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Reviews IX

by

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The next 15 reviews below (all the remaining reviews except the last, long one) are by the editor of *SPP*.

Endymion Wilkinson. *Chinese History: A Manual*. Harvard-Yenching Institute Monograph Series, 46. Cambridge (Massachusetts) and London: Harvard University Asia Center; distributed by Harvard University Press, 1998. xxiv, 1068 pages. Revised and enlarged edition, Harvard-Yenching Institute Monograph Series, 52. Same publisher and distributor, 2000. xxiv, 1181 pages.

Lydia H. Liu, ed. *Tokens of Exchange: The Problem of Translation in Global Circulations*. Durham and London: Duke University Press, 1999. 456 pages.

XIANG Chu. *Han Shan shi zhu; fu Shide shi zhu [The Annotated Poems of Cold Mountain; with an Appendix of the Annotated Poems of Pickup]*. Peking: Zhonghua Shuju, 2000. 19 + 1036 + 90 pages.

SUN Hongkai and JIANG Huo. "Han-Zang yuyan xishu fenlei zhi zheng ji qi yuanliu [The Controversy over the Linguistic Affiliation and Classification of Sino-Tibetan and Its Origins and Development]." *Dangdai yuyanxue (Contemporary Linguistics)*, 2 (1999), 17-32.

Jenny F. So, ed. *Music in the Age of Confucius*. Washington, D.C.: Freer Gallery of Art and Arthur M. Sackler Gallery, Smithsonian Institution; distributed by University of Washington Press, Seattle and London, 2000. 152 pages.

TSENG Yuho. *A History of Chinese Calligraphy*. Hong Kong: The Chinese University Press, 1993. xxix, 415 pages.

Edward J. M. Rhoads. *Manchus & Han: Ethnic Relations and Political Power in Late Qing and Early Republican China, 1861-1928*. Seattle and London: University of Washington Press, 2000. x, 394 pages.

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Kevin Robb. *Literacy and Paideia in Ancient Greece*. Oxford and New York: Oxford University Press, 1994. x, 310 pages.

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Piotr Bienkowski and Alan Millard. *Dictionary of the Ancient Near East*. Philadelphia: University of Pennsylvania Press, 2000. x, 342 pages.

Helmut Birkhan. *Kelten / Celts: Bilder ihrer Kultur / Images of Their Culture*. Vienna: Verlag der Österreichischen Akademie der Wissenschaften, 1999. 453 pages; 800 color and black and white illustrations (photographs, maps, and drawings).

Elizabeth Lichtenberger. *Austria: Society and Regions*. Tr. Lutz Holzner. Vienna: Austrian Academy of Sciences Press [Verlag der Österreichischen Akademie der Wissenschaften], 2000. An expanded version of the author's *Österreich-Wissenschaftliche Länderkunde* (Darmstadt: Wissenschaftliche Buchgesellschaft, 1997). 491 pages; 310 color illustrations; 21 color maps; 78 tables.

William W. Fitzhugh and Chisato O. Dubreuil, ed. *Ainu: Spirit of a Northern People*. Washington, DC and Seattle, Washington: Arctic Studies Center of the National Museum of Natural History, Smithsonian Institution, in association with University of Washington Press, 1999. 415 pages, 595 illustrations (320 in color), maps, index.

New Information about Ancient Mummies in Xinjiang (Two Items)

FEATURE REVIEW

H. K. Horken (1898-1996). *Ex nocte lux: Enträtselte Urgeschichte im Licht jüngster Forschung*. Tübingen: Ernst Wasmuth Verlag, 1972. 594 pages. *Ex nocte lux: Unriddled Pre-History in Light of the Most Recent Research*. Review and summary-translation by Adelheid E. Krohne.

Karen G. Turner, James V. Feinerman, and R. Kent Guy, eds. *The Limits of the Rule of Law in China*. University of Washington, School of Law, Asian Law Series, 14. Seattle and London: University of Washington Press, 2000. xiv, 348 pages.

Reviewed by Jacques deLisle
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The Limits of the Rule of Law in China is an eclectic set of essays that examine an impressively wide range of aspects of Chinese law, and that share a generally skeptical or pessimistic view of China's prospects for establishing the "rule of law" -- at least as that term is typically defined in the modern West. Primarily a collection of papers presented at two conferences in the early 1990s, the book includes chapters by many of the leading second- and third-generation of scholars specializing in Chinese law who teach and/or were educated in North America. The volume opens and closes with a pair of short reflections on attitudes toward law that emerged in China two and a half millennia ago and their implications for law's status and potential in China today. In between, contributors focus primarily on law under the Qing or in the reform-era People's Republic, with a few authors undertaking brief excursions into the law of the Mao years, the early decades of the twentieth century and contemporary Taiwan. Specific topics include: the views held by twentieth-century Chinese legal thinkers and politicians and Western scholars of general or fundamental rule-of-law issues in China; the roles of criminal confession, collective criminal responsibility and mechanisms for removing and disciplining high-level officials during the Qing dynasty; and the development of the law of civil obligations, the law of foreign investment and trade, judicial discretion (and its control), decentralization of law-making power, and sources of ambiguity in legislation in contemporary China. Collectively and in many cases individually the authors' approaches are interdisciplinary, drawing on the insights and methodologies of history, political science, linguistics, and legal and social theory, as well as more conventional legal scholarship.

Three contributors find ancient roots of a Chinese ambivalence or antipathy toward the rule of law. In a rich and pithy foreword, the eminent scholar of Chinese legal history and early Chinese legal thought, Chang Wejen looks to the well-known sixth-century B.C. episode in which Zi Chan, premier of the state of Zheng, ordered that the laws be inscribed on a bronze vessel and publicly displayed so that the law would be known, its stability tangibly indicated and its strict and unmanipulated application assured. Chang also recounts the somewhat less famous contemporary criticism by Shu Xiang, who argued that positive laws could be effective (and good) only if they tracked higher moral norms, if the people had already learned the dictates of those abstract norms and compatible concrete rites, and if the ruler had created the necessary institutional environment of virtuous judges

and officials. Otherwise, making the law public would lead to niggling pettifoggery, disregard for higher norms, skepticism toward the state's authority and social disorder. In a posthumously published epilogue, historian Jack Dull returns to the stories of Zi Chan and Shu Xiang (and some of their predecessors) and adds the tale of Deng Xi, who was assassinated by a conservative rival and condemned in contemporary and later Confucian commentaries for his role in publicizing and exploiting/employing the laws. Deng Xi's transgression, Dull tells us, was to fulfill Shu Xiang's prophecy -- and then some. Deng Xi (whom Dull ironically dubs China's first lawyer) is variously condemned for his role in making Zheng's laws known to the public and, worse, for making use of those laws in ways that helped particular criminal defendants' cases. In an editor's introduction, historian Karen Turner addresses more recent periods of antiquity. She opens with a passage from Xunzi -- in many ways the great intermediate figure between the early Confucians and the most influential Legalists -- which stresses the need for both good rulers and good laws. She adds a brief discussion of the materials on Qin law unearthed at Mawangdui and Shuihudi, in which she finds a complex blend of concern with the need to use formal and elaborate laws to constrain officials and an understanding that law must have a moral dimension and underpinning.

In considering the distant past's lasting implications for law in China, these pieces move refreshingly beyond the familiar polar conflict between Legalism (*Fajia*) and Confucianism, or between the "rule of man" (*renzhi*) and an especially narrow and harsh version of the "rule of [or by] law" (*fazhi*). Chang sensibly recognizes that ideologically Confucian dynasties relied on laws (albeit regarding them as lower and incomplete norms), and interestingly emphasizes that the Legalists ultimately were no more able than their Confucian adversaries to avoid dependence on a good (and, indeed, great) ruler to establish and (perhaps more challengingly) implement and maintain the positive laws necessary that are necessary for effective rule. Chang thus brings out a broadly shared, durable and -- for the rule of law -- tragic feature of Chinese law and politics: the failure to generate a practical theory that makes the ruler himself subject to the law. In looking to the Confucian-Legalist "hybrid" Xunzi and to the inevitably not-purely-Legalist materials on Qin practice, Turner reaches similar if less subtle conclusions. She finds a remarkably uniform, long-standing and highly resilient Chinese perspective that sees the moral quality of the leader (and not the quality of laws and institutions) as the determinant of the "quality of political culture" and governance. She finds a related emphasis on substantive justice (defined in terms of extralegal moral norms) over formal or procedural justice (which Turner strongly associates with what she sees as the embattled and battered Western ideal of the rule of law). For Turner, the Qin materials' indication of a broader legal recognition

and reinforcement of status inequalities in favor of the state elite, first, further indicate an ingrained orientation that is inimical to the rule of law (at least in any form that would be accepted as such in the contemporary West) and, second, appear generally morally objectionable as well. Dull's account is more interesting (and less clearly presented), but points in the same general direction. He suggests that both of Deng Xi's apparent transgressions -- publicizing the laws (lawfully but against a superior's will) and using the laws as a defense lawyer would (effecting what the Confucian perspective perceived as substantive injustice) -- threatened to produce the unacceptable effect of constraining or challenging the extensive discretion that officials enjoyed under a regime of vague, weakly articulated and not-fully-public normative principles that the elite controlled and could manipulate. The official Confucian opposition to a central role for positive law thus appears as less a matter of principle than a matter of avoiding accountability and preserving power.

Chang and, to a lesser degree, Turner (but not Dull) see some reason for optimism for the rule of law in China today. Chang suspects that Shu Xiang may have been right and Turner, in effect, concurs: context matters a lot for law's impact and efficacy. And, for Chang, China's contemporary social, economic and international contexts may be (or at least may be becoming) more favorable. Turner is more skeptical, pointing to the PRC's history of antipathy to foreign models and China's longer tradition of disdain for law, but she too sees some hope in law's potential to develop to meet the needs and expectations of an increasingly complex and pluralistic PRC society. This does not mean that implementation of an archetypal Western rule-of-law model is achievable or desirable. Chang finds persuasive the Confucian critique that a too-single-minded reliance on law is impractical and not necessarily normatively appealing. And Turner seems to find compelling much of the contemporary Western attack on conventional Western rule-of-law ideals.

Three chapters by historians -- one also trained in law -- examine distinctive aspects of Qing public law and find relatively robust legal structures, albeit ones that depart in important ways from the models from the modern West. (This departure is amply foreshadowed in the authors' choice of topics that Western commentators have regarded as among the more "lawless" or "barbaric" features of Qing law.) Alison Connor considers the central role of defendants' confessions in Qing criminal law. Recognizing that an insistence on confession as a condition of conviction led ineluctably to the pervasive use of torture, Connor examines the Qing jurisprudence of torture and finds much that is governed by law or law-like norms. She points to Qing statutes and regulations that set forth significant limits: They permitted torture to extract a confession only if already-gathered

evidence of the defendant's guilt met a "burden of proof" (perhaps better characterized as a threshold of sufficiency and credibility), prohibited torture of certain groups (including the especially vulnerable as well as the highly privileged), specified the permissible instruments of torture, limited the amount of torture, restricted the most severe forms to the most serious cases, required the magistrate to supervise interrogation under torture and to make detailed reports to his superiors on the use of torture in his jurisdiction, and mandated severe penalties for those who violated the legal limits on torture. Connor recounts other sources that reflected and promoted less official limits, including the ubiquitous magistrates' handbooks which expressed caution and even skepticism about the use of torture and gave elaborate guidance about when a magistrate should not or must not resort to it. In the law of torture and in the ample opportunities for recantation of confession and *de novo* review of lower officials' judgments accorded by Qing process, Connor discerns a legal regime predominantly concerned with the accurate determination of guilt and the doing of substantive justice (through punishing the guilty and acquitting the innocent), rather than a quest for the defendant's submission or consent -- or even reform and reintegration -- that other scholars have seen as the motivations behind the Qing insistence on confessions.

Joanna Waley-Cohen considers the principle and practice of collective -- and, therefore, vicarious -- criminal responsibility. She finds collective criminal liability to be rooted in a deep cultural habit -- one reflected in Confucian ideology -- of defining individual identity almost entirely in terms of relationships and group membership. After examining briefly other forms of collective accountability in Qing law and social practice, Waley-Cohen focuses on *yuanzuo* -- under which members of the group (typically a familial group) in principle bore indivisible and relatively undifferentiated responsibility for the grave criminal acts of one of their number. She sees the handful of serious offenses singled out as *yuanzuo* to be those which the Qing state regarded as "political." By this she clearly means both crimes that are political by any measure (*e.g.*, rebellion and treason) and those that appear to challenge the underpinnings of an avowedly Confucian political order (*e.g.*, lack of filial piety, massacres that threaten to wipe out a family line, and acute family discord). In the few legal provisions that waive the most severe punishments for some categories of officials or relatives of *yuanzuo* offenders and in the practice of granting conditional -- essentially probationary -- lenity to many who were subject to *yuanzuo* collective responsibility, Waley-Cohen detects a powerful legal mechanism that helped Qing authorities to maintain social and political control. They could eliminate ruthlessly the most severe perceived threats (whether true criminals and suspected accomplices or simply rival factions) and, at the same time, bolster their Confucian legitimacy (by being more

benevolent than the law required toward some defendants for whom lesser sanctions seemed politically adequate or morally appropriate under Confucian norms).

R. Kent Guy analyzes the relatively rarely-used process of impeachment of provincial governors under the Qing. He details three types of accusations against these senior officials: (1) an ordinary memorial by officials who might rank well below the governor (which could trigger formal investigative proceedings by the Censorate); (2) a secret memorial by a fellow governor or a governor-general (a governor's immediate superior); or (3) a special order by the emperor himself. In Guy's assessment, these three routes to removal are arrayed along three related, ascending spectra: (1) status of the accuser; (2) degree of informality of the procedure (both in the form the accusation must take and the process accorded the accused); and (3) susceptibility to use for political ends or factional strife (rather than for ferreting out and punishing malfeasance in office). Guy argues that the sometimes-considerable procedural protections that governors enjoyed reflected a concern with preserving the legitimacy and sanctity of the regime, rather than with safeguarding any rights of the accused. Advancing his contention that the less formal processes were especially political, Guy examines two cases of imperial accusation and finds that they strongly reflect the political circumstances and concerns of their times: factional conflict and a concern that the system of administrative discipline not be undermined in an era of Qing strength, and a quest for a scapegoat for the authorities' failure to stop Taiping rebels during the dynasty's declining years.

In different ways, these chapters point to significant limits to the prospects for the rule of law in China in more recent times. While Connor argues forcefully that there was much law and respect for law even in the seemingly unlikely realm of Qing torture, she concludes that the People's Republic has fallen below that baseline despite the apparent promise of reforms that formally prohibit torture and eliminate the requirement of a confession for conviction. Behind such formal "progress," she points to widespread use of torture and a practice of continued reliance on confessions that show less commitment to truth-seeking and are "less regulated, more arbitrary and potentially more cruel" than those that she found in Qing China. Waley-Cohen concludes that what she sees as the cultural habit of conceiving of the group as the relevant unit for criminal (and other) responsibility has persisted (not surprisingly) into the PRC years, reflected in such phenomena as Maoist class justice and the harassment of dissidents' families during the reform era. Such a presumably intractable feature clearly bodes ill, at least for any rule-of-law regime that would have Western legality's core trait of individual responsibility and rights. Guy eschews explicit consideration of the latter-day implications of his study, but his concluding section suggests an ambivalent and moderately skeptical answer to the "rule of

law” question. He writes that at least some of the procedures for removing Qing governors show at least a moderate degree of law-governedness or legality, but one saw law not as a particularly distinctive or sacrosanct realm but, rather, as one part of a repertoire of political instruments.

The collection’s other chapters focus mostly on law in reform-era China and are all written at least in part by lawyers or legal academics, many of whom are trained in other relevant disciplines such as history, political science or linguistics.

Two authors tackle the “rule of law” question by examining how contemporary Chinese have understood the issues at a relatively broad, theoretical level. Jonathan Ocko closely examines a relatively narrow topic: how PRC legal scholars used analyses of imperial-period Chinese legal history to build, obliquely, a case for specific conceptions of law and legal reform in the first few years on the post-Mao reform era. In focusing on a series of essays in the initial issues of *Faxue Yanjiu* (which began operations at the end of 1978), several annotated volumes on Qing, Ming and earlier dynasties’ law (which were published around 1981), and articles in other newspapers and periodicals of the same vintage, Ocko has chosen both an especially yeasty and significant moment in recent Chinese legal thought and a particularly nice example of the venerable and distinctive Chinese practice of political argument by historical analogy. Ocko depicts reform-minded authors as, first, making the obligatory criticisms of the oppressive class character and substantive injustice of Chinese law during the dynastic period and, second, coalescing around the position that “feudal” China was at its best when the emperors themselves followed the laws they made, and when “clear sky” magistrates upheld the law consistently and applied the law neutrally without regard to parties’ personal connections, factional ties or social positions (presumably with the exception of those aspects of social position explicitly recognized in the law). In these at-best-thinly-veiled discussions of the proper character of socialist legality for Post-Mao China, Ocko discerns a strong, and sometimes quite explicit, prescription for building on these virtues of the past and choosing the rule of law (*fazhi*) over the rule of man (*renzhi*). This position is rooted in a repudiation of the legal nihilism and tyrannical politics of the Gang of Four era, yet is tempered and in some respects undermined by the reformist legal intellectuals’ recognition of Legalism’s ultimate dependence on having a good ruler, by their not-wholly-consistent and not-fully-acknowledged attraction to the idea of lower-level officials’ having discretion to do substantive justice, and by their sometimes-reluctant acknowledgement that many of the praiseworthy, law-supporting officials of the past had come to unhappy ends.

Shen Yuanyuan provides a critical overview of the quest for “socialist legality” or the “legalization movement” from the beginning of the reform era to the eve of Tiananmen.

She notes the considerable accomplishments in promulgating a vast array of laws and in increasing dramatically the number of legal and judicial personnel. She recounts some of the problems that have made those efforts relatively ineffective in fundamentally transforming the Chinese legal system, including: the failure to establish a full legal structure for a market economy (which has left economic actors both dangerously under-regulated and stiflingly over-regulated), and the broader and interrelated failures to insulate law from political manipulation and to win popular acceptance and legitimacy for the new laws. Shen then turns to a more abstract discussion of the meaning of *fazhi* in reform-era China. She argues that the official conception saw “socialist legality” or “socialist *fazhi*” as an instrument for strengthening the Chinese Communist Party’s ability to achieve its goal of economic development by giving clear direction to the people, assuring uniform interpretation of Party policy by cadres charged with implementing economic reforms, and maintaining the level of public order that is a prerequisite to economic development. Shen depicts debates among Chinese legal scholars as departing remarkably little from this official vision. On her account, the relatively few who argued for something like a true “rule of law” were drowned out or at least obscured by more muddled or more orthodox positions. Shen then underscores how much this Chinese vision of socialist legality departs from Western rule-of-law norms and then examines the implications for Chinese legal reform of the assaults to which this Western ideal has been subjected in the West.

Shen and Ocko depict, and lament, relatively dim hopes for China’s reaping the full benefits offered by a legal order that more nearly approximates at least (or especially) those elements of the “rule of law” ideal articulated in the West that have (best) survived the intramural occidental critiques from Critical Legal Studies, continental philosophers and the like. Notwithstanding some reformist intellectuals’ proclaimed preference for *fazhi* over *renzhi*, Shen finds a very widespread acceptance of a narrowly instrumentalist conception of law and strikingly little deep and genuine commitment to (or even understanding of) the rule of law as it is defined by its proponents in the West. And Ocko similarly discerns in reformist intellectuals’ legal writings a quest not so much for justice as “an end in itself,” but rather for an “ethic of service” to the public (or the public good) and a related attraction to the model of extralegal intervention by great rulers on behalf of the right substantive ends, with a striking example being Deng Xiaoping’s famous emperor-like tour of the south in 1992 to reinvigorate reform and, in the process, define standards for guiding selective implementation of laws. Shen’s description of what needs to be done to change the situation is an ambitious, and therefore daunting, prescription. It requires both qualitative shifts in Chinese reformers’ intellectual temperament (recognizing that the formal rationality associated with the rule of law is not “all or nothing,” that there are limits to

law's contributions to achieving social goals, that law's effectiveness depends on institutional and social conditions, and that a commitment to the laudable goals of substantive justice can create opportunities for unpredictability and tyranny), and major institutional and legal-cultural changes (establishing real procedural restrictions and legal remedies that are beyond Party-state actors' discretionary control, creating an autonomous legal system and achieving popular legitimacy for it).

A few chapters address efforts to build elements of a legal system and to enhance legality in China by borrowing from the West. Shen Yuanyuan notes that a major feature of China's post-Mao law reform effort has been the enactment of extensive legislation that has borrowed from the West (particularly on economic matters), but that such laws have not had their intended effect because of the very different environment they have faced in China, including (but not limited to) China's not having adopted a Western notion of the rule of law. She identifies this Western vision of law as one in which law imposes restraints on governmental power (and not just on actors subject to the government), and justice is conceived in formal and procedural terms (rather than substantive ones). James Feinerman's contribution on foreign investment and trade law offers a broadly similar assessment. Oddly titled "The Rule of Law Imposed from the Outside," the chapter depicts reform-era leaders as, first, choosing to adopt Western-style law as a means of attracting foreign capital to foster market-oriented economic development, and, second, dooming those laws to conspicuously limited success (and foreign investors to great frustration) by, in essence, failing to do more to establish the rule of law. The latter shortcoming consists in part of enacting imperfectly market-supporting formal laws, neglecting the construction of legal and institutional frameworks needed to support markets, and rejecting conceptions of law that are not narrowly instrumental.

Tahirih Lee examines Chinese reformist intellectuals' and (to a lesser extent) leaders' wrestling with the imported idea of federalism during much of the twentieth century. She depicts how the Western-derived concept has been construed to mean a great many things, including: a despicable apologia for local power and warlordism or a means for reunifying China on the basis of good local self-government during the late Qing and Republican periods; a promising method for integrating peripheral areas during the era of the CCP's gradual acquisition and consolidation of national power; an unacceptable challenge to the principle of a unitary state during most of the PRC period; an inspiration to relatively moderate reformers seeking to find ways to integrate Hong Kong, Macao and Taiwan and to maintain prosperity through decentralization during the first decade of the post-Mao reform era; and an element of now-exiled intellectuals' proposals for the development of democracy, the elimination of the Communist Party's political monopoly

and the decentralization of political power in China during the years following the 1989 Tiananmen Incident. Lee's account suggests two related, common threads in this sprawling history of federalist ideas in China: significant support for "economic" federalism (meaning, roughly, the decentralization of control over the making of economic policy, and the allocation and distribution of economic resources) and little acceptance of formal or full-fledged federalist principles in "political" affairs (where concerns about excessive decentralization and potential disintegration have restricted permissible discourse to questions of the discretionary delegation of central powers and the need to address dangers of over-concentration of power at the center).

These contributors conclude that journeys to the West can do little to redress the limits -- largely political ones -- to the rule of law in China. As Shen and Feinerman see it, the scope of the PRC's agenda of legal borrowing has excluded key elements of the West's rule-of-law system for reasons that are not likely to change easily, including a failure to understand Western-style economic law's dependence on supporting values and institutions, or (especially among official reformers) a refusal to take the political risks that would attend rule-of-law-supporting reforms in those areas. Joining Turner in seeing the largely academic critiques of the West's "rule of law" ideal as fairly devastating, Shen indicates that Chinese borrowing from the West is made still less likely by the state of disarray into which the Western model has fallen. Although not so expressed, the implications of Lee's analyses are broadly similar to the others': The concept of federalism, which is ultimately of Western origin, might offer part of a solution to some of China's systemic problems, but formally implanting such a fundamental structural element has been and is likely to remain politically off-limits in China.

William Alford's essay echoes and refines some of the views offered in the chapters that address the (lack of) Western impact on China, offering: a criticism of formalistic views that ignore the importance of social and cultural contexts and the possibility of partial success in building legality; a measured and balanced argument that the Western notion of the "rule of law" is not so coherent and compelling as its proponents sometimes assert nor (as Ocko's essay also argues) as disreputable and uninspiring as its academic critics often claim; and a suggestion that Chinese law reformers would do well to study the lesson taught by Western experience that procedural and remedial mechanisms and a cadre of independent lawyers are important underpinnings for the rule of law. But Alford reaches these conclusions after addressing a nearly opposite question, asking why the obviously rich and important phenomena of Chinese law have had so little impact on Western understandings of China. He identifies four groups of scholars and the causes of the blinders that have afflicted three of them: (1) the older generation of sinologists in the

“grand tradition,” who studied official sources and identified with the elite Confucian views expressed therein, including a low regard for the place of law in Chinese society and governance; (2) the “impact-response” school of analysts of China’s nineteenth-century encounter with the West, who saw the Qing system as reactive, reactionary and ultimately bankrupt, its law therefore of little interest and, probably, every bit as inadequate, static and unredeemable as contemporary Western critics and Chinese revolutionaries and reformers had charged; (3) social scientists studying the PRC who admiringly embraced the Maoist rejection of law (and consequently overstated its thoroughness in practice), or who stridently condemned the PRC’s repressive uses of law as an instrument of authoritarian rule (and thereby ignored rapidly mounting evidence of a more complicated picture, especially during the reform era), or who simply have ignored law entirely (for reasons that may include methodological prejudices, traditional disciplinary boundaries or individual scholarly temperament); and (4) a cadre of law-oriented historians and, more recently, interdisciplinary legal academics who have taken Chinese law seriously, their perspectives made credible (and seemingly obvious) and their research made possible by the undeniable and striking growth Chinese law during the reform era, and by the expanding access to source materials revealing how law actually operated in China in earlier times (principally the late imperial period).

Having under-appreciated Chinese law for so long, the logic of Alford’s analysis would seem to suggest, we should have little confidence that we are not still underestimating it (unless one has the hubris to assume that the fourth, current group is invulnerable to the sorts of problems that affected its predecessors). It is a nicely ironic echo of the book’s overall theme that this essay which is arguably most hopeful about the rule of law in contemporary China is the one that focuses least on law in China.

Three contributions examine specific aspects of public law in the contemporary People’s Republic. Tahirih Lee addresses what can be best described as a constitutional question: Can a federal structure provide answers to the challenges posed by transformative developments in the reform-era PRC, including political decentralization, social and economic diversification, pressures for democratization, and rising ethnic tensions? Recognizing that federalism is a dirty word in official PRC constitutional discourse and that notions of federalism advanced by contemporary Chinese reformers and dissidents have been bewilderingly diverse, conceptually muddled, and politically unviable, Lee sees hope for a “unique” and semi-surreptitious Chinese federalism. While she recognizes the potential problem in distinguishing “economic” from “political” affairs, Lee argues for an informal federalism with Chinese characteristics that would accept substantial, durable, not-merely-discretionary delegation of fiscal and other economic

decision- and rule-making powers to more local levels while retaining for the center a greater share of the authority to make political decisions. Not all China's federal units need be equal, with autonomy being granted generously to the most economically different areas (the Special Autonomous Regions of Hong Kong and Macao) and sparingly to the most politically fractious regions (the misleadingly named autonomous regions in heavily minority areas). In this scheme, Lee sees hope for maintaining the internal decentralization and cross-border economic integration that have built reform-era prosperity, and, at the same time, stanching the outflow of central authority by making clear a realistic set of reserved central powers (ones more modest than those which the official position has asserted but been unwilling or unable to enforce).

Margaret Woo turns from such constitutional matters to legal institutions, specifically courts and the many organs that oversee them. She identifies three types of judicial discretion that undermine legal certainty and legality in contemporary China: (1) "fact-based" discretion, which entails judges' emphasizing the specific circumstances and the apparent demands of justice in the individual case; (2) "self-interested" discretion, which means judges' deciding cases on the basis of connections (*guanxi*), favors, gifts or parochial interests (local protectionism / *difangbaohuzhuyi*); and (3) "ideological" discretion, which consists of judges' looking to Communist Party-defined norms and policies in reaching their decisions. Woo finds strong and sometimes deep roots for these types of discretion in fundamental principles of the reform era (such as "seeking truth from facts" and the strikingly ideological and constitutionally enshrined Four Cardinal Principles), Mao-era legacies (such as the principle of close Party supervision of the judiciary or the mass line approach to decision-making), features of a civil law system in a Chinese context (such as a lack of deference to precedent and a bureaucratic conception of the judiciary), and lingering Confucian norms (such as emphasis on harmony and disesteem of litigation). Woo argues that legal provisions that formally constrain discretion in fact permit or support it. Fact-based discretion finds shelter in procedural laws that use vague terms, impose few requirements of consistency, adopt a rule-exception framework, and favor informal resolution of disputes. Self-interested discretion has ample room for survival under belatedly enacted and weakly enforced laws targeting judicial corruption, and in the absence of legal prohibition of *ex parte* contacts or deciding cases on grounds other than those developed in a transparent, public record of evidence in the case. Ideological discretion is maintained by adjudication supervision (*shenpanjiandu*), which permits discretionary reopening of supposedly final court judgments -- without the consent of the parties -- to assure conformity to the Party's policies (as well as to correct legal error or judicial corruption). Finally, Woo examines what she calls the "ideology of

supervision” (*jiandu*) and its extension, including: “internal” review of individual court decisions by appellate courts, the Supreme People’s Court, the deciding court’s adjudication committee, or that court’s president (who is, in effect, chief judge and the bureaucratic superior of the deciding judge or judges); “external” supervision of the courts by the procuracy (which serves as a sort of latter-day judicial censorate, as well as the prosecutor, in the PRC); the people’s congresses (which have supervisory and inspection authority over courts at each level in the PRC hierarchy), the masses (who can petition and protest to higher authorities and use the Administrative Litigation Law to bring judicial challenges to specific decisions -- but not to underlying laws and rules); and the Party (which indirectly controls most of the other mechanisms through its penetration of other institutions or its general “guiding” role in politics, and which more directly, *inter alia*, launches campaigns that direct courts, for example, to deal harsh sentences to criminals). In such mechanisms, Woo finds much that reinforces political authority, and little to encourage legal certainty.

Claudia Ross and Lester Ross move the discussion from institutions to legislation. They employ techniques of legal and linguistic analysis to assess the problem of ambiguity and vagueness in contemporary Chinese statutes. Making extensive use of exemplary texts from important legislation, the authors discern three features prevalent in PRC laws, all of which are familiar sources of frustration to Western lawyers who have tried to translate PRC laws or to negotiate transactions governed by PRC legislation. Chinese laws mix “strong obligations” (often expressed as *bi* or *bixu*) and “weak obligations” (often expressed as *ying* or *yingdang*), employ a wide variety of “and”- and “or”-like connectors (ranging well beyond the simple *he* and *huozhe*), and frequently resort to a maddening “etc.” (*deng*). Ross and Ross explain that these troublesome terms -- often combined in the same statute or provision -- reflect careless or inexpert draftsmanship or intractable ambiguity, and (even on the all-too-rare occasions when they are translated reasonably well and consistently) do not neatly track Western linguistic and underlying conceptual distinctions such as “must” vs. “shall,” or “and” vs. “or,” or exhaustive vs. illustrative lists. Some of these differences, the authors argue, are deep indeed, reflecting Chinese conceptions of duties appropriately written into law that are more than a moral ought but less than a full Western-style legal obligation, or a Chinese view that an “and so forth” is not necessarily problematic in a provision creating legal obligations or prohibitions. Altogether, the authors conclude, these features make for a good deal of statutory ambiguity and, therefore, opportunities for arbitrariness, abuse and corrosive legal uncertainty for those who must implement or be subject to Chinese law.

