Zhang, Wen Yu, Xiao Liang ,Wei Yang. The Strained Path of Setting up the Resources Recurring Industry System in Zhejiang Province [J].CHINA ENVIRONMENTAL PROTECTION INDUSTRY.2008,(12) : 66－70. In Chinese

Hejie Zhang, Xiao Liang, Wen Yu, Wei Yang. A Survey of Taizhou Chiho-Tiande Metals Co., Ltd [J].CHINA ENVIRONMENTAL PROTECTION INDUSTRY.2009,(6) : 1－5. In Chinese

Hejie Zhang, Yufei Meng.Zhejiang C Constructive Company Turns Rubbish into Treasures[J].Science Decision.2006,(11) : 58－59. In Chinese

Combining English and CTE courses: A case study on curricular integration in vocational education of China

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Abstract: The current English teaching program in vocational school of China is far from meeting either the requirement of career or social expectation. In this study, an approach of systematic English curriculum reform was proposed aiming to improve the quality of English teaching. The core of this approach is to integrate English course and career & technical education (CTE) course together, which is based on both the current trend of CTE reform and the actual situation of the English teaching in vocational schools of China. Three key aspects of this approach were introduced: the objects, the content and the way to realize it. The significance and the challenge of this reform strategy were also discussed.

Key Words: Curricular Integration; English Teaching; CTE; Vocational School

I. Introduction

The modern concept of modern career & technical education (CTE) values more on the development of students' capabilities rather than the grasping of abstract knowledge. So, the teaching program in vocational school should aim at the students' development of capabilities rather than their performance in examinations [1]. Nowadays English skill is getting more and more important in individuals' career development. However, the current English teaching program in vocational school of China is far from meeting either the requirement of career or social expectation and need to reform.

In this case study, an approach of systematic English curriculum reform is proposed aiming to improve the quality of English teaching. This approach roots in both the current trend of CTE reform and the existing problems of English teaching in the selected vocational school. The core of this approach is to integrate English course and CTE course together.

II. Theoretical background of the study

2.1 The concept of Curricular integration in CTE

Curricular integration is an educational reform strategy to make students achieve both academic and occupational competencies simultaneously. It aims to improve the educational and employment opportunities of youth who will face new technologies and business management systems that demand high-level worker skills.

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The motivation of integrating the academic and CTE course are the vocational schools being expected to deliver workers who have both special career skill as well as problem-solving abilities, higher-level thinking skills, and communication/ employability skills, which need the cooperation of both vocational and academic educators. In the traditional class room, the vocational and academic classes are separated from each other. Vocational educators have been criticized for promoting overly specific training while academic educators suffer criticism for providing curriculum that lacks participatory forms of learning and opportunities for students to connect learning to "real world" events [2]. The integration of vocational and academic education offers an opportunity to help students make connections between academic and technical information.

There are several reasons why to make academic and technical integration. Integration establishes positive connections between academic and CTE disciplines by helping CTE teachers realize the significant amount of academic knowledge and skills embedded in their technical content, while providing academic teachers with real-life problem-based activities where students can apply academics in relevant ways. This positive connection stimulates higher levels of thinking in students: rote memorization and drill and practice can take a secondary role in the instructional process.

By working together, integration draws on the capabilities of all teachers involved in the process. CTE teachers often lament their students' lack of basic academic skills and may feel unqualified to help them learn these skills. Having a certified math or language arts teacher as part of an integration team can provide missing expertise to the CTE teacher and his/her students. Working together can also help prevent fragmentation of the curriculum, as students start to see how the different subjects relate to one another and make learning more relevant. In addition, curricular integration can also address academic standards by giving students opportunities to not only acquire new knowledge and skills, but also apply it [3].

2.2 Characteristics of integration

Several aspects can be observed in the school where people have adopted an integrated approach to CTE and academic curriculum. Firstly, rather than a teacher in isolation, teachers should be working in teams, developing cross-curricular objectives, activities and assessments [4].

There should be flexibility in scheduling, and the length of class periods might be variable, rather than limited to 45-minute blocks. Teachers should be given time to plan together (an essential part of curricular integration). Also, there should be a focus on the core skills (both academic and career-technical) that are needed by all students.

In addition, there should be school and community support for the integrated curriculum approach. It should not be seen as a "passing fad" [5] but a curricular approach that is embraced. These characteristics can be found within the career academy models that many large high schools have adopted. They can also be found in many area career centers that have a full complement of academic teachers on staff along with CTE instructors, and the students attending the career center for a full day.

In this paper, as a case study, a general integration approach will be proposed to combine English course (academic course) and Travel specialty course in the vocational school, aiming at extending thoughts in vocational education's reform. To make sure such an approach does work to improve the quality of English teaching, several classes in Travel specialty of Beijing Changping Vocational School has been chosen to apply the new approach. It turns out very successful to inspire the interest of students and help them make a progress in English..

III. Practical background of the study

3.1 The situation of English teaching in travel major of Beijing Changping Vocational School

Training English skill is a very important part in the education of travel major. Currently there are six English classes each week in the Travel Major of Beijing Changping Vocational School. Four of them are for Basic English. The text book is used by all the vocational school in Beijing. The main contents of the text book are some general topics, such as weather, clothes etc. Two classes are given for oral English or specialty English course, depends on terms.

Basically the training object of this major is to encompass major specialist areas within travel management and service e.g. tour operations, aviation, events, hospitality and cruise management and places. Through three years training and education, the students should grasp the special knowledge and theories on tourism, as well as broadly general knowledge e.g. history, geography, architecture, religion, ceremony, cultures etc. They should be able to solve the problems in the real work situations with their knowledge and skill. They should acquire competitive skills of computer and language, particularly English skill.

The English teaching in travel major should reflect current trends and developments within this dynamic service sector industry. With the bursting of several important events, such as participating WTO, holding 2008 Olympic game and successfully application of 2010 World Expo in Shanghai, China has attracted more than ten millions tourists from all over the world each year, which makes the tourism in China more prosperous. However, a very serious situation is the lack of tourism specialist with high qualification and competitive skills, particularly those who have both strong tourism knowledge and proficient English communication skills, which has become an obvious shortcoming to impede the development of Chinese tourism [6].

Unfortunately, the current English teaching focuses more on the English itself than the relationship with the knowledge and skill in travel and tourism. Although the English teachers may have excellent English ability, they know little about tourism. As a result, they usually emphasize the general English knowledge such as grammar and vocabulary rather than practical tourism English. On the other side, the English skills of tourism teachers are usually poor, which limit themselves to touch the abundant global tourism information and get ideas of the current trends. Furthermore, they don't even know how to translate the key tourism words and sentences into English that is important to be a qualified tour guide and manager. Since the current English teaching and career teaching in vocational schools is far from meeting the requirement of the reality.

3.2 The properties of the students in the travel major

For the students in the vocational school, there is a sharp contrast between their attitudes and confidence of learning English and learning CTE courses.

Most of them are at very poor level in English. As one research investigated by Beijing Changping Vocational School, about 3 out of 40 students can not speak out 26 English letters in order correctly and more than 1/3 can not understand some daily phrases used in class, such as "class is over." "Let's have a rest" before they come into the vocational school[1]. The content of their text book is too difficult for them. Even worse, most of them have completely lost their confidence and hold hostility in studying English when they enter the school[2].

However, the students show strong interests and high talent in learning CTE course, and they are also very keen to participate the practical session. Currently most of students of travel major in middle vocational schools are graduates from primary middle schools all over the country. Some of them have accepted geography and history courses in their middle school education from which students can get some basic knowledge on tourism. The courses of geography and history in middle school are basic of the courses of tourism geography and tourism history in travel major. This make the students can accept the major courses easily.

Usually they have strong abilities of organization, inter-personal skill and coordination. The personality of most students is warm-heartedness and open-mindedness. The career education and training makes them polite, tolerant and obedient. They are also very sensitive to the comments and evaluation from other people. They are far more interested in the major courses than the academic courses. There are about 300 students in travel major in our school served as volunteers for the 2008 Beijing Olympic Games and they get high valued for their high discipline and profession.