Each of these diverse essays points in its own way a pair of related features of PRC public law and politics that entail significant limits for the rule of law and its prospects: first, a commitment to expansive central political authority (reflected in the rejection of constitutional entrenchment of local powers, the construction of institutions and ideologies of top-down or politically directed supervision over courts, and the preference for legislating obligations that Western systems would leave to regulation by extralegal, and not-immediately-political, morality); and second, a proclivity toward measures that preserve extensive discretion in the interpretation and application of laws (manifested in the tolerance only for vague and vulnerable delegations of law-making authority to lower levels, the enactment of laws that do as much to codify forms of judicial discretion as they do to limit it, and the frequent use of ambiguous or open-ended statutory language).

Finally, a pair of chapters consider developments in key areas of civil or economic law in contemporary China. Pitman Potter examines civil obligations--principally contract law--in the PRC and Taiwan. Focusing on the PRC's General Principles of Civil Law and now-superseded Economic Contract Law, he depicts "official views" of contract formation as endorsing formal legal equality among a diverse array of parties with the capacity to make presumptively autonomous agreements in a presumptively market-based economic order. Legal protection for state authority, however, remained robust principally in mechanisms which reflect "political inequality": voidness of contracts that conflict with state policy or interests, tight regulation of the establishment of enterprises and of authorization to engage in specific business activities, and restrictions on profits and on transactions in some commodities. On Potter's account, "official views" on contract enforcement have a similar structure: Contracts in the reform-era PRC generally are enforceable so long as formal requirements governing contract-formation have been satisfied, and (in contrast to an earlier preference for mediation) disputes are to be resolved primarily through formal processes and institutions (including formal arbitration, adjudication by economic chambers in people's courts, and enforcement of such judgments). Yet, state interests retained special protection in laws that require strict specific performance of contracts with implications for the state plan, despite an officially accepted judicial practice of flexible, half-a-loaf remedies for other contracts (especially those with respect to which full enforcement would threaten serious economic harm). Potter finds that "popular views" of civil obligations have only partially accepted official views, embracing the general notion of contract (out of enthusiasm for market-oriented economic reform) and favoring the shift to formal dispute resolution, but remaining skeptical about formal legal equality (in light of the obvious use and abuse of superior political power or personal connections in making and breaking contracts) and holding mixed views about flexibility

and pressure to compromise in shaping remedies for breach of contract. Potter offers a parallel analysis of Taiwan. There, he finds greater and growing congruence between popular and official views. These stress voluntariness and equality in contract-formation and full enforceability of formally valid contracts, limited only by modest side-constraints reflecting “community values” (which are enforced by courts’ holding invalid contracts that are not “appropriate to law and society” and by courts’ providing redress in cases of unjust enrichment). While he finds that popular attitudes continue to show some reluctance to see contracts and contract law as the sole basis for the relationships they formally govern, Potter speculates that this is fading as the web of transactions and actors becomes wider and more complex in Taiwan.

James Feinerman reviews the PRC’s post-Mao efforts to develop laws governing foreign investment and trade that would attract Western capital and international commerce and thereby serve the reform-era leadership’s goals of hastening China’s economic development without sacrificing social order. Feinerman provides a lucid and succinct overview of the principal legal vehicles for foreign investment and other laws affecting foreign investors. He provides an extensive catalogue of legal and practical problems and (at best) partial solutions: implementing regulations for laws governing foreign investment vehicles and statutes creating the essential framework of a company law and core elements of the civil code that came only many years after the basic foreign investment legislation; opaque tax laws and disparate tax treatment for foreign investors that continued to produce distrust after the adoption of a unified tax law for foreign-invested enterprises; restricted access to domestic markets that continually disappointed expectations encouraged by PRC authorities; impediments to foreign exchange access that were not completely redressed by the creation of swap markets and the unification of the formerly bifurcated “domestic” *renminbi* and Foreign Exchange Certificates; legal unanimity requirements, less formal restrictions on management behavior, dependence on the cooperation of Chinese partners and authorities, and an “iron rice bowl” mentality (including expectations of job tenure and secure, employer-provided access to social welfare benefits) among Chinese workers that limited foreign-invested firms’ freedom to engage in market-driven behavior; and a highly flexible attitude toward contracts and an insistence on informal modes of dispute resolution in PRC fora that too often denied foreign investors the expected benefits of their bargains. Feinerman finds that, even in the post-Tiananmen efforts to reinvigorate reform, the attempted legal fixes to such problems suffer from the same over-reliance on promulgating a few pieces of legislation -- with little regard to their efficacy -- that afflicted the initial round of foreign investment laws, and made them inadequate to provide the legal

framework that foreign investors demand as a condition of their full-fledged participation in China's quest for economic development.

In these chapters too, the analyses underscore limits to the rule of law in the contemporary PRC, here at two levels: first, the preservation of legality-undermining and legally unconstrained discretion in the hands of state authorities, even in the law-on-the-books and with respect to matters what Western systems regard as "private law" topics that fall primarily within the realm of the parties' autonomy; and second, the lack of success (Potter suggests) or interest (Feinerman indicates) in bringing the law-as-applied or the law-as-experienced into line with the fairly modest promises of formal legislation and official policy positions (a pattern that Feinerman identifies as "formalism" and Potter as a gap between "official" and "popular" views).

The fourteen essays provide much to support the conclusion signaled in the volume's title: that there are very substantial "limits" to the rule of law in China -- whether that conclusion is construed as one of disappointed evangelism (China has not developed and is unlikely to develop the rule of law that some Chinese reformers and Western government officials, business people and advice-providers seek) or one of moderate relativism (China has had and arguably does have a legal order worthy of the name, but one that does not match the conventional and perhaps contestable and even chimerical Western ideal of the "rule of law"). To a degree unusual in a conference volume, the authors almost all seek to engage squarely the book's central question. Their contributions to the collective case aside, the chapters individually provide short treatments of important subjects that at least are fully serviceable overviews and that often are first-rate, insightful, and provocative works. Together, and far more vividly than any more narrowly focused edited volume could, these chapters convey the astonishingly rich array of issues and methodologies -- and, in some cases, the increasingly sophisticated use of theory and rigorous analysis and the greatly augmented source materials -- that characterize the best recent scholarship on Chinese law. Almost without exception, the authors avoid the twin vices that have plagued much writing on Chinese law: They generally do not extensively indulge in empirically unrooted, sweeping pronouncements about the general nature of Chinese law. And they do not lapse into thoroughly unreflective close descriptions of a narrow aspect of Chinese law that, so handled, could engage only a reader with an exceedingly narrow specialty or interest.

While its strengths are considerable, *The Limits of the Rule of Law in China* has shortcomings, including some that are the vices of its virtues. Several of the contributions, including a few of the most analytically ambitious, sometimes stumble when they try to construct or apply legal theory or social science and comparative frameworks to their

generally solid assessments of specific questions of Chinese thought or practice. Connor's interpretation of the Qing criminal process's emphasis on substantive justice overreaches a bit in pressing the argument that truth-seeking underlay and explains the law of confession and torture. In doing so, she gives short shrift to the seemingly considerable risks of false confessions and, therefore, false convictions that Qing criminal justice tolerated and that seem better explained by, say, a strong sense of the importance of general deterrence and, presumably, its contributions to maintenance of social order (even at the cost of some error and individual injustice). Waley-Cohen points to an interesting set of factors that might explain the Qing preference for harsh rules of group accountability with considerable flexibility and occasional lenience achieved through limited rule-based exceptions to liability and extensive discretion in applying or foregoing punishment, but she does not develop or apply these ideas systematically. Although she says quite plausibly that the legal regime she describes reinforced the power of the state and provided effective tools for social and political control, she ultimately seems to favor (for largely unarticulated reasons) a view that finds the major roots of the Qing state's creation and maintenance of its law of collective responsibility in a Chinese mind-set that regards the individual primarily or only as a member of a group. This preference for a cultural account probably underlies (or perhaps reflects) some questionable features of the chapter, including: an argument that verges on circular reasoning in which she asserts that offenses grouped under *yuanzuo* are ones the Qing state regarded as "political" and that one of the ways we know that an offense was regarded as political is that it was a *yuanzuo* offense; an assessment that classifies what seem to be, at least in significant part, cases of direct and individual liability for negligent supervision as instances of collective (and therefore vicarious) liability among bureaucrats; and a disinclination to pursue at least one plausible explanation for severe group responsibility and discretionary leniency in *yuanzuo* even though many elements of the argument are in her essay and are broadly compatible with her conclusions. Specifically, the Qing system may have proceeded from the quite plausible assumptions under Qing social and institutional conditions that family members or fellows in some other organic group might very well be complicit in an individual offender's heinous crime and that it would be very hard for the authorities reliably to uncover and prove such involvement. Draconian vicarious liability rules then, first, had the value of overcoming otherwise insuperable evidentiary hurdles in cases involving group-member complicity and, second and relatedly, could provide an otherwise-lacking deterrent to state-threatening intra-group conspiracies. When the presumption proved false, discretionary lenity could permit a route for letting innocent (or less culpable or more reformable) members of the offender's group off the hook. Guy's account of the Qing law of gubernatorial

impeachment opens with a stab at broad theory, suggesting that Qing law (presumably including impeachment) served to reinforce the moral order and to preserve the state, advancing both goals within the framework of a positivist, instrumentalist conception of law. While this is plausible as far as it goes, the argument is not fully worked out and is largely abandoned in favor of a more grounded analysis that develops the multiple, specific political functions of procedures for removing top provincial officials.

Among the contributions focusing on more contemporary periods, Lee's epic survey of the many mutually and internally inconsistent things that federalism and federalism-like concepts have meant in twentieth-century China has an unfortunate parallel in her own attempt to assess and reconstruct a concept of an "unofficial and unique [Chinese] federalist model." Recognizing the unacceptability of a formally federalist arrangement to a regime in Beijing that is unwilling to yield power on a non-revocable basis (although missing some of the subtleties and depth of Beijing's opposition), she posits an "informal or nascent federal arrangement" that would "memorialize" existing concessions to local power, as well as draw a limit to the erosion of central power. But little is offered to suggest what such "memorializing" would be if it were truly informal, or how it would differ from what is known to be politically beyond the pale if such "memorializing" were even modestly formal. Understandably trying to find soil in which such a potentially radical proposal might take root, she tosses together a motley assortment of features from the Chinese legal and political landscape -- including fiscal decentralization, political decentralization, interregional economic inequality, *guanxi*, ethnic tensions and irridentism -- that are not likely to yield a coalition for a coherent and viable federal model, informal or otherwise. At points, the reading of the recent Chinese discussion seems skewed. Although Lee's brief assessment of non-Chinese federal systems and her avowed aim in articulating a Chinese federalist model both reflect an appreciation of federalism's Janus-faced qualities (which are evident, for example, in the nearly opposite "states' rights" and "central national government" meanings of "federal" or "federalist" in the American lexicon), Lee associates the neoauthoritarianism (*xinquanweizhuyi*) that was briefly in vogue among then-Premier Zhao Ziyang's circle with only the decentralizing face of federalism, thereby slighting part of the complex and ambivalent vision embraced by the theory's adherents who also insisted on the need for a strong, technocratic central leadership for some purposes.

Woo's interesting pairing of analyses of judicial discretion and institutions of supervision encounters, and perhaps encourages, some pitfalls. While the three types of judicial discretion she identifies are all corrosive of the rule of law (defined as the principle and practice of applying general rules neutrally to reach determinate -- and, therefore,

predictable -- outcomes in individual cases), they look very dissimilar when they are considered from the perspective that animates supervision (primarily, one of hierarchical, external, political control over the courts). On that score, "self-interested" discretion (corruption) is a serious vice, but "ideological" discretion (toeing the Party's line) can be a virtue. On the other hand, the discretion Woo discerns in the formal process of judicial supervision and other institutions and procedures of supervision over the courts is not as similar to the judicial discretion she discusses as a seemingly apt use of the same term to describe both phenomena suggests. In the context of supervision, "discretion" interacts in a complex way with judicial discretion. In supervision, of course, discretion means a lack of binding rules governing when actors (often political ones) will intervene to prohibit or to require a court to follow or to depart from what a legal rule seems to dictate. Woo also is unduly expansive in describing what she sees as a possible incipient forms of "constitutional review" to limit discretion. As legal concepts and in the contemporary Chinese political context, there is a yawning gap between, on one hand, true constitutional review that permits the striking down of statutes or other government actions for failing to conform to the constitution, and, on the other hand, the developments Woo points to, including the Supreme People's Court arrogating to itself a role in *interpreting statutes* in a system that still vests the power of constitutional interpretation in the legislative branch, and the *shensu* petition procedures which (although *recognized* in the constitution) allows individuals to ask the authorities to conduct a discretionary review of allegedly errant (but not necessarily unconstitutional or even unlawful) state actions.

An elaborate set of theoretical concepts drawn from linguistics (and, to a degree, logic) adds little to Ross's and Ross's analysis of the vague, indeterminate and open-ended language of Chinese statutes. On the other hand, their assessment of the causes of the traits they identify in Chinese legislation is cursory and scattered, suggesting inconclusively that it may be a matter of language and culture (and therefore presumably quite intractable) or of drafting habit (and therefore relatively easily altered) or of inexperienced draftsmen and weak corrective institutions (and thus, it would seem, posing an intermediate level of difficulty for would-be reformers). They pay scant attention to a plausible additional possibility identified by many commentators on Chinese legislation: The features of Chinese statutes they identify may reflect a more-or-less conscious strategy for preserving state discretion and room for *ex post* adjustment. Ross and Ross also risk overstating the degree of imprecision in Chinese statutory language by their repeated use of literal, character-by-character translations, which tend to make Chinese legislation read like bad versions of classical Chinese verse or wretched imitations of American Beat poetry. Potter's carefully crafted parallel structure for examining Taiwanese and PRC official and

popular views of civil obligations produces a few interesting -- and contestable -- choices in his analyses. For example, the suggestion that Taiwanese popular views include a tendency to use contracts but to subordinate them to the broader relationship between the parties has no parallel in his discussion of PRC views and habits despite considerable research and evidence suggesting a similar pattern in much urban contracting on the mainland. Also, the sharp distinction drawn between "popular" and "official" views of contract in the PRC becomes a bit difficult to apply if one looks closely at a key group in reform-era Chinese contracting: local cadres, particularly in the rural areas, who interestingly -- sometimes maddeningly -- straddle the official/popular boundary in their economic functions and their apparent attitudes toward making and enforcing contracts.

The chapters that address relatively specific and concrete issues in contemporary Chinese law suffer also from the long delay in publishing the volume. Potter and Ross and Ross discuss a PRC economic contract law that has been superseded by a new uniform contract law that regulates a much-evolved set of economic practices and that is in many respects more similar to Western models than its predecessors. Feinerman's chapter makes only passing reference to developments in foreign investment law in the years since Deng Xiaoping's reform-restarting *nanxun*, a nearly decade-long period marked by striking changes in the laws, policies and patterns of foreign investment and growing ferment over the legal implications and requirements of China's entry into the WTO. Connor's brief comments on PRC criminal process, while understandably paying little heed to formal legislation, do not address (except in a non-substantive footnote) the reforms pledged under the substantially more liberal (if hardly fully honored) Criminal Procedure Code that has replaced the statute in effect from early in the reform era through much of the 1990's.

The contributors' analyses generally hold up impressively well despite the several year lag between initial preparation and publication. It is regrettable that the authors did not have the opportunity to extend their arguments to more recent developments (which, given the nature of those developments, likely would have added richness and subtlety as well as freshness to the chapters). It is also unfortunate that the innovative and path-breaking quality that many of these pieces had in the early 1990's has been diminished by delay, as many of the ideas in the book have become part of a scholarly consensus -- in significant part because of what many of these authors have published elsewhere in the interim.

Beyond specific issues with some of the individual chapters, the generally quite strong pieces that comprise the volume are often least effective when they address the book's implicit central question of whether the rule of law is achievable in contemporary China. Some of the Qing-focused pieces' attempts to find implications for present-day China seem forced or incomplete. Connor's estimable chapter is less effective in its

opening closing sections' consideration of the PRC era. Although she rightly stresses the importance of PRC practice over its laws on the books, the comparison is primarily between PRC reality and Qing ideals -- despite her careful acknowledgment that Qing practices surely often fell short of what Qing law and magistrate's handbooks prescribed.

Connor's limited foray into comparative analysis does have the virtue of suggesting an intriguing question: Does the Qing/PRC contrast suggest that, if the will or the means to eliminate torture is not present, then laws and norms that admit, accept and regulate its use may produce less torture, less substantive injustice and less harm to the rule of law than does the alternative of formal proscription and pervasive violation? Guy's analysis of Qing impeachment law could prompt a similar query: Does the Qing experience suggest that, if a commitment to separating "political" and "legal" actions against senior officials is absent, then laws and procedures that admit, accept and regulate the at-least-partly-political sanctions that accept and regularize such measures may yield a system that is less prone to arbitrariness, lawlessness and manipulation? While Guy clearly foregoes this and any other contemporary comparative inquiry, his opening and closing sections so explicitly take up the issue of differences between Chinese and Western conceptions of law, and the book's implicit central theme hangs so heavily over all of the contributions, that Guy's otherwise unproblematic emphasis on the most politicized mode of impeachment regrettably looks like a stacking of the deck against a sanguine view of the possibilities for the rule of law in China.

The contributions that focus largely on contemporary China also work least well in sections that grapple with sweeping and abstract concepts and frameworks for analysis that seem designed to answer (or at least address directly) the book's big question, often with little connection to the stronger cores of the chapters. Here, examples include: Turner's and Shen's undertaking inescapably awkward and simplistic short exegeses on Western theories of the rule of law and Western critiques of rule-of-law ideals as preliminary steps in their assessments of the prospects for the rule of law in China; Ocko's occasional articulation of an intermittently-used structure that promises to organize what proves to be a very complicated discussion around the simplifying themes of the relations of the ruler to law and the ruler to officials; Woo's quick excursion through the *fazhi/renzhi* discussion and Western political science analyses of the trade-off between law and discretion and between certainty and individuated justice; Potter's opening discussion of a society's ideals of equality and justice being the foundation of its legal culture and the yardsticks by which its laws are measured; and Feinerman's wide-ranging comments on the possibilities for law in a system where centralization/decentralization's effects on legality are ambiguous, institutions and personnel supporting the rule of law are weak, historical antipathy to law

persists, impatience with the pace of economic development has risen, and the “validity” of any purely instrumental approach to law has been cast into doubt.

The focus on *the* rule of law in such passages, in the book’s title, and in the titles of many of the chapters risks obscuring one of the signal contributions of *The Limits of the Rule of Law in China*. What the authors have done is to provide a rich mosaic depicting some of the multiple, complex and ambivalent *roles* of law in China. While their discussions about the rule of law and its limits has the problems, as well as the strengths, noted above, the contributors collectively have constructed (although often not explicitly) a compelling case for pursuing the *roles-of-law* question for its own sake and as a means to understanding a Chinese legal system that is “neither as self-sustaining as its proponents would like us to believe nor as hollow as its detractors insist,” yet that “quite clearly must be reckoned with” in assessing China (in Alford’s terms), or laws and “legal discourse” that have been “very much a part of [Chinese] social and political life” but that have been “based on assumptions different from our own.” It is in looking at such areas that the essays in the volume are most original and convincing. Here surely lie the most fruitful directions for further scholarship on Chinese law. And, for those with a taste for broader comparative law theory or for what Chang calls “mov[ing] from analysis of Chinese law and legal institutions to deliberation about th[e] fundamental issues,” surely the more promising line of inquiry flows not from some of the less felicitous passages in this book that undertake a comparison of Chinese thought and practice with a Western rule-of-law ideal, or that attack the Western ideal for its internal weaknesses or its unattainability or its irrelevance to Chinese reality or its unfairness or inappropriateness as a yardstick for China. Surely the greater potential gains will flow, rather, from something like the suggestion (touched upon by Alford’s essay and immanent in many others) that both “Chinese” and “Western” legal ideals and practices need to be handled as internally pluralistic (indeed, sometimes not terribly coherent) orders that find different sets of answers (but not immutable or inalterably bundled ones) to common questions about law’s character and law’s role in the regulation of human affairs.

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The next 15 reviews below (all the remaining reviews except the last, long one) are by the editor of *SPP*.

Endymion Wilkinson. *Chinese History: A Manual*. Harvard-Yenching Institute Monograph Series, 46. Cambridge (Massachusetts) and London: Harvard University Asia Center; distributed by Harvard University Press, 1998. xxiv, 1068 pages. Revised and enlarged edition, Harvard-Yenching Institute Monograph Series, 52. Same publisher and distributor, 2000. xxiv, 1181 pages.

When the first edition of this marvelous reference work came out in 1998, I danced with glee and trumpeted it loudly to everyone I knew in Chinese Studies. The first print run of 3,000 (?) copies sold out very quickly. At the unbelievably low cost of twenty dollars, it is no wonder that all the copies of the book were snapped up so quickly. Before the field was able to absorb fully the remarkable riches of the first edition, the thoroughly revised and enlarged second edition appeared early in the year 2000.

It is truly astonishing that Endymion Wilkinson was able single-handedly to produce these two volumes, and the second one within such a short period of time. This is especially the case when one considers that, for the past six years, he has been serving as the full-time ambassador of the European Union to the People's Republic of China -- a big job with a sizable staff and a large budget. Wilkinson not only collected all of the materials printed in the *Manual* and wrote all of the chapters himself, he personally input and typeset both editions. It is a testimony to his technical skills, resourcefulness, and perseverance that he was able to produce such a **handsome** (and I use the word advisedly) book. The *Manual* is extremely well designed and clearly organized, with exceptionally crisp, sharp type (both Roman letters and Chinese characters), and it is also very easy to read. It is difficult to comprehend how Wilkinson could have achieved such splendid results working only on his own personal computer and using an ordinary word-processing program.

Nearly 30 years ago, we had all benefitted from Wilkinson's *The History of Imperial China: A Research Guide* (Cambridge: Harvard University Press, 1973). From time to time, we would ask each other, "Is he ever going to bring out an updated version?" Most people who replied to such questions hazarded the guess that Wilkinson would not revise his *Research Guide* because, so they said, "He's no longer in academia." Or, "He's a diplomat / a best-selling author of books about Japan / a popular lecturer on Pacific affairs." And so forth. So most of us gave up hope of another edition of the *Research Guide*.

The 1998 publication of the *Manual* took us all by surprise. Both the scope and the detail of the *Manual* were far beyond what anyone could have expected or even dreamed of in a handbook for the study of all aspects of Chinese history.

Before describing the contents of the *Manual*, I hasten to point out that -- although it presents full and accurate references for thousands of scholarly books and articles -- this volume is not simply an excellent bibliography for Chinese studies. It also functions as a dictionary of key terms, an encyclopedia of important topics, and the most convenient place to look for basic data concerning various facets of Chinese civilization. Above all, however, the *Manual* is a critical tool for instructing its users how to do the highest possible quality research on Chinese history. One of the principal aims of the *Manual* is "to suggest ways to avoid anachronistic interpretations of the past" (e.g., to discuss matters pertaining to "national minorities" in China during the Shang Dynasty even though neither China nor the concept of national minorities [or anything remotely resembling it] existed at that time).

Weighing in at 1,068 + xxiv pages, the first edition of the *Manual* was already a hefty volume (mercifully printed on thin, yet durable and opaque, paper). As seen above in the heading to this review, the revised edition is about 10% longer, but Wilkinson has actually managed to squeeze in nearly an additional 20% of new material, without any loss of legibility, by extending the length of each page by three lines and adding approximately five more letters per line.

Now, what can one find within the covers of this remarkable book? Of the six major divisions of the book, the Introduction discusses recent historiographical trends, the concept of center and periphery that is crucial in dealing with China from the very beginning, periodization, and the dynasties (together with their names and dates). The first major section, appropriately called "Basics," fittingly begins with an informed consideration of language and script, then moves on to dictionaries, people, geography, chronology, telling time, statistics, guides and encyclopedias, suggestions for how to locate primary and secondary sources, and libraries. The second major section describes Pre-Qin sources, ranging from an expert treatment of archeology through an account of preliterate signs and symbols, shell and bone inscriptions, the evolution of the sinographs, epigraphy, writing materials, printing, and excavated texts (this last a wholly new and extremely valuable chapter). The third major section expertly surveys historical genres, beginning with a treatise on primary and secondary sources, then proceeding to annals, standard histories, topically arranged histories, miscellaneous histories, government institutions, official communications, law, and war. The fourth major section deals with primary and secondary sources for the investigation of myth and religion, classical literature, traditional encyclopedias, anecdotal and informal sketches, intellectual writing, popular literature, agriculture, food, the environment, medicine, science and technology, calligraphy, painting, music, women's studies, non-Sinitic people inside and outside of

China, and foreign descriptions of China. The last major section treats primary sources by period, from the Qin to the Republic (a third edition of the *Manual*, already under preparation, will cover the PRC as well).

Comprehensive as the above listing of topics in the *Manual* would appear to be, this by no means exhausts its invaluable resources. For example, the *Manual* offers students one of the most convenient treatments of old Chinese weights and measures available anywhere. The same holds for Wilkinson's masterful accounts of names and titles, money and prices, furniture, and many other categories. Furthermore, there are boxes on the most delicious assortment of subjects imaginable (early bilingual dictionaries, the concept of Zhongguo ["middle kingdom"], festivals, the Western Regions, and so forth) and 36 tables displaying data on such topics as the number of characters, the components of characters, definitions of Tao ("way, path, track"), the heavenly stems and earthly branches, Neolithic and Early Bronze Age cultures, non-Sinitic peoples and countries mentioned in the histories, and so on. Also included are a 12 page list of publishers in China, Japan, Europe, and the Americas, an index of some 2,000 Chinese terms explained in the *Manual*, an index of names, an index of books and periodical titles, and a lengthy subject index.

How did Endymion Wilkinson accomplish all of this? By dint of hard work and total devotion. Where did he find the resources of energy to sustain himself during the gargantuan task of locating, assessing, and assimilating the contents of 4,300 primary and secondary sources in Chinese, Japanese, and European languages? In his love and passion for the subject. What kindled that love and passion within him? His teachers of two and three decades ago, whom he names at the end of his acknowledgements. I suspect that there is also some deeper fire within Wilkinson, without which he would not be able to keep up with such an avalanche of new materials in so many disparate disciplines of Sinology.

Endymion Wilkinson is a very well known figure in the bookstores of Peking and Hong Kong (not to mention numerous other cities around the globe). It is quite a sight to see the ambassador's limousine, flag fluttering, pull up to a bookshop, and then to watch as this tall, dignified man emerges. Once he enters the door of the shop, he is transformed from ambassador to bibliographic bloodhound, unerringly sniffing out all of the latest and greatest new offerings. Most impressive of all Wilkinson's scholarly sleuthing is the tenacious talent he possesses for bringing to light the most important forthcoming publications. Often Wilkinson knows about major new works months in advance of their actual availability in stores. Indeed, so up-to-date (and even ahead-of-date) is Wilkinson that, if one has any complaints about his *Manual*, it is that he sometimes seems to operate on the assumption that more recent works tend to be superior to earlier works. For

example, Wilkinson states that *Ciyuan* has been superseded by *Hanyu da cidian*. However, despite the enormously increased coverage of the *Hanyu da cidian*, there are still instances where the *Ciyuan* is handy for quick glosses. Given Wilkinson's manifest desire to be as current and helpful as possible, this is a pardonable peccadillo.

The Harvard-Yenching Institute (which underwrote and published the *Manual*), and the editor of the monograph series in which the *Manual* appeared (John R. Ziemer) have every right to be proud of this landmark in Western Sinology. It should be ~~suggested~~^{required} reading for all students and teachers of Chinese history and culture. The *Manual* is a milestone of historiographical scholarship.

Lydia H. Liu, ed. *Tokens of Exchange: The Problem of Translation in Global Circulations*. Durham and London: Duke University Press, 1999. 456 pages.

The editor is to be congratulated in bringing together some of the brightest young minds in Chinese Studies and galvanizing them to write collectively a highly stimulating book. She announces at the outset that their mission was not to write about translation "as if it were a purely linguistic or literary matter." Rather, this is an investigation of how signs, meanings, and values travel from place to place across the face of the globe. In this process, "self" and "other" are said to merge, giving rise to hybrid forms of "interculturality."

Aside from her "Introduction," the editor is responsible for two chapters, one on "The Question of Meaning-Value in the Political Economy of the Sign" and another on "Legislating the Universal: The Circulation of International Law in the Nineteenth Century." In both of these essays, Lydia Liu grapples with the uncertainty of commensurability among languages. She shows how the inescapable incommensurability of linguistic entities gives rise to mistranslation, conflict, and domination. Since the historical record seems to indicate that these unequal relationships -- communicated through inadequate translation and enforced through various types of power (including military, but also legal and cultural) -- are apparently inevitable, one wonders how the often sorry outcome could have been any better and despairs that results will be any better in the future.

To the notion of incommensurability, Roger Hart adds that of relativism (and its opposite, Quine's indeterminacy of correlation) in his "Translating the Untranslatable: From Copula to Incommensurable Worlds." Despite close readings of early Jesuit translation into Chinese as case studies of presumed incommensurability between languages, the feeling inspired by Hart's formidable article is similar to that evoked by my colleague Nathan Sivin's oft-cited (including here) article entitled "Why the Scientific

Revolution Did Not Take Place in China -- Or Didn't It?" rivaled only by another famous article by Sivin: "On the Word 'Taoist' as a Source of Perplexity." Well, did / does Sinitic have a copula, or didn't / doesn't it? And did / does it make a difference for Chinese science and technology whether Sinitic possessed / possesses a copula, or didn't / doesn't it? I'm perplexed.

In "Demystifying *Qi*: The Politics of Cultural Translation and Interpretation in the Early Jesuit Mission to China," Qiong Zhang attempts to demonstrate that Matteo Ricci and his confreres navigated the slippery spaces in the nexus between Christendom and Neo-Confucianism by consciously "(mis)representing" basic terms for the purposes of transforming them and thereby subtly converting the people who subscribed to the belief system such terms originally represented. One wonders, though, whether this "(mis)representation" was carried out with devious intent, or whether it was the product of a. the Jesuits' inadequate understanding, or b. their overwhelming and genuine (even if arguably misguided) desire to save souls from perdition.

Haun Saussy's "Always Multiple Translation, Or, How the Chinese Language Lost Its Grammar" reveals that even ruthlessly intentional literalness fails to present another language in its true colors, yet neither does sympathetic, exegetical rendering: the interlinguistic pivot is never unwobbling. As for how the Chinese got their grammar back, the curious may wish to consult Victor H. Mair, "Ma Jianzhong and the Invention of Chinese Grammar," in Chaofen Sun, ed., *Studies on the History of Chinese Syntax*, Monograph Series No. 10, *Journal of Chinese Linguistics* (1997), 5-26.

"Japan's Engagement with International Terms" by Alexis Dudden is a fascinating demonstration of how Japan's skillful utilization of international terminology was a powerful device for gaining power vis-à-vis its Asian neighbors. Once the Japanese realized the vital role of language *per se* in international politics, they adopted a *modus operandi* in which privileged English -- and they have never looked back. It is one of the most profound ironies of recent history that basic Western ideas and concepts have primarily been funneled into Chinese through a Japanese medium.

The inclusion in this volume of James Hevia's "Looting Beijing: 1860, 1900" is somewhat problematic on at least three grounds: 1. it is not concerned with translation, unless the fact that the word loot was borrowed into English from Hindi is permitted to count as a significant issue in translation studies; 2. the author studiously avoids any serious discussion of the causes of the looting, making it seem as though it were a predetermined military policy; 3. it was published before (so was Hart's paper).

"The Gramophone in China" by Andrew F. Jones is a relatively straightforward, mostly factual account of the history of the phonograph in China from its introduction

around the turn of the twentieth century up to about 1937. While it does not offer many surprises, this is an entertaining chapter whose ideological position oscillates ambiguously. Perhaps most unexpected is a three paragraph critique of Arjun Appadurai's musings on global culture and its "nostalgia for the present [*sic*]" (whatever Fredric Jameson meant when he coined that typically mystifying post-modern phrase).

Larissa N. Heinrich, in "Handmaids to the Gospel: Lam Qua's Medical Portraiture," presents a series of portraits of Chinese individuals with grotesque tumors and other physical disfigurements. These portraits, which were painted by the artist Lam Qua (fl. 1830-1850), once belonged to Peter Parker and are now preserved in the Yale University Medical History Library. They constitute a curious blend of almost romantic portraiture and hideous disease. Since these paintings are respectful representations of Chinese by a Chinese artist, and since they were obviously painted for medical purposes, the author's repeated contention that the illnesses portrayed in the paintings were meant to stigmatize China as a sick, deformed nation seem overdrawn.

Traditional China certainly had sex, gender, and an abundance of homosexuality, but Tze-lan Deborah Sang's chapter entitled "Translating Homosexuality: The Discourse of *Tongxing'ai* in Republican China (1912-1949)" documents clearly that the categories and terms for discussing these issues during the first half of the twentieth century were nearly exclusively borrowed from the West. As usual, however, many of the key words -- such as *tongxing'ai* ("same-sex love") and *xing* ("gender --> sex") itself -- were filtered through Meiji and later Japanese sources. Her assertion that Republican sexology was not merely playing catch-up with Western discussions of the subject is feeble.

The situation with regard to the development of psychiatry in China is similar to that for sexology. As Nancy N. Chen states in her "Translating Psychiatry and Mental Health in Twentieth-Century China" can be viewed as a series of translational practices that have occurred over the past century." The author devotes most of her analysis to the linkage between *shenjing shuairuo* (misspelled on first occurrence as *shenjing shruairuo*) and *qigong*. The former term is often rendered in medical literature as "neurasthenia," but there appears to be a sense of uneasiness both about the category and about the standard translation. Since the symptoms closely match what is popularly called "nervous exhaustion / collapse / breakdown" in America, it should be accepted as a genuine mental health problem. An enormous number of people in China complain of this complex of symptoms (weak nerves, fatigue, sleeplessness, headache, dizziness, etc.) and many of them in recent years have increasingly sought the help of *qigong* ("exercise of vital energy") practitioners. The results are often alarming, since the psychotic reactions from *qigong piancha* (*qigong* deviation) frequently are much worse for the patient than his / her

original *shenjing shuairuo*. The author twice uses the indigenous expression *zouhuo rumo* (once misspelled as *zhouhuo rumo* and once as *zhouhuo rumuo*) to describe the obsessive, destructive behavioral pathology of *qigong* deviation. In the first instance, she particularly explains it as "a form of *qigong* possession" and in the second she literally translates it as "to deviate and having demons enter." Her "literal" translation, however, is far from literal, since the four characters composing the phrase actually mean "walk [into the] fire [and] enter demon[ic] arts." Regardless of such small blemishes, this study opens a telling window on Chinese psychopolitics. In light of what has been happening to Falungong (a wildly successful form of *qigong* that has cured thousands of people [especially middle-aged women] of *shenjing shuairuo* and other psychological and physical ailments) in the last couple of years, the stakes in this mental health game are very high.

One of the most poignant articles in the volume is Q. S. Tong's "The Bathos of Universalism: I. A. Richards and His Basic English." Richards was an influential literary theoretician, but it is hard to pinpoint just what he stood for. One of his most important books was *The Meaning of Meaning* (1923). Reading through the book intently, one begins to suspect that Richards wrote it partly in subtle jest. Seven years later he wrote a brief guide to *The Meaning of Meaning* entitled "The Making of 'The Meaning of meaning.'" One suspects that Richards was pulling our leg, both with the book and with the guide. Then he went on to write *Mencius on the Mind* (1932; here was a man who was fond of the letter "m" for the titles of his publications!), a splendidly ambiguous work, fitting for a scholar who demonstrated his mastery of the technique in "Seven Types of Ambiguity." Was the writing of *Mencius on the Mind* by Richards, who knew scarcely a word of any Sinitic language, a joke or an affront? Has any student of Chinese thought ever taken *Mencius on the Mind* seriously? Has anyone ever comprehended *Mencius on the Mind*? Seldom in the annals of scholarship has there been such a pretentious and pompous book, such an airy balloon of vaunted vapidness -- yet no one dares to prick it for fear of being declared an insensitive fool. Richards was still lionized and giving public lectures at the age of 75. I once had the occasion to attend such a performance by Richards, and it was a bizarre experience. Not only was it impossible to make any sense whatsoever of what the speaker was saying, a middle-aged white woman had posted herself in the hallway outside the lecture room. She was writhing and wailing pitifully -- and nobody could make sense of what she was saying either (it was a surreal experience). Finally, I heard a cogent question amidst the woman's babbling: "And what are you going to do about **OUR** people, Professor Richards?" Eerie! Richards -- rightly so -- completely ignored the **mad** woman. Returning to his earlier career, however, Richards had the impish chutzpah to name his brand of literary explication "practical criticism," but it was

anything other than that. So here was a person who promoted the most preposterous, abstruse, intellectual shenanigans and who then turns around and "invents" Basic English. The author of this chapter gives Richards the benefit of the doubt -- this was to be a ruthlessly streamlined English that any simpleton could learn (the antithesis of the supposed reader of his impenetrable *Mencius on the Mind*). Tong uses the words "pathos" and "bathos" to describe this apparently idealistic enterprise. But I wonder if there was something deeper and more sinister going on here. I am haunted by thoughts of what really motivated the starkly contradictory personality of Richards.

Moving on to a less darksome subject, Jianhua Chen talks about "Chinese 'Revolution' in the Syntax of World Revolution." The reasons for Chen's use of "syntax" rather than the more obvious "context" are evident from the very beginnings of the chapter where we once again encounter a round-trip borrowing: Sinitic *ge ming* ("remove [the heavenly] mandate") passes to Japanese *kakumei* where it is fitted to the Western concept of "revolution," then sent back to China as *geming* with this new, alien meaning. (For anyone who wants to understand the linguistics of such exchanges, at all costs avoid the long footnote 18 of this chapter, which will only confuse you with irrelevancies and inaccuracies.) Chen ends this insightful and informative investigation with Li Zehou's expression: "Yes to reform; no to revolution." Alas for poor Professor Li (who lives abroad in luxury), it is not a question of semiotics. Sometimes revolutions are both necessary and inevitable, no matter what we call them.

The final chapter of the book is Wan Shun Eva Lam's "The Question of Culture in Global English-Language Teaching: A Postcolonial Perspective." This is a sane and civil approach to a sensitive issue. English is the international language. The challenge for those who teach it in China, as elsewhere, is how to make it best serve the interests and purposes of its diverse students. Eva Lam offers intelligent guideposts for how that can be done.

The book closes with a glossary of Chinese characters, a substantial bibliography, an index, and a list of contributors.

Tokens of Exchange appears not to have been the result of a conference that brought all of the authors together for mutual discussions of their various chapters. On the other hand, there is evidence (e.g., cross-references and citations) that the papers were circulated among the authors before final drafts were written. Consequently, the volume is a generally coherent attempt to treat global tradition from a variety of different angles -- but all converging on China.

XIANG Chu. *Han Shan shi zhu; fu Shide shi zhu [The Annotated Poems of Cold Mountain; with an Appendix of the Annotated Poems of Pickup]*. Peking: Zhonghua Shuju, 2000. 19 + 1036 + 90 pages.

The present volume is a pair with and built on the same model as the author's *Wang Fanzhi shi jiaozhu [The Annotated and Collated Poems of Brahmacharin Wang]* (Shanghai: Shanghai Guji Chubanshe, 1991), 2 + 51 + 26 + 1,112 pages. Both volumes exhaustively collate and annotate the complete corpora of these two "vernacular" poets of the T'ang period. Roughly 400 poems are treated in each of the two volumes. Both are hefty volumes typeset in the old-fashioned way (top to bottom, right to left, with pages running from what would be the back to the front of a modern book.

There are differences, however, and these are due mainly to two factors: 1. the nature of the poems in the two different collections, and 2. the dissimilar situations concerning the presentation and transmission of the two collections.

Han Shan, although nearly as highly colloquial as Wang Fanzhi, is far more allusive, thus requiring greater identification of source texts and parallel texts. Furthermore, unlike the Wang Fanzhi collection, the Han Shan collection was never lost, hence the author is required to spend far more time in discussing various extant Chinese and Japanese editions. The fact that the Han Shan poems were never lost also means that there is much more traditional commentary that has to be taken into account. The Wang Fanzhi poems, conversely, disappeared for approximately a millennium, and have been recovered only through the miracle of the Dunhuang manuscripts. This, in turn, means that the author had to devote more attention to the problem of manuscript readings (orthography, variant forms, lacunae, and so forth). Whereas the Han Shan volume has a long list of scholarly works consulted, the Wang Fanzhi volume has a bibliography of modern studies specifically on the Dunhuang manuscripts. Whereas the Han Shan volume provides an index (arranged by total stroke count of head characters with an additional 4-corner index of head characters) of all the lines in the corpus, the Wang Fanzhi volume offers a finding list for explanations of vernacular terms and allusions (also arranged by total stroke count of head characters, but without a 4-corner index to the head characters). The Wang Fanzhi index of terms and expressions is far more useful than the Han Shan index of lines for those who wish to do research on vernacular usages of the Tang period.

Xiang Chu is the outstanding authority in China on these two collections of poems, both of which, incidentally, I view as deriving from multiple authors rather than from a single hand (this is especially true of Han Shan). What is rather surprising is that his method of writing about these two bodies of semi-vernacular poetry is so traditional. Why this is surprising is that, as Xiang Chu himself acknowledges in the Foreword to his Han

Shan volume, I twice invited him to come to the University of Pennsylvania for extended stays. Both times he asked me for references to Western scholarship on Han Shan and Wang Fanzhi and I responded by giving him relevant citations and materials. Yet there is scarcely a mention of work done in the West or in Japan in either of the two books. This is profoundly disappointing in many respects, but mostly because it indicates that the author is oblivious to the community of Sinological scholarship that extends beyond the borders of China and to the valuable contributions that it has to offer.

One of the items I gave to Xiang Chu was my own review article entitled "Script and Word in Medieval Vernacular Sinitic," *Journal of the American Oriental Society*, 112.2 (1992), 269-278. He was sufficiently curious about its contents that he had one of his graduate students, ZHANG Zikai, translate the article as "Qufen Zhonggu Hanyu suyuyan zhong zi he ci de jixian de zhongyaoxing -- cong dui Hanshan shi de yizhu kan shijie Hanxuejie de biduan [The Importance of Distinguishing between Script and Word in Middle Vernacular Sinitic; Looking at Some Problems in World Sinology through the Translation and Annotation of the Poetry of Cold Mountain]," *Xin Hanxue [New Sinology]*, 1 (2000), 395-422. And yet Xiang Chu completely ignores even the Chinese translation of the English article. This is unfortunate, because the article in question treats a number of points about the language of Han Shan that Xiang Chu skirts. Similar remarks could be made, for example, about the superb work of Paul Demiéville on Wang Fanzhi.

Xiang Chu and other Chinese scholars like him are operating in a vacuum. They do not realize that Chinese Studies is no longer restricted to China and that, in fact, important advances in methodology and approach, not to mention exacting textual studies, have been made outside of China. That is why many of China's best young scholars choose to go abroad to pursue their careers. It would appear that the scholarly atmosphere of China inculcates a complacent spirit of being content to do things the way they have been done for centuries.

Given the constraints of such a static, replicative scholarly outlook, Xiang Chu is a master within it. His ability to draw on a vast array of traditional sources is tremendously impressive, and he has an uncanny ability to recall obscure texts that illustrate difficult passages. Xiang Chu's two volumes should be the first place for anyone doing research on Han Shan and Wang Fanzhi to turn, but they should not be the last.

SUN Hongkai and JIANG Huo. "Han-Zang yuyan xishu fenlei zhi zheng ji qi yuanliu [The Controversy over the Linguistic Affiliation and Classification of Sino-Tibetan and Its Origins and Development]." *Dangdai yuyanxue (Contemporary Linguistics)*, 2 (1999), 17-32.

Seldom in these pages do we review articles, but the one I am about to introduce here is of such tremendous significance and, without intervention, is so likely to be overlooked that I have decided to make an attempt to see that it receives due recognition and does not fall into instant oblivion. Never mind that the title declares openly that it is concerned with a controversial subject of enormous dimensions. And never mind that there is much in the article that remains arguable and in further need of clarification. What makes this article of such vast significance is that, without any fanfare, and perhaps without themselves being aware of what they have achieved, the authors quietly acknowledge that **Sinitic (i.e., "Chinese") not only includes more than one language but also includes more than one branch.**

Let that sink in for a moment.

For the last quarter century, I have been pleading with my colleagues in the West and in China to face reality and recognize that Sinitic is a language family or language group that includes at least eight different branches and dozens of languages, not to mention hundreds of dialects and thousands of sub-dialects. After many unfortunate and unhappy arguments, they always refused to budge, insisting that Hanyu (Sinitic or Hanic) is a single language with but minor differences in pronunciation and no differences in lexicon and grammar worth taking note of. They always resorted to the old canard that, when written down, all forms of Sinitic are the same. Of course, that is utter nonsense, but scholars have stuck to it because -- many have frankly admitted to me -- if, say, Cantonese and Pekingese were recognized as two mutually unintelligible languages (which they indeed are), then China would break up. Aside from the very poor logic of such a position, it should have no bearing on the linguistic classification of Sinitic, which is to be carried out independently of politics.

After all, haven't Chinese linguists themselves tacitly acknowledged that Sinitic is not just a single language when they repeatedly state that *Hanyu xiangdang yu yi ge yuzu* ("Sinitic / Hanic is equivalent to a language group"), a statement that is found in the most authoritative Chinese reference works, such as the volume of the *Zhongguo da baike quanshu [Encyclopedia of China]* on language and script.

Now, Sun and Jiang have a chart on p. 22 of their article which, while confusing in certain respects that I shall point out momentarily, unmistakably shows the filiation of Sinitic to unfold as follows: Proto-Sino-Tibetan divides into a Sinitic group (Hanyu zu)

and what they call Tibeto-Karenic (Zang-Kalun), the latter of which we will not pursue further. The Sinitic then divides into a Proto-Bai (Yuanshi Baihua [*sic* --> Baiyu]) and a Proto-Sinitic (Yuanshi Hanyu), the former of which we will not pursue further. Then, lo and behold, Proto-Sinitic divides into a Proto-Min (Yuanshi Minyu) and an Old Sinitic (Shanggu Hanyu). What?

Let **that** sink in for awhile.

Under Proto-Min, we find only "Modern Min Dialects" (Xiandai Minyu Fangyan), which is hardly adequate for the historical development of Northern and Southern Min, but better than whatever we had before. Under Old Sinitic which, be it noted, is parallel to Proto-Min, we find the following line of development, with no further elaboration: Middle Sinitic (Zhonggu Hanyu) --> Most of the Modern Sinitic Topolects (Da Bufen Xiandai Hanyu). This is, to say the least, a very strange way of dealing with the better part of an entire language group with a billion speakers!! (And one wishes to know why Min is accorded the special privilege of being granted a proto-language parent while, for example, Cantonese and Wu are not.) But the Maginot Line of Chinese politco-cultural resistance to objective linguistics has at last been breached. The world will never be the same again. Let us hope that the consciousness of Sun and Jiang expands outward to others and inward to greater precision in their own conceptualization.

N.B.: Of the 79 items in the bibliography of this article, 52 are in English, French, or German, while 27 are in Chinese (among these 27 several were written by individuals highly proficient in English).

Jenny F. So, ed. *Music in the Age of Confucius*. Washington, D.C.: Freer Gallery of Art and Arthur M. Sackler Gallery, Smithsonian Institution; distributed by University of Washington Press, Seattle and London, 2000. 152 pages.

The ultimate origin of this book lies in the 1977 discovery of the undisturbed tomb of the Marquis Yi of Zeng (Zeng Hou Yi) in Leigudun, Suizhou, Hubei Province. The tomb, dated to c. 433 BCE, contained the bodies of a nobleman in an elaborately decorated coffin, 21 women who had been strangled to death, and a dog. Also found in the tomb were nearly ten and a half tons of bronze ritual vessels, weapons, and other items. What has brought the lion's share of attention to this tomb, however, were the musical instruments that filled two of the four burial chambers. The central chamber housed a complete set of instruments belonging to a court ensemble, while the chamber to the east -- where the coffin of the marquis had been placed, contained a group of eight instruments for

more private entertainment. It is claimed that these two sets of instruments form the oldest surviving musical ensembles from any culture. Whether this is actually true might require more research. For example, many spectacular instruments -- some of them decorated with panels depicting their use in performance -- were found in the Royal Tombs at the Sumerian city of Ur, one of the most important sites in ancient Mesopotamia and dating to 2500 BCE. Whether they were used in concert does not in any way diminish the spectacular nature of the instruments recovered in such extremely fine condition from the tomb of the Marquis Yi of Zeng.

The volume under review affords to these ancient instruments the full attention they are due -- but it was long in coming. Discussions about the Smithsonian exhibition which constituted the basis for the book were initiated in Wuhan and Peking in 1988. As nearly all such negotiations are in China, they were long, protracted, and extremely involved. The American side displayed the necessary persistence and patience, demonstrating their resolve and good faith by hosting two directly related international symposia, "New Perceptions on Chu Culture during the Eastern Zhou Period" (1991) and "Bells of Bronze Age China" (1997). By 1999, the Chinese authorities were finally ready to "talk turkey" and permitted the organization of a small exhibition of precious artifacts, in celebration of which the articles in this volume were assembled.

The first chapter, "Music in Late Bronze Age China," is by John S. Major and Jenny F. So. They discuss the discovery of the tomb of Marquis Yi of Zeng, court and chamber ensembles, textual sources for the study of music in the fifth through third centuries BCE, and the special affection of imperial literati for the *qin*-zither which they, perhaps anachronistically, projected back to the time of Confucius. In reading this chapter, I was struck by the similarities between the nature and role of courtly music in China and that in the ancient Near East. Fig. 1.7 shows a detail of a design on a bronze *hu* (ritual wine vessel), from Baihuatan, Chengdu, Sichuan dated to the fifth century BCE. It is reminiscent of many similar scenes on artifacts from Mesopotamia, Egypt, and Asia Minor. For example, a Hittite vase from Inandik, mid-late second millennium BCE, in the Archeological Museum of Ankara, has a design which is also divided into registers, shows musicians and dancers, plus people drinking wine from cups that have been filled from large vessels placed on stands before them. The biggest difference is that, on the Hittite vase, exalted personages sit on folding chairs (which only came to China much later), whereas in the Chinese scene, the only dignity visible kneels on the floor. A systematic comparison of courtly music scenes in ancient East Asia and West Asia would certainly be rewarding for anyone who cared to undertake it. For that matter, so would a comparison of hunting scenes and other aspects of aristocratic life in East and West Asia.

Robert Bagley's chapter is on percussion. It falls to him to discuss the magnificent bells and chimes belonging to Marquis Yi. This he does ably, placing them in their Eurasian metallurgical and musicological contexts, accounting for the millennium of development from signaling devices to musical instruments, discussing the regional characteristics of different types of bells, describing their casting, acoustics, and tuning, as well as the wooden mallets used to strike them, scales (basically pentatonic), and the unique inscriptions on the bells which are so invaluable for reconstructing the musical theory and practice of the late fifth century BCE in what is now Hubei (central China). Relying on a close reading of the pitch standards for the state of Zeng and those for the state of Chu marked on the bells themselves, Bagley raises the interesting possibility that Pythagorean-like numerology was operative in the creation of Marquis Yi's bells and that it may well have had important philosophical and political implications.

Bo Lawergren, a professor of physics and one of the world's most distinguished authorities on the early history of stringed instruments, writes about the *se*, *qin*, and *zhu* zithers found among the Marquis Yi's grave goods. He discusses their chronology, distribution, strings, tuning pegs, soundboards/boxes, bridges, and lacquering. The shape of the ancient *qin* (broad box on right and narrow neck on left) suggests to Lawergren that it may have been influenced by West-Asian inspired harps that have been found at Pazyryk (just north of the Altai) from the fourth century BCE and two similar harps from Zaghunluq, Chärchän, Xinjiang dating to about the same time that I called to Lawergren's attention shortly after they were excavated in 1996 (see the report on this subject elsewhere in this review issue of *Sino-Platonic Papers*). As usual with Lawergren's articles, this one is also accompanied by numerous fine pen-and-ink drawings designed to explain the construction and development of instruments. Together with the text, they give us a good idea of how the different zithers were used, as well as where and when they arose.

Feng Guangsheng, a musicologist and Vice Director of the Hubei Provincial Museum where the instruments from the Marquis Yi's tomb are kept, describes the winds among them. These are the *chi* (transverse flute), the *xiao* or *paixiao* (panpipes), and the *sheng* (mouth organ). In his discussion of the origins and extramusical significance of the wind instruments, the author observes that Greek mythology attributes the invention of panpipes to the shepherd god Pan and notes their remarkable worldwide distribution. Later, he closes his section on the panpipes with a most important listing of some cultures among which panpipes have been found. Unfortunately, in the middle, something got lost in translation when he notes (p. 95): "In Romania and Hungary, panpipes (called *nai*) are common, popular folk instruments. It is interesting that panpipes in ancient China were also once called *nai*. This may be the result of migration of the Huns (Xiongnu) from

China's northwestern frontiers to the Hungarian plains during the first centuries A.D." It is not at all clear what the author is intimating may be the result of the westward Xiongnu (Hun) migration during the early centuries C.E. Presumably he means that the Huns took the Sinitic word *nai* with them to eastern Europe. This is a worthy surmise, but further investigation is necessary. Actually, Feng has misromanized the graph in question, which should be read *lai* in Modern Standard Mandarin (MSM). The Old Sinitic pronunciation of this word has been reconstructed as *lat* (Karlgren), *ladh* (Fang-kuei Li), and *rats* (Axel Schuessler). Any attempt to link up the Sinitic word with words from other languages dating to approximately two millennia ago must take into account the ancient pronunciation. Another problem is that the word *xiao*, which is often used to refer to the panpipes, properly designates an end-blown vertical flute. A panpipe is, in essence, a series of *xiao* of different lengths, tied side by side, so it makes sense to call the panpipes a *paixiao* ("lined-up *xiao*"), but the term *paixiao* is relatively late, probably not dating before the Yuan (Mongol) period or early Ming (c. 14th-15th c.). The other fairly early terms that are often said to signify panpipes, e.g., *dixiao* ("bottom [i.e., sealed at the bottom] *xiao*"), *dongxiao* ("hole [i.e., open at the bottom] *xiao*"), and *yunxiao* ("cloud *xiao*") are not early enough for the Marquis Yi instruments and, furthermore, we cannot say for sure that they signified panpipes rather than the end-blown vertical flute when they were first employed. Thus we really do not know what the Marquis Yi panpipes were called in their own times. It is more likely that they were called by the contemporary pronunciation of the graph that is pronounced *lai* in MSM instead of *xiao*. As a matter of fact, in the Xiang Jun [Lord / Lady of the Xiang River] of the "Jiu ge [Nine Songs]" which are part of the *Chu ci [Chu Elegies]*, the panpipes are euphemistically but appropriately styled *cence* ("uneven"), a clear reference to their staggered lengths. This puts us in the right area (the Chu culture area of south Central China) for (and only a century or two later than) Marquis Yi's panpipes. Also relatively close in time and space is the famous metaphysical usage of *Tianlai* ("the panpipes of heaven") in the "Qi wu lun [On the Equality of Things]" in the *Zhuang Zi [Master Zhuang]* (see Victor H. Mair, tr., *Wandering on the Way: Early Taoist Tales and Parables of Chuang Tzu* [Honolulu: University of Hawaii Press, 1999], p. 12). There is little archeological evidence of panpipes in the West much before the sixth century BCE, but this is earlier than in China. And sets of small bone tubes have been unearthed from excavations dating to c. 2000 BCE near Saratov in Russia that may have been tied together panpipe-fashion. Panpipes of red pottery (using a scale that is at least partly pentatonic) are known in the New World from around 500 CE. What all this boils down to is that: 1. ethnomusicologists have their work cut out for them; 2. there is the making of a good dissertation topic here. A hint for those who would try to determine the mechanism

of dispersion of panpipes: this is (as its late name "panpipe" indicates) a shepherd's instrument, and that is embodied in its old Greek name, *syrinx*. *Syrinx*, so the myth tells us, was a nymph who was transformed into a reed to escape the unwanted advances of Pan. Frustrated, the god of shepherds (himself half goat) cut the reed into sections. But then he felt sorry for what he had done and kissed the pieces tenderly, causing them to emit melodious sounds. So he fashioned them into the *syrinx*, which was subsequently celebrated in the *Idylls* of Theocritus.

The next instrument treated by Feng is *sheng* ("mouth organ"). In three pages, he provides a great amount of information derived chiefly from archeological materials, but also relies on textual sources. I should like to add only that the *sheng* was in all likelihood originally a southern instrument (and even more southern than the panpipes). Briefly put, a few of my reasons for making this claim are: 1. most of the archeologically recovered *sheng* are from the south, 2. the natural body of the *sheng* is a gourd -- a fundamentally tropical and sub-tropical plant, 3. the mythology, legends, and folkways surrounding the gourd and the instrument are far more elaborate among many non-Han people in south China and Southeast Asia than among Han persons in north China, 4. in Southeast Asia the instrument is called a *khaen* or *khen*; while the ancient reconstructions of *khaen* / *khen* and *sheng* are not agreed upon by historical linguists, they do seem to be phonologically and etymologically related. See Victor H. Mair, "Southern Bottle-Gourd (*hu-lu*) Myths in China and Their Appropriation by Taoism," *Zhongguo shenhua yu chuanshuo xueshu yantaohui (Proceedings of the Conference on Chinese Myth and Legend)*, Hanxue yanjiu zhongxin congkan (Center for Chinese Studies Research Series), No. 5, vol. 1 or 2 (Taipei: Hanxue yanjiu zhongxin, 1996), pp. 185-228 for more information of this subject.

The final chapter, by Lothar von Falkenhausen, is entitled "The Zeng Hou Yi Finds in the History of Chinese Music." Focusing on entertainment and ritual, he divides his discussion into ensembles and genres; timbre and tuning; melody, tempo, and rhythm; and notation and musical theory. This is a general yet expert presentation, bringing a fitting closure to the scholarly articles and demonstrating once again the overwhelming importance of the Marquis Yi tomb finds for the history of Chinese music.

The last chapter is followed by a chronological chart, a map, a "Checklist" of 18 items that appear to have been permitted by the Chinese government to be exhibited in Washington, a glossary of Chinese characters, references, a list of contributors, and an index.

I shall close this review by posing two questions prompted by my reading of this informative book: 1. to what extent is the late fifth-century music of Marquis Yi's small,

regal court at Zeng in Hubei representative of the age of the Shandong native Confucius (550-479 BCE)? 2. Might Marquis Yi's brand of music be better thought of as a variant of southern Chu music than northern Zhou (?) / Warring States music?

This is a beautifully produced, lavishly illustrated volume. Printing technology now allows brilliant color photographs to be displayed on the same page as black-and-white text. The only slight technical glitch is that some of the photographs taken by Chinese photographers are not entirely in focus. Those taken by John Tsantes are of extremely high quality, despite the often difficult conditions under which he had to shoot them.

I shall close this review by posing two questions prompted by my reading of this informative book: 1. to what extent is the music of Marquis Yi's small, regional court at Zeng representative of the age of Confucius (550-479 BCE)? 2. Might Marquis Yi's brand of music be better thought of as a variant of southern, Chu music than northern, Zhou / Lu (?) music?

TSENG Yuho. *A History of Chinese Calligraphy*. Hong Kong: The Chinese University Press, 1993. xxix, 415 pages.

Tseng Yuho was Professor of Art History at the University of Hawaii and an artist in her own right. She was also the wife of Gustav Ecke, the distinguished historian of Chinese art and architecture. The present work is manifestly a labor of love on which she spent many years. Its greatest drawback is that it is based almost entirely on traditional Chinese scholarship with a smattering of modern Chinese art history and a sprinkling of studies by Western scholars. She lists in the bibliography only one book by her husband (not a very pertinent one) and only about a dozen other works written in Western languages out of more than 200 items. Of the Western language publications listed, there is little evidence in the text that she actually consulted many of them in a meaningful way.

Tseng also wrote the catalog for what she calls the "First Chinese Calligraphy Exhibition" which was organized by the Asian art curator, Jean Lee, at the Philadelphia Museum of Art (see *Chinese Calligraphy* [Philadelphia, 1971]). The catalog was fraught with translation errors, problems of documentation and identification, and other shortcomings (see Victor H. Mair, "The Complete Text of Sramana Hui's *Subcommentary on the Quadripartite Pratimoksa* [*Ssu-fen chieh-pen shu*]," *Journal of the American Oriental Society*, 104.2 [April-June, 1984], 327-332). The work under review is beset with similar difficulties, despite Tseng's best efforts and extensive consultations with Chinese scholars. Tseng states that she is "privileged... to give an indigenous voice from the inside. I have

no apology for my personal experience and understanding of the subject, and to offer [*sic*] the view of a practicing artist, bred and immersed in Chinese art and culture." It is exactly this sort of feisty non-scholarliness that makes one wary at the outset. But the very next sentence is cause for even greater alarm. "My mentors in this, [*sic*] were Mi Fu (1051-1107) and Tung Ch'i Ch'ang [*sic*] (1555-1636), typical literati-artists who were devoted to the skill of the brush, and who combined their creative instincts with scholarship to write down their experience for posterity." Even if the author honestly believed that her enterprise is to be directly compared with that of Mi and Tung, it would have been more politic (and modest) to refrain from saying so in public.

Some of the author's innovations are of dubious worth. For instance, *ts'ao-shu* is normally rendered as "grass(y) script / style" and *hsing-shu* as "running script / style". Tseng, however, translates these as "Draft-script" and "Action-script," probably thinking of *ts'ao-kao* ("draft") and *hsing-wei* ("action"). But *ts'ao-shu* is certainly not always used for drafts and *hsing-shu* is more aptly characterized as "running" than as "action [--> active]." The part of the turtle's *chia* used for some late Shang oracular inscriptions is not the carapace but the plastron. And so forth. Readers should beware of Tseng's unusual terminological usage.

Romanization errors are also present in abundance. *Yin* (seal, print), for instance, is consistently mistranscribed as *in*. Liang-chu comes out as Liang-ch'u, divination inscriptions (*pu-tz'u*) are called *pu-tzu* or *p'u-tz'u*, and so on. The spelling of the place names on the map is especially unreliable (e.g., Lou-lang instead of Lou-lan, Ningsia instead of Ninghsia). The reader must also guard against wrong characters (e.g., for Yao Shou 姚綬 we find Yao Huan 姚緩, the last character of Chao Chih-ch'en 趙之琛 is written as 琛, etc.). There are, as well, some rather noticeable misspellings, such as Stien for Stein. Furthermore, unidiomatic, ungrammatical, and unfelicitous English is so prevalent that the reader is often left wondering just what the author intended to say. The author's misuse of commas is so frequent that it becomes highly disruptive. Many sentences are incomplete, seeming to end in mid-air. And then there are the bizarre expressions such as "carved out white writing."

Despite these more or less mechanical types of shortcomings, how may we assess the overall presentation of the book? The first thing that must be recognized is that the photographs and drawings are both numerous and generally clearly reproduced. The coverage of different types of calligraphy is also quite broad. In short, the book is pleasant to leaf through, but not to read too closely and intently.