3.3 The current CTE curricula reform in Beijing Changping Vocational School

The curricular reform of CTE course has been successfully put forward in Beijing Changping Vocational School. And the Automobile-Maintaining major plays a leading role in curriculum and education reform. The reform in this major has the following properties: 1) emphasizing the construction of the quality control system;2) being oriented by the job markets; 3) systematically reforming. The step and process of developing new curricula has been systemized. And several supportive systems have been established such as faculty team, the practice base, and the quality control and assessment system, and resources database.

The CTE course reform has made a big progress, and substantially improved the quality and the effect of the teaching. However, the reform of academic courses, particular English course, is just

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[1] It is a routine to have an examination on academic courses for the first grade students when they just enter to Beijing Changping Vocational School. In the examination of the first term of 2007,one item was about writing out the 26 English letters. And 3-5 students in each class could not give a right answer.

[2] Generally, all the new students in Beijing Changping Vocational School will be required to write a short passage about their feeling on English study, both English and Chinese are accepted. More than half of the new students during half of them confessed their unsuccessful experience on English study and their hostility attitude to English.

at the beginning.

From the above review of the background, the following points can be concluded:

a. the current English course in the travel major of Beijing Changping vocational school focuses on the general English knowledge rather than practical tourism English, which is far from meeting the requirement of the English skill in the students' career development.

b. Half of the students in this major show neither interests nor confidence in learning English course, although they show strong interests and high talent in learning CTE course.

c. The CTE course reform has made a big progress in this school; however, English course reform is just at the beginning.

As a conclusion, the English course in the travel major of Beijing Changping vocational school need to reform to meet the requirement of the students' career in future, and to arouse the student's interest. Based on the writer's teaching experience, a systematic approach to reform the current English course in Beijing Changping Vocational school will be proposed in the next part of this essay. The core of this approach is to make curricular integration between English course and CTE course, which derived from the concept of "academic and CTE course integration" --- an international trend of education reform [7].

IV. The new approach to integrate English and CTE course

The new approach has three key aspects to integrate English and CTE course in vocational school: the object of integrated curriculums set, the teaching content selection and the application of action-oriented & mission-driven teaching program.

4.1 Setting the object of integrated curriculum

Setting the goal of the integrated curriculum should consider the key capabilities that the career development requires. "The key capabilities are also called general capabilities or core capabilities. It refers to a kind of general, transferable ability. It will play a key role in it's owners career development in future. Somebody also calls it 'portable skills'" [8]. Besides specialty skills, the portable skills (core skills) and personalities are more and more important for a worker. "Modern vocational education aims at developing these qualities of the students and cultivates their abilities of solving the problems from the real world" [9].

According to the cultivation Plan, key capabilities that the students in travel major in Beijing Changping Vocation School should possess are listed in the figure 1.

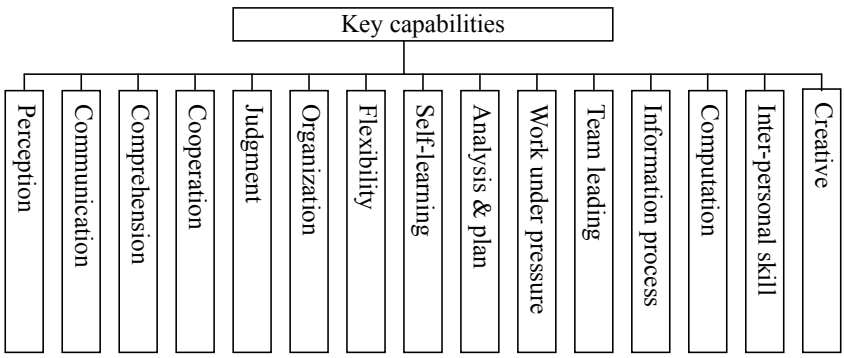

Figure 1. Key capabilities that students of travel

The goal of training the social, interpersonal and communication capabilities is compatible with the properties of English language as communication tool. English teaching is an important way to improve such abilities.

Actually the English education reform pursues multiple goals besides the training of key capabilities of students. For example, the curricula reform also aims at developing their attitudes, emotion, judgment and personality and so on. The new approach will try to integrate the curricula under guide of multiple goals.

4.2 English teaching content selection

The teaching content of the combined curriculum should be selected based on the analysis of both the role of the English education and the properties of the travel major above, with reflecting the integration with CTE course.

The new term examination in September of 2007 in Beijing Changping Vocational School shows that the students in vocational school generally have little interests in learning English. Most of them hate to learn new vocabulary, particularly for those words difficult to remember. However, the students show strong interests in learning CTE course, and they are very keen to participate the practical session. Based on this，a strategy to reform the current English teaching is to combine the content of specialty curricula in the English teaching and extend the range of teaching topic selection. Here are several possible ways to make such combination or integration.

1. To supplement and embody the contents of specialty curricula in the basic English course

The current text book for English course in vocational schools is authorized by Beijing Education Committee, which focuses on basic and daily English rather than specialty English. However, the teacher can supplement and embody the contents of specialty curricula in the English course.

For example, when giving a lesson to student of Travel major, teachers can select special words and paragraphs usually used in tour guiding to develop dialogues and text, which is common content of CTE course. Then the students can learn specialty knowledge when they practice their English communication skills.

Teachers can also use different ways to extend students' specialty English knowledge step by step. For example, at the beginning of each class, teachers can ask one or more students to introduce randomly-selected scenery in English and write down the new words in their introduction, and then teach the new words to other students. Such activities can strengthen the students' spoken English skill as well as extend their special vocabulary.

Here is another example to show how to integrate the English course and specialty curricula from the angle of content. The topic of unit 8 (Accident—dialogue：An Emergency) in the textbook is a story that a girl witnessed a car crash, then made a phone call to police for help, and then dialogued with the police. When teaching this unit, the teacher can ask the students to play the

role of tour guide and to imagine how to deal with such issue. The students are allowed to modify the dialogue to meet the situation. In case students do not know some special words that might be used in such situation, the teacher may teach the potentially useful words first. Such arrangement can substantially increase the students' interests and improve their abilities to apply the knowledge to solve real-world problems.

2. To develop specialty English course

To deal with the problems in real world, the students should accept a all-around education, which generally combines with all kinds of teaching contents in different field but related with the course of a piece of real work, including technology, social condition, environment.

From the angel of content selection and combination, to create specialty English course means to integrate the knowledge from both English and specialty curricula. For example, In the CTE course of Travel Major, the travel sceneries have been classified into three levels: National Key Scenery, Beijing Key Scenery and Changping Key Scenery. To create specialty English course, English teachers can select a Key Scenery, such as the Ming Tombs, and set different study content and situation for each scenery based on the established procedure.

In the English class, the students can be asked to guide the whole tour as a role of tour guide, and the tour can be further separated as different key situations, such as picking up the tourists from airport or train station, arranging accommodation, shopping, dinner, scenery introduction, tourist delivery, and dealing with unexpected affairs etc. The teaching programs should be developed centering on these key situations, and set different key missions at different situations.

It is worth to note that the teaching content should not be the direct translation from the tourism course. Instead, more emphasis should be put on the activity, interaction and culture difference etc.

4.3 Action-oriented & mission-driven teaching program

The core of vocational education is to help students get practical abilities applicable in their work by particular practices。The teaching program should be orchestrated under the guide of the action-oriented concept, which claims that the best way to develop the capabilities is carrying on a particular mission by DOING or ACTION [10]. "The basic feature of action-oriented education is to replace the old partial action mode, that is, to finishing assigned task according to the external regulations, with the full action mode which includes all the steps of action such as clear task, plan, strategy, executing, controlling, and feedback' to finish a real work. Teachers should help students get necessary knowledge and build their personal knowledge system by developing suitable learning tasks and multiple teaching strategy." [11]

In other words, the ability of students will be developed in the course of planning, collecting information, practicing and thinking which are needed for completing the missions which are selected from the real work. The successful teaching programs should include several meaningful missions that provide challenges to make decision and action themselves, which can be called "action-oriented & mission-driven teaching program". There are two critical points in making

such a program.

1. To make the students identify themselves as expert

German great educator Friendrich Adolf Wilhelm Diesterweg（1790-1866）said: “The essence and the art of education is encouraging, evoking and inspiring rather than just teaching”. This is more important for students in vocational schools. The expert here means that compared with the English teacher, the students know more about specialty knowledge through their previous study. Most students in vocational school, as the academic or English learning loser have an unsuccessful experience on academic learning, and lack confidence and interests in learning academic courses. But if the students identify themselves as experts, they will be much more confident and active in the English class. The expert here does not mean they are real experts in travel major field, but means that compared with the English teacher, the students know more about specialty knowledge through their previous study. The teacher can encourage the students by this way.