Chapter 1 deals with mythical origins of the script and the alleged beginnings of the script stemming from Neolithic pottery marks. This chapter is embarrassingly full of error.

For instance, the author makes appallingly ludicrous statements about *wen* and *tzu* (the two most basic terms for writing), such as that *tzu* has something to do with *ru* (*sic*, "breasts") and breast-feeding (!). Readers should skip this chapter, except perhaps for the nice pictures of the pots, and go directly to chapter 2 on oracle bone inscriptions. On second thought, the reader is advised once again just to look at the photographs and rubbings of the bones and shells, then pass on politely to chapter 3.

With chapter 3, the author begins her systematic explanation of each of the main types of brush-written styles. But not before a detour to bronze inscriptions. And, in the midst of her discussion of the bronze inscriptions, she cannot help indulging in a disastrous exegesis of the famously mystifying symbol  on the Neolithic Lung-shan pottery urn from Ch'eng-tzu-yai, Shantung. Nobody knows for sure what this symbol means, but Tseng declares confidently that it is made up of a sun, fire, and mountain from top to bottom and is to be read *kuei* (brightness or heat of the sun). Now I quote her directly: "In later age, the mountain radical was omitted from the word  ." First of all, none of the three components of the Ch'eng-tzu-yai symbol resembles the allegedly corresponding oracle bone forms for the sun nor for fire. Secondly, normally radicals were added, not omitted, with the passage of time. Third, the oracle bone form for fire  actually looks a bit like the bottom component (which Tseng asserts signifies a mountain), except that it does not have enough points. Fourth, the oracle bone form for mountain  also does not have enough points to be equated with the bottom component and is differently constructed. Fifth,  is only pronounced *kuei* when it is reduplicated (with the meaning "bright") or as a single-syllable surname. Otherwise, it is pronounced *chiung* in Modern Standard Mandarin and has the meaning "bright(ness)" or "warm(th)."

Not wanting to punish myself or the reader any longer, I will humbly advise that the safest course is merely to look at the pictures in the rest of the book and not even bother with the text at all, unless Tseng happens to be quoting Richard Barnhart or someone else who happens to know what he is saying.

Edward J. M. Rhoads. *Manchus & Han: Ethnic Relations and Political Power in Late Qing and Early Republican China, 1861-1928*. Seattle and London: University of Washington Press, 2000. x, 394 pages.

This is a hard-hitting, even-handed, fair-minded book on a delicate topic: race. In *Manchu & Han*, Edward J. M. Rhoads confronts the subject of anti-Manchuism at the end of the Chinese empire. The central document examined is Liang Qichao's (1873-1929) lead commentary in the inaugural issue of *Qingyi bao* (*The China Discussion*). This

appeared in late December 1898, shortly after the failure of the Hundred Days Reform Movement (June 11-September 21, 1898) which had been promoted by the Guangxu Emperor (1871-1908, r. 1875-1908), operating under the influence of Kang Youwei (1858-1927), the teacher of Liang Qichao. In his commentary, Liang called for "tearing down the boundaries between Manchus and Han" (*ping Man-Han zhi jie*) and made a number of remarkably straightforward racist statements.

Liang strongly encouraged the Manchus to miscegenate with the Han, declaring that races who do not mix face extinction. One of the first Chinese intellectuals to invoke social Darwinism, in a discussion of the political situation in China, he baldly stated that the Manchus were dull and parasitic, whereas the Han were intelligent and productive. While admitting that Manchu warriors had at one time (a couple of centuries earlier) been valiant and active, Liang declared that by his time they had become weak, ineffectual, and interested only in luxurious consumption. This would have been bad enough if it were only a question of the internal dynamics between Han and Manchu, and would have ultimately led to a revolution on the part of the Han who, being more capable and numerous, would certainly destroy the Manchus. What disturbed Liang the most, and what led to his urgent plea for the Manchus to assimilate themselves to the Han, was the fact that the white race was waiting in the wings, about to enslave the entire yellow race. Liang accused the Manchus of being ready to sacrifice the yellow race to the white race because they stupidly and selfishly wished to hang on to power in China as long as they could. In the end, said Liang, they would surely either be overthrown by the Han people or subjugated by the white race. If the latter, because they were so useless -- there not being a scholar, farmer, artisan, or merchant among the five million of them (a gross exaggeration, of course) -- the whites would not be sympathetic to them, whereas the Han people would be able to survive reasonably well because of their resourcefulness.

As an aside, we may note that Liang refers to China as Zhina, a name that has been discussed many times in the pages of *Sino-Platonic Papers*. Rhoads wrongly derives it from Japanese "Shina," whereas the Japanese word came from Chinese "Zhina." The name Zhina had appeared in countless early Buddhist translations (transcribing Sanskrit *cīna* or *cīnasthāna* and referring in the broadest sense to the peoples north of the Himalayas, but more narrowly to Qin [whence it derived] and the succeeding houses that ruled China) and, from at least the Tang Dynasty and the Sung Dynasty onwards, authors writing original Chinese texts employed it from time to time. Another linguistic point is that, as claimed by Ch'en Chieh-hsien (Chen Jiexian), "modern linguists have estimated that fully one-third of Manchu vocabulary is derived from Chinese...." Hence, he concludes that "the mother language of the Manchus, like some other aspects of their primitive culture,

proved unable to resist assimilation after contact with the [Han] Chinese." But we also need to ask what proportion of modern Sinitic / Hanic languages (including vocabulary, phonology, and other features) consists of Manchu words and elements (not to mention Mongolian, Jurchen, Khitan, Turkic, and other Altaic words and elements) -- regardless of how camouflaged they may be by the sinographs. And Rhoads correctly points out that "The process of cultural assimilation was not all one way. Just as the Manchus were unquestionably 'Sinicized' (or, more precisely, 'Hanified'), so also were the Han to some (though admittedly far less) extent 'Manchufied.'" (p. 10) I am not even certain that Rhoads' parenthetical qualifier in the last sentence is justified or necessary.

The second major document discussed by Rhoads is Zou Rong's widely circulated 1903 pamphlet entitled *Gemingjun (The Revolutionary Army)* which genocidally demanded the "annihilation of the five million and more of the furry and horned Manchu race [Manzhou zhong]." Zou Rong got his bloodcurdling wish less than a decade later when huge numbers of Manchus were hunted down and slaughtered. This shameful, despicable, inhumane (*burendao*) behavior on the part of the Han -- a pattern that had been repeated against other non-Sinitic peoples to the north, south, east, and west countless times during the preceding three millennia and more -- refutes the contention of Mary Clabaugh Wright that, by 1865, the Manchus had been so acculturated to the Han that the "ethnic issue" was relatively unimportant in the 1911 revolution (as expressed in *The Last Stand of Chinese Conservatism* [Stanford University Press, 1962]). Only with the expulsion of the emperor from the Forbidden City in 1924, the desecration of the Qing tombs in 1928, and the subsequent disbandment of the Eight Banner system -- thirty years after Liang Qichao's commentary in *The China Discussion* were the barriers between the Han and the Manchus completely eradicated.

My biggest disappointment with *Manchu & Han* is that, like most books of its kind, it is carried out almost strictly as a Sinological exercise. For example, the "banner people" are referred to only as *qiren*, but surely there must have been a Manchu basis for this term; it would be good to know what it was. Since Manchu was throughout the Qing Dynasty one of the official languages of the state and the mother tongue of the rulers, plus the fact that there are still in existence huge quantities of Manchu documents and printed works, I believe it should be taken for granted that all specialists in Qing history would be familiar with this language. After all, it was only a century ago that all Sinologists were expected to master manchu. With the vast proliferation of Japanese scholarship on all periods and facets of Chinese history, plus the enormously expanded role of archeological materials and visual culture in research on China, it is understandable that someone studying the Ming or earlier periods would devote more time to acquiring competency in these areas and may no

longer be required to become proficient in Manchu. But, to my mind, it is virtually unthinkable that a specialist on Qing history would not consider it his / her solemn duty to become proficient in Manchu. Similarly, all students of Chinese Buddhism should be familiar with Sanskrit, the international language of Buddhist Studies.

Finally, it is unfortunate that the author seems to have been unaware of the excellent contributions of Juha Janhunen on the history of the Manchu, especially his superlative *Manchuria: An Ethnic History* (Helsinki: The Finno-Ugrian Society, 1996) which is particularly germane to the concerns of *Manchu & Han*.

The author had worked for many years on this book before it came to fruition. He mentions doing research at the Institute for Qing History, People's University (Peking) during the academic year 1982-83. Clearly, the publication of this volume is a major achievement for the author, as it is for the field. All students, not only of the Qing Dynasty, but anyone with a serious interest in the significance of ethnic relationships for the history of China (which should mean most historians of China) ought to acquaint themselves with *Manchu & Han*.

Louisa Schein. *Minority Rules: The Miao and the Feminine in China's Cultural Politics*. Durham and London: Duke University Press, 2000. xviii, 365 pages.

"This book is about *minzu* [ethnic groups]..." So begins the Preface (p. xi). These are the very first words of ^{Louisa Schein's} the book. Then, after describing the genesis of her investigation in working among the Hmong refugees in America and in wanting to trace their roots to Southeast Asia, her quest veers off course. As have so many other well-meaning Western researchers, the author of *Minority Rules* is waylaid by the Chinese juggernaut and feminist politics. The book ends up being something else than what it started out to be. In short, the original purpose of Louisa Schein's research was aborted, or at least seriously distorted, by political and ideological concerns.

The author begins with the very tough question of what to call the people whom she is studying. Although she recognizes clearly that Miao is a term imposed by the Chinese and that for centuries the Chinese have used it in a derogatory sense (*miao* started out as a poor transcription of Hmong and related ethnonyms but the surface signification of the character used for the transcription, viz., "sprouts," is often used punningly in Chinese texts to demean the people whom it labels -- the indignity of the graph was sometimes increased by the addition of a dog or insect radical), she follows Chinese practice by adopting Miao as the blanket designation for a number of groups. This is Schein's first big capitulation to Chinese control mechanisms. The same methods are used toward

"minorities" across the length and the breadth of the People's Republic of China. (Of countless examples that could be cited, the Tibetans [the English word is derived -- via Arabic -- from the self-designation of the Tibetans, prefaced by a Tibetan syllable meaning "upper"] are designated by the Chinese as Zang [with frequent homophonic aspersions as "dirty," "slave," "booty," and so forth] rather than being respected with their own ethnonym, *böd-pa*, which has deep resonances with their culture and history.) It is the Chinese who recognize whether a "minority" exists or not, and it is the Chinese who give their official ethnonyms, toponyms, and even their surnames and personal names on passports and other legal documents. By these methods, the Han Chinese gut the culture and the very identity of their subject peoples. I know the situation in "Xinjiang [New Borders -- of the Chinese Empire]" best, and it is pathetic. Ürümqi notoriously becomes Wulumuqi, Kashgar is reduced to Karshi, and young men who are opposed to such travesties are herded up by the thousands like cattle and sent off to die in concentration camps. All the while, the National Geographic Society tries its utmost to keep up with the latest Chinese ukases and supposedly sensitive American ethnographers rush to adopt the latest Han chauvinist declarations about their subject peoples. Thus, by p. xv, Schein's book is already running smoothly along a Sinocentric path, with talk of "my *di er guxiang* [second native place]" and "moral passion for the Chinese people." What happened to the Hmong -- who intensely dislike the word Miao and all that it stands for? They are lost in the miasma of Sinitic / Hanic consciousness.

The first chapter of the book itself begins with another depressing vignette which "captivated" the author: a Han intellectual in 1951 describing how "Miao" women "would invariably rush" to offer their embroidery to Chairman Mao. "These are the women's best tokens, usually only given to their lovers..." (!) Schein is captivated; I am disturbed.

This is the birth of *minzu* for our times.

Although Schein has the decency to problematize these happenings by asking a lot of questions about what was really going on in such transactions, with the turn of a page we find her admitting the obvious: "This book is about China as much as it is about the Miao minority people...." I would say that it is more about China than it is about the "'Miao' minority."

These gripes aside, one must admit that the author has done a commendable job of presenting the Miao through a thoroughly Chinese lens. She tells about their names and their history. She summarizes the findings of earlier Sinologists and anthropologists who have studied them. Her extended residence in the "Miao" market community of Xijiang in southeast Guizhou Province and travels to other "Miao" areas and research centers afforded

her considerable familiarity *on the ground*. Much appreciated are the more than forty illustrations (including a map) which portray various facets of "Miao" life and culture.

Schein argues that the "Miao" are feminized by the voyeuristic market economy in which they are submerged. She does a good job of describing "Miao" women and the Han males who are intrigued by them, who **consume** them. But what are the Miao men doing all the while? Where are they? They are on pp. 159-160 and, completely feckless, are apparently complicit in this feminized economy.

The most puzzling thing about *Minority Rules* is that I did not notice a single "Miao" word in all of its 365 pages, although there are hundreds of Mandarin terms for even the most commonplace notions (*jiuge* ["drinking songs"], *zhishifenzi* ["intellectuals"], *kaiifa* ["development"], *hei* ["dark"], *meiyou banfa* ["no way"], etc.). This is strange for an ethnographer who actually knows Hmong. And there is only the briefest mention of the "Miao" script (p. 206), despite the fact that one chapter is about scribes and sartorial acts. Language and writing are essential elements of culture; surely they deserve some discussion in an ethnographic study.

As the author observes more than once, her theme is "cultural production," and it is chiefly the Chinese (Han people) who are producing the cultures she describes. Would that it were otherwise.

Geoffrey Lewis. *The Turkish Language Reform: A Catastrophic Success*. Oxford and New York: Oxford University Press, 1999. ix, 190 pages.

The subtitle of this provocative book is intentionally and obviously oxymoronic. The purpose of this review is, first, to clarify why the author felt compelled to describe the Turkish language reform in these terms and, second, to attempt to determine if he was justified in doing so.

I should confess that Kemal Ataturk, the father of the Turkish Republic and the most ardent proponent of Turkish language reform, is -- to my mind -- one of the greatest leaders in world history. Thus it will be difficult for me to be entirely objective in making this assessment, but I will try my best to do so.

Lewis begins by describing the Turkish language reform as "often bizarre, sometimes tragicomic, but never dull." Reading on to the second page, however, I discover that Lewis (Emeritus Professor of Turkish at the University of Oxford) does not mean what I (Professor of Chinese at the University of Pennsylvania) mean by it. Roberts defines language reform (at least for the purposes of this book) as a "deliberate campaign... carried out... for nationalistic reasons, to purge... [a language] of foreign words and substitute

native words for them." I, on the other hand, who am a strong supporter of digraphia (roman letters and characters as two parallel / complementary writing systems) for China, was thinking in positive terms of the romanization of Turkish that was initiated in 1928. Lewis writes about the second stage of language reform in Turkey, whereas I had in mind the first stage, which was actually **script reform**.

In chapter 3, "The New Alphabet," Lewis makes very clear the difference between *dil devrimi* (language reform) and *harf devrimi* (letter reform), which -- as he correctly points out -- are entirely separate matters. My confusion stems from the fact that the Chinese expression *wenzi gaige* is customarily -- but incorrectly -- translated as "language reform" when it should actually be rendered as "script reform." However, when *wenzi gai* was in full swing during the 50s and 60s of the twentieth century, it subsumed reforms of the Chinese languages (with the stress on Mandarin as opposed to other Sinitic languages) as well as of the script (e.g., simplification of the characters and romanization). After the end of the Great Proletarian Cultural Revolution in the early to mid 70s, it was decided that *gaige* ("reform") was an offensive term in China, so it was largely expunged from daily usage. The "Committee for Language Reform" (Wenzi Gaige Weiyuanhui) became the "State Language Commission" (Yuyan Wenzhi Gongzuo Weiyuanhui).

I should not have been apprehensive about Lewis's book because of its title. The author is unmistakably in favor of *harf devrimi*. "Its intrinsic beauty aside, there is nothing to be said in favour of the Arabo-Persian alphabet as a medium for writing Turkish." (One could almost say the same for the Chinese script in relation to Mandarin -- but **not** in relation to Literary Sinitic -- and with more assurance in relation to Cantonese, Taiwanese, Shanghainese, Japanese, and Korean.) After that succinct announcement, the remainder of the chapter consists primarily of a discussion of the reasons for the script reform and the steps that were taken to implement it.

The rest of the book essentially amounts to a sustained and excruciating demonstration of the ridiculous lengths to which Turkish purists have gone to weed out words of foreign origin. One must bear in mind that a very large proportion of **older** Turkish words derived from Arabic and Persian (not to mention still older words that derived from Tocharian, Sogdian, and other Central Asian languages where the Turkish mother tongue came into being), while a still substantial number came in somewhat later times from Greek and French, while many words of English and other European languages have entered Turkish even more recently. To comprehend the effect that cleansing Turkish of all these Persian, Arabic, Greek, French, English, and other "borrowed" words would be like removing from English the 60% of our vocabulary that came from French or from Uyghur the 70-80% that came from Arabic, Persian, Russian, Sinitic, English, French,

and German. Not much would be left, and one would have to engage in rather drastic contortions with what the presumably "pure" Turkic remnant to make up for the nearly mortal loss.

I believe that there is a deep reason for the poverty of Turkish (and indeed this is true of all Turkic languages) when it is ruthlessly shorn of its non-Turkic elements. Namely, Turkic is a relatively young language group, and -- in a very real sense -- it is still in process of formation. It was almost certainly still coalescing during the period when it borrowed from Tocharian, and was probably still a juvenile tongue when it came in contact with Persian and then Arabic. Given such circumstances, the emerging communities of Turkic speakers would have been compelled to adopt (and adapt) lexical items from speakers of other, already well established, language groups simply to confront the practical problems of daily existence. This phenomenon (the relative youth of Turkic), which -- to the best of my knowledge -- has not hitherto been discussed by anyone else, undoubtedly also has a bearing on the unwillingness of critical historical linguists to recognize Altaic as a legitimate, genuine language family, because all of its presumed constituent languages (Mongolic, Tungusic, Turkic, and perhaps Koreanic and Japonic) are relatively recent and resemble each other only because of massive intra-areal borrowing, especially among the first three, allegedly more core, branches.

Returning to the topic at hand, Lewis's book is learned, eloquent, and witty. He makes sure that all Turkish words, phrases, sentences, and passages are rendered into English. Particularly effective and entertaining are those passages which he skillfully translates twice -- first in their unadulterated form with their full complement of words of non-Turkic origin, then in their cleaned-up, "pure" Turkic form.

The volume closes with a list of references, a "General Index," and an "Index of Words, Phrases, and Suffixes."

Kevin Robb. *Literacy and Paideia in Ancient Greece*. Oxford and New York: Oxford University Press, 1994. x, 310 pages.

This review is presented to Professor Barry Powell of the University of Wisconsin who, perhaps better than anyone else, has grasped the significance of the invention of the Greek alphabet.

The volume under review is fittingly dedicated to Eric Havelock, the scholar who did so much to advance our understanding of the impact of the alphabet upon Greek culture. In *Preface to Plato* (Cambridge: Harvard University Press, 1963), *The Literate Revolution in Greece and Its Cultural Consequences* (Princeton: Princeton University

Press, 1982), *The Muse Learns to Write: Reflections on Orality and Literacy from Antiquity to the Present* (New Haven: Yale University Press, 1986), and other works, Havelock showed how utterly transformative the alphabet was for Greece, the first society to become culturally dependent on this new technology for communication.

It falls to Kevin Robb, who has been working on a closely related complex of issues since before 1970, to make more precise our understanding of how and why the Greeks invented the full alphabet. One striking feature brought out by Robb is that the Phoenician script -- as earlier pointed out by I(gnace) J. Gelb, the great Chicago Semiticist -- was actually syllabic or at best a "quasi-alphabet." Unlike Gelb, however, Robb emphasizes that the invention of the Greek alphabet was truly that and, as such, there was no transition stage with only partial vowel notation, as suggested by Gelb who suspected that the *matres lectionis* ("mothers of reading") played a role in the devising of vowel notation. Of course, this is an extremely important issue for historians of writing, since the Greek alphabet constitutes the first known writing system anywhere on earth to possess both consonants and vowels. Obviously, this is a great advantage over syllabaries (which do not allow for complete analysis of the sounds of languages) and consonantaries (which are, in essence, merely a specialized type of syllabary because they assume that each consonant necessarily comes with an attached carrier vowel). Neither syllabaries nor consonantaries -- much less pictographic, ideographic, and logographic writing systems -- can conceive of consonants apart from vowels or vowels apart from consonants.

This is a matter of great moment in the history of mankind, for the ability of human beings to write down with **facility** all of the significant sounds of their actual speech, made writing a **flexible** tool that permitted the easy and accurate acquisition of literacy for speakers of any language. Syllabaries, by nature, are language specific (and, as I have shown above, consonantaries are essentially syllabaries) in that they are designed to represent the inventory of syllables of a given language. Alphabets, in contrast, are more easily transferable and adaptable. Above all, the Greek alphabet is just one more example of the analytical quality of the Greek mind. It was this quality of mind that ultimately led to the greatness of European civilization in science, philosophy, art (e.g., perspective), music, and virtually all areas of human endeavor. The inventor of the Greek alphabet was a supreme genius, but he was only one among a whole series of Greek geniuses.

The invention of writing itself was a long, drawn-out process that began in the Upper Paleolithic with the revolution in consciousness of Cro-Magnon Man (e.g., cave art and symbols). Its gradual realization was a communal effort and not dependent on the brilliant insight of a single individual. Admittedly, the more or less faithful recording of sentences by the Sumerians c. 3000 BCE was a significant stage in the evolution of

writing, as was the isolation of consonants by the Phoenicians (the Egyptians had also vaguely figured this out too, by emphasizing a certain subset of the hieroglyphs. But neither the emergence of Sumerian logographic writing nor the recognition by the Phoenicians of the greater efficiency of consonantal writing enabled human beings to record on a flat surface strings of phonetic symbols that closely approximate the way human beings talk (i.e., real language).

Because of the tremendous importance of the Greek alphabet, it is altogether appropriate for Kevin Robb to expend such energy and effort in trying to identify the motivation for its invention. Robb stresses the oral background of the alphabet when he marshals evidence to show that it was first used "to record on durable substances a few hexameters that were felt to be appropriate to occasions of eighth-century oral life." Thus, according to Robb and other scholars, a mnemonic need to set down oral poetry was the crucial factor in the invention of the alphabet, not -- as had formerly been alleged -- such commercial applications as accounts and bills of lading. Robb goes one step further and argues that the vowels were devised specifically for the purpose of correctly conveying the meter of poetic utterances. Where Robb parts company with other scholars who also recognize that the alphabet seems to have been designed for the purpose of capturing the nuances of spoken poetry is in his insistence that the aim of the inventor was not initially to record the whole of a Homeric epic, but rather was focused on short, inscriptional texts. "These are" as Robb states succinctly, "what we find in the archaeological record -- and nothing else."

So how did those who first invented and utilized alphabetic writing in Greece pass it on to ever-widening circles of literate individuals? Literacy was, Robb states, a matter of schooling, and this is where *paideia* comes in. For those who are unfamiliar with this Greek word meaning "education, culture," *Webster's* defines it as "training of the physical and mental faculties in such a way as to produce a broad enlightened mature outlook harmoniously combined with maximum cultural development." It is in the *paideia* that Robb locates the growth of literacy.

Appropriately for the subject at hand, this is a very **learned** book, with due acknowledgement of previous scholarship related to the topic at hand and a rigorous marshalling of sources (including numerous lengthy, but still highly readable, footnotes). At the same time, this is **not a pedantic** work. The author is careful to gloss all Greek words, writes clearly, and -- a good index of his intention to communicate rather than intimidate -- transcribes everything into the Latin alphabet.

Aside from his masterful treatment of *paideia*, Robb covers the origins of Greek literacy and the close association between literacy and the law. Along the way, he provides

insights into art (vase painting), dance (*orchēstōn* ["of the dancers"]), Socratic and Platonic dialogs, *mimēsis*, and history. I was also pleasantly surprised to find that the author makes some intelligent remarks on China's "logographic writing system" (p. 266). This is a thoroughly scholarly work, yet an utter delight to read.

Oswald J. L. Szemerényi. *Introduction to Indo-European Linguistics*. Translated from *Einführung in die vergleichende Sprachwissenschaft*, 4th ed. (Darmstadt: Wissenschaftliche Buchgesellschaft, 1990), by David Morgan Jones and Irene Jones. Oxford: Oxford University Press, 1996; first paperback ed., 1999. xxxiii, 352 pages.

The author states that his work was conceived by the original German publishers as an introduction to comparative Indo-European linguistics. It is curious, therefore, that the German title simply means *Introduction to Comparative Linguistics*. The English title is something else again, since it mentions the Indo-European linguistics side of the book's mission, but has nothing to say about its comparative aspects. Still more intriguing is the fact that, already in the mid-1950s, the author had begun writing an apparently separate work entitled *Introduction to Indo-European Philology*, long before the *Einführung*, which was first published in 1970. The English *Introduction to Indo-European Philology*, of which a 346 page draft exists, consisted of a first half which surveyed the Indo-European languages and a second half which presented a thorough phonological analysis of Indo-European, but it was never published. Judging from the contents of the *Einführung*, i.e., the *Introduction to Indo-European Linguistics* under review here, it would have been substantially different, since the latter is made up of the following sections: 1. Introduction, 2. Language in Change, 3. Tasks of Indo-European Linguistics, 4. Phonology: Presentation of the System, 5. Morphology, 6. Prehistory of the Indo-European Phonological System, 7. Morphology I: Nouns and Adjectives, 8. Morphology II. Pronouns and Numerals, 9. Morphology III: Verbs (with many subsections, including personal endings, thematic vowel, voices mood formations, tense stems, paradigms, the non-finite verb, and prehistory). A big difference between the *Einführung* (the present volume) and the *Introduction to Indo-European Philology* is that the present volume lacks the survey of Indo-European languages in the aborted *Introduction* (except for pp. 9-13, which provide a very quick run-down of the dozen branches of the family), while the latter lacks the morphological exposition of the present volume.

The seriousness of Szemerényi's *Einführung* (which I shall henceforth refer to as the *Introduction*, i.e., the book under review) and the intense level of scholarly documentation can be deduced from the fact that the very first section of the book, entitled

"Abbreviations, etc.," is 16 pages long. This is an exceptionally long list of abbreviated sources for a book that is less than 400 pages in length. Next comes a list of abbreviations for 70 languages cited, from Aeolic to Welsh. Many other less frequently cited languages, such as Thracian and Illyrian, are listed only in the Index.

Each of the book's sections is divided into about half a dozen subsections. In general, the subsections are very heavily footnoted, with the footnotes providing a host of references to scholarly books and articles on various topics touched upon in the text. Since numerous other scholarly references are embedded in the text itself, the book presents somewhat the aspect of an extended bibliographical essay. References almost always take the (rather boring) form of "On / For X, see Y," and almost never provide any evaluative guidance, even on such controversial topics as Nostratic or the Indo-European homeland. Rather than arriving at some sort of conclusion on a given topic, the author seems more determined simply to present the various possibilities advanced by other scholars and then just to let the reader decide for him/herself which s/he prefers. The value of this sort of exercise for many Indo-Europeanists is due to Szemerényi's familiarity with scholarship in Eastern European languages, since it is often overlooked by those who work mainly in Western European languages.

The heart of the book lies not in Szemerényi's historical account of studies on various problems in Indo-European linguistics, but in the second half of the book, from p. 155 on, where he tackles morphology head on. Here the author seems to be more the master of his own material, speaking authoritatively and succinctly on one specific problem after another. He draws confidently on data from all of the Indo-European branches and declares his opinion concerning their significance. (Citations to Greek are in the Greek script, but citations to all other languages are transcribed in roman letters.) Even in the second half of the book where he is more willing to speak in his own voice rather than cite the views of one scholar after another, Szemerényi does not shortchange us bibliographically, still offering plentiful footnote references to scholarship on the various issues at hand. Since these references span the period from the latter part of the nineteenth century up to the near present, the book has the additional contribution of being a resource for the study of the history of Indo-European linguistics. Szemerényi possesses, as it were, a strong disciplinary memory.

The book closes with a list of around 150 "Special Topics," virtually all of which can also be located via the "Index", which leads one to wonder about the utility of this list. Items included in it are specified by their subsection or subsubsection and designated as "not indicated in the Table of Contents" (which, by the way, is very full and amounts to an outline of the entire book), so it would appear that Szemerényi wanted to give these topics

more prominence than they receive in the "Index" but less than in the "Table of Contents" itself.

My Indo-Europeanist colleagues speak of Szemerényi (and this book of his in particular) with respect, almost awe. This is probably because he avoids controversy as much as possible and relies on the work of other established scholars as much as possible. My only quibble, almost a complaint, is that he twice mentions that Chinese is monosyllabic (p. 97: "the canonical form in Chinese is the monosyllable" and, still worse, p. 105: "syllable and word coincide"). I have spoken against this extremely widespread, erroneous assumption about Sinitic so often that I will not repeat myself here. I only wish that a scholar of Szemerényi's stature and caution within his own field of Indo-European historical linguistics would not have repeated (and thus helped to perpetuate) it in this otherwise authoritative handbook.

Piotr Bienkowski and Alan Millard. *Dictionary of the Ancient Near East*. Philadelphia: University of Pennsylvania Press, 2000. x, 342 pages.

This is an extremely valuable handbook for anyone with an interest in the development of civilization in Southwest Asia and Northeast Africa from the Paleolithic down to 539 BCE (the fall of Babylon to Cyrus the Great of Persia). Entries are well-selected, essays are succinct, and there are many attractive features: abundant cross-references, bibliographies of essential scholarship, plus numerous photographs (most of objects from the collections of the British Museum) and drawings. The entries are written by the editors and eleven other specialists, two of whom are in Ankara and one who is in America (all the rest are in Britain). Subjects covered include places, persons (both modern and ancient), and cultures; general matters such as hunting, food, animals, technology, and language; specific topics such as childbirth, latrines, and texts. Virtually every test item I searched for (e.g., Guti, Sea Peoples, Linear A and B, Babel, Sir William Matthew Flinders Petrie) could be found quickly either directly as an entry or through the index. The writing is clear, concise, and accurate. This dictionary is an utter delight to use. Highly recommended.

Helmut Birkhan. *Kelten / Celts: Bilder ihrer Kultur / Images of Their Culture*. Vienna: Verlag der Österreichischen Akademie der Wissenschaften, 1999. 453 pages; 800 color and black and white illustrations (photographs, maps, and drawings).

One might well ask why such a lavish book about the Celts would be written by an Austrian and published in Austria, rather than in Ireland or Wales, with which one nowadays immediately associates the Celts. The simple answer is that Austria is the earliest known location of the Celtic people. Indeed, the Celtic culture of what is now Austria is the earliest that can be associated with a particular people or group of tribes. The era of the Celts lasted for more than a thousand years in Central and Western Europe. This illustrated volume is the first attempt at a comprehensive documentation of Celtic culture, from its emergence in the Hallstatt period (c. 700-450 BCE) through the La Tène period (c. 450 to the beginning of the Christian era), to the era of Christianization, stretching between Anatolia and Ireland, from Slovakia to Portugal.

This volume serves as a companion work for the standard reference *Kelten: Versuch einer Gesamtdarstellung ihrer Kultur* (Vienna: 1997, 2nd ed.) also by Helmut Birkhan, a renowned authority on ancient Celts. Where the latter is a detailed textual description and analysis, the present work functions as a visual data base, to which one gains access through its topical arrangement (archeology; history; language; religion, gods, and myths; cults and religious institutions; king, nobles, warriors, artisans; everyday life in peace and war) and also through a lengthy index.

The book begins with a lengthy introduction based on state-of-the-field information and closely keyed both to the illustrations in this volume and to the fuller text in the 1997 companion volume. The introduction, which is detailed and authoritative, covers up to Sinn Fein (end of the twentieth century) and Tolkien's *Hobbit*.

Noteworthy is the degree to which the Celts were in contact with the Scyths to the east. It was from the Scyths that the Celts acquired *kurgans* for their burials and the practice of placing a wagon therein, plus early silk, as at the site of Hohmichele (c. 650 BCE) near the Heuneburg. Even before the advent of Scythian influences, the swastika was very prominent as an ornamental motif, as at Hallstatt.

This is a large (9 1/2" X 12"), glossy volume, but it is not meant to be a coffee table book. Rather, it is a scholarly resource which visually documents diverse aspects of Celtic culture from the earliest times.

Because they straddled East and West at a crucial time in the development of civilization (the Bronze Age), the Celts are vital for research in many areas -- mythology, metallurgy, folkways. Just as the Iranian peoples were culture brokers (*Kulturvermittlers*) par excellence in Asia, so were the Celts in Europe. What is most fascinating of all is that

the Celts and the Iranian peoples (especially the Scythians and their close relatives) were clearly in contact (see, for example, the epochal monograph *From Scythia to Camelot* by C. Scott Littleton and Linda A. Malcor, Garland Reference Library of the Humanities, vol 1795 (New York and London: Garland, 2000; 1st ed. 1994).

Even though this is a thoroughly scholarly book, the author adds some humorous and mystifying touches. For example, Fig. 121 shows a bronze La Tène Cheshire Cat head on a real cat's body, and the book is dedicated to the enigmatic girl paddling a little Welsh *corwg* in Fig. 716. Unlike the Cheshire Cat, her face is not even fully visible, but -- for the author -- she captures something essential about the Celtic spirit.

This is a completely bilingual book, so the text and the captions appear twice, once in German and once in English.

Elizabeth Lichtenberger. *Austria: Society and Regions*. Tr. Lutz Holzner. Vienna: Austrian Academy of Sciences Press [Verlag der Österreichischen Akademie der Wissenschaften], 2000. An expanded version of the author's *Österreich-Wissenschaftliche Länderkunde* (Darmstadt: Wissenschaftliche Buchgesellschaft, 1997). 491 pages; 310 color illustrations; 21 color maps; 78 tables.

This is a regional geography of Austria set clearly in the context of its relationship to the European Union and, beyond that, to the larger world with which it trades and from which it receives immigrants. Judging from the 16 books and scores of articles that she has written, her membership in the British Academy, the Academia Europaea, and the Austrian Academy of Sciences, the author is well qualified to write the sort of comprehensive account that is found in this book. Reading through this beautifully produced book, one quickly feels reassured that one is in the hands of an expert who knows her subject matter thoroughly.

The book is logically organized, being divided into 9 major chapters: territorial history and legacy, the political landscape, population and society, environment and natural resources, agrarian society and leisure society, city and country, dual economy and dual transportation, certain and uncertain futures, and Austria and Europe. It is obvious merely from looking at the chapter titles that the author is not content with a matter-of-fact description of the country. Instead, she raises significant issues at every turn and problematizes matters that seem to be simple. Because she does this not in a heavy-handed manner but for the purpose of seeing things more clearly and in a genuine spirit of inquiry, the reader does not find such authorial management of the material annoying or intrusive. Rather, one welcomes her subtle suggestions and questions as guides to a better understanding of a complex set of circumstances.

A glimpse at a few of the sections reveals that the issues raised by Lichtenberger are real. For example, the rise of Vienna as a world metropolis and the development of the Austro-Hungarian Monarchy are of tremendous importance reaching far beyond the borders of today's Austria. Likewise, the flood of refugees and "guest" workers has indeed led to the phenomenon of "ghost" residents. Similarly, the mountains which embrace many of Austria's greatest resources (hydroelectricity, minerals, tourism) also pose enormous challenges (expensive construction and maintenance of transportation grids, avalanches, mudslides). And so forth.

This is a thinking person's book. Yet, at the same time, one can find out easily just about any essential factual material one needs to know by consulting the well-designed maps, five of which are triple foldouts, tables and figures, and illustrations, all of which are listed clearly at the back of the book. There is also an extensive bibliography of works in German and English divided up according to each chapter and two indices, one of subjects and one of geographical names.

For those who have not paid much attention to Austria before, they may be surprised to learn that it is the earliest known home of the Celts (the Hallstatt Culture, c. 750-450 BCE). It is also a very civilized place -- the birthplace of Mozart and the bagel (!). A glimpse at foldout map 5 shows that the Austrians also care deeply about their environment, devoting a large proportion of their country to national parks, reserves, and protected areas.

Austria (now) is a small country, with only 2.5% of Europe's population. But it occupies the center of the Union, sits astride the continent's mightiest river, the Danube, and is anchored by the Alps which are the spine of all the surrounding countries in more ways than one. The fact that, geographically, Austria projects farther eastward into the heart of the Commonwealth of Independent States, and historically as well as culturally has had more intimate linkages with Eastern Europe than any other part of the European Union means that it will undoubtedly once again play a key role in linking up the two main parts of the continent. For anyone who wants to understand this land, its people, and its potential, there is no better guidebook than the one under discussion.

William W. Fitzhugh and Chisato O. Dubreuil, ed. *Ainu: Spirit of a Northern People*. Washington, DC and Seattle, Washington: Arctic Studies Center of the National Museum of Natural History, Smithsonian Institution, in association with University of Washington Press, 1999. 415 pages, 595 illustrations (320 in color), maps, index.

The enigma of the Ainu remains as perplexing as ever. While recent research in genetics, physical anthropology, and archeology indicate that the Ainu were holdovers from the Jomon people, members of Japan's oldest archeologically attested culture, dating back to 12,000 BP and earlier. But this does not help much to solve the problem of the origins of the Ainu because we do not know who the Jomon people were either.

While the jury is thus still very much out on who the Ainu were, and may continue to remain out for a very long time, it is obviously an extraordinarily important question and has vital ramifications for understanding the peopling of the world and the spread of basic technologies (Jomon, actually Jōmon, literally means "cord[-impressed] pattern," referring to the culture's distinctive pottery, astonishingly the oldest known pottery vessels in the world, though not the oldest pottery in the world, since pottery figurines are known from Southeast Europe dating back to more than 20,000 BP).

The old Ainu bore apparent physical resemblances to Caucasoid peoples: full beards, extensive body hair, light skin, large noses, comparable cranial features, and so forth, but they also possessed Australoid features: thickish lips, broad noses, a bluish tinge to their complexion, and so forth. One thing is quite clear: the Ainu did not appear to be Mongoloid or Negroid. Current genetic testing and analysis cannot definitively determine the affiliations of the Ainu because all living Ainu are heavily intermixed with Japanese (who themselves are a blend of many genetic elements from Southeast Asia, East Asia, Northeast Asia, and beyond to Central Asia) or other Northeast Asian peoples. In a sense, although substantial numbers of individuals in Northern Japan, Sakhalin, and the Kuriles may claim that they are of Ainu descent and preserve Ainu ethnic traits, the original Ainus are already virtually extinct.

Linguistically, too, the prospects for resolving the affiliations of the Ainu are poor. There are only a handful of Ainu speakers left, and they will soon pass into oblivion. Although anthropologists, ethnographers, and linguists have recorded significant amounts of Ainu, once the living language disappears forever, it will be all the more difficult to link it up with any other language families. Nonetheless, various theories have been put forward regarding the affiliations of Ainu language, from Indo-European to Austronesian, Altaic, Korean, and Japanese. All of these proposals are weak, particularly the latter three, which are premised largely upon relative^ylate (apparently during the last 1,500 years or so) borrowings and influence.

I believe that the current impasse will last until a new conceptual model is adopted, which I hereby propose. Namely, if -- as the archeological evidence indicates -- the ancestors of the Ainu were already present in Japan 12,000 and more years ago, that would have been long before any of the world's extant language families existed (e.g., Indo-European is only about 6,000 years old, and Altaic, Japanese, and Korean are all younger than Indo-European). A similar scenario holds for the racial affiliations of the Ainu. Namely, they may well descend from a people who existed before the formation of the current four main racial groupings: Caucasoid, Mongoloid, Negroid, and Australoid. Consequently, efforts to connect the Ainu with any currently existing linguistic or genetic groups may be misplaced. This is not, however, to say that the situation with regard to the origins and affiliations of the Ainu is utterly hopeless. Rather, it is to suggest that entirely new strategies for dealing with the problem need to be adopted. For example, Ainu should be examined in light of linguistic superfamilies that predate even Nostratic (c. 10,000 BCE). Naturally, this means that scholars must first do the work of attempting to reconstruct such superfamilies. Archeologists should examine the whole range of early Jomon Culture extremely carefully, but especially the pottery, in light of the evolution of developments elsewhere. For instance, there has recently been discovered highly fragmentary evidence of pottery in China that predates Jomon by a couple of thousand years, and I have already cited the pottery of Southeast Europe that is another 10,000 years earlier. If we are serious about confronting the puzzles of Ainu linguistics and genetic origins, then we must be all the more serious about examining the ~~entire Jomon~~ entire Jomon archeological record in light of the archeological record beyond Japan, for at the time-depths involved, there is nothing else to rely upon directly. Indirectly, ethnographic data collected within the past couple of centuries may be useful because they conceivably reveal very old cultural traits, but only if employed with extreme caution, since nothing is more easily borrowed than aspects of culture.

With that statement, we may turn to the book under review, which is a marvelous treasure-trove of ethnographic materials assembled by the editors and their collaborators. The editors are well qualified for the task at hand. William Fitzhugh is an acknowledged expert on northern peoples and the author or editor of numerous articles and books on related subjects, including a highly successful earlier volume in the same mold as *Ainu*, viz., *Crossroads of Continents: Cultures of Siberia and Alaska* (Washington, DC: Smithsonian Institution Press, 1988). That the current volume has been put together so lovingly must be due in large measure to his co-editor, Chisato O. Dubreuil, herself of Ainu descent and a specialist on Ainu art.

What does this sumptuous volume have to offer? Most prominently, it has color photographs of over two hundred artifacts. The photographs are clear and true -- viewing them, one almost feels as though one is looking at the original piece. And what amazing, revealing pieces they are! For example, number 29.24 is a pair of salmon-skin boots with fish-scale tread; they are beautifully designed and seem to glow with a golden glitter. Number 29.25 shows one of a pair of nonskid boots, also made of salmon skin. The soles have large fish-scales pointing backwards to provide traction on snow, ice, and mud. Even the spiny dorsal fin was left in the middle of the sole to increase the traction. Number 45.6 is a duckskin robe worn by Ainu living in the northern Kuriles who did not have access to the hides of such fur-bearing animals as bears and deer to produce warm winter clothing. Feathers intact, the duckskins (skins of ravens, cormorants, gulls, puffins, albatrosses, and other marine birds were also sometimes used) not only provided warmth, they were sewn together in esthetically pleasing patterns.

Many of the artifacts are identified as having been collected by named individuals in a specific year (usually belonging to the nineteenth century or early twentieth century). That such a wonderfully informative exhibition could be brought together is a testament not only to the collectors of the artifacts, but also to the 29 lending institutions and owners: the American Museum of Natural History, Asahikawa City Museum, Brooklyn Museum of Art, Buffalo Museum of Science, David and Chisato Dubreuil, Field Museum of Natural History, Takeki Fujito, Hokkaido Archeological and Cultural Remains Investigation Center, The Historical Museum of Hokkaido, Hokkaido Asahikawa Museum of Art, Hokkaido Prefectural Government Board of Education, Noriko Kawamura, Kitanihon Mingsha Co., Shin Mouri, Milwaukee Public Museum, Hokkaido Museum of Contemporary Art, National Museum of Ethnology (Osaka), National Museum of Natural History (Washington, DC), Kazuyoshi Ohtsuka, Otoineppu Village Office (Hokkaido), Peabody Essex Museum, Peabody Museum of Archaeology and Ethnology (Cambridge, Massachusetts), Rausu Town Board of Education, Royal Ontario Museum (Toronto), Chinta Sunazawa, Kazuo Sunazawa, the Ainu Museum at Shiraoi, the University of Pennsylvania Museum of Archaeology and Anthropology, and Kan Wada. It is through such caring, farseeing persons and organizations that the heritage of mankind is preserved and appreciated. The book under review is both a tribute to their humanistic spirit and a testament to the hundreds of individuals (curators, photographers, anthropologists, ethnographers, officials, and others) who contributed to the special exhibition which is its foundation and to the production and distribution of the book itself.

Aside from the photographs of the artifacts, there are more than an additional hundred color illustrations, plus 275 black-and-white illustrations, for a total of nearly six

hundred. Most of the black-and-white photographs are from the same time period when the artifacts were collected. The book also includes many old, period drawings and paintings by early Japanese ethnographers illustrating the life and folkways of the Ainu. Among these are the earliest depictions of the Ainu in the first renditions of the *Pictorial Biography of Prince Shotoku* (9.1), illustrated accounts of a seventh-century hero, which appeared as early as 1069 and showed the Aine to be far more European-looking than they have since become.

With all of the attention I have devoted to the visual aspects of this volume, I would not want to give the impression that the textual dimension is in any way deficient. Quite the contrary, the book includes a substantial introductory chapter detailing the history of Ainu ethnicity by William Fitzhugh and is divided into six main divisions: theories of Ainu origins; the historic period; the "discovery" of the Ainu by collectors, museums, and the public; the land, spirit, and culture of the Ainu; material culture and arts; the past and future of the Ainu people, their language, and their culture. Altogether there are 55 chapters on such diverse topics as shamanism, genetics, archeology, tourism, mythology, religion, technology, geography, boat-launching, textiles, and so forth. From this book, one can obtain a reliable account of virtually any known facet of Ainu history and culture by recognized authorities. An extensive bibliography (pp. 393-404, three columns), makes possible more detailed investigations for those who are so inclined.

The story of the Ainu is both enigmatic and tragic. Here is a people for whom the salmon is a vital part of their diet and ritual, yet they were prohibited by the Japanese government from catching salmon in favor of commercial fishermen. Even now, in a presumably more enlightened age, the Ainu must obtain special permission to catch fish necessary for their annual first-salmon ceremony. These living relics of the archaic past -- who are soon to be so attenuated that they may be said to be on the verge of extinction -- hold the keys to important questions about the remote past of humankind. We should do everything within our power to understand them before they forever fade into oblivion.

New Information about Ancient Mummies in Xinjiang (Two Items)

Item I

Headline: 2,000 Year Old Ancient City Is Discovered in the Heart of the Tāklimakan [Taeklimakan] Desert

New China News Agency Report, March 10, 1999

Clipped from *Jiefang Ribao (Liberation Daily)* (Shanghai), 11/II/99

Note: umlauts are indicated by an "e" following the vowel to which they apply (this is necessary because the present article is initially being transmitted by e-mail).

Main points

1. Information provided by Idris Abdursul, Vice Director (and Acting Director) of Xinjiang Institute of Archeology who was in Peking attending the second session of the 9th National Peoples' Congress.
2. The city was newly discovered by a Sino-French Expedition that three times went deep into the desert at Niyä (Niyae).
3. The city has been called Yuansha Ancient City. (Note by VHM: Yuansha ["Round Sand"] is probably the translation of a Uyghur word.) It is 230 kilometers north of Keriyä (Keriyae) (Yutian). Wheat, millet, and other grains have been found in storage pits. Inside and outside of the city, a number of saddle-shaped querns (millstones) have been found. Cattle, goats/sheep, camels, etc. were raised as domestic animals. Around the city there was an elaborate network of irrigation canals. All of this shows that an agro-pastoral economy was practiced along the lower reaches of the Keriyä (Keriyae) River over 2,000 years ago.
4. Several relatively well preserved corpses have been recovered from the site. They have round eyes, long noses, and brown hair woven into multiple braids.

Translated by Victor H. Mair
University of Pennsylvania
8/IV/99

Item II

More Ancient Corpses from Chärchän (Chaerchaen) (Qiemo)

Note: The reliability and precision of the following report are very different from the previous report. I have summarized this report from materials kindly sent to me by Mr. Jingyuan Liu of the Department of Chemical Engineering at the University of Newcastle in Callaghan, Australia. He, in turn, had received most of the information in the report over the internet from a person calling himself Fengren ("Crazy Man"). Fengren had travelled to Chärchän (Chaerchaen) in August, 1997 with an internet friend who calls himself Tango for the express purpose of seeing some newly discovered mummies that they had heard about. They describe their experiences in a two page travel report that they transmitted to Mr. Liu. Although they are unfamiliar with Xinjiang geography, archeology, and culture generally, their report corroborates bits of information that I have received from other sources and can be tested against my own personal observation of the type of site they describe. Because the report of Fengren and Tango (hereafter FT -- it was actually written by Fengren but also incorporates the observations of Tango, so I will refer to the report as being collectively by both of them) intersects with a great deal of information that I have gleaned from other sources in the last few years, I will both supplement it and comment on it critically as I translate and summarize the relevant parts.

FT relate how they give a local guide 100 RMB and he leads them out of the county town east along the Chärchän (Chaerchaen) River. Their description of the road, the scenery, and so forth roughly tallies with what one would see if one left Chärchän (Chaerchaen) and were on the way to Zaghunluq. If they really were going *east* along the Chärchän (Chaerchaen) River, however, then they were definitely not going to Zaghunluq, because the latter is 6 kilometers *southwest* of the county town. They do not mention the names of any villages, probably because they are total strangers to the Uyghur language and the geography of the Chärchän (Chaerchaen) area. Let us take FT at their word; they went east.

Since FT say they went east for about 30 minutes, I believe that they actually may have gone to a site called Kawa Eriq ("Pumpkin Canal" -- another source referred to this place, probably mistakenly, as Jawa Eriq), not Zaghunluq. This is all the more interesting, because we already know a lot about Zaghunluq, but next to nothing about Kawa Eriq. In a moment, I shall summarize the important points conveyed by FT. First, I will briefly

explain what I had previously learned about Kawa Eriq from other sources. This is necessary in order for the reader to understand how archeology in Xinjiang typically proceeds. As best I can reconstruct the scenario of events, the Kawa Eriq cemetery was discovered in August of 1995 when local farmers were supposedly digging a ditch. Once the news got out, permits were issued for emergency excavations. These commenced in October of 1995 and resulted in the determination that there were "about 100 tombs" (fewer than at Zaghunluq) at the site and that it dated to approximately 2500-3000 BP (perhaps slightly later than Zaghunluq). 42 cases of materials removed from the graves were transported to Peking. A "distinguished white haired professor from Peking", who had secured a permit to dig at Kawa Eriq, recommenced excavations in August of 1996. The "distinguished white haired professor from Peking" was only given permission to dig at Kawa Eriq, but he surreptitiously carried out the unauthorized excavation of two graves at Zaghunluq, apparently in search of mummies as well preserved and splendidly clad as Ur-David and the Stately Woman (probably Ur-David's wife), Little Baby Blue Eyes and Blue Bonnet (these three individuals are now in the Ürümchi [Ueruemchi] Museum), the Priestess in Purple, and the Scream Baby (these two individuals and several others are now in the Korla Museum) -- all of whom were recovered from the salty sands of Zaghunluq. It would seem that the temptation to take similar trophies back to the national capital was simply too great for the "distinguished white haired professor from Peking" to resist.

As it turned out, somehow word of what the "distinguished white haired professor from Peking" was up to got back to Ürümchi (Ueruemchi), and alarm bells and sirens went off. I myself was in the Tarim Basin at the time and was heading from Khotan and Niyä (Niyae) for Chärchän (Chaerchaen) (Qiemo). By the time I reached Chärchän (Chaerchaen) the "distinguished white haired professor from Peking" was being held under house arrest -- together with his Zaghunluq loot -- in the same guest house where I stayed. I just managed to make it to Zaghunluq for a badly needed survey before the authorities from Ürümchi (Ueruemchi) descended upon Chärchän (Chaerchaen).

(One of my informants for the non-sensitive portions of the preceding two paragraphs was Tursun Bäkri [Baekri], a local culture worker who is thoroughly acquainted with archeological sites and activities in the Chärchän [Chaerchaen] area.)

I do not know exactly what happened to the "distinguished white haired professor from Peking", but it is better not to repeat here what I **do** know, other than to say a few words concerning the aftermath of this sensational series of events. The main upshot of the abruptly terminated, unauthorized excavations of the "distinguished white haired professor from Peking" was that Wang Bo, an archeologist attached to the Ürümchi (Ueruemchi) Museum was dispatched to Zaghunluq in the fall of 1996 and instructed to bring back

everything of value that he could lay his hands upon. And what a haul it was!! On Friday, June 27, 1997, I was afforded the extraordinary privilege of examining the storage and work room where all of the materials brought back from Zaghunluq were being kept. This is an enormous hall. On the second floor of the Museum, this hall had served as the exhibition room for the finest pieces from all of the different collections until it was given over to Wang Bo for the newly recovered materials from Zaghunluq, the other items being sent back to their respective collections throughout the Museum.

Here is a brief itemization of just a few of the most important objects that I saw on June 27, 1997: an exquisite, small, sharp, brightly shining stainless steel (the first in the world?) needle that was surely genuinely ancient because it was found undisturbed inside of a little box that was tied up and placed in a bag; two of the earliest extant and best preserved harps in the world (one smaller [violin sized -- about two feet long] and one larger [viola sized -- about three feet long], according to Bo Lawergren [an expert on ancient instruments to whom I described them] they are similar to the famous harp from Pazyryk [the famous Scythian tomb preserved in ice north of the Altai]); early chopsticks; numerous spindle whorls, some of them shaped like propellers; combs for removing lice; forty odd large cardboard boxes stuffed with mostly very well preserved textiles (including one of the most beautiful pieces of embroidery I have ever seen in my life -- with a luscious green background and, if my memory serves me correctly, gold thread among the other colors woven into its surface, all fresh as if it had been completed yesterday); bundles of sticks about twelve inches long (always approximately eight in number), some with different colors of thin yarn (especially red) tied around their tops and kept in cloth wrappers or bags (since these bundles of sticks are found in many of the Zaghunluq burials, they were obviously very important for the ancient inhabitants of that place -- I believe that they are comparable to the bundles of *_barsom_* sticks carried by Iranian magi, that they may well have been used for purposes of divination, and that they are probably related to the milfoil sticks associated with consultation of the *_Zhou yi [Zhou Changes]_*).

It is curious, in fact astonishing, that the only human remains brought back from Zaghunluq by Wang Bo (at least the only human remains in the enormous work room that I visited and that he acknowledged to me) was the severed head of a man wearing a felt helmet (very much like the one on the man from Subeshi whom I call The Hero) and with a goatskin mask stuck tightly to his face. Having been to Zaghunluq just a few months before Wang Bo began his rescue mission and having seen countless human remains scattered about on the ground, I find it difficult to believe that no well-preserved bodies were left for him to recover -- unless the "distinguished white haired professor from Peking" took everything else (but that is impossible because he was stopped short after

excavating only two graves), or unless the salt diggers who come up to the Zaghunluq graveyard everyday suddenly increased their digging a hundred-fold, or unless plunderers and adventurers overnight increased their depredations a thousand-fold, or unless someone systematically and intentionally removed all of the human remains left at the site, or unless higher authorities had directed Wang Bo **not** to bring back any human remains.

For me, this is now by far one of the biggest mysteries (among countless big mysteries) surrounding the ancient peoples of Eastern Central Asia. Zaghunluq is a huge cemetery that stretches across the perfectly flat, barren, pebbly, salt-encrusted tableland for thousands of square meters (about 1,100 m X 750 m) in all directions. The extremely high aridity and salinity of the environment, plus the bitterly cold winters, torrid summers, and tombs designed to allow the circulation of air around the bodies of the deceased combine to ensure that the Zaghunluq mummies and their artifacts are the best preserved in all of Eastern Central Asia. Furthermore, despite the intermittent intrusions of the salt diggers and the occasional grave plunderers and robbers, the vast scale of the graveyard and the fact that the tombs are barely evident on the surface until they are actually dug mean that when Wang Bo arrived there on his salvage mission in the fall of 1996, there still must have been countless well-preserved bodies buried in the salty sands of the Zaghunluq terrace cemetery. This is all the more likely to be true because of the sheer magnitude of the textiles and other artifacts brought back from Zaghunluq by Wang Bo and his team -- amounting to several truckloads! If the salt diggers, wood gatherers, grave robbers, tomb plunderers, and other assorted looters had left so many valuable textiles and other artifacts in the ground for Wang Bo to retrieve, surely there would have been at least scores of well-preserved "worthless bodies" left behind as well. I have with my own eyes seen plentiful ancient human remains strewn all over the desert floor in Eastern Central Asia. Salt diggers, wood gatherers, grave robbers, tomb plunderers, and other assorted looters are not interested in human remains. They tear them to pieces and throw them aside in their lust for gold, bronze, jade, pottery, fine textiles, and other items they consider precious. The same is true elsewhere in China and, indeed, has been true of such dastardly creatures elsewhere throughout the world from ancient times to the modern day. So what happened to the bodies of all the other ancient citizens of Zaghunluq who were buried on that dry, salty tableland? This is a deeply troubling puzzle.

I wish to make it clear that, in raising the questions I do in the previous paragraph, I am not casting the slightest aspersions upon Wang Bo, for whom I have great respect and whom I consider to be an excellent physical anthropologist and archeologist. If something is amiss in the way the missing mummies of Zaghunluq have been handled, we must look elsewhere than toward Wang Bo.

But let us return now to FT whom we left on the road to Kawa Eriq. What did they see when they got there? As they approached the site, they saw a "slope as big as a dam" (this must indicate that Kawa Eriq is on a tableland or terrace similar to many other cemeteries in and around the Tarim Basin). The motorcycles they were riding had to be shifted to a lower gear to climb slowly up the steep slope (exactly the same thing is necessary at Zaghunluq, etc.). (Since FT don't mention a concrete marker with a plaque identifying the site that is prominently placed to the right side of the sandy road at the bottom of the slope at Zaghunluq, this is all the more reason to believe that they were at Kawa Eriq or some other comparable site and not at Zaghunluq.) When they reached the top, they saw a totally barren *_gobi_* ("pebbly desert") for as far as the eye could reach. A hundred meters away, there was a solitary, windowless, flat-roofed building that was about half as large as a basketball court and made of brick (perhaps sun-dried, although FT do not specify what kind of bricks they were). Their guide opened the door of the building, looked at Tango's camera and VCR, then let them go in without saying anything.

Fengren writes that he was stunned from the moment he entered the building. Inside was a large, earthen pit over three meters deep. At the bottom of the pit were three desiccated corpses. They were naked and had yellowish, shrivelled skin, yet their bodies were completely intact. Their eye sockets were large, but dried out and empty. They had no hair. (This is surprising to me [VHM].) One was lying supine with limbs extended; two were lying on their sides with their bodies curled in a fetal position (FT say the arms of these two seemed to be "struggling" [*_zhengzha_*]). FT stood at the side of the pit holding their breath. Their hearts were beating rapidly, but they were not afraid. In the strange atmosphere, the young guide explained to them that the mummies had been discovered when some local Uyghurs began to dig here in a search for stones to build a house with. (This makes slightly more sense than that they were diggin a ditch, as Tursun Bäkri [Baekri] had told me, since it is highly unlikely that there would be scarcely a drop of water up on the dry, flat tableland.) The guide went on to say that he couldn't understand why they would be digging there for stones, but that's what they apparently did (so he thought). Anyway, as they broke through the surface with their shovels, the soil slipped down into a cavity. Some reed mats were revealed and the sandy soil continued to run down into the opening they had made. At this point, the Uyghurs who were doing the digging reported what had happened to the Public Security Bureau. Public Security sent some men out to check and they realized that it was an ancient grave. Thereupon a pit was dug inward from the side and a wooden structure made of logs and branches was discovered. After that, those who were carrying out the preliminary investigation came upon an ancient corpse which is ostensibly still lying in the position where they found it. Unfortunately, this tomb

originally consisted of two levels but the men who were excavating it were unaware of that at the time, so the first level collapsed down into the bottom level and there is now just a single large pit. (This information is very valuable for comparative purposes. Tombs of similar two-level wood framework construction have also been found for a comparable period at Barköl [Barkoel] [Balikun] which is at the far eastern edge of the Tängri [Taengri] Tagh north of Qumul [Hami]. One of them, complete with its Caucasoid inhabitants, has been reconstructed in the first hall of the Ürümchi [Ueruemchi] Museum.)

Later, representatives from the Institute of Archeology in Ürümchi [Ueruemchi] arrived and were confronted by many puzzles that were difficult to solve. First, the race of the mummies was neither Han nor that of any of the peoples of modern Xinjiang, such as the Uyghurs and Kazakhs, so the racial affinities of the mummies was undetermined. In any event, they were neither East Asian nor Middle Eastern. Secondly, the placement of the bodies in the burials was very strange. It was not like that of Han people or Westerners who bury their deceased supine with arms extended flat at their sides or folded over their chest. Nor did the mummies have their heads pointing to the west as is the case with Islamic burials of the region. Rather, the burial postures seemed to be more casual. Third, the burials were multiple (done at more than one time) and multi-leveled, which is a rather rare phenomenon anywhere else in the world, and burial customs are not readily changed. At the second level were found two adults, a male and a female, and at the first level were found two boys, one of which has been taken to the Institute of Archeology in Ürümchi [Ueruemchi] (I suspect that this is the boy of about 8-10 years age that I saw for the first time on my third visit to the Korla Museum in 1997 with a plain colored cashmere bonnet somewhat like the blue one of Baby Blue Eyes [but not quite so soft and fluffy] and a shroud a bit like the tour de force sampler of the baby from Könchi [Koenchi] River [1800 BCE] in the Ürümchi [Ueruemchi] Museum; Korla is the administrative center of Bayingholin Mongolian Autonomous District, an enormous part of the Uyghur Autonomous Region to which Chärchän (Chaerchaen) belongs). Thus, the burials must have taken place at more than one time. It is not known whether there was a third level. Fourth, it is odd that, although the area around this grave was probed, no other graves were found. This was an unmarked, single grave. (As we have seen, the grave in question is not at Zaghunluq, but it does seem to be part of Kawa Eriq or another late Bronze Age / Early Iron Age cemetery in the vicinity. All along the southern rim of the Tarim Basin, from Khotan to Chärchän [Chaerchaen], wherever there are modern oases [and there are many of varying size] there are bound to be ancient cemeteries on the tablelands at the outskirts of the arable and irrigable lands. Just to the east and west of Chärchän [Chaerchaen], there are at least half a dozen, some dating to as late as the Han

period [2nd c. BCE-2c. CE] and the Jin period [265-420 CE]. The ecological conditions of two to three thousand years ago were almost the same as they are today, except that in ancient and late prehistoric times the oases reached farther out into the desert along the rivers and streams flowing from the Qurum [Kunlun] and Altun [Aerjin] mountain ranges than they do nowadays.) Fifth, the age of the corpses is not known for sure, but they are certainly several thousand years old, at least four thousand. (This is not very likely. Judging from their general location and the description of the type of burial and its contents, the grave in question is probably between 2,400 and 3,000 years old. [VHM])

After the guide had made these remarks, FT circled around the pit. As they did so, they were told that there had also been animal bones and pottery associated with the burial, as well as bronze and iron spear tips and wooden shafts, but these had all been taken away by the Institute of Archeology (presumably the one in Ürümchi [Ueruemchi], but FT do not make that clear [VHM]). In one corner of the building there was a pile of tattered reed mats. FT went over for a look and broke off bits of them. They were made very simply and were used together with a wooden frame made of different lengths of logs and sticks to separate the two levels of the tomb. Then FT went back to look carefully and thoughtfully at the three corpses that were still lying in the bottom of the pit.