So in the action oriented teaching program, the teacher should remind the students to be aware of their identification of expert. For example, telling the students that they should think themselves as a tour guide or working staff. Once the students identify themselves as experts, they will enjoy the role and like to share their knowledge with others.

2. To create teaching mission

English, as a tool for communication, should be grasped in daily use. Otherwise, it is a dead language. So, English education should high-light the function of usage in class. A proper teaching mission can inspire the students’ interest to use English in class.

As mentioned before, teachers can select a Key Scenery to create specialty English course by dividing the tour of the selected scenery into different units or situation.

Take the Ming tombs travel line for example. The teaching missions can be designed or created based on the actual situation. In this case, leading a travel group to the Ming tombs is the main mission. With matching the contents of CTE course, the mission of guiding Ming Tomb can be divided into several sub-missions, such as picking up the guest, hotel accommodation, shopping, touring and sightseeing, bidding farewell to guests, dealing with incidents or emergency etc. Different situations can set according to the submissions. The students should be complete each of the submission, in order to grasp how to finish the whole mission.

This program is illustrated in figure 2.

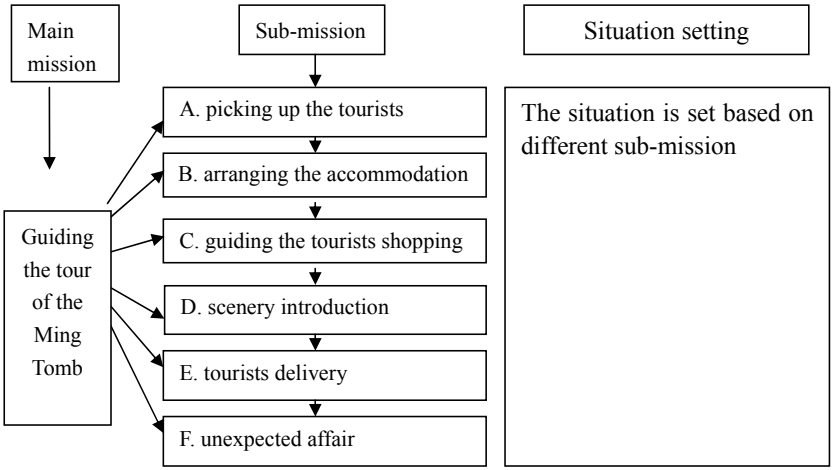

Figure 2：The illustration of "mission –driven" teaching program

The teaching mission can be optimized and improved in the practice of teaching. For example, after carrying on the mission-driven teaching program, a survey can be done to collect the comments and the questions from the students. Based on the feedbacks of the survey, the teaching mission can be improved in future.

V. The significance and the challenge of the approach

5.1 the significance of the approach

A recent study by the National Research Center for Career and Technical Education highlighted the potential value of curriculum integration and provided several case study examples of the strategies schools were employing to achieve curriculum integration. While perhaps more research needs to be done regarding its effectiveness, it is clear that for many schools, curriculum integration has become an effective strategy for enhancing student achievement [12].

So theoretically, the approach of curricular integration between English and CTE courses should be effective to help students find their interests and confidence in learning English, and substantially improve their English skills. It can also foster the growth of students' learning teams in which teachers get to know the needs of each student.

This approach has been applied in real teaching experience in Beijing Changping Vocational School. For example, in the term of 2005-2006, lots of students were struggling to prepare for the examination of certification of restaurant service in the second-grade in Travel Major. The certification included 2 parts. One part is about the students' specialty skill. Another part is about their oral English on serving guests in restaurant. The teacher selected some important potential contents of the examination and prepared many dialogues, special words and paragraphs in the situation of restaurants and hotels. Then the students could learn and review specialty knowledge when they practiced their English communication skills. By using such strategy, the students showed much stronger interests in learning English, and they also developed their abilities in

applying the knowledge to solve real-world problems. As a result, the pass rate of the examination for this certification is very high. No students were failed for the oral English part.

Besides this, there is another strong evidence can approve the approach is very successful to inspire the interest of students and can help them make a progress in English. The testing-class got the top marks among all the para-classes in the final exam on the first term of 2007-2008 (Quoting from the statistics made by the academic affairs office in Beijing Changping Vocational School).

A survey on the mission-driven teaching strategy can also approve the effect of this teaching strategy. It was based on the investigation of 80 students in the 2 testing classes on the second term of 2007-2008. The result of the survey showed that the attitude of the students to the program was positive. 97% of students believed that setting a mission after the dialogue could help them grasp the key sentences and know how to use them in daily life. 53% students said they liked the team-work in which they could cooperate with each other to finish the mission. In the survey 73% students suggested that they could be more involved in designing the mission, and the mission types could be more flexible. These feedbacks provide clear evidence of the effectiveness of curricular integration also bring useful information to improve the quality of curricular integration and mission designing in future.

The survey and the statistics can suggested that such an approach by integrating English course and major course can improve the students' oral English skills as well as inspire their interest to learn English.

5.2 The challenges of curricular integration

There are several potential challenges that make the curricular integration between English of CTE course difficult.

This first set of challenges may be tied to the ways in which teachers are prepared in vocational school. Teacher education programs typically focus on a single course, either English or CTE area. There are separate methods, curriculum, testing/assessment and other teaching pedagogy courses in English and CTE course, which reinforces the separation of, rather than the integration of career-technical and English teaching. Teachers are prepared to teach a separate, dissimilar curriculum.

There are several issues that prevent integration activities. Both English and CTE teachers have curriculum that may be driven by a combination of local, state and national standards. For CTE teachers, the concern may be, "How will I cover the technical content if more time is spent on English?" while English teachers may ask, "How can I prepare my students for their English level tests if I have to work with the CTE teacher?" Some educators see integration as actually "watering down" academics rather than enhancing them [13].

There are a host of logistical issues. Building layout may not be conducive to integration activities. In many vocational schools, many CTE labs are out of mind, out of sight at the back of

the building, making contact with English teachers difficult. The need for scheduling flexibility is difficult for some schools to manage. Trying to match up teachers' schedules for common planning time is perhaps the biggest challenge. This is where administrative support is key. A building principal must be willing to try different strategies, including shifting teacher responsibilities, hiring additional staff or reworking bell schedules to make time and space available for teacher planning.

Finally, there are time constraints for the teachers involved in curriculum integration. In addition to the struggle to find common planning time, teachers have a lack of time--period. It is extra work from their routine teaching, and developing integrated activities is a challenge that will likely require work well outside any normal school day. So, teachers must be willing to make sacrifices of their own.

VI. Conclusion

Based on the review of the properties of the Travel Major, the role of English education in this major and the current curriculum reform in Beijing Changping Vocational school, a systematic approach to integrate the English course and CTE course is proposed in this essay. This approach could substantially increase both the students' interests and their performance in English teaching. The approach will be the outline to guide the next English curriculum reform. Several classes will be selected for running the teaching programs. People will continue to evaluate the effect of the approach with surveys, examinations, etc. Hopefully it will be generalized as a reform pattern to integrate other academic course with CTE in the vocational schools of China.

References

European Commission Asia-Link program "Design of a Curriculum on Curriculum Development project team", Vocational Education and Training—the Guidance on Curriculum Development of Learning Field. Beijing: Higher Education Press, 2007 June, 3.

Susan Bodilly, Kimberly Ramsey, Cathleen Stasz, and Rick Eden，Integrating Academic and Vocational Education: Lessons from Eight Early Innovators（R-4265-NCRVE/UCB,1993，Online edition, Rand. Org）, <http://www.rand.org/pubs/research_briefs/RB8005/index1.htm>.

Bettina A. Lankard. Integrating Academic and Vocational Education: Strategies for Implementation,(Online edition, ericdigests,org,1993), <http://www.ericdigests.org/1993/math.htm>.

Maine CTE Centers, Featured Promising Practice:Academic/Literacy Integration, (Online edition, maine.gov), <http://maine.gov/education/it/promise/1academiclit.pdf>.

Carol A. Norris, Alternative Assessment: Research, Resources, and Use Guidelines(Online edition, Cal.org , July 1994), < http://www.cal.org/resources/digest/hancoc01.html>.