Upon being asked by Jingyuan Liu (via e-mail) the following three questions (1. is it true that none of the three corpses had any hair? 2. is it true that none of the three corpses was wearing any clothing at all? 3. was the sand around the grave just regular sand or did it have a high salt content?), Fengren supplemented his description with these remarks: The windowless building had been constructed by the Institute of Archeology. Because the building was still unfinished at the time FT went there, it was not open to the public. Scarcely any light filtered inside and it was thus very dark and hard to see things. The adult male and female corpses did not have any hair. The boy that FT saw had a small amount of blond hair. Although he was young, the lad was quite tall. Although his body was all curled up and his flesh was shrivelled, he was so tall that FT at first mistook him for a full-grown woman. As for whether or not the corpses were wearing clothing, FT thought that the Institute of Archeology may well have removed it. Furthermore, on the pile of reed mats in the corner of the building, FT saw some fragments of what seemed to be sackcloth or burlap. FT, moreover, agreed that the site they visited must have been a somewhat elevated salt flat that seemed to stretch on endlessly (like Zaghunluq [VHM]) and whose surface was covered with small pebbles. The tomb was sunk in a loess pit, not in sand. (I am dubious that it was loess [VHM].) The desert was several tens of kilometers to the north. To the west at the foot of the slope about ten kilometers away were Uyghur villages. Along the Chärchän (Chaerchaen) River there are large rocks and trees, so FT

could not understand why the Uyghurs would have come up on the tableland to seek rocks for building. (I think that they were actually up there looking for something else, perhaps salt or something else of still greater value to them [VHM].) It is significant that the bronze and iron arrowheads that were said to have originally been found at the site soon disappeared.

After further communications with Fengren, LIU Jingyuan learned that the tomb he visited with Tango in 1997 had been discovered in the latter part of 1995. This agrees perfectly with my surmise that they may actually have visited Kawa Eriq without realizing it.

I had heard from several other sources that the local cultural authorities at Chärchän (Chaerchaen) were attempting to construct a small museum at the site of an ancient graveyard, so this must be the building where FT saw the three mummies *in situ*. I am not aware of the current status of this museum.

This report, although sketchy and full of surmises, is valuable because it provides firsthand evidence of more mummies being discovered at Chärchän (Chaerchaen). Although the description was not made by trained archeologists, the details related by FT are sufficiently specific that they can be used in combination with and tested against information from other sources. The FT report confirms my own observations at dozens of sites throughout vast stretches of the Tarim Basin and surrounding areas since 1993. We may conclude that: 1. extensive settlement of the region begins early in the second millennium BCE; 2. the earliest occupants are virtually all Caucasoids, Mongoloid elements gradually showing up in the easternmost portions of the region (e.g., the Qumul [Hami] area) only from around the first millennium; 3. once settlement began, populations grew rather quickly to large numbers (judging from the enormous ancient cemeteries I have visited and some of which are described in the book by Mallory and me listed in the bibliographical note below); 4. disturbances of graves, together with physical destruction of the human remains and their associated artifacts, have occurred on a massive scale at many sites (done by treasure hunters, wood and salt gatherers, people building new graves on top of the ancient ones, or simply malicious individuals); 5. gathering precise and complete data about archeological sites in Eastern Central Asia is both difficult and frustrating because of their remoteness and because to this date there has only been one single final site report published for the whole of Xinjiang, namely *Beiting Gaochang Huihu Fosi yizhi (Ruins of a Buddhist Temple of the Khoco Uighur Period at the Ancient City of Beiting)*, an account of investigations of a 10th-13th century monastery at the Uyghur capital at Beshbalik about a dozen kilometers north of Jimsar county town. The

excavations were carried out by the Xinjiang Archeological Team of the Institute of Archeology, Chinese Academy of Social Sciences (Peking) during 1979 and 1980. The final report on the Beshbalik Buddhist temple was published by Liaoning Art Press in 1991. The only other site report that is close to publication is that by Lü [Lyu] Enguo and colleagues for Charwighul (Chawuhugou), site of a sprawling series of five cemeteries dating to approximately 2500-3000 BP that is located in the foothills of the Tängri [Taengri] Tagh (Tian Shan) about 30 kilometers northwest of Khotunsumbul (Hejing) county town. Excavations were carried out mostly in the second half of the eighties and the bulk of the final report was completed by Lü [Lyu] Enguo already by 1996. I have personally provided funds for the publication of the site report, but for reasons too complicated and sensitive to go into here, it has still not seen the light of day. The writing of final reports for other extremely important Bronze Age and Early Iron Age major sites -- e.g., several in the Krörän [Kroraen] / Kir'uran (Loulan) area, Qaradöwä [Qaradoewae] (Wupu), Sampul (Shanpula), etc., for some of which excavations were undertaken as much as two decades ago -- have scarcely been begun. In most of these cases, we are lucky to have very brief, preliminary reports in newspapers and journals.

Bibliographical note

For more information about mummies specifically from Zaghunluq, see the follow two items:

Dolkun Kamberi, "The Three Thousand Year Old Chärchän Man Preserved at Zaghunluq." *Sino-Platonic Papers*, 44 (January, 1994).

HE Dexiu, "A Brief Report on the Mummies from the Zaghunluq Site in Chärchän County." In Victor H. Mair, ed., *The Bronze Age and Early Iron Age Peoples of Eastern Central Asia*, 2 vols. (Washington, DC: The Institute for the Study of Man; Philadelphia: The University of Pennsylvania Museum Publications, 1998), pp. 169-174.

For more information about the mummies of Eastern Central Asia in general, their artifacts, and their culture, see the following three items:

Victor H. Mair, ed. *The Mummified Remains Found in the Tarim Basin*. A Collection of Papers in *The Journal of Indo-European Studies*, 23.3-4 (Fall/Winter 1995), 279-444. This collection includes rare photographs of Zaghunluq mummies.

Elizabeth Wayland Barber. *The Mummies of Ürümchi*. New York and London: W. W. Norton, 1999. See especially chapters 2 and 3 for the mummies of Zaghunluq.

James P. Mallory and Victor H. Mair. *The Tarim Mummies: Ancient China and the Mystery of the Earliest Peoples from the West*. New York and London: Thames and Hudson, 2000.

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8/IV/99

More New Information about Ancient Mummies in Xinjiang

In my last report (8/IV/99), I mentioned that when Wang Bo went to Zaghunluq in the fall of 1996 and hauled back to Ürümchi turckloads of textiles and artifacts, he surely must have encountered numerous human remains. I was puzzled that he did not bring back any (except the human head that was tightly covered by a leather mask). My surmise was correct, and now a tiny bit of the evidence has leaked out.

In a new book entitled *Zhongguo yinyue wenwu daxi [China's Musical Relics Series]*, Xinjiang volume, chapter 2 features what the authors call a "vertical harp" (it looks more like a cross between a harp and a violin to me). Anyway, it is a very important find and I did mention it in my previous report. Since this report does not focus on the harp itself, I will not describe it in detail. Rather, I will merely describe the circumstances in which it was found.



Date: 4th-3rd c. BCE

Accession #: Xinjiang Uyghur Autonomous Region 96QZ1M14:20

Archeological data: Unearthed in 1996 from tomb no. 14 in the no. 1 sector of the southwest area of the no. 1 cemetery in the village of Zaghunluq in the township of Toghraqliq, Chärchän County. [VHM: One can get an idea of the vast scope of the Zaghunluq cemetery from the way it is divided and subdivided here.] The burial is in a rectangular shaft tomb with a single passage and a mat frame. The tomb passage is oriented to the west with an inclination of 18° (eighteen degrees) to the north. The grave

entrance is 7 m long and 5.6 m wide. The grave is 2.2 m deep. **There are at least 19 bodies in the tomb.** [VHM: Emphasis added. The fact that the exact number was not determined indicates that human remains were not part of Wang Bo's salvage mission.] Most of them are supine with limbs flexed. [VHM: Exactly like Ur-David and the two women who were buried with him nearby.] When the "harp" was unearthed, it was lying across the chests of cadavers I and J (I is a child and J is a middle-aged female wearing a dark brown cap). [VHM: The harp is 86 cm long.] Also unearthed from the tomb were wooden combs, wooden ornaments for suspending from the waist, wooden spindle whorls, woolen textiles, a small amount of pottery, iron implements, grindstones, etc.

End of translation

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As to why Wang Bo did not bring back to Ürümchi or describe any of the human remains and why neither he nor anyone else mentioned human remains to me (even though I asked him about them) or to anyone else, I believe the following factors may be operative:

1. Wang Bo was simply instructed by his superiors to bring back as many cultural relics (*wenwu*) as he could get his hands on.
2. There are no facilities to store or conserve additional human remains properly in Ürümchi, Korla, Chärchän, or elsewhere in Xinjiang.
3. There is little interest in Caucasoid human remains, but lots of interest in cultural relics.

VHM

Comment by VHM:

Wang Bo and his crew must have gone through at least scores of tombs similar to 96QZ1M14 in the fall of 1996. It is quite probable that the mountains of textiles I saw in the early summer of 1997 were removed from the bodies of individuals buried in the tombs. The reason I say this is because there were so many extremely fine, well-preserved

textiles in Wang Bo's storeroom, yet the ancient people of Zaghunluq were not given to burying large amounts of extra clothing along with their deceased.

If Wang Bo found at least 19 bodies in 96QZ1M14, then, in his fall 1996 foray at Zaghunluq, he must have encountered a total of hundreds (and perhaps even more) bodies when he went through all of the tombs in that vast cemetery. I repeat: the quantity of artifacts brought back to Ürümchi in the fall of 1996 is simply astonishing (see my previous report for a brief description). The number of tombs that would have had to be opened to yield that amount of material would necessarily be quite large.

So, the burning question is this: what has happened to all the bodies that Wang Bo encountered? Are they still in the ground? If so, now that the graves have been opened and disturbed, the denuded bodies are surely in danger of damage from salt diggers, the elements, and other factors. I believe that we are facing a terrible crisis. If the bodies are still intact, they will not remain so for long. I have with my own eyes seen ancient human remains scattered across the desert at dozens of sites in and around the Tarim Basin. Will the same thing happen at Zaghunluq? Can the world do anything about it?

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24/IV/99

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**EX NOCTE LUX  
Unriddled Pre-History  
In Light of the Most Recent Research**

H. K. Horken  
1898-1996

Ernst Wasmuth Verlag, Tübingen 1972

Review and summary-translation  
by Adelheid E. Krohne

INTRODUCTION

This book was first published nearly thirty years ago. Much has changed since -- a wealth of new discoveries (the inclusion of which is too voluminous but in concert with the subject here), time-measuring techniques and continuously shifting timetables. The author was an exceptional researcher who combined careful argumentation and scientific overview with the eye of an accomplished artist and experienced sailor.

The significance and impact of the ice age on the history of the beginning of mankind as well as its consequences is exceedingly complex and difficult to present compressed into this limited space, complicated by the constant desire for digression for the sake of clarity. The author has not invented anything new or unusual, presented no new discoveries, nor did he engage in wishful thinking or modish ideas. What he did accomplish, based upon years of observation and long reflection, however, is probably the first undertaking of a synoptic presentation of the relationship between man, the glacial occurrences and global evolution, as based on climatic, geophysical, pre-historical, archaeological, anthropological, biological, ethnic, linguistic, mythological and other factors.

The core of the book is The Conceptual Model (translated here in its entirety). It lays out an ingenious as well as amazingly simple idea which sheds new light on a number of previously vexing, unrecognized or misunderstood problems of interest to the above fields.

Technical literature is expansive, unclear and (especially for the layman) difficult to come by. However, what is known about pre-history is usually without satisfactory written evidence, hypothetical, at times incomplete and contradictory. Often, just at the most critical points, plausible explanations of the who? how? when? why? and from where? are missing.

Therefore, it is not surprising that two or more scientific theories about a given phenomenon have opposed one another or cancelled each other out altogether. Only if one is aware of these facts is it possible to gain a clear picture of the tremendous accomplishments and appreciate the difficulties in the sector of early man and pre-history.

By drawing on a multiplicity of theories, the author builds on those that “fit” logically within the framework of The Model and carefully explains why others no longer stand up to scrutiny.

Horken introduces the fruit-eating prehomnids that become hunter-gatherers and began roaming from tropical zones into moderate climates of Eurasia, their dependence shifting from flora to fauna and migratory game becoming their life support. Remarkable distances were covered throughout the land, and eventually continents, on long established elephant-, rhinoceros- or mammoth paths, and later those of bison, reindeer and stag.

Horken’s Model introduces the Gulfstream and leads us into the Arctic where new lands are rising in the shelf areas and eventually are heated by the Gulfstream. We obtain a graphic picture of the Northern Hemisphere, its flora, fauna and climatic fluctuations forcing hunter-gatherers and coastal dwellers in search of new homes and out of each other’s way.

In his review of EX NOCTE LUX in *Anthropos* (1975), Prof. Werner Mueller stated “here alone an important consequence is to be considered -- the new shelflands are habitable and have, without doubt, offered habitat to coastal cultures”. Horken vividly lays out the development of this culture “behind the ice” and is now supported by an old source. *The Theological Historian*, Otto Huth, Tübingen (1972) said: “It appears to be a stroke of luck that the most important work which would have contributed to (Horken's) theory had escaped him; now it becomes demonstrable validation of great weight: the comprehensive book of the Indologist Bal Gangadhar Tilak, *The Arctic Home of the Vedas* (Bombay, 1903). His scrutiny of the Vedas' calendar led to the realization that their original home lay in the Arctic. At the time Tilak’s conclusion appeared too curious to be regarded as noteworthy -- now it can be put in its proper place.” In that work Tilak explains that, “in light of the latest research in geology, archaeology, linguistic palaeology, comparative mythology and astronomy bearing on the primitive history of man, I was gradually led to a different line of search... that the ancestors of the Vedic Rishis had their home near the North Pole but migrated southwards because of the unwelcome climatic conditions of their original home.” Prof. Mueller continues that “this new interpretation of glacial manifestations obtains a highly significant weight in the history of civilization.”

Horken goes on to examine in detail the migration northward into the rising shelflands and explores these peoples’ existence “behind the ice”. In this sunless, foggy

land, they lost their pigment and a rich seafood diet contributed to their statuesque physique. As a result of being closed off from the rest of the world for roughly 42,000 years or 1,300 generations between glacial events, these people were dependent upon themselves. Constantly challenged by their environment, they developed their own strong characteristic attributes. They had to deal with matters others might have skirted around. The farther north they advanced, the darker the winter nights were -- a hard school for thinking. The geophysical circumstances of their existence led to their belief -- simple, impressive and based on the annual rhythm of nature.

Hermann Wirth recognized that the oldest writing did not originate in Mesopotamia or for purposes of commerce but evolved from religious symbols. For instance, the course of a year depicted by two opposing halves of a circle representing day and night, life and death; man's greeting of the sun with up-raised arms, and representing life, appears in a form similar to the letter "Y", but, in contrast, that symbol with the arms lowered reflects the sinking sun, nature's rigidity, sadness and death. The world's oldest ideogram denoting death and rebirth, the great annual central occurrence, is the cross within a circle. The Nordic belief blends structurally and logically into The Model's concept, supported by Tilak's beautiful rendition of the Vedic bards. This could only have evolved in the seasonally accentuated North, had to originate there and would be unthinkable elsewhere.

Over thousands of years, these Nordic peoples forged social cohesion, developed and improved utilization of their resources such as fishing, gathering and provisioning for the long winter. Living by the sea, they learned going to sea, boat building, seafaring and overseas commerce. Traces of their goods, amber and Cornwall tin, for instance, are being found to this day far from their original sites. All such exploits promote organization and discipline, which, in turn, must have enhanced their vocabulary. Time was available in large quantity but dire needs hastened rapid progress. They worked metals, built chariots, and, according to Tilak's studies of Comparative Philology, they founded cities, made considerable progress in agriculture and knew the art of spinning and weaving.

While the Nordic coastal dwellers settled the northern new lands, the Asian hunter-gatherers escaped Central Europe's inhospitable loess storms by making their way south into the pluvial paradises of the Sahara and Mesopotamia.

The Model details how, when the ice melts, the sea level rises and the new shelflands begin to submerge again, leaving escape routes for these Nordic peoples "behind the ice" open only toward the south or via the sea route. Tilak also discourses from *Rig-Veda* and *Avesta* passages which tell that "the happy land ... the paradise, was located where the sun shone but once a year and that it was destroyed by the invasion of snow and ice which ... necessitated migration southward". Tilak went on to state that "it is not

unlikely that their primeval home is located to the north of Siberia rather than Russia or Scandinavia". And that is where Horken places the new shelflands -- Novaya Zemlya, Franz Joseph Land, the Laptev Sea and the New Siberian Islands. Escape from there was possible only via the rivers Ob, Yenisey and Lena into the regions of the Kaspian Sea, Lake Balkash and Western China or via the Amur river towards Sakhalin, Japan and south into the Manchurian and North China Plains.

The glacial mechanism as laid out in *The Model* serves to delineate at what time and at what place, in which order and to what extent during the glacial ups and downs of new lands rising from the seas or sinking again, man arrived, settled, expanded and when he had to flee once more. It was not easy for early man to cope with life -- he had to develop ingenuity to survive.

In their flight, waves of bands and tribes of peoples meet, collide, conquer or are themselves conquered. Some eventually return to their old homelands generations later when the shelflands rise again, others continue to migrate over the continents and populations increase.

The Mesopotamian region became a turnstile for a constant stream of migrating peoples. In search of new habitat, they spilled over the mountains from north and east and via the sea routes from the south. Hunger and overpopulation forced migrations onward.

Wherever the Nordic peoples traveled -- by land or by sea -- they brought with them their habitus, their culture, belief, symbols, rituals, and language which had developed behind the ice; and leaving the traces of their culture, their symbols, language and ancient memory, where they still can be found in the mythos of Homer, in India, the Sioux, the Cheyenne as well as the old Peruvians.

The existence of these ideograms, of which only a small number are cited, and their distribution, are not to be glossed over and are known to science. However, as long as the unfounded "Ex Oriente Lux" theory continues to dominate the field, which sets correlation on its ear, the explanation of the riddle of the symbols will remain as "radiating from Mesopotamia". The questions of how and why such symbols could have originated in Mesopotamia, their meaning, and in what manner and via what route they "radiated" into China, the North and the West as far as the Americas, remains unexplained. The persistence of "radiation" from Mesopotamia far to the East, far to the West, and even to the North, is without any evidence, factual basis or rational, technical possibility.

With inception of the carbon dating method, the Ex Oriente Lux dogma becomes less and less sustainable, time differential of some finds amounting to as much as several thousand years. The more tests are undertaken and the more new discoveries are made away from Mesopotamia, the greater the likelihood is that many cultural artifacts were

brought into Mesopotamia and are not a product of “radiation” outward. These controversies will increase over time. A case in point is the discovery of early writing in Transylvania, which carbon-tested as the earliest script in Europe and is considerably older than the “corner-stone” writings upon which Mesopotamia based the title to “the cradle of civilization”.

Through their fate, the Nordic peoples had become seafarers par excellence. Their basic language contains unmistakable maritime terminology. There is no harder school of learning than that of seafaring, with shoals, ebb and tide, spring tides, near incalculable currents and groundswells. Nothing compares with the wealth and force of often opposing powers at sea, which the sailor cannot escape. Boat construction had to be based thereon, which trained -- indeed compelled -- these ancient seafarers to become outstanding shipbuilders. In addition, at sea one is unable to assemble a workforce as on land, but is dependent on his own technical ingenuity. Seafaring demands the understanding and use of the laws of nature, and to master them has, at all times, been at the forefront of technical advances. Even in pre-historic times, shipbuilding was intellectually the key industry. It challenges every technical problem to the highest degree. Prof. Huth states “the opponents of this thesis, the *Ex Oriente* dogmatists, criticize without perspicacity. The author (Horken) has recognized the great cultural historical role of seafaring, while most general historians are amazingly water-shy.”

The natural elements and reckoning thereof, led early on to the concept of a calendar, which had its beginnings in ideograms. Tilak adds, “it may be easily seen that the many traces of the Arctic calendar are still discernible in the mythology of the Celts, Teutons, Lets, Slavs, Greeks and Romans”.

It would be a worthwhile task for science to get to the bottom of the fact that, wherever in the Mediterranean regions and the Near East, copper, bronze, and iron appears, human influx from the North has been established. Also, wherever these Nordic peoples appear, they already carry such crafted metal products with them.

It is in the nature of a synopsis to make do with indications, going into detail only where vital facts, hitherto unknown or misunderstood, need to be illuminated. For instance, there is no dispute that Nordic peoples settled in India. This does not mean, however, that the *Ex Oriente Lux* hypothesis did not create confusion in that regard. In China, by contrast, the dilemma of dating vs. “radiation” is particularly evident.

The Mongolian type verifiably developed during the ice age. The post-glacial cultures, from the Mesolithic and Neolithic Periods, roughly speaking, did not exist south of The Great Wall (which, of course, did not exist at that time) but were amply represented in the region to the north thereof. The Chinese themselves begin their mythology with the

Three Dynasties, as their first Emperor Fu-hsi is supposed to have lived 4480-4365 BC. This would correspond with pre-dynastic Egypt or approximately the Samarra-, Halaf-, Obed time in Mesopotamia. The Chinese claim seems to be logical but science does not recognize it -- the "radiation" gets in the way and, besides, it has no historical basis.

From its beginning Chinese history is imprinted by incursions of barbarians from Lake Balkash via Dzungaria-Gobi. Cultural influences from that direction have been unmistakable over millennia. If one believes in the direct route of cultural influences from the north, as well as to Mesopotamia and into China, one cannot fail to recognize the historic-mythical concepts falling structurally into place with the discoveries of religious, linguistic and racial elements via Mesopotamia and India.

Despite much effort, discerning conclusions and deserved successes, and despite significant appreciation of a growing body of new finds, the entire sector of pre- and early history remains fragmentary. The picture of habitus, characteristics, origins and migratory movements of early man remains, overall, bleak, despite some convincing breakthroughs, as well as many considerably misunderstood points and great gaps.

It would be of the greatest benefit to attempt to see the glacial scheme of The Model clearly, based on all collected finds and facts and used as a guideline, reliably and methodically ordered. One may imagine all cultural developments, and traces of pre-historic and early man imposed on uniform transparencies to be overlaid on a Mercator projection: from *Homo habilis* via *pithecanthropus*, Heidelberg man, etc.; to the finds of Neanderthal and Cro Magnon; from pebble tools to the various tool types, ceramics, beaker cultures; to idols, symbols, early letter forms, reliefs, sculptures, structures, early agriculture; to domestication of animals. All such relics are to be appropriately entered at their site of discovery. These transparencies, sorted into the various fields of research, may then be placed upon one another. Thereby the reviewer would not only obtain a graphic overview of early cultural properties of mankind, but at the same time discover a curious phenomenon revealing itself: Again and again, and in the remotest places, the same markings appear.

Influences become evident, from the writing of the Nordic peoples, which developed from their death and rebirth ideograms, to the dynastic linear script of Egypt and that from the Red Sea's cultural center. Similar idiosyncrasies are found in the old Sumer and Mohenjo-Daro letters (on the Indus) which obviously emanated from the seafaring culture of the Red Sea. There are textile patterns, also carpets, extending from southern Russian regions, eastern Iran and farther east deep into China where the motifs reappear on lacquer bowls and in silk designs. But they also show up in the American West, in Central and South America.

There are the close relationships of Egyptian, Mesopotamian, Far Eastern and American architecture (covered elsewhere in the book). Old Norwegian roof construction is of startling similarity to Chinese temples. Two-wheeled wagons on the Volga bearing strong Nordic resemblance reappear in the Chinese terra cottas of the Han. These connections continue in linguistics. Philological science has identified a considerable number of Chinese words of Indo-European origin. One of the most important is *ma* (Old High German *mara*) for horse, according to H. Jensen. On both sides of the Pacific, one meets *Knotenschrift* ("knot-writing," i.e., *quipu*) and Maori sagas resemble in detail Nordic myths. The opening of the cranium (often inappropriately referred to as trepanation) is the most peculiar phenomenon which one encounters in early times the world over.

These are only a few suggestions, lightly touched upon, for a phenomenon which reveals itself more and more frequently the deeper one delves into these transparencies. Close connections appear unverifiable and the route thereto, under present notions, often "mysterious". But there are no riddles in nature, only gaps in human knowledge.

If one were now to enter the new shelflands into these proposed transparencies, where this Nordic race from "behind the ice" came into being, and the forced escape routes via which they could and had to flee whenever climatic conditions worsened by a few degrees (making life impossible in those dark regions where it could barely be maintained in the best of times), the picture changes with one stroke. But it is not with "one stroke" that all problems could be solved, aside from the fact that the "one stroke" consisted of many. It would appear, however, that a useful basis for comprehensive and productive research in all specialty areas of archaeology has been found.

This much becomes clear: the same people in different areas imported the various cultural products at different times. The paths and epochs become plausible and correspond to their technical capabilities. This impression intensifies if one replaces the Mercator principle with a true-to-scale Azimuthal projection. Indeed, the paths and epochs present themselves as a series of plausible routes across the Atlantic, along the Eurasian rivers and across the Pacific in the northern latitudes. The so-called Mesopotamian "radiation theory" offers no satisfactory answer to the questions why and how. However, if one recognizes these Nordic peoples' "cultural catalyst" as a so-called "missing link", spontaneous and convincing answers result. It requires no "adventurism" or "wanderlust" — these people did not act voluntarily but out of bitter necessity, and then traveled, as a rule, on the escape routes available as set forth.

## TENTATIVE TESTS

Throughout two centuries the deluge theory was the dominating popular belief, stubbornly represented by the deacon and geologist Buckland. According to that, a tremendous deluge catastrophe, for which the bible text appeared to bear witness, was to have caused the many visible but at the time unexplainable changes on the earth's surface which so suddenly affected fauna and flora. Particularly puzzling were the glacial erratics in the European lowlands. In 1786, the mining director Voigt of Weimar hit upon the idea that ice might be an efficient means of transport for these boulders. While he only had movement from one river -- or seabed to the other in mind, it was the first step on the right path. About fifteen years later the British mathematician Playfair recognized that rocks could be moved over large distances by ice alone. Another twenty or so years later, an outsider, the Embassy counselor von Hoff in Gotha, developed the fruitful thesis that it is not the utilization of enormous and sudden energy, but great periods of time which are required to explain geology. With that, the persuasive argument was found to counter the defenders of the catastrophe theory. Sir Charles Lyell (1797-1875) meanwhile, motivated by Prévost, developed the same concept which von Hoff had established earlier. In his *Principles of Geology*, which aided in the foundation of modern geology, Lyell argues persuasively that the earth, during enormous time-spans, and precisely as a result of minute causes, can bring about vast changes. At the same time, Lyell toyed with the idea of the so-called ice drift theory. While it is possible that some rocks actually drifted on ice floes from Scandinavia to the northern German lowlands, this would have played a very minor role when compared with global transport. Help arrived with the representative of a new generation, Albrecht Penck (1858-1945), eventually one of the giants among the geomorphologists.

What others had labored and struggled with, Penck managed effortlessly with his logical and consistent concept. Nothing is more difficult and therefore more praiseworthy than to free one's self from the shackles of convention and the power of habit to obtain a clear view into a new landscape of thought. Only 21 years of age and based on his precise investigative findings in Northern Germany and Scandinavia, Penck ended the ice drift theory. With one stroke, he entered into the ranks of the most esteemed scientists. Instead of lofty theories, he relied upon mechanical efficiency and the laws of physics. The ice had left its traces, the scrape tracks on the walls and floors of valleys, as well as the huge deposits of scree slopes and moraines, often in layers or all mixed up, reaching far into the landscape. This handwriting of the glaciers, incised with tremendous pressure on smoothly polished rock is unmistakably legible.

During decade-long investigations provided by Plenck, the evidence continued to indicate that there were not one but four glacial periods, interrupted by three warm periods, all about the same length. He estimated the total length of this glacial age at 600,000 years, so those individual events played out over extraordinarily long time periods. If one considers all the decisive events which transpired during the epoch of the evolution of mankind, one is inclined to assume that the ice age lasted considerably longer. (Today one already deals in some cases with far greater concepts of time.) It is also assumed today that the glacial epochs were of irregular duration with multiple ice advances, and that actually only three glacial periods occurred in the north, and five in the south. The southern so-called Danube ice age, which preceded (up to now) the oldest considered glacial period, was itself divided into two cold and two warm periods. In North America, the problems are similar. The Eurasian and North American glacial events progressed similarly and yet again, in some respects, quite differently.

There were other interesting theories to account for global transformations, none of which, however, stood the test of time; neither the wandering poles nor the carbon dioxide thesis, neither sunspots nor earth axis oscillation. Even the Milancovič-Soergel curve lost its support when it no longer “fit” the latest ice age research or paleogeology. By 1964, David B. Ericson and Gösta Wollin, of Columbia University, published their 15-year study results in *The Deep and the Past*, thereby establishing the Ericson-Wollin Ice Age Timetable. Based upon sediments on the ocean floor and the microorganisms encapsulated in them, they established that the ice age began one and a half million years ago and lasted twice as long as had previously been assumed. This would mean, therefore, that it started 500,000 years after the appearance of *Homo habilis*. The intervening warm periods, according to Ericson-Wollin, lasted a particularly long time. (As of the writing of *The Model*, only five years had elapsed since the Ericson-Wollin study, which had not yet found universal acceptance.) The next ray of light shed onto glacial research came through the imposing science personality, geophysicist and polar explorer Alfred Wegener. His continental drift theory has contributed valuable suggestions, which form an important base for the concept of this book. The great American paleontologist Henry Fairfield Osborn espoused the principle of four inseparable factors in evolution by combining the (opposing) theories of Buffon, Lamarck and Darwin: heredity, individual development, environmental influences, and selection.

In his last decade, even Goethe pursued an interest in the subject of glaciers and remarked “for all of this ice we need cold...”. On this point science appeared to agree. But is this conclusive?

Glacial ice is re-crystallized firn, i.e. snow from prior seasons, which has become granular due to partial melt. The more snow falls and gradually fills the firn basin, the more its weight presses on the lower layers. This pressure is essential for it promotes the process of transformation. The conversion of snow into firn requires “only” about a year, while the transformation from firn into ice requires endlessly long time spans. It is through strong and long-prevailing pressure, when the air is pressed from between the firn grains, that it becomes glacial ice. The speed at which a glacier can advance, as measured by the slowness of geological events, is amazing. Measurements reveal that it is not so much the gradient of the slide surface below the glacier, but its size (its mass and weight) which is the determining factor. Like every animate organism, a glacier is of incredible vitality and requires an environment providing adequate nourishment. In these environs, above the snowline (be that high or low depending on climate), a glacier can live as long as its nourishment “grows”. It does not require additional cold, rather snow in sufficient amounts. No matter how cold, if no new snow falls, a glacier deteriorates. On the other hand, if instead of only mild cold, a muggy rainy period sets in after the “rain” falls as snow, then the glacier flourishes. The glacier does not require additional cold, but it certainly needs continual snow for its tremendous growth; in turn it sends its tongue with increasing speed into the foreland and creates cold. These events merely establish the laws of physics. We begin to get the idea, when pursued further, that this might be a suitable basis for the development of a Model exploring the physical mechanics of nature's processes in this far distant epoch.

If glaciers require these huge amounts of water, the sober question arises: where does all this “food supply” come from? How is it transported to the glacier? And where could such extraordinary masses of water come from in the form of snow? At the time, and through a mysterious mechanism on repeated occasions, there must have arisen, evolved and disappeared again, very effective pre-requisites for tremendous water-rain-snow masses around the arctic land circle. So long as we cannot isolate this mechanism, we cannot say:

- How the ice age came into being
- The course of the various phases
- Whether the process has ended
- Whether we are living in a fourth interglacial period
- And if so, how long this might continue

Above a frozen polar sea, no notable water content in the air could develop which is necessary for glacial development. A discussion of the course of the world's warm currents and their effects upon their respective inlands is examined in depth, focusing, for our purpose, on the Gulfstream, Europe's central heating system.