Li Qingfeng. A Study on how to speed up the cultivation of Travel specialists and experts (on line edition,cnta.gov.cn,2008 March) < http://www.cnta.gov.cn/html/ 2008-6/2008-6-2-21-17-8-142.html>

Bettina A. Lankard. Integrating Academic and Vocational Education: Strategies for Implementation,(Online edition, ericdigests,org,1993), <http://www.ericdigests.org/1993/math.htm>.

Guan Jing. the Development of Key Skills in English Vocational Education. the Journey of Foreign Education,2003,January, 32-35.

European Commission Asia-Link program "Design of a Curriculum on Curriculum Development project team" . Vocational Education and Training—the Guidance on Curriculum Development of Learning Field, Beijing:Higher Education Press,2007 June, 3.

Duan,Fusheng. To Develop CTE Should Center on the Purpose of Service, be Oriented by Job Market, and Fulfill 5 Breakthroughs, Beijing: the Journal of Changping Vocational Education, 2008 May, 5-9.

Zhao Zhiqun. Action-oriented Teaching Strategy, the Journal of Vocational and Technical Education Forum ,2008 October, 1.

Bettina A. Lankard. Integrating Academic and Vocational Education: Strategies for Implementation,(Online edition, ericdigests,org,1993), <http://www.ericdigests.org/1993/math.htm>.

Chris Zirkle，Integrating Occupational and Academic Skills Across the Curriculum (Online edition, goliath.ecnex.com, Sept.2004), <http://goliath.ecnext.com/coms2/ summary_0199-873935_ITM>.

Sub-skills Approach and Extensive Approach to Reading in TEFL

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Abstract: There are various approaches to reading in TEFL. As English language teachers, only by understanding what the different approaches are, what positive or negative role each approach contains, and how the appropriate approach may be related to the teaching practice, can better teaching and learning effect be achieved. This article, by means of analysing sub-skills approach and extensive approach, as well as evaluating the role of each approach may play in the development of reading and general language ability, draws the conclusion that extensive reading approach is better to EFL learners, and provides the possible ways of improving language ability with extensive approach.

Key Words: sub-skills approach, extensive approach, reading ability, TEFL

1. Introduction

McDonough and Shaw (1993:101) comment "As a skill, reading is clearly one of the most important". To improve reading ability, there are various approaches in this field at the present, of which two approaches are the most focused, they are sub-skills approach and extensive approach. According to the classroom observation carried out in East China University of Political Science and Law (ECUPL), most EFL teachers adopt sub-skills approach to reading classes, they believe this approach makes them feel "secure", because on the one hand following this approach they will definitely know what to teach in each class, on the other hand following this approach students will clearly know what to learn in each class. And the students of this university (ECUPL) do think the EFL teacher who shows them one skill in each reading class is the most professional teacher. But does sub-skills approach really work in EFL teaching and learning? With the question, this article will analyse both sub-skills approach and extensive approach first, then it will evaluate the role of each approach in the development of reading and general language ability. The main aim of the article is to find out the most effective approach to reading ability and demonstrate how to combine the approach with teaching practice.

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2. Sub-skills approach

2.1. Explanation of this approach

Urquhart and Weir (1998:91) report that "if reading itself is a skill, it must be possible to break this down into different level of component skills categories." In fact, several experts have made attempt to divide reading skills into component skills. Munby (1978) advocates that there are nineteen detailed skills to develop reading skill, such as recognising the script of a language, deducing the meaning and use of unfamiliar lexical items, understanding conceptual meaning, understanding the communicative value of sentences, recognising indicators in discourse, basic reference skills, skimming, scanning to locate specifically required information and so forth.

Therefore it can be concluded that sub-skills approach is an approach, which believes that under the reading skill there are a lot of individual skills, which are called sub-skills. Learners need these sub-skills, focusing on which can help them get specific information from the reading texts. By means of the practice of each sub-skill, learners will achieve the utmost aim of improving reading skill. Basing on this approach, the teacher is required to teach sub-skills in detail and attempt to train learners to get familiar with them until they can use the sub-skills freely.

2.2. Evaluation of the role

In the development of reading and general language ability, there are several positive roles that sub-skills approach may play.

First, sub-skills approach can provide learners with concrete idea of reading skill. In this approach, reading skill is divided into specific details, thus learners are offered opportunities to have a clear clue on what exact skills are required to improve reading ability. Grabe (1991:382) reports "a reading components perspective is an appropriate research direction to the extent that such an approach leads to important insights into the reading process. In this respect, it is indeed a useful approach."

Second, sub-skills approach can help learners build up specific reading skills. Through the conscious practice of each specific skill, learners will form a solid foundation. "All these skills are assumed to play a significant role in the reading process, they include everything from rapid identification of vocabulary to the making of reference …" (Dubin et al, 1986:163).

The above might be the reasons why the EFL teachers of East China University of Political Science and Law prefer to apply sub-skills approach to reading classes and why the students of that university accept the sub-skills approach as well. But there are several obvious negative points in the role of sub-skills approach.

First, dividing language skill into too many details will destroy the nature of language. When people read in the mother tongue, it is unusual that they analyse each specific skill. Lunzer and Gardner (1979: 64) comment that "reading comprehension should not be thought of in terms of a multiplicity of specialised aptitudes. To all intents and purposes such differences reflect only one general aptitude: this is being the people's ability and willingness to reflect on whatever he is reading."

Second, too much concentration on sub-skills approach will probably constrain other reading approach. Richards (1998:47) reports "A skills approach to the reading has achieved a sort of unstoppable momentum. The dominance of skills, especially in ESL academic programs, leaves little room for considering other approaches."

To sum up, although learners' reading ability can be improved by this approach, it is not the most effective approach to reading. Only through more extensive reading that learners can gain substantial practice in operating the skills more independently on a range of material. (Hedge, 2000)

3. Extensive approach

3.1. Explanation of this approach

On extensive reading approach, there is no completely consensus definition. This article adopts Hedge's opinion (2000:202), which illustrates a series of characteristics of extensive reading approach.

-reading large quantities of material, whether short stories and novel, newspaper and magazine articles, or professional reading

-reading consistently over time on a frequent and regular basis

-reading longer texts (more than a few paragraphs in length) of the types listed in the first point above

-reading for general meaning, primarily for pleasure, curiosity, or professional interest

-reading longer texts during class time but also engaging in individual, independent reading at home, ideally of self-selected material

The aim of extensive reading approach is to "flood learners with quantities of L2 input with fewer possibly specific tasks to perform on this material. Exposing learners to large quantities of meaningful and interesting L2 material will, in the long run, produce a beneficial effect on the learners' command of the L2." (Hafiz and Tudor, 1989:5) Richards (1998:6) reports that extensive reading approach is to "get students reading in the second language and liking it."

3.2. Evaluation of the role

Compared to sub-skills approach, extensive approach is a long-run approach, through which learners cannot expect prompt effect. It is probably that being time consuming, this approach has not yet been extensively applied in most universities of China. Although Hedge (2000:204) reports "It would be unwise to make strong claim about the role of extensive reading", it cannot be denied that there are several obvious positive roles that extensive reading approach plays.

Richards, Platt, and Platt (1992:133) report that extensive reading is "intended to develop good reading habits, to build up knowledge of vocabulary and structure, and to encourage a liking for reading." Robb and Susser (1989) suggest that extensive reading procedure would be superior to, or at least remain equal to, the skills-based method.

Extensive reading can build up learners' vocabulary

Nuttall (1996:62) reports "An extensive reading programme is the single most effective way of improving vocabulary." When L2 learners read, it is probably that there are some repeatedly unfamiliar words in the material. If an individual word is met again and again and understood more than once in different contexts, naturally learners will quickly identify the words and tend to easily remember the words. Harris and Sipay (1990:435-436) comment "all the sources of information about a word are consolidated into a single, highly cohesive representation." As a result of frequent appearance, the unfamiliar words can turn into learners' familiar words. Richards (1998:16) comments that "familiarity breeds automaticity," which is called automatic processing with peripheral attention by McLaughlin (1990). Wilkins (1972) believes that through reading, learners can effectively come to understand which words are appropriate in which contexts.

Extensive reading can develop learners' structural awareness.

When conducting extensive reading, learners will also encounter some new structures. If the grade of the material can match learners' level, a certain amount of extensive reading can make learners develop their structural awareness even though these structures have never been taught to them.

In line with Input Hypothesis (Krashen, 1985), L2 learners can understand the input language, which contains "i+1". "i" refers to learners' current level of competence, and "1" refers to a bit beyond the current level. Input Hypothesis maintains that being exposed to the language environment, learners can subconsciously acquire the language from the input they comprehend. Therefore encountering various structures in extensive reading is beneficial for learners to transfer the input into intake, thus structural awareness can be developed distinctly.

Extensive reading can develop learners' schematic knowledge.

According to Celce-Murcia and Olshtain (2000:102), schematic knowledge is thought of as two types of prior knowledge: topical knowledge and sociocultural knowledge. In addition to linguistic knowledge (vocabulary and structure), extensive reading approach can help L2 learners to develop schematic knowledge as well. By means of extensive reading, learners are provided opportunities to understand the world, the society and the people from other ethnic groups. In other words, learners can acquire knowledge through second language reading. Harris and Sipay (1990:533) comment "wide reading not only increases word-meaning knowledge but can also produce gains in topical and world-knowledge that further facilitate reading comprehension." Grabe (1986:36) reports that "the more reading done, of the greatest informational variety and ranges of purposes, the quicker the reader will achieve the capacity for creating, refining, and connecting diverse arrays of cognitive schemata."

Extensive reading can help learners develop reading skill

Extensive reading approach provides an opportunity for learners to practise detailed reading skills subconsciously. In terms of extensive reading, there are various types of materials, such as novel, magazine and newspaper, which might contain a love story, a business report or an interviewing of a pop star. Towards these different kinds of materials, learners will subconsciously apply one or several specific skills in order to read efficiently, such as skimming, scanning or top-down. Keeping on extensive reading, learners are bound to have the ability to apply proper skills to the corresponding materials, therefore, the reading skill will definitely be improved. Nuttall (1996:127) reports "getting students to read extensively is the easiest and most effective way of improving their reading skills." Mason and Krashen (1997) report that the reluctant EFL learners at a Japanese University made statistically significant gains on a cloze test after a semester of reading extensively.

Extensive reading can help learners develop cultural awareness.

Extensive reading approach provides an opportunity for learners to acquire cultural awareness subconsciously. Delanoy (1997:60) comments "cultural learning is now viewed as an integral part of communicative language learning", which demonstrates the significant role of culture learning in EFL. With culture competence, students tend to understand better what is happening in the English-speaking world, and moreover they tend to cause no trouble when communicating with English native speakers. Reading extensively, students can not only acquire the western culture on the life style such as food, clothes, houses and transportation, but also acquire the western culture on the way of thinking such as why they understand the world in that way. "Such experience can allow learners to participate in the culture of the target language, which in turn can enable them to further learn how cultural background influences one's view of the world."(Singhal, 1997) Fantini (1997:41) comments "language work is always complemented by explicit attention to sociolinguistic aspects, cultural aspects, and the comparing and contrasting of target and native linguacultures."

Extensive reading can result in learner autonomy.

The traditional way of improving learners' reading skill is that the teacher, taking little account of learners' opinions, selects material for learners, and designs a series of tasks for the reading material. This method reflects teacher authority, which tends to make learners passive followers and take no responsibility for their own learning. In contrast, extensive reading approach advocates that learners might select materials for their own, and no specific tasks should be performed on that material. This approach reflects learner autonomy, which believes that learners have the "freedom and ability to manage their own affairs" (Scharle and Szabo, 2000:4). Extensive reading approach changes the role of teachers as well as the role of learners. Teachers are no longer controllers and learners are no longer followers, who are required and tend to be willing to take responsibility in the learning event. Hedge (2000:204) comments that "involving learners in programmes of extensive reading can be a highly productive step towards autonomous learning", also Naiman et al (1978) suggest that the most successful language learning strategies are connected with assuming responsibility for one's own learning.

4. Encouraging extensive reading

By means of the comparison and contrast of sub-skills approach and extensive approach to reading, it can be concluded that both of the approaches can be applied to train students' reading ability, but extensive approach is better. Extensive approve is not only effective to improve students' reading ability, but also effective to improve students' general language ability. The following methods are how to combine extensive approach into real teaching practice.

4.1 Outside of the English classroom---organising a class library

A class library can provide learners with various materials, compared with using the same material, learners are given more choices. Therefore more opportunities are offered to meet learners' interest. The teacher prepares a bookshelf in the front of the classroom, asks students to bring one or two English materials to the classroom and put them on the bookshelf, thus a small class library comes into being. Several students are in turn the librarians per week, taking charge of the borrowing and returning materials. A set of methods can be designed as follows:

Displaying on wall

"Younger students often enjoy visible performance". (Richards, 1998: 154) The teacher can post a grid on the wall, which lists out the names of the materials and names of students. The librarians write down the date when individual students finish the material. Thus students can know clearly what others read and how many others read, which will result in that students compete to read more. For example:

Students —	Sun-rainy	Sarah	Terry	Johnny
Alice's in Wonderland	February 15th	February 14th		February 9th
Cinderella		February 4th		
Harry Porter			February 10th	February 16th

Writing comment

The librarians prepare and keep one note list for one material. Ask students to write short comment for the material that they finished. The comment can be several words or one or two sentences. Since other classmates will see what individual students comment on the material, the students will read with high motivation. The teacher can also ask librarians to organise students to vote for their favourite materials per month.

Holding seminar

The teacher can take one hour per week for students to conduct reading seminar. Divide students into small groups (about 5-6 in one group), ask them to discuss the problems that they

encountered during the reading, such as some certain plot, some cultural background. At the same time, they can also exchange what reading skills they use in that material. Seminar can help students solve the problem, learn from others, and the most important is that students are provided with the equal opportunity to state out their opinion, therefore students are encouraged to read more in order to speak more in the seminar.

4.2. Inside the language classroom---showing the importance

Students know that what the teacher teaches in the class is the most important to them. If the teacher can spend some time on extensive reading in the class, students will be encouraged to read more.

Silent reading time

In each week the teacher spends 20 minutes in conducting extensive reading. Both the teacher and students select reading materials from the bookshelf, 15 minutes is taken for silent reading and 5 minutes is for asking open-ended questions. For example: “Do you want to borrow this book to read this weekend? Why?” “How do you like the material, what made you choose that material?”

Applying reading material

If the teacher can apply what students read outside of the class to the classroom teaching activities, students will be motivated, for example, when teaching vocabulary, the teacher uses the example sentences like these: ***Snow white is very beautiful, while her stepmother is cruel.*** Since these sentences are related to what they read, students will not only attain a better understanding towards the new knowledge, but also they are stimulated to read after class.

Book Report

Every one or two weeks 3-4 students are arranged to make the book report to the class in the front, which includes what they are reading, what they are thinking after reading, and how they like to recommend the books to the classmates. Through holding book report, the students who do the report will read with pains, and the students who listen to the report will acquire large amount of book information, also it is an effective way of training presentation skill.

5. Conclusion

Sub-skills reading approach reflects the idea of being teacher-controlled. It is the teacher who chooses what to teach, who decides which one should be taught earlier than the others. By firmly controlling the class, the teacher feels safe because he prepares for everything possible. While extensive reading approach reflects the idea of being learner-controlled. It is the students who select what to learn, who decide the sequence of learning according to their individual interest and ability. It should be realized that to change from sub-skills approach to extensive approach is not the change of the teaching method only, but the change of the teaching concept. It takes time.

Reference

Celce-Murcia, M. and Olshtain, E. (2000). Discourse and Context in Language Teaching. Cambridge: CUP.

Delanoy, W. (1997). " Cultural learning in the FL classroom" in McLean, A. (ed). Special Interest in EFL. Whitstable IATEFL.

Dubin, F. Eskey, D. E. and Grabe, W. (1986). (eds). Teaching Second Language Reading for Academic Purposes Reading. Mass: Addison Wesley.

Grabe, W. (1986). "The transition from theory to practice in teaching reading." In Dubin, F, Eskey, D. E. and Grabe, W. (eds). (1986).

Grabe, W. (1991). "Current developments in second language reading research." TESOL Quanterly, 25, 375-406.

Fantini, A.E. (1997). (ed). New Ways in Teaching Culture. Alexandria: TESOL.