Also taken into consideration here is the origin of the word "weather", from the pre-teutonic word *wedhro*. This word was formed from the concept "blow", "move", and "wind", also known in Old Slavic as *vedro*. This philological affinity is particularly remarkable, as will be shown. Until recent times, weather prognostication was haphazard. The most favorable criteria were conditions on the high seas, based on centuries of exacting observations and log keeping. In the face of the weather's fickle resistance to scientific control, it might appear utopian to attempt to project a weather chart of the glacial and interglacial periods into the many millennia of the past. Fortunately a peculiarity of physics, independent of the weather comes to our aid here: the accumulation of air particles appearing as wind is subject to atmospheric pressure, the so-called pressure gradient force. But it is not only the power of these gradients which is crucial in the flow from high to low atmospheric pressure. As with all movable matter on the rotating earth (including the air particles in their collective total, viz., the "wind", in addition to friction, *the Coriolis force* also plays a major part. This diversional force operates vertically to the respective movement of the air particles i.e., proportional to their velocity. In the Northern Hemisphere, it directs the air particles off in the direction of the gradients to the right (in the Southern Hemisphere to the left).

This law of physics applies as long as the earth rotates and is surrounded by water and air. And with that, a useful constant is established in the search for the unknown causes of the ice ages. It is just possible that other constants will be discovered to render effective service, such as a certain regularity which results in the relationship between high and low atmospheric pressure.

We have struggled with rather naive-appearing questions and *have gone just as far as below the glacial ice*. But elementary physics has provided answers, which while not in the least new, have nonetheless been neglected because of a certain distorted perception due more to habit than logic. This naive questioning may appear pedantic and test one's patience. But it is well worth the effort when it sheds light upon the events of the past. Possibly even nature provides answers to our questions, for which we are searching.

NOTE:

In the full text of *The Model*, the word *Schwelle* plays an important part, yet in translation falls short of the sense in which it is applied here. While a dictionary might offer "threshold, doorstep, sill or

ledge," *all items to be tripped over*, such terminology does not readily adapt itself to the ocean floor, where it has a tremendous effect on the function of the Gulfstream. Rather than the words barrier or dam, both of which might apply under some circumstances, the original German word *Schwelle* is being used throughout for the sake of simplicity.

## THE MODEL

The ice age Model cannot be built in reality -- it can only be built in the mind. Therefore, there is no background against which it is to be laid out in all of its vast significance, in order that all developing considerations in their physical-mechanical consequences can follow logically.

Should additional attributes appear desirable, they could then, without difficulty, be "lent" to The Model. A generous process. But that is the only generosity granted in The Model, especially with regard to environmental conditions under which it has to perform its function. All manner of arbitrariness or capriciousness must be excluded. The Model must not serve just any personal whims. It should most precisely correspond with reality, but what reality? How did the Northern Hemisphere appear before the ice age began? According to Plenck and Milancovic-Soergel, this was approximately 600,000 years ago. According to Ericson-Wollin, it was one and a half million years -- in any event, a very long time ago. Enough time to take into account the possibility of some, under crucial circumstances, important changes in and upon the earth crust. Unfortunately, there is no authentic evidence as to how the Northern Hemisphere developed before the ice age. As a precaution, this ice age Model operates on only available, verifiable geophysical-mechanical facts.

The base of The Model is a flat circle. Although the earth is a globe, a flat surface has the advantage of a better overview from and to all points. The center of the circle is the North Pole, its periphery the 10th northern latitude. Any unavoidable distortion created by the extension of The Model to the equator is thus, for this delimited analysis, of no consequence. Similarly, mere shortening of The Model's radius could cause certain interesting land and water connections to be distorted.

The Arctic Ocean and the circle of land consisting of three continents, as well as North Africa, are entered on our level circle according to today's geographic knowledge of contours at sea level. Beginning at zero longitude from Greenwich, the periphery of The Model's circle cuts across the Niger's bend in the Sudan, the Blue Nile in Ethiopia, barely includes the Gulf of Aden, crosses the Indian Ocean, cuts across the southern tip of India, Vietnam and the Philippines, crosses the Pacific Ocean and Central America north of the

Panama Canal, barely cuts the northernmost portion of South America, crosses the Atlantic Ocean and reaches west Africa at Guinea. Inasmuch as thoughts are duty-free, we can afford the luxury of fashioning a three-dimensional Conceptual Model. Above sea level, all elevations up to the highest peaks are entered true to scale, below the waterline all ocean depths are rendered exactly.

Inasmuch as the profile of The Model continues below sea level, the chart will give an unaccustomed picture in comparison to the usual charts, particularly when one is not familiar with sea charts. The continental margin and the so-called shelf *occasionally show considerably different contours from the familiar coastline*. For instance, the European shelf on the northwest coast of Spain, which is relatively close to the coast, falls suddenly and steeply to the floor of the Atlantic basin and turns from the inner corner of the Bay of Biscay, between San Sebastian and Biarritz, France, in a northwesterly direction far out into the Atlantic, until it curves back past Ireland and England toward Norway. On the whole, the shelf of the continental rise, which lies under shallow water, descends only very gradually until -- usually just about the 200 meter line -- it slopes more strongly downward at an angle of nearly 45° to the sea floor. The shelf line, as portrayed with appropriate and ample exactitude in the 200 meter line, gains more and more interest when The Model begins to function.

Because The Model also provides all its underwater formations according to scale, a number of familiar, but in this context particularly noteworthy, facts become evident. While the ocean floors in the expansive sea basin generally are supposed to be only slightly wavy, quite abrupt differences in elevation are found to some extent in the North Atlantic. The North Atlantic ridge (which continues into the South Atlantic ridge and plays an important role in Wegener's continental drift theory) continues to the north, over the Azores into the still shallower North Atlantic *Schwelle* between Scotland -- Faeroes -- Iceland -- Greenland, where it looks like a subterranean heap of rubble formed from a collapsed bridge between the Eurasian and American continents. The European shelf belt already described continues impressionably in the Barents Sea past Novaja Zemlja, the Cara Sea and Sewernaja Zemlja then farther east and grows in width in the Laptew Sea, around the New Siberian Isles all the way to the Bering Strait and Alaska. That the East Asian and Alaskan shelves converge and the Bering Strait was passable during or after the ice age, has already been established by recent research; it was a migration route into North and South America for Mongolian peoples. Strangely enough, this fruitful thought with its cause and consequences was not systematically pursued further.

In our context, there are two additional shelf areas of interest, one of which is on the East Coast of North America, and lies within the domain of our Model. It is

particularly informative through the subterranean Hudson Valley, which can be followed from New York in a southeasterly direction over 200 km far out into the Atlantic, until it drops 2300 m into a steep canyon. The other shelf area lies off the South American east coast, beginning about the 15th southern latitude and broadening gradually seaward, then achieving its greatest expansion between the mouth of the Rio del Plata and Tierra del Fuego, from whence it stretches approximately 800 km well beyond the Falkland Islands. This shelf could have played a decisive role in the riddle of how the Tierra del Fuego peoples appeared.

To the first question, "What is expected of The Model?", the answer is simple and immodest: "conceivably the most exact reproduction of the pattern of four glacial periods and their three intervening warm periods, with distinct demonstration of their basic idiosyncrasies." Almost immediately there is no answer to the next question, i.e., "how can The Model be put into operation?"

Nothing would be more desirable than to hold strictly to the concepts of science. However, the theorem of H. B. Geinitz that "the cause of the ice age is not known" holds sway to date. Nonetheless, it is agreed that at the beginning of the great ice age an especially severe cold existed at the North Pole, however, under these conditions, The Model refuses all attempts to bring about glaciation. According to superficial observation, the amounts of rain necessary to produce an ice age are non-existent. The fact that a frozen-over sea is incapable of yielding such massive amounts of moisture, yet the warm Gulfstream is instead able to deliver copious amounts of rainwater, has previously been discussed. Therefore, by way of trial, The Model shall begin with the Gulfstream effect while closer examination of its energies will be taken up later on.

In our imaginary Model, the Gulfstream originates on a broad front, as we know it today, i.e., at the point presently between Iceland and Scotland across the North Atlantic ridge and into the Arctic Ocean. Science, however, is of the opinion that the water level of the oceans on our globe has reached its highest peak. Let us assume that prior to the inception of the first glacial period, i.e., before the freezing of enormous quantities of ocean water within the glaciers, it was logically the same. That it could not have been like this since time immemorial, and that the distribution of the oceans and landmasses over the course of geologic time has undergone considerable changes, is powerfully evidenced by the oceanic deposits, often to heights of thousands of meters and on all continents. Since when an arctic ocean has existed, whether, when and how deep it might have been frozen, since when there has been the Gulfstream, why, how and since when it might have penetrated the Arctic Ocean are the imponderables, but *one fact is certain, i.e., that it required hundreds of thousands and more years for the influx of warmth to defrost the*

*presumably frozen arctic*. Everyone knows from their own experience the process of a frozen pond which melts slowly as a result of continuous inflow of warm water. At first, the ice will melt at the point of entrance of the warm water. Then, along the course such warm water takes in the cold pond and lastly -- if at all -- the ice will melt at the side opposite of the warm water inflow.

FIRST: In our Model, the Gulfstream's behavior is analogous to the example of the frozen pond. The Gulfstream surges unceasingly northeastward along Norway; between Iceland and Scotland, then between Spitzbergen and the North Cape it follows eastward with the Coriolis force's deflection to the right. Then, between Franz Joseph Land, Novaja Zemlya and, the northern Russian mainland through the Barents Sea and Kara Sea it continues farther east, and in its course melting ever more ice-fields until its heat reserves are exhausted. *Nevertheless, in the course of time, of which there is no shortage, it will distribute its heat supply farther and farther, and ever broadening eastward.* Quite gradually, but without let up, this Gulfstream warming effect will set in motion a chain reaction of far-reaching consequences.

SECOND: Owing to the severe difference in temperature between the warm Gulfstream and the overlying polar air, which develops along the constantly melting ice edge in ever growing measure, Arctic water-vapor and landward fog and clouds form. Granted, "that portion of the gaseous water vapors in the air is variable with respect to time and locale. The higher the temperature is the more readily a body of air can collect water vapors in a gaseous state without resulting in condensation." Because the very cold polar air above sea level adjusts quickly to the water temperature within a few degrees, in this case there results due to the Gulfstream a remarkable rise in the temperature of the air above the water, which now can capture considerable quantities of water vapor in gaseous form without subsequent condensation. *With this process, we have the sought after water quantities required for the ice age glaciers to function!* The wind is already blowing, so the transport can begin. The remainder of the applicable laws of physics is as follows: "Should cooling set in, at first a condition of 'satiation' with water vapors will be achieved (100% relative humidity), with further cooling droplets will form or snow crystals, and thereby clouds and fog. With continuing condensation the drops, snowflakes or ice crystals become so large and heavy that they will fall to earth as rain, snow, sleet or hail" (according to Remien, Stocks, Walden). *Glacier nourishment on an ice age scale is thus secured as a matter of physics.*

THREE: Yet another physical process, which is closely related to the FIRST & SECOND items above, comes about immediately afterwards and by degrees. Still more water, which has been freed up through the function of the Gulfstream, is transported far inland as clouds by the wind, where it stockpiles in ever growing measure in the form of snow-firn-glacial ice and is deprived of circulation back into the sea. *Slowly but incessantly the sea level sinks.* This means that the high water line relocates ever farther off the coast. *Just as slowly, but incessantly, where the shelf permits, new land rises constantly from the sea.* This happens particularly west of France and Ireland, in the North Sea, east of Norway, as far as Alaska, in the Bering Sea, on the east Asian coast and between Indonesia, and finally on the east coast of North America (and outside of our Model, off South America). We won't concern ourselves for the moment with how many meters the sea level has dropped in the course of the ice age or how many square meters of land may have risen to the surface. Rather, we will focus on the mechanical consequences of the principles of physics and the fact that *both principles; the dropping of sea level and birth of ever new landmasses, had to be quite substantial in the course of an ice age* due to the massive accumulation of moisture in the glaciers.

FOURTH: We know that, without the Gulfstream's "central heating," the northern climate for flora and fauna would not have, in the remotest sense, been able to sustain life. It is only the magnitude of the Gulfstream's influence upon the balance of atmospheric heat that permits life to survive. If, with the inception of the ice age, the Gulfstream's thermal transport relocates more and more to the north and (because of deflection due to the rotation of the earth) to the east, then the climate must follow as well. However, this -- in turn -- leads with certainty to great climatic changes. Roughly, in condensed form, one may say that the climatic conditions as our grandparents still knew, approximately in the area between England, Germany (but not principally in Italy) varied merely by degrees. We cannot ignore however, unimportant nuances in concept like oceanic or continental climate. Undoubtedly, the temperatures from north to south and country to country were 1 to 2 degrees higher with corresponding, often remarkable, consequences for flora and fauna. The advances or lagging of respective weather and climatic changes might tend to blur with the fact that one is dealing with *gradual, not qualitative differences within the European climate at the turn of the last century.* (We are here speaking strictly of the climate at the time of our grandparents instead of today, because at present certain disturbances seem to be increasingly operative, which could invalidate a comparison and require separate examination as to their specific causes.)

With the beginning of an ice age there must have developed more and more in Europe -- and in modified form in Asia and North America -- different climatic conditions which were neither caused by great cold nor have as a consequence great cold, which spread over all of Europe. On the contrary, instead of gradual climatic variation, the Gulfstream effect produced climates of stark contrast between north, middle and south. Immediately adjacent to a *mild climate zone, stretching from Western Europe along and off today's coastline via Iceland, Scotland into the North Sea, and between the North Cape and Spitzbergen, lies the Scandinavian glacier massif*. This massif stretches across the Baltic Sea, into the north German lowland, and deep into Russia, where it meets the advancing Alpine glaciers. *Between the warm zone and the glacial massif, wild storms raged from west to east* (as if through a fireplace -- here through this "ice chimney"). South of the Alpine glaciation lie wide regions in the grip of strong pluvials in Italy, North Africa, the Near East, some parts of the Far East, and northwestern America.

FIFTH: Just one more geographical consequence springs from the same cause. The huge masses of water subjected to glaciation in the course of an ice age not only cause the water level of oceans to sink substantially and large tracts of land to rise from the shelf shallows, but also bring about a fundamentally changed climate. These glacial masses also exert tremendous pressure upon the land beneath, which is of interest with reference to the Scandinavian glaciation.

This Conceptual Model no longer satisfies our demands. We "endow" it with one further attribute, making it relatively elastic and loading it down with the weight of ice over 3,000 meters thick on the Fenno-Scandinavian ice shed. Obviously, more accumulated than had been calculated by R. Grahmann. For the sake of clarification, let us consider an example that everyone knows: while strolling on a beach, one's bare foot sinks as a result of body weight more or less deep into the more or less resilient sand. But around the sole of our foot, from the toes to the heel, the sand swells approximately at the same rate above "sand level", as the bottom of the foot has sunk below "sand level". Once the pressure lets up, i.e., when the hiker lifts his foot, the sand will gradually level out again. The footprint lifts, and the swelling round about it sinks, until after a while nothing remains to be seen of either. What is of interest with reference to the glacial ice pressure, especially the round-about isostatic rebound, is the inherent Grahmann effect, determined by the law of physics. What does the plastic-elastic Model say?

SIXTH: The areas west and south of Ireland and England, the North Sea, the area between Bergen and Kristiansand, outside Hålogaland and around the Lofoten, between Norway's North Cape, Spitzbergen, Franz Joseph Land and Novaja Zemlya *must have been subjected to this isostatic rebound*. Farther eastward and to a diminished degree, one might consider as well the new land area as far away as Severnaya Zemlya. Parts of these areas would in any event have shelflands, because of the gradual sinking of the ocean waters. It would not be unreasonable to argue that the drop in ocean waters, as a result of the water's absorption into ice age glaciers, could have reached such proportions as obviously expected here. This fact is indeed recognized by science; it is with reference to the dimensions that opinions differ widely. Most estimates seem to lie between 90 and 160 meters. There are also calculations which considerably exceed the 160 meter estimate. In a 1962 study of *The Earth and Its Oceans*, J. F. Gaskell says on this subject: "The amount of the water which is bound up in inland ice during an ice age, equals a substantial part of the collective ocean waters. If, for instance, the icecaps of Greenland and the Antarctic would suddenly melt, the sea level would rise by about 100 meters. This would suffice to inundate New York, London and Hamburg. Of course, such a process is not quite so simple. Inasmuch as the land is relieved of the tremendous weight during the melting process, it raises, which in turn causes other areas to become submerged. If old coastlines are surveyed, it becomes evident that in the past, *interglacial periods* had to exist, during which the greatest part of the inland ice on earth melted. The warm periods can be established approximately with the aid of fossils. The dating method for the past 20,000 years becomes much more precise because one can draw upon the carbon-14 method. In the time span of 18,000-6,000 years before the present, the oceans have risen by nearly 100 meters; therefore, it does not come as a surprise that the history of early man mentions deluges and inundations. A rise in sea level by about 10 meters today would, with exception of a few cliff faces, change most coastlines and flood many population centers, because a large percentage of continents lie relatively low." We may add that sea level rise has repeatedly inundated population centers during the Paleolithic period.

The author would have been lucky if such sentences had been available to him when he embarked on the writing of his book. Gaskell verifies essential insights which the function of The Conceptual Model yields conclusively. He observes, among other principles, the interaction between ice pressure and sinking of land, melting and rising of land, as well as certain correlations among these. He believes that between 16,000 and 4000 BC the oceans rose by nearly 100 meters (and we can prove that it has continued to do so in the roughly 6,000 years which have passed since then). And he impressively justifies the testimony of the Greek, Mesopotamian, and Indian myths. But back to the

roundabout upwelling and its effect on the elastic Model. In accordance with Grahmann's ice compression calculations, one may also apply the maximum upwelling tendency "in an amount of hundreds of meters". However, larger land areas, according to their tectonic characteristics, conduct themselves differently from the wet sand which wells up under our hiker's foot. They will rise up considerably more sluggishly and over a broader area, but in relative terms not as steep and high as the beach sand in our example. Let us try and translate this into numbers: If one fixes Grahmann's "amount of hundreds of meters" at 300 meters, the amount that the land has sunk under the 3,000 meter high Scandinavian ice sheet, the rebound effect ought to be equal. Assuming that the land around rose only one third as much as it had been submerged, one would still arrive at the maximum effective sum of 100 meters. With even more cautious application of the two components -- drop of ocean sea level due to conversion of enormous masses of sea water into glaciers -- welling up of land around the powerfully crushing and submerging Scandinavian ice sheet -- a double effect develops in the mentioned areas. This alone would suffice to yield so much land between Scotland, Germany, Denmark, North Cape, Spitzbergen, Franz Joseph Land and Novaja Zemlya (not to mention constantly rising land farther east) as to accommodate present-day Denmark, England and Ireland more than twice over.

The Model did not disappoint: now it is important to examine more closely the environmental conditions required for the habitat of thriving flora and fauna in the area reaching from northwestern Europe to Alaska which, according to The Model's tests, would have emerged in the course of the ice age. Prehistoric research is of no assistance. Although the drop in sea level, through the sea water's conversion into glaciers is basically accepted, and though the rebound effect as well as the same result from the forced components should be equally clear, the inevitable rising new land areas are barely deigned noteworthy by prehistoric researchers. This is apparently because of an incorrect hypothesis, viz., exceptional polar cold in the course of the ice age, that such new areas held no interest -- since they were presumably buried beneath the ice.

One comes so much closer to the true course of events the less one formulates extreme ideas. At first glance, this might appear contradictory because the climate contrasts were obviously very great. But, in their end effect, the astounding contrasts of climates and environmental conditions are hardly caused by continuous deluge-like rainfalls, merciless degrees of cold or devastating heat or drought periods (even though such isolated processes may not be excluded). *They developed through measured but constant doses, over the slow but long-lasting factor of time*, which in all epochs and zones of the earth and its creatures produced significant changes. Seen from the distance of eons these changes sometimes appear as "turbulent revolutions". Aside from that, one must not expect more

from The Model than it can fulfill, after it has already provided useful results during complex processes of change, which climate and environmental conditions are, from ice periods to warm periods: namely, *a general overview, a rough diagram* as it reveals itself from The Model, appropriately in logical outline and pertinent geophysical mechanism. To enter into the nuances of seasons, would already be pretense.

To the west of Europe, in the North Atlantic, a new environmental habitat surfaced, which resembled neither in form nor climate, and consequently only conditionally in flora and fauna, present-day northwestern Europe. *With the silt of the continental shelf, which gradually rose out of the Atlantic, this nearly flat and fertile lowland must have greatly exceeded the surface area of present-day Ireland.* Its oceanic climate was humid, mild and equable because of the Gulfstream's effect. From this corner of the Bay of Biscay (which is not per chance of interest to stone-age research) the shore swings in a gentle arc approximately 100 km or more off today's French coast toward the northwest, at approximately 49° north latitude and 11° west longitude, and roughly 50 km distance off the coast of Ireland and the Hebrides, and back to the Shetland Islands. The surface area of gradually emerging lowland, with its fertility and mild climate for flora and fauna, could be assumed to have provided ample compensation for the areas of today's Ireland, which were gradually covered by ice. That it could come to glaciation at all, in the area of today's Ireland with its relatively low hills (mostly far below 1,000 meters) despite the proximity and influence of the Gulfstream effect, itself handily explains the physical consequences of The Model: above the Gulfstream the polar air warms quickly and without resistance. Whether the warm air layer extends to 30 meters or upward to 300 meters above sea level, depending on season or circumstances, considerably colder polar air lies directly above it, which compresses the snow line down to a few hundred meters. The vapor-satiated warm air, which develops over the Gulfstream, is transported southeastward by the wind, rises upward on the Irish mountain slopes, cools off and furnishes the necessary snow. With that, both essential factors of glaciation are successively secured on all ice age scales. *The glacial deposits and erosion channels of the northern Irish-Scottish-Mid English glaciers are still discernible at the exit of St. George's channel in the underwater profile of our Model.*

In the lee of this widespread glacier formation, i.e. in southern and eastern England, especially during the height of glaciation, considerable amounts of cold must have been released. This would not only have created a colder climatic zone as a consequence but also have been the cause, giving rise to harsh, severe storms, which we will come to know in greater detail. The considerable release of cold follows logically from the conditions already examined: warm Gulfstream air must have drifted upward upon the slopes, into cold air regions, delivering snow for the glaciers, and in the course thereof

exhausting its own thermal supply. The cold polar air could thus run off unhindered in the lee of the glacier. There, in the southern English lowlands, it could increase and expand with the aid of the melting cold of the glaciers' tongues. The climate immediately adjacent to the western and eastern environmental habitat was in marked contrast. *The expansive, newly emerged lowland west of Cornwall and Brittany, and west and south of Ireland, offered abundant grazing grounds for ice age fauna.* These included the mammoth from which the southern elephant descended, the woolly rhinoceros, and, at the beginning of the first ice period, apparently the hippopotamus, which today only resides in Africa, but whose fossil remains have even been found in England. Later there were giant stags with their herds, masses of bison, wild cattle and horses. The Atlantic coastline, with its gently inclining banks, must have been ideal playgrounds for seals, sea lions and walruses, and would have had a climate approximating today's Portuguese coast, or the Azores and that of the Rockall and Porcupine Banks. *Since all these areas lie to windward of the Irish-Scottish-English glacier, the proximity to the ice would hardly have had a detrimental effect upon the climate.* To the east of England, and if one bears in mind its useable area, there emerged from under the double glacier load in east and west new land nearly twice again as large, a second, likewise, flat and fertile land from the North Sea. Here the humid-mild warm air, formed above the Gulfstream, found unhindered entry, creating a favorable climate for the ice age fauna and offering ample nourishment. Time and again, and much to their vexation, Dogger Bank fishermen have caught buffalo horns as well as bison and mammoth bones and tusks in their bottom nets. From the profusion of these finds, throughout generations of fishermen, one can only conclude that these animals were crowded together in exceptionally large numbers, on a relatively small area of approximately 27,500 square km, and perished on the Dogger Bank. With the very gradual recurring rise of the North Sea, they obviously failed to evacuate by migrating in time toward the Dutch or German Coast, but remained on the broad high ground of today's Dogger Bank, or moved there. As the water continued to rise and the path to the coast was cut off, the food supply for the following generations diminished steadily. The few weakened mammoth and bison herds which survived were drowned by the increasingly more devastating storms that blew across the area. Occasionally nature sets gruesome traps for its creatures.

If, according to one theory, a particular polar cold was the cause for the ice age, then the entire North Sea would have been covered with Norwegian-Scottish-English glacial ice. Reinig, for instance, draws (in our judgment with the wrong presumption) a thoroughly logical conclusion on his map "Glaciated Areas of the Earth and Loess -- Distribution during the Great Ice Age". Of course, neither mammoth nor bison would have

been able to exist in such glacial ice. We find them, however, in surprising numbers in the Dogger Bank trap! They could have come to that place only before the end of a glacial period, inasmuch as with the beginning of an interglacial the sea level began to rise again. It follows, that, at least in the course of the ice age during which these mammoths lived (*most probably in the last, the Wuerm ice age*), there could not have been ice in the North Sea -- on the contrary, it was rather mild there with abundant vegetation and splendid game. These considerations fit all the better into what The Model demonstrates.

*A third significant environment developed on the Norwegian coast between Bergen and Kristiansand as well as north and south of Hälögaland, around the Lofot Islands and the Westfjord. These expanses were far more extensive than all the habitable areas of Norway today!*

*The fourth large habitable region rising from the seas extended from the southern edge of the Barents Sea and those small and large islands which developed south of the glaciated Spitzbergen and Franz Joseph Land, all the way to Alaska, and became wider and broader in the process. Its most remarkable idiosyncrasy rests therein, that here a half-year long summer day is followed by a half-year long winter night and that, even in summer, much fog dominates. Nonetheless, and thanks to the Gulfstream's balancing effect, the contrast between the half-year long summer day and the half-year long winter night, the climate is relatively mild, humid, warm and favorable for flora and fauna, particularly in the west. Another characteristic of these far-reaching lowlands off today's Eurasian North Coast was its near hermetic barrier from the rest of the habitable world for the duration of an ice age, which means a length of time of at least 100,000 to over 200,000 years. During such extended periods of time flora and fauna remained "among themselves" behind this transverse ice barrier and had to adapt to their environment, such as the half-year long darkness, as best they could. This general finding does not rule out that in the course of certain glacial retreats or advances, occasional and isolated escape routes opened, possibly along one riverbed or another. Along the Pacific coast and the Bering Sea, the latter of which had formed a land-bridge, it may well have been possible to circumvent the transverse ice barrier throughout the entire ice age, even if only in certain parts, and at times, only along beaches.*

*Great herds of mammoth existed in these Eurasian new lands up to the last ice age. According to the consequence of The Model, they had to migrate slowly eastward, possibly onto today's Siberian mainland, i.e., into flat, fertile and ice free river valleys. Due to the naturally low ground temperature, the ice could melt only in summer and very slowly. To conquer the Siberian ice or the easterly adjacent Verkhoyansk-Cherskiy and Kolyma Ranges as well as the Anadyr on the Chukchi Peninsula, was unthinkable. It is*

questionable whether the Pacific coastline as a migratory route offered the mammoth adequate pasturage, since they could not live off the sea (as humans can). Even these mammoth would have, quite imperceptibly, fallen into an initially comfortable trap, in which they obviously succumbed, due to unusually severe and sudden cold and snow influx. "The most magnificent mammoth finds in incredible numbers originate from the river gravel in northeastern Siberia, the valley of the Yenisey and Indigirka. It was here, that by 1915, 50,000 mammoth had already been found. Their bodies were frozen in the Siberian permafrost as if in a refrigerator . . ." (E. Ebers). The animals remained perfectly preserved throughout thousands of years in the ice, including food residue in their mouths, between their teeth and in their stomachs, which indicates that they must have perished very early on and most suddenly, and been immediately deep-frozen before the permafrost could form at the conclusion of the ice age. (One is reminded automatically of the devastating blizzards with their many meters-high snowfalls, which even today occasionally blow across North America.) In our context it is of interest once again that the story of the mammoth's demise lends confirmation to the conception of The Model. (Or perhaps one should turn this around: the solution to the riddle of the mammoth's mass destruction is lent substantial assistance from the conception of The Model).

In the same vein, there is another interesting observation from the animal world: the annual bird migration between Africa and the far north must already have been in existence during the ice age, or originated then. The flight path leads over Denmark on the ice edge of the ice age. Why this flight path skips over Central Europe will be discussed in the next paragraph. It stands to reason that such enormous flocks of birds can move north only when the micro-organisms -- the mosquitoes, other insects, and certain mollusks -- are present in plentiful supply, i.e., when the long Nordic summer day begins. Accordingly, there must have been an inviting environment, ice free, warm and adequate beyond the Scandinavian-Finnish-Russian-Siberian ice barrier. This is precisely the contention of The Model. It would be a worthwhile assignment for ornithology to think through and examine the riddle of the birds' flight path from this point of view. Anyone who has ever heard the far-resounding swan-song sung by the swans on their flight south, fateful and fascinating, which, through the ages, has represented a panoply of death lore, understands well how their departure and arrival quite naturally became the symbol of the Nordic summer day and Nordic winter night.

Immediately adjacent to the moderate humid, warm climate belt, the northern areas of glaciation are developing. Their western portion -- the Irish-Scottish-English glaciers -- have previously been described. According to the mechanics of The Model, nowhere are the conditions for the Gulfstream effect as favorable as on that long, steep Norwegian

coastline. The Gulfstream continuously channels great amounts of thermal energy along the coast, approximately 1,700 km (as the crow flies) from Bergen to the Barents Sea and northeast, whereby it constantly and considerably heats up huge (and intensely receptive) polar air pockets, which are carried off shore to heights (up to 2,000 meters in south and north.) What is the impact of all this?

With the common assumption of additional polar cold along the seaward facing Norwegian mountain slopes, even by ice age standards, one should expect extraordinary glaciation, with an ice shed in *front* of or at least *on* the range's crest, an ice wall at the base reaching far out toward the shelf's edge and which shoves floating glacial tongues beyond, at the end of which glaciers calve, capsize and drift away. Since they would drift off toward the northeast with the Gulfstream, thus cooling it further, the glacier-enhancing effect would slow down even more. The Model, however, yields a completely different picture. (This does not preclude entirely isolated and occasional developments, as discussed, perhaps off the Westfjord behind the Lofot Islands.)

On the strength of The Model, flat, fertile shelf-land emerges off the coast. The warm air which constantly wafts upward on the slopes undoubtedly brings much snow, leading to glaciation. But much of the snow also melts again and thereby holds the glacier in check. As soon as the constantly following warm air reaches the mountainshed, it collides abruptly with the cold air stored in the lee of the mountain crest, and delivers its humidity in the form of snow. *Therefore, a far stronger development of snow-firn-glaciers must follow east of the Scandinavian mountain slopes.* Throughout thousands of years, they could not help but flow down on a broad front to fill a certain basin ever higher and higher. The Bothnian Gulf and the Baltic Sea are a present from the ice age to the post-glacial world. This gigantic glacial trough, abundantly and continuously fed, would have to shift its ice shed ever farther east, advancing roughly in the direction and in line with the Onega and Ladoga Lakes, the Gulf of Finland, and the eastern Baltic Sea, in the end considerably surpassing in height the peaks of the Norwegian-Swedish mountain ranges, and constantly running off toward the southwest, the south and even far to the southeast.