Hafiz, F. M. and Tudor, I. (1989). "Extensive reading and the development of language skills." ELT Journal 43/1: 4-13.

Harris, A. J. and Sipay, E. R. (1990). How to increase Reading Ability: A Guide to Developmental and Remedial Methods. White Plains, NY: Longman.

Hedge, T. (2000). Teaching and Learning in the Language Classroom. Oxford: OUP.

Krashen, S. (1985). The Input Hypothesis. London: Longman.

Lunzer, E. and Gardner, K. (1979). The Effective Use of Reading. London: Heinemann Educational.

Mason, B. and Krashen, S. (1997). "Extensive reading in English as a Foreign Language." System 25(1), 91-102.

Mc Donough, J. and Shaw, C. (1993). Materials and Methods in ELT. Oxford: OUP.

McLaughlin, B. (1990). "Conscious versus Unconscious learning." TESOL Quarterly 24: 617-34.

Munby, W. (1978). Communicative Syllabus Design. Cambridge: CUP.

Naiman, N., Frohlich, M., Stern, H. H. and Todesco, A. (1978). The Good Language Learner. Research in Education Series, no. 7. Ontario Institute for Studies in Education.

Nuttall, C. (1996). Teaching Reading Skills in a Foreign Language. Macmillan and Heinemann.

Richards, J. C. (1998). Extensive Reading in the Second Language Classroom. Cambridge: CUP.

Richards, J. C., Platt, J. and Platt, H. (1992). Longman Dictionary of Language Teaching and Applied Linguistics. Essex: Longman.

Robb, T. N. and Susser, B. (1989). "Extensive reading vs. skills building in an EFL context." Reading in a Foreign Language 5/2: 239-52.

Scharle, A. and Szabo, A. (2000). Learner Autonomy. Cambridge: CUP.

Singhal, M. (1997). "The Internet and foreign language education." The Internet TESL Journal. Vol. III, No. 6, June, 1997. http://iteslj.org

Urquhart, S. and Weir, C. (1998). Reading in a Second Language. London: Longman.
Wilkins, D. A. (1972). Linguistics in Language Teaching. London: Edward Arnold.

"Chinese Culture All-Dimensional Introduction" for Foreign Experts in the Fields of Culture & Education

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Abstract: The paper creatively proposes to conduct "Chinese Culture All-Dimensional Introduction" research on foreign experts who work in the fields of culture and education and also brings forward feasible and practical concrete measures for the "All-Dimensional (in their daily life, teaching and social communications) introduction". These concrete measures include upon the arrival of the foreign experts to China, setting up Chinese culture courses, Chinese language courses in a well-organized and systematic way; relevant governmental department lecturing on the correlative policies, laws and regulations; governmental bodies, social, educational and cultural institutions offering various seminars, cultural festivals, celebrations and competitions, etc. to give prominence to the theme of Chinese culture. A case study on American expert, Mr. Thomas Wayne Simmons, who won 2004 National Friendship Award is also conducted. The positive meaning of the research is summarized: helping foreign experts adjust to their work and life better and quicker; holding high the great banner of culture to promote deeper Sino-foreign communication and co-operation; spreading Chinese culture across the oceans and continents to upgrade China's international status among alien cultures.

Key Words: Foreign Experts, Culture & Education; Chinese Culture Introduction; All-Dimensional.

I. Introduction

With the ever-increasing of China's foreign exchange and co-operation, more and more foreign experts who work in the fields of culture and education have come to China. Their numbers and qualifications witness a steady increase in recent years. The nation's vast landscape, abundant resources, long history and splendid culture have attracted foreign friends from all over the world and also attracted those excellent international talents who are willing to undertake cultural and educational tasks in China.

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As a very special group, foreign experts who work in the fields of education and culture have different understandings and interpretations about China, however, there is one thing in common, that is, their curiosity, interest and puzzle towards Chinese culture. It is not hard to understand the curiosity, interest and puzzle towards this civilized nation who has more than five thousand years of splendid culture. The current author once entertained one foreign expert who came to China for the first time and encountered an interesting story. After seeing lots of wreaths at his apartment complex, that American expert asked me to introduce him the celebration activity or festival with great enthusiasm and pleasure. Obviously, he knows nothing about Chinese funeral wreath. If not for the current author's timely communication, he will undoubtedly not only embarrass himself but also for his ignorant action bring unnecessary troubles and conflict between himself and the relatives of the dead. Another interesting example is that in Japanese the common Chinese character for daughter is actually mother. If anyone who does not know this fact want to guess the meaning literally, he or she will be bound to encounter mistakes in cross-cultural communication, therefore, proper decoding diverse culture is the key and precondition of cross-culture communication. How we can facilitate the new-coming foreign experts to adjust to Chinese living and working conditions is the issue posing in front of us.

II. Foreign Expert Chinese Culture All-Dimensional Introduction

Based on so many years of foreign affairs practice and experience, the current author creatively proposes to conduct Chinese culture all-dimensional introduction to foreign experts who work in the fields of education and culture and also suggests practical and feasible measures for the introduction.

1. The Principles of the Introduction

1）Practicability

The introduction requires practicability and practicability should be emphasized. Upon arrival, for the newly arrived foreign experts, they urgently need to know the Survival Culture, such as asking for directions, shopping, boarding buses, buying tickets, etc. After they are settled, they will need to feel Leisure Culture, such as studying Chinese, sight-seeing, practicing Shadow-boxing or Qigong, etc. Therefore, Chinese culture introduction requires the close connection with the requirements at their different stages and levels to stand out its practicability.

2）Suitability

The introduction should also focus on its suitability. It will not be suitable to talk at length with Japanese friends about Japan's invasion to China and Nanjing Massacre. It is obviously true that we should respect history, however, we must take the audience's endurance and receptiveness towards the introduction content into full consideration. We should try our utmost to arrange the content to be easily acceptable and suitable for their diverse needs.

3）Contrastiveness

We need to contrast Chinese culture with foreign cultures, thus we can find the differences and common grounds to provide guidance for the introduction.

3. The Methodologies of the Introduction

For this special group, the methodologies of the introduction should also be special, diverse and more importantly all-dimensional and multiple. In terms of all-dimensional, we mean that the introduction is conducted in their daily life, their daily work and social contacts. In terms of multiple, we mean that the methodologies for the introduction should be flexible. It can be conducted in the formal classroom teaching and also in the various activities combined recreation with education.

4. The Content of the Introduction

On account of the particularity of this special group, the content of introduction should be mainly focused on the primary culture, that is, fact culture (history, festivals and taboo, etc), achievement culture (novels, songs and stories, etc.) and surface behavior culture. Special attention should be paid to speech act, such as the speech act in family life and working life. The introduction of high-level culture depends on the individual and special attention should be paid to deep-structured culture act, such as aesthestics, sense of value and view on friendship, etc.

In addition, while conducting Chinese culture introduction, the following five cultural layers should not be ignored: 1) The feelings of ethnic groups and history; 2）The differences of life-style; 3）The differences of cultural tradition; 4）The differences of sense of value; 5）The influence of ways of thinking.

III. A Case Study on American Expert, Mr. Thomas Wayne Simmons

The current author has conducted a case study on the American expert, Mr. Thomas Wayne Simmons who won 2004 China Friendship Award and warmly received by Chinese Premier, Wen Jiabao.

1.Question

We found that there are some foreign experts who are able to blend into Chinese culture very well and participate in all sorts of activities or games actively. They play well with their Chinese colleagues and students and enjoy their everyday life in China, however, there are also some who are always on pins and needles everyday and dare not to communicate with others and avoid all kinds of social contacts and cultural entertainments. The question is: why there are two so different conditions mentioned above?

2.General Introduction of the Case Study

（1）Subject

Some basic information: Mr. Thomas Wayne Simmons, male, born in October,1948,in the United of America. M.A. He has been teaching English in China for the past 13 years and the working areas are Shandong and Henan. He won provincial-level friendship award and the national friendship award and warmly received by Chinese state leader. Mr. Simmons has a very strong interest for Chinese culture. He has decided that if possible, he is willing to dedicate his rest of life to teach in China. His teaching content is rich and teaching style is diverse and flexible and he is warmly welcomed by his students. Furthermore, he has excellent relations with the students and many students call him intimately“Daddy Wayne” and treat him as a fatherly figure.

（2）Study Method

Survey is conducted according to the practical conditions of the subject. Questionnaire surveys on himself, his colleagues and students are conducted and relevant data were collected.

3. Result and Analysis

Through the survey we found that Mr. Simmons himself, his colleagues and students all agreed that he has a very strong interest in Chinese culture and high motivation for studying Chinese language and culture. He is willing to use the Chinese culture and language he gained to serve the university, to serve our students, therefore, we found that his attitude of Chinese culture learning is excellent. Furthermore, he has strong self-confidence and in the English classroom he can design some Chinese culture and language phenomena to achieve high interaction with his student. We found that Mr. Simmons is extroversive in personality and he is a very humorous man in and outside of the classroom. His smiles always influence everyone around him. In addition, he bears no prejudice on the Chinese Nation and no Ethnocentrism as well. Mr. Simmons also has high tolerance for foreign cultures. According to the survey, he believed that there is no good and bad in culture, it is just that different people do the same thing in different ways, which should deserve understanding and respect.

4. Considerations of the Study

1) Consideration of the Personality of the Subject

For many year, we always consider what kind of foreign experts are prone to Chinese culture introduction. From the above study we can arrive at some conclusions. Firstly, the person should be friendly to the nation and has strong interest in Chinese culture. Secondly, the person should have strong motivation to learn and know Chinese culture. Thirdly, the person should be extroversive, instead of being introversive and bear no racial prejudice. Fourthly but not lastly, the person should have high sense of identity and tolerance. It goes without saying that there are probably more personality items for us to carry out further investigation and study.

2）Consideration of Objective Factors

Apart from the personal factors we mentioned above, objective factors cannot be overlooked. Objective factors can be composed of China’s foreign policy, foreign experts living and working conditions and their social communication environment. Our current foreign policy is favorable to attract more experts. The working and living conditions offered by each organization and department which employs foreign experts are the key to keep excellent talents and enable them to learn and know Chinese culture consciously and follow up to popularize and publicize the culture to promote China’s international image.

IV. The Tentative Plan to Establish Foreign Experts Chinese Culture All-Dimensional Introduction Handbook

This tentative plan has been in the current author’s mind for so long and only till this date, it came into being in words. Establishing foreign experts Chinese culture all-dimensional introduction handbook has significant meaning. Our cultural introduction work can be based on

this and have rules to follow after the handbook's establishment. It also offers foundation and reference for our nation's relevant departments to make decisions and provides basis for further study of correlative cultural introduction projects. More importantly, it can offer real help and assistance for foreign experts to solve their cultural perplexity after their arrival in China and enable them to adjust to their working and living conditions as quickly as possible. The establishment of the handbook can enable us to hold high the great banner of culture and promote sino-foreign exchange and co-operation in depth and in harmonious development.

1. First Step to Establish the Handbook: Culture Testing Planning and Construction
Culture testing is necessary and helpful. Its establishment can help us act with a well-defined objective in mind, not only focusing on the focal points of culture introduction, but also leaving out no details. Prophase testing provides foundation and reference of culture introduction for subsequent testing, while subsequent testing is not only the testing for foreign experts mastery of Chinese culture, but also the supplement and sublimation for prophase testing.

2. Second Step to Establish the Handbook: Culture Testing Planning and Construction: Formulate and Plan Chinese Culture Introduction Courses Syllabus

If the conditions permit, organizations employing foreign experts can set up Chinese culture introduction courses, including Chinese language courses and other courses with the main theme of culture, such as Chinese Calligraphy, Chinese Cuisine, Chinese Martial Arts, etc. Through systematic and all-sided culture teaching, we can cultivate the cross-culture awareness and communicative competence of foreign experts and finally achieve the highest level of cross-culture communication---empathy, that is, to experience the target culture from the opposite.

3. Third Step to Establish the Handbook: Design Activities for Culture Introduction
The activities for culture introduction should be rich, interesting and widely covered. Relevant governmental departments can be invited to lecture on the correlative policies, laws and regulations and governmental bodies, social, educational and cultural institutions to offer various seminars, cultural festivals, celebrations and competitions, etc. to give prominence to the theme of Chinese culture. Among them, some of the typical examples are: Shandong Foreign Experts Day and Shandong National Day Celebration sponsored by Foreign Affairs Office of Shandong People's Government; Shandong Excellence in Teaching for Foreign Experts Working in the Fields of Culture and Education and Teacher's Day Celebration sponsored by Shandong Education Department; Qilu Friendship Award sponsored by Shandong Personnel Department. Every organization employing foreign experts can conduct introduction work featuring Chinese culture according to practical situation. For example, based on the traditional Chinese festivals, such as Spring Festival, Lantern Festival, Dragon-Boat Festival, Mid-Autumn Festival Shandong Jiaotong University arranges foreign experts to participate in different folk-custom activities to enable them to really feel the Chinese taste, Chinese festivals and Chinese culture.

4. Fourth Step to Establish the Handbook: Design and Set Up Topics Featuring Culture Content and Phenomena

This step is actually the elaboration of the second step. Under the guidance of culture introduction courses syllabus, the extensive and profound Chinese culture content and phenomena are hackled, classified, induced and summarized to design and set up systematic and detailed special topics. Its role is more like culture dictionary rather than special topics. If there is anything foreign experts need, they can always turn to the handbook for the answer. It goes without saying that it is very difficult to compile this handbook by which requires joint co-operations and concentrated research between people working in the fields of foreign affairs and Chinese culture. At present, one educational research project— "Chinese Culture All-Dimensional Introduction" for Foreign Experts to Shandong was conducted at Shandong Jiaotong University with the current author as the project leader. This project has achieved primary success.

V. Issues Required Attention in the Process of Culture Introduction

1. Foreign experts whose mother tongues are English, Japanese and Russian consist of the majority of the overall foreign expert in China. Therefore, the quality work of Chinese culture introduction for them determines the success of our work. Therewith, we should conduct comparative research between Chinese culture and Japanese Culture, between Chinese culture and English culture, between Chinese culture and Russian culture to find the common grounds and similarities to bring to a great height of development and for the differences, it should be dealt with caution and detailed and patient explanations for the purpose of harmonious co-existence and mutual supplement of the common grounds and differences in culture introduction.
2. The collision, melting and harmonious co-existence between Chinese and foreign cultures requires further adaptive research. There should be a process from culture shock, culture collision and culture conflict to the melting and co-existence between the two cultures, sometimes, the process is a lengthy one, which needs a great deal of culture adjustment work, however, the proverb: *Every cloud has a silver lining.* is the portraiture and praise for the winners of Chinese culture introduction.

VI. Conclusion

The paper creatively proposes Chinese culture all-dimensional introduction for foreign experts working in the fields of education and culture in China and elaborates on the principles, methodologies and contents of the introduction. A case study on American expert, Mr. Thomas Wayne Simmons is conducted. Based on the study, a tentative plan to establish the handbook of Chinese culture all-dimensional introduction for foreign experts is proposed. The viewpoints and assumptions in the current paper are far from mature. It is the author's wish that the study is like a modest spur to induce others to come forward with new ideas and solutions. With our joint forces and efforts, we are probably able to solve the cultural puzzles foreign experts encountered after their arrival in China and help them adjust to various circumstances as quickly as possible for the sole purpose of contributing to the construction of a harmonious word and holding high the great banner of culture to promote sino-foreign communications and co-operations in depth and in harmonious development.

References:

Kramsch,Claire. Language and Culture[M].Shanghai Foreign Language Education Press,2000.

Kramsch, C. Context and culture in language teaching[M]. Oxford University Press，1993

YueMeiyun. Applied Linguistics[M].Nanjing University Press,1994.

Deng Yanchang. Language and Culture[M]. Beijing: Foreign Languages Teaching and Research Press,1989.

Hu Wenzhong. Foreign Language Teaching and Culture[J].Hunan Education Press,1997.
Hu Wenzhong. Culture and Communication [M]. Beijing: Foreign Languages Teaching and Research Press,1998.

Hu Wenzhong. British and American Culture Dictionary[M]. Beijing, Foreign Languages Teaching and Research Press,1995

Xie Zhijun Language in Culture and Culture in Language, [J]. Foreign Language Circle,1999 (1)

Wang Fuxiang. Culture and Language[M].Beijing: Foreign Languages Teaching and Research Press,1998

The Application of CLT in College English Vocabulary Teaching

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Abstract: The Communicative Language Teaching (CA) occurred in 1970s puts emphasis on the communicative principle. In China the author finds that lexical problems frequently interfere with communication; communication breaks down when people do not use the right words. And the ultimate goal of learning language is to communicate. The essay tries to expound the necessity and significance of the CLT application in College English Vocabulary Teaching in China.

Key Words: vocabulary teaching, CA, college English study in China

I.A Brief Survey of Vocabulary Teaching

1. The importance of English vocabulary learning

Vocabulary is the tool of thought, self-expression, translation and communication. In any language teaching, vocabulary plays a tremendously important role. The famous linguist Wilkins said people could describe few things without grammar, but they could express nothing without vocabulary. Widdowson thought that the native English speaker can understand those language material with correct vocabulary but not so proper in grammar rules rather than those with correct grammar rules but not so proper in vocabulary use. Lewis(1993) held the idea that vocabulary acquisition is the main task of Second Language Acquisition and the language skills as listening, speaking, reading, writing and translating all can not go without vocabulary. Non-native language learners usually trend to make mistakes about vocabulary; the most difficult thing in listening is vocabulary. Foreign language teaching methods are various but all show the importance of vocabulary teaching. To start learning a foreign language is connected with learning the words.

2. The simplification and neglect of vocabulary teaching

Traditional English language teaching in China is dominated by a teacher-central, exam-oriented, grammar & vocabulary-based method. In China, the teaching and learning of English vocabulary have typically been undervalued and neglected in our English language instruction. English teacher usually prioritize syntax or phonology as central to linguistic theory and more critical to language pedagogy. They don't think that vocabulary is central to language and words are of

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critical importance to the typical language learners. Simply increasing learner's vocabulary without putting its knowledge to use may not be effective

II. The Application of CLT in Vocabulary Teaching

1. The Theory of CLT

The communicative approach appears in the peaceful times in the early 1970s. Weak version of the Communicative approach stresses the importance of providing learners with opportunities to use their English for communicative purposes. The strong version of Communicative teaching, on the other hand, advances the claim that language is acquired through communication. Anyway, these approaches can be described as "learning to use" or "using English to learn it".

2. The Application of CLT in College English Vocabulary Teaching

2.1. Choosing Suitable Topics According to the Unit Theme

The college English textbooks are usually including several units where there are concerned words in the glossary. Usually teachers first explain every words, its pronunciation, spelling, word structure, word collocation, its part of speech, and so on. The Integrated Course of The new version college English student's textbook contains several themes, each of which is embodied in one unit. For example, in Unit One of Book 1 the theme is Growing Up, so the teacher could choose several topics for students to discuss. Everyone has experienced the process of growing up, during which so many things happened that help you to be mature and successful. So the topics of Generation Gap, My Honored Teacher, Encouragement, To Be Sincere Towards Life, and etc. can be chosen. The teachers instruct and assign students to prepare for the presentation of their discussion. Thus, the related words are practiced.

2.2. Explain the Word Meaning in a Situation

The nature of communication may be the guidance in the communicative words teaching approach. That is to say, whatever word teaching activities the students are involved in, if it is really promoting language use, the students should have a desire to communicate. If they do not want to be involved in communication then that communicating will probably be not effective. The students should have some kind of communicative purposes, then their attention will be centered on the situational use of words of what is being said or written, they will have to deal with a variety of languages, rather than just one spelling forms or grammatical construction use. Therefore, in the word teaching, what teachers should do most importantly is to arouse the students' communicative consciousness, activate their communicative motivation. To comprehend a word' real communicative meaning and use, if there is a great amount of situation knowledge in learner's mind. Thus, what the teachers should do is to enlarge readers' situation knowledge, arouse their communicative desire to attain the communicative aim. So the following are two ways to use:

2.2.1.Role play (deducing meaning from the context)

Littlewood (1981) proposed two types of communicative activities: the precommunicative

activities and the communicative activities, both of which are needed in the communicative language teaching classroom.
Activities and materials which engage students in the classroom communication include: games, music, discussions, stimulating pictures, dramatic stories, amusing anecdotes, role play and the etc.

Role-play is to create the presence of a real life situation in the classroom. It is important in the classroom communication because it gives students an opportunity to practice communicatively in different social contexts and in different social roles. The language applied in this activity is varied according to the character's status, attitudes, mood, and different situations.

2.2.2 Reading Authentic Materials

In communicative principle, authentic material is considered desirable to give students an opportunity to develop strategies for understanding language as it is actually used by native speakers. According to Tomlinson, authentic materials are "materials such as newspaper articles, brochures, train tickets, letters, advertisements, recording of news, airport announcements, etc., which were originally used in real situations and were not designed for use in language teaching. Such materials are used in the classroom to expose the learners to language in real use". For communicative method, the authentic material is the effective way for learners to acquire communicative abilities. When students pay attention to the really useful materials and the real language situations, the words seem easy to master. The following is an advertisement: experience the sheer pleasure of pure silk against your skin. Slip into a billowy silk shirt, an indispensable and luxurious addition to your wardrobe. Throw it on over leggings of jeans and, of course, it's perfect for work or dressed up for special occasions. Available in three colors—brilliant blue, shocking pink or ivory, it's terrific value at only £ 29.95. This is a small indulgence you just can't afford to miss. This is a shirt advertisement, all the word in which is colorful and superb. Several adj.s are used to indicate its texture, value, pleasure, low price, necessity of purchase, color and etc. In the wonderful description of the shirt, it is better and easier for students to feel the word billowy means free, easy and elegant than just telling them its Chinese meaning.

2.3. Reading Extensively

The aim of language teaching is to let students learn how to use language in spoken English or written English. So all kinds of words related to all fields should be mastered and one word can be used in several fields. Students should be available to English newspapers and magazines in the original, especially those freshly published. So in such ways, they have the opportunities to learn authentic English, to add authentic English to their vocabulary and to grasp the up-to-dateness of English expression. Reading material should be various, such as literary books (novels, dramas, poems and etc.), scientific books, everyday life books and so on.
We admit that we can listen to such English broadcasting as VOA and BBC through radio programs. To break the obstacles of new words, there will be a great progress. So after the limited hours for English teaching, teachers should encourage and instruct students to get in

touch with the authentic materials. It benefits and makes effective.

III. The Disadvantage of Communicative Approach

As a new approach to foreign language teaching and learning, the communicative approach is based on many modern linguistic theories. Since its birth, it has been embraced by teachers of foreign languages throughout the world.

In terms of preparation and sheer professional skill in knowing when and how to intervene productively, it demands more energies and adaptability from the teacher. The teacher also needs to be more confidently competent in the foreign language. Secondly, it does not offer the teacher the security of the textbook, while with more traditional approaches, it is sufficient for the teacher to follow the prescription offered by textbook. Therefore, it is necessary for the teacher to select, adapt and invent the materials he or she uses. Thirdly, it may perplex students who are taught by other approaches, at least at the initial stages. Finally, it is more difficult to evaluate the performance of students.

IV. Conclusions

Every communicative language teaching methods used in grammar, text, listening, writing and the etc are all closely related with vocabulary. Without the acquisition of vocabulary, that is equal to that a capable housewife feels it difficult to cook porridge without rice. As for a teacher, it really of significance to master the principles & spirits of Communicative Approach to help students to improve their learning strategies and building up the communicative consciousness to help them enlarge their vocabulary, enhance the vocabulary knowledge so that the abilities of listening, speaking, reading, writing will develop and the communicative capability will be improved. The author will keep the communicative principle in mind during the vocabulary teaching. More works need to be done and researched.

References:

Ellis, R..Second Language Acquisition[M]. Shanghai: Shanghai Foreign Language Education Press, 2000.

Kramsch, C.. Context and Culture in Language Teaching[M]. Shanghai: Shanghai Foreign Language Education Press, 1999.

Lewis. The Lexical Approach[M]. London: Language Teaching Publication, 1993.

Littlewood, W.. Communicative Language Teaching[M]. Beijing: Foreign
Language Teaching and Research Press, 2000.

Peng feng. An Application of Lexical Approach to Teaching Vocabulary in the Foreign Language Context of China[MA]. Jiangxi: Jiangxi Normal University, 2004.

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