*The examinations and calculations of ice age research agree with the physical consequences of The Conceptual Model.* In this vein, the ice shed "did not form along the mountain crests, but approximately 150 km farther east in the area of the Bothnian Gulf". The accumulated glaciation is estimated to have been extraordinarily deep. "One can attribute a thickness of 3,000 meters at its ice shed". (E. Ebers) That is, on average, over one third higher than the Scandinavian mountain peaks! This colossal Scandinavian glacial block continued on into the aforementioned ice barrier, which most likely stretched between the 60th and 70th parallel. *Life-sustaining conditions for flora and fauna are unfathomable*

*in this glacial wasteland, particularly in Fenno-Scandinavia.* The cold, which flowed off to the southwest, the south and southeast, had to have been considerable. Here at the southern front of the ice, Goethe was right after all with his “great coldness”. To be sure, this cold did not create glaciers; the glaciers created the cold!

The second largest center of glaciation in the so-called “Old World” was the Alps. By comparison to the northern glacial giants, these appeared rather meager. Just the same, they played a leading role in the drama of the ice age: the Alps were fully glaciated after the high mountain massifs had filled their glacial troughs and lowered the snowline considerably, then sent, particularly on the north side, broadly compact ice tongues far into the foreland which exuded substantial cold as they went. *The Alps contributed their part by narrowing the nozzle-like sluice between northern and southern glaciation.* Together with the Pyrenees (where there was probably substantial glaciation as a result of oceanic warm-air influx, yet without glacial tongues worth mentioning) and the Gulf of Lyons, the Alps formed, for the duration of a glacial period, a quite effective *barrier* for flora and fauna *between Central Europe and Spain* -- except along the beach-line. To some extent the same must have occurred in Italy, had not there, *in the course of a glacial period, a large drained portion of the Adriatic Sea* maintained a broad, though mountainous open access to the Yugoslavia of the twentieth century.

Farther east lay the next largest glaciation (if one excludes the Carpathians) between the Black and Caspian Seas, which, together with the Aral Sea most likely formed a gigantic inland sea. *The Caucasus and Elbrus Mountains, both totally glaciated, formed yet again an effective barrier between north and south.* Even farther east, if one disregards the Himalayas, the boundaries of the southern glaciated area and the adjacent northern ice free zones blur more and more, so that they shall be dealt with appropriately in the next paragraphs.

The area between the northern and southern glaciation approximates the longitudinal section of a bass trumpet whose mouthpiece is located along a line south of the Irish-English glaciation and north of the Pyrenees and western Alps. The neck of this tuba narrows markedly in the north on a line of Elbe-Berlin-Warsaw, and along the Alps' ice edge in the south. From there, the tube of the trumpet widens more and more in the direction of the Asian-Pacific coast. *It is through this tuba that a relentless wind blows violently.*

The balance between high and low pressure systems, so well known as a source of the weather in modern meteorology, must have reversed itself in the course of a glacial period, probably because of its relationship to the Gulfstream. Accordingly, in its tendencies, it would have shifted back roughly to the same extent toward south and west as

the Gulfstream effect advanced to the north and east. Air movements pass steadily from high to low pressure whereby a cyclone (low-pressure area) on the northern half of the globe runs counter-clockwise, while an anti-cyclone (high-pressure area) goes clockwise. As clear as the processes in this bass trumpet profile are, it is difficult to demonstrate the course of the weather in detail. Too many components operate together. The wind plays too many too lively melodies on the tuba:

- There is the newly emerged land, far out in the west, which displaced the harsh eastern continental climate into western European areas, which today enjoy the advantage of balanced oceanic climate.
- There is the glacial cold from north to south and south to north, constantly down-flowing into the bass trumpet's profile, which is -- particularly in the summer! -- considerably increased by the continuously melting glacier tongues, which create additional cold.
- There accelerates already in the trumpet's mouthpiece the Irish-English cold run-off, which adds to the wind considerably.
- There, in the trumpet's narrowing throat, the wind experiences renewed acceleration.
- Thereto also joins the, by far, deeper cold of the Fenno-Scandinavian-Russian glacial giant.

These are all weighty components, which collaborate, complement, mix and provide variety. It may be said with certainty that unusually severe west-winds blew increasingly through the effect of the cold. But it is not certain how they might have conducted themselves at various times of year: whether they blew constantly, or only once or repeatedly, each day, or in the night or whether they blew entirely irregularly. There are reliable witnesses to the facts of this case: the *main witness is the loess*, which not only the farmer learned to appreciate, but also the mammoth who, as a result of their tremendous food requirements, always had a keen instinct for good pastures. What is loess? It is defined as a fine, dust-like, windblown, yellowish flour-sand of no ordinary structure, caused by the sharp, constant wind, which, on the windward side of the rocks grinds the fine grain and deposits them leeward of elevations. Certain bizarre rock formations carved by the wind on their west-facing sides also belong to the loess landscape. Under the force of such winds, small shrubs could hardly subsist in such landscape, not to mention trees, and gradually, turned even the landscape of western Europe into steppe. The grass of the steppe captured the easterly drifting loess, which could stratify around the grass blades.

The blades of grass decomposed, the fine vertical reeds remained, and lent the loess its peculiar “capillary structure”.

In the broad, typically continental, wilderness of the Asian highlands, loess increases to this day because the generating winds still blow often and severely. The loess has blown into China in this manner over thousands of years, in places accumulating up to 500 meters in height, where it has caused concern over the Huang Ho (Yellow River) and other Chinese rivers, which channeled their paths through the loess, carrying the fine mud along for deposit in the lowlands, thereby ominously raising the riverbeds. In Europe and European Russia, loess developed only during the glacial periods. The obstinate wind is thereby proven. It has blown from Belgium, across the Rhine to Hanover, Brunswick, Magdeburg, and Silesia, Poland and left the loess behind. The loess lies south of the Maas and Moselle Rivers, even in western and southwestern France, left and right along the Rhine, between the Danube and the Alps, in the north of today’s Czech Republic, Slovakia and between Vienna and Silesia, and even farther and broader eastward as has been proven. This was not a friendly landscape (apart from the loess plains) and not at all inviting and comfortable for flora and fauna. On the contrary, it must have been most disagreeable for all life forms: in winter a dearth of snow and much cold, in summer dry and parched with cold nights -- and always wind and wind and wind.

These relics of ice age flora and fauna, patiently collected by science, verify that tundra (seldom with shrubs) and less often steppe (with interspersed or extended tracts of forestation) existed during the Wuerm ice age only, at a distance parallel to the Russian glacier edge, approximately along a line from Kiev to Moscow, and that they were sparsely populated by large animals (of which today only the musk ox remains in small numbers in the Arctic), including the mammoth, the steppe bison and the wild horse (at that we may imagine the mammoth, bison, and wild horse probably only during interglacial times and predominantly in the loess plains). *The ice wedges testify to the extreme temperatures.* They still exist in the Siberian permafrost. To this day, the summer warmth is insufficient to thaw the ground other than superficially around the cold pole (approximately 650 km south of Verhoyansk). This presupposes a mean average annual temperature of  $-2^{\circ}$  C (this occurs today in Central Europe only in January!). Nevertheless, there have been permafrost layers south of the northern glacial giant and the Irish-English glaciation, as well as north of the Alps. Wind and cold freezes the ground through and through, but because it lacks a protective snow cover; it contracts and forms frost fissures, which fill with water during the summer. Ice requires more space; in winter the ice freezes, and the fissures in the ground or rock blast asunder. This process repeats itself through thousands of years. Later, these fissures fill with other materials and so have been preserved to this

day. One now finds these permafrost grounds and ice wedges where, according to our Model, they “belong”: in southern England, Holland, in the front of the glacial giant, and in front of the Alps. But even in glacial-distant and glacial-free Thuringia and at the Vogelsberg, just to mention two examples, the ice wedges testify to the erstwhile cold in the tube of the trumpet.

The enchanting, “wildly romantic” landscapes of the Central European mid-ranges attribute their formation to the frost's power over thousands of years, which literally froze stones, rocks and entire mountain ranges to bits and pieces. In this way *tremendous deposits of gravel mounds developed between the northern and southern glaciation, without the help of glacial moraines*, and were transported farther by creeks and rivers, where they were additionally processed, unless they remained to this date wherever the frost had corroded them. Science cannot come to an agreement on explanations for some of these phenomena, and not just this “interstice”. One gets the impression that, *with the assumption of great cold as the sole cause for ice ages, the rising of multiple contradictions would dissolve readily, as soon as one supposes instead -- as in The Model -- that additional (Gulfstream) warmth is also a significant ice age cause.*

Simpson calls nature opportunistic. Occasionally, one might think it is moody when at one time it heaps threatening powers upon already harsh conditions, or at another provides for well-balanced contrasts. Such is the case of this certain “interstice”, where the wind blows through to make the cold colder, and threatens all life with death by freezing. It is well known that wind prefers to waft around heights instead of over them, as if it knew that “on the next floor reside different winds”. Indeed, there are no winds of express train velocity. There is only freight traffic. There, the “sailors” of the air glide in broad and long water-loaded cloud-ships, toward the Alps, *over the Alps into the Mediterranean area, the Near East, across the Mediterranean and to North Africa, where they gradually transform the Sahara into a promised land.*

The Alpine glaciation lay with its northern glacial tongues at approximately 48° north latitude. Farther east, the mountain ranges receded more and more toward the equator. At their southernmost point, they reached approximately 65° longitude at the Hindu Kush on the 36° northern latitude. *In these increasingly warming regions the snow line rose. Also, the mountain peaks rose as high as the Himalayas and far above 8,000 meters. Also increasing was the distance to the Gulfstream effect, which barely left room for hope of snow.* The Himalayas, which swing in a curve southward above latitude 30°, owe their snow supply, and this was probably true even during the ice age, mainly to the monsoon winds, and could hardly have been more glaciated than today. Nevertheless, their glaciation is quite remarkable. At 65° eastern longitude, the predominantly west-east

running mountain ranges pile up in the direction of the Bering Sea, and again, lower the snow line. *But even that cannot help much toward glacier formation in ice age measure, for the necessary quantity of snow is missing.* The only thing not missing is wind, wind, wind, and its product loess, which it brings along, multiplies and carries farther. The wind races from west to east through valleys, increases the winter cold, and the summer drought is even dryer. Such climate is not tempting, but tolerable for flora and fauna, so long as the frosty wind of winter and total drought in summer do not destroy life before it can take secure root or flee in time. The areas south of the southern glaciation -- the Mediterranean, Africa, Near East, Egypt, Mesopotamian, Iran, India, China -- will be discussed appropriately in a different connection.

One calls America the "New World". With a view to mankind's development, this is understandable. From the point of view of geologic evolution, North America in particular, is a very "Old World", which can tell us a great deal. Paleontology is indebted to North America for magnificent discoveries and, therefore, also prominent paleontologists. North America -- where the Grand Canyon, that deeply cut gorge of the Colorado River, presents an extraordinary "backward glance in reverence" to far-away worlds which over millions of years deposited its relics along the steep canyon walls -- where impressive giant saurians as in the *Atlantosaurus* layers of Wyoming have been found -- where the complete genealogy of the horse as most convincing and uninterpreted evidence of Darwin's theory of evolution came to light. *This North America obviously has not known primates, no common ancestor of man or anthropoids.* That is curious. Already since the early tertiary, four species of horse ancestors from North America migrated to the "Old World", where they became extinct. In the same space of time, anthropogenesis came to pass, leading from *parapithecus* and *propliopithecus* via *proconsul* to *Homo habilis*. There must have been climatic reasons which prevented the less winter-hardy *Homo habilis* and his ancestors (who -- at least for the most part -- were still vegetarians) from migrating the opposite way to America.

What does The Model tell us about North America? *The Gulfstream has rendered important service as far as the now dry Bering Strait.* Is it possible, even in Alaska, to conjure up a relatively mild climate belt? *Just in the nick of time, the warm Kuroshio comes to the aid from the west Pacific Coast, along Japan, the Kuril Islands and Kamchatka.* Cold undercurrents from the Polar Sea could no longer disturb it. The Bering Strait, even half the Bering Sea between Alaska, the Aleutians and Kamchatka had gone dry. In the remaining sea, the Kuroshio circles and vigorously produces warm air, which wafts over this fertile new land, approximately twice the size of England, and reaches into the wide Yukon Valley. The same service is provided by the Gulfstream on the north side,

in front of the stretched-out new land and the flat Alaska coast, up to the mouth of the McKenzie. According to the geophysical mechanics of The Model, these are the only suitable climatic regions -- free of ice, permafrost, wild winds and loess -- on the northern edge of the American glaciation. *And this is exactly what American glacial research has worked out. It speaks for our theory of warmth vs. the cold theory.*

Meanwhile, the Gulfstream's warm air from the northwest, and the Kuroshio's from the southwest, drift up the slopes of the Endicott Range and feed the glaciers. The warm air heated by the Kuroshio is uplifted out of the Yukon Valley, over the slopes of the Alaska Range, and feeds enormous glacial troughs in the lee (similar as the Gulfstream over the Bothnian Gulf). On its way around the Aleutians, through the Gulf of Alaska, south along the northwest coast of America, the Kuroshio furnishes even the coastal mountain range and the Rocky Mountains with snow, whereby the center of gravity must lie approximately in British Columbia. Farther south, the feeding of the glaciers must fail more and more -- not only because of increasing warm belts -- but also because of the growing distance between mountain ranges and the coast. (At approximately the 40th parallel north, i.e., still farther south than Naples, the distance from the Rocky Mountains to the coast already amounts to 1500 km!)

While the Gulfstream, with its efficiency, advances steadily farther east, more and more seawater is transported to the snowlines and taken up by the glaciers. The sea level continues to sink. *Relatively soon the coastline retreats in the shallow east Siberian Sea and in the Bering Strait, moving away from the sea, at distance of up to 700-800 km(!) in the direction of the North Pole.* The Gulfstream-powered warm air sweeps over the newly emerged land and reaches today's Alaskan Coast between Nome and Point Barrow, with the already described effect. The Gulfstream continues to flow along the north coast of Alaska, farther to the east. With the clockwise drift to the right of the Coriolis force, the Gulfstream would much rather press into the Union Straits and possibly between Banks Island, Prince Albrecht Peninsula and Victoria Island, and the jumble of islands behind the Banks Strait, so long as the waterway has not yet risen from the sea. In that case, it must unwillingly turn left and flow along the Parry Islands, Grantland and northern Greenland. By now the Gulfstream has accomplished a great deal and expended much energy. *Even if it has relinquished considerable warmth, here it meets up with the lowest temperatures of the Polar Sea.* Thus the drop in energy remains constant, and it is here that the Gulfstream pours forth the greater part of what energy it has remaining. Banks-Albert-Victoria Land have only minimal rises, not over 500 meters. On one hand, one must add 100 or more meters as a result of submersion in the course of an ice age. On the other hand, the snowline here in the high north has sunk almost or completely down to sea level. All of

these components operate together to create the snow line and snow transport for glacial development in ice age scale.

It is at this point that the Gulfstream finds assistance once again. As it was in the Bering Sea, where the Kuroshio doubled the energy output, so *the Gulfstream experiences effective support here in the high north -- through the Gulfstream. It meets itself in on-coming traffic!* The Gulfstream, which we will examine further, sends one arm barely south of the 60th parallel to the west, which rounds the southern tip of Greenland, and the right hand traffic, past the Labrador Stream, through the Davis Strait toward the northwest. While this Gulfstream is not particularly strong, its temperature drop is more considerable. Greenland itself was probably glaciated far less in the course of an ice age than it is today. However, the double effect of the Gulfstream, combined with the Kuroshio effect, must have caused tremendous glaciation northeast and northwest of Hudson Bay, probably surpassing the Scandinavian ice shed with a mass of several thousand meters, which ran off on both sides of Hudson Bay in broad glacial tongues toward the south.

*That same picture seems to develop from American ice age research.* Although the Alaska investigation is by no means concluded, one may nevertheless expect confirmation of The Model's theory. Far more completely explored are the glaciation processes in central North America, which R. F. Flint published in his voluminous *Glacial Geology and the Pleistocene Epoch* (1947). The ice thrust to the south, reaching to about the 38th parallel north and covering a magnitude of thousands of meters, a surface area of around 16 million square km. Previously described causes and previously described consequences about south thereof on a loess belt which extended from 45° north latitude on the Pacific, almost to the east coast and south beyond the 30th parallel.

It would be desirable to come to grips with the various life-sustaining environments. What did it look like between America and Eurasia in this regard? The evolution of the horses' genealogical family tree, which had already been so brilliantly described by Darwin, is once again of assistance: four pre-horse species were able to migrate during the tertiary from North America to Europe where, however, they became extinct without descendants. A fifth species which also was similar to the grass-eating, one-hoofed horse, immigrated during the quaternary, (the Pleistocene, thus during the great ice age) into Eurasia. *By this time, the land bridge of the America-Greenland-Iceland arc had collapsed with certainty;* only their piers remained. The equine species, therefore, could only have used the emerged land of the Bering Strait during the ice age, to reach Asian Europe. But precisely where in North America might they have migrated from? If they had come through the McKenzie Valley, then the way into the North Eurasian climate belt would have been the acceptable one. If they came through the Yukon Valley, they

were at a crossroads of the newly risen Bering lowland: either to the north around Cape Dezhneva into the mild climate belt, or westward behind the Siberian ice barrier, which was probably negotiable only in places on the beach-line. These ancient horses could have penetrated only the Chinese lowlands, or the partly inhospitable, cold-stormy Asian highlands with their fertile loess oases, in wind lee locations. Might they, if necessary, have mastered the beach-line? Horses are unable to live off the sea as man can. Perhaps both paths were possible? Why might those equine ancestors, who were our most loyal and industrious friends until well into the 20th century, have emigrated from America at that distant time? Surely, they had felt comfortable there. Through 50 million years, they experienced their entire developmental history there -- and only there. Their evolution led from the leaf-eating horse of the early Eocene with four toes on its front feet and three in back (not bigger than a cat which one could have carried in one's arms) -- via still leaf-eating, gradually sheep-sized species with three toes in the Oligocene -- to the first steppe dwellers in the Miocene, which began to adapt to grass feed -- finally to the development of the single-hoofed, grass-eating ancient horse, whose representatives wandered off to Asian and Europe. About thirty nearly uninterrupted stages of development from the Missouri in Nebraska, Wyoming and Dakota, were unearthed by O. Ch. Marsh. If one places one's self in front of The Model in those distant times, one can practically see generations of equine lead stallions grazing, from time to time snorting and looking up, restlessly stomping with their feet and scenting southwesterly across the Missouri, from where something ominous is slowly approaching. According to geography previously described, glacial streams running off the high ice sheds must have come together not far west of James Bay in Hudson Bay, to advance under this double pressure with increased speed to the Missouri bend. Especially during in the first and second glaciation of Nebraska and Kansas could these glaciations easily have arrived earlier than any other North American glacier tongue at their terminus. Threatened from the southeast, these early horses could hardly have reacted differently than to move toward the northwest over the course of many generations. On their right flank, they were squeezed by the advancing ice, prevented from turning back and driven to haste. Possibly, they may have attempted to escape toward the south, along the ice edge but abandoned that due to the west-to-east howling loess storms. The escape westward from Wyoming was difficult through the mountains. The way northward, between the coastal mountains and the Rocky Mountains, must have come to an end, at the latest, before the glacial troughs at the convergence of both mountain ranges. *The only route remaining was on the east side of the glaciated Rockies to the Bering Strait.* And that certainly was tough enough.

The promising equine species was not able to sidestep the ice in the north-south facing valleys to return north again in the warmer periods, as did the magnificent giant trees in the tertiary. The splendid trees remain. *The horse, one of the finest among the grand creations of the North American fauna, had vanished from its original home.* In Asia, Europe and Africa it began, dear to man and of vital necessity, a brilliant epoch which could not be imagined without it. The horse was returned to its ancestral home only by the Spaniards.

## CONSEQUENCES

“One can apparently overcome insurmountable obstacles and discover unforeseen moments, insofar as one relinquishes certain preconceived ideas whose validity are more thanks to habit than logic.”

Louis Duc de Broglie (1892)

In The Model, a terra incognita has emerged. Although the wide, for flora and fauna apparently salubrious, *environments behind the ice*, had up till now only revealed half of the required attributes, the areas appear to be "alternately sufficient and insufficient", but are the ones we are in search of. They did not appear because we "wished them" so. *According to the sober laws of physics, they must have inevitably risen from the sea.* This is a remarkable advantage, particularly if one considers the many temptations for wishful thinking and preconceived opinions, to which pre- and early history is exposed, to a certain degree. This empowers us to pursue the theme from the ground up, to ask further with the knowledge, "which unforgivable sin is it against the essence of natural science, if to the question, 'why', the answer is 'therefore'" (Lorenz).

Those environments behind the ice arose in The Model on the condition that the Gulfstream could deliver the required water masses. *Is the Gulfstream really this productive?* To be sure, due to the effects of the Gulfstream, areas have evolved which could sustain life of plants, animals and man. *But how could they have gradually become insufficient?* Expressed differently: how could, in The Model's experiment, continuously advancing glaciation in the Northern Hemisphere become reversed? *How could the ice age have ended?* Why have there been, in Eurasia and North America in particular, these ice advances and retreats with their varied, peculiar phases? Why not more ice ages before? And afterward? Hereafter?

The Model of the Gulfstream, with the five inferences from the same physical causes, has performed its task over thousands of years; it should now be examined still more closely under the microscope. That is not easy. Although it is a stream, it does not flow between banks, not to mention dams, but in the broad Atlantic. Nevertheless, it behaves, when it feels like it, as if it flows between steep, smooth banks. "In the year 1922, for instance, the Coast Guard cutter 'Tampa' lay at the outer edge of the stream during exploration. The stern was in warm water, the bow in the immediately adjacent flowing cold water. At the stern, the water temperature read 20°, while at the bow, not 60 meters distant, 4° C was measured. Where could there be found a more distinct dividing line? Unfortunately, by the next day it had shifted far off. A distinct boundary between the water of the cold arctic current and the warm was still present, only at a different place". (A. Villiers)

A temperature drop of 16° is substantial if one considers what relatively smaller differences (between cold and warm, more or less saline, more saline or warmer, or less saline but colder water, together with the friction effect of wind, the slackwater, and other factors) bring to bear, on the already marked reaction to progress, velocity and transport capability of the Gulfstream. All the same, in 1962, J. C. Swallow wrote: "If one imagines The Model of an entire sea area, as for instance the North Atlantic's, and takes into consideration the shearing force of the wind, the Coriolis force depending on its geographic latitude, and the mainland's rim, there results from these computations a system of surface currents which conforms to what has been observed." (Incidentally, this is a welcome -- if belatedly discovered -- finding in support of The Model!) "Generally the surface currents are weak and point to velocities of less than 20cm/sec. The equatorial currents, however, reach 1/2 to 1 m/sec. In the strongest sea currents, as in the Gulfstream, one even finds velocities of 2-3m/sec. Most surface currents are not very deep; apart from very strong currents, they are dissipated at about 100 meters in depth. The high speeds of the Gulfstream reach only to 400 meter depth". Off Cape Hatteras on the east coast of the USA, more precise examinations were undertaken of temperatures, saline content, density and current velocity on a profile of Chesapeake Bay in the direction toward the Bermuda Islands. This revealed that the depth to which the Gulfstream was effective was relatively deep, namely 1,000 meters. By comparison, the width of the Gulfstream belt measured there is relatively small. "It is only 50 Km in width, the speeds, however, exceed 150cm/sec., from which arises the gigantic water transport of 57 million m<sup>3</sup>/sec. For comparison it should be mentioned that all rivers of the world, which empty into the world oceans, have only a flowage of 0.51 million m<sup>3</sup>/sec." (G. Dietrich, 1960). What this means is that the Gulfstream conveys 112 times more water than all rivers

together! J. C. Swallow expresses the same phenomenon somewhat differently: "the water-transport of the Gulfstream amounts to approximately a thousand times that of the Mississippi." And Old Man River is a very respectable fellow.

Where, and how, does this giant of ocean currents come about? Not only the North Equatorial current, but also the Atlantic flows into part of the South Equatorial current along the coastline, from South America deflecting toward the northwest into the Caribbean Sea. There the considerable, already warm, water masses of both currents are heated up further and pressed through the Yucatan Channel into the Gulf of Mexico, heated even more and squeezed through the nozzle of the Florida Strait into the Atlantic. Along the edge of the Sargasso Sea, past Cape Hatteras, the rush of the Gulfstream collides near Newfoundland with the cold but slow Labrador current which it literally runs over, to now head toward Europe as its central heating system, which function is of particular interest to us. In character and consequence, the Gulfstream most closely resembles the northward flowing Kuroshio, on the Pacific West Coast, with whose ice age usefulness we are already familiar. Both distinguish themselves through narrow, fast-flowing current belts, and particularly powerful (i.e., to depths of 1,000 meters) and extraordinary water transport. This occurs through so-called "transverse circulation", i.e., the immediate vicinity of the warm and cold water boundary on the left flank; through its abnormal warmth and consequently unusual warmth transport; through its evaporation-enhancing performance as a result of the great temperature difference between water and air; through which these qualities became an important source of energy for climate and weather; through one of their producers, the jetstream-originating annual rhythm of its current velocity; through certain erratic anomalies, so-called "pulsations" and "meandering course", i.e., in a wavy line which tends to lead to current whirlpools of significant extent. "The water of each individual current keeps its own properties over nearly thousands of kilometers" (T. F. Gaskell). This does not mean, however, that the Gulfstream remains always constant in its attributes. So, for instance, its temperature is warmer in summer simply because it is constantly heated further on its path of origin. But already such temperature differences can have strong influences on the Gulfstream fauna.

Plankton was discovered by the amateur nature researcher J. V. Thompson in 1828, and received its name at the end of the 19th century through V. Henson. It consists of a number of microscopic plants and small kinds of crayfish which -- adapted to various temperatures and saline conditions -- drift in the current and at the same time rise and submerge; i.e., nighttimes they come to the surface and during the day they submerge again. Plankton is an essential nutrient basis for the sea fauna. The Gulfstream also carries plankton. More precisely stated: its own specific plankton, which is balanced to its

temperature and saline content and which will perish in great depths or polar regions. In this connection, the Gulfstream is not only of interest as a thermal and evaporation source but one of nourishment as well. Because of their very nature, the coast and the sea are a vital source for life to these new, Nordic land environs. Just one example: the Gulfstream carries its plankton, eaten by small fish, which are eaten by larger fish, and from which in turn feed the seals. Man lives on the seals. A conscientious observer, Crantz, who was fortunate to experience Eskimos of stone-age environment, recognized their dependence on the seal and wrote about it in *History of Greenland*, published in 1767: "The meat of the seal serves the Greenlanders as nutritious food. They live exclusively from it. The fat is used as oil for their lamps and hearth; they utilize it for nourishment as well as for trade objects. They prefer the ligament fibers over cotton or silk for sewing. From the skin of the intestines, they fashion windows and curtains for their dwellings and even shirts; parts of the bladder are used in fishing as buoys or flotation devices for their harpoons. From the bones they fashion all the instruments from ancient times which nowadays are made from iron. Even the blood is processed and prepared with other ingredients for soup. From the hides they make their clothing, blankets for their beds, houses and boats as well as straps and belts of all types. To be able to land a seal is the greatest wish and pride of each Greenlander. They are trained from childhood on for this task, which in fact, is very strenuous. In this manner they sustain themselves, earn respect among one another and become useful members of their community". A lively graphic lesson!

In the new land regions which are of interest here, the seals probably were far more numerous than they are in Greenland; but *the careful utilization of all parts would have been, in principle, no different among early man whom we are searching for, than with the Eskimos*. The more thoroughly one pursues the Gulfstream, the more firmly one becomes convinced that -- as much as it is the deliverer of warmth and enhancer of evaporation energy, as well as a distributor of nutrition -- it accomplished not less, but more, than The Conceptual Model had projected. Research results in the meantime corroborate this. In 1969, Jacques Piccard reported to the participants of the Futurologist Congress in Munich about his excursion of that summer. The "Ben Franklin", with a five-man crew, let themselves drift between 200 and 600 meters beneath the surface of the Gulfstream for 2,700 km in the course of 31 days from Florida to Nova Scotia. This demonstrated as correct what, up until then, science could only assume but what had not yet been generally accepted. Even in its depth, the Gulfstream is a uniform ocean current of great velocity and only about one or two knots less than on the surface. Over long distances, the current's speed was measured below at five to six knots (thus nine to eleven km per hour). The

volume of flow and therewith the enormous water transport of the Gulfstream exceeds all valid computations to date and justifies the boldest expectations.

Once an ice age advance had been set in motion when, how, or why, could or did it come to an end? As if of its own volition, the eye gets hung up between Greenland and Scotland. The question is self-evident: How *does the Gulfstream react to the continuously lowering sea level over the North Atlantic "Schwelle"*. For reasons of objectivity, we proceed on the premise that all criteria, including the Atlantic "Schwelle", pertained more or less as they do today.

The essential part of the Atlantic "Schwelle" between Greenland and Iceland is relatively shallow. How shallow? For clarification of the question of interest here, the relative shallowness of the connecting line and its average depth is critical. But the Atlantic "Schwelle" has a lively profile, which does not make it easy to render a judgement. Between Iceland and Europe, during the height of the ice age, we have to count on an average depth of 150 meters under the shelf -- provided that the "Schwelle" appeared then as it does today.

Even at today's high water line, the North Atlantic "Schwelle" presents a considerable hurdle for the Gulfstream. It passes over the "Schwelle" in full swing despite the opposing traffic with the Greenland current and with warm / cold, saline-poor / saline-rich mixed undercurrents, which are capable of causing considerable "traffic jams". Off Cape Hatteras, where it is compressed, the Gulfstream was measured with the abnormal depth effect of 1,000 meters at a width of "only" 50 km. But already shortly after passing that cape it broadens to four times that width or approximately 200 km, while its depth now comes to about 400 meters. Thus width, depth and velocity are variable concepts. Among all known ocean currents, the Gulfstream is in every respect, and without exception, of the greatest potency. Therefore, it would appear that on arrival at the North Atlantic "Schwelle" one could trust it with a depth of 200 meters if not more. (Since Piccard's submerged journey of 1969 we know with what we can, in fact, credit the Gulfstream as to the depth and speed at its depth.)

The fact is that the Gulfstream is as powerful in its performance as it is sensitive in its reaction to water conditions which it meets enroute. During its journey, as a rule, it maintains a sharp differentiation from the surrounding water, as the example of the Coast Guard Cutter "Tampa" cited above has demonstrated. Where, however, it collides head-on with cold water, possibly in part in shallow water, it becomes critical. In less than no time, it confronts the slow Labrador Current with the strength of its "mass times force". But what eddies that creates! And already there approaches the next opponent, the powerful, cold Greenland current. The Gulfstream cannot evade this meeting in unfavorable territory,

i.e., at the North Atlantic “Schwelle” where its particular capabilities -- width, depth and velocity -- are restricted as to their effectiveness. Indeed, today it manages the challenge quite handily! But how about then, at the height of an ice age, when the handicap was comparably harder?

The North Atlantic “Schwelle” is a “water-traffic artery of the first order with heavy opposing traffic”: the warm Gulfstream flows with considerable speed toward the northeast, the cold Greenland current to the southwest. The traffic controls would be secure as long as both currents are held to “the right side of the road” as based on the Coriolis force (caused by the earth's rotation) -- the Gulfstream on the east side, the Greenland current on the west side of the North Atlantic “Schwelle”. But the traffic controls become complicated because all “water transport carriers” of the oceans travel on two “floors”: the warm and less salty (as both conditions cause water to be lighter) on the upper level, i.e., at or not far below the water surface, the cold and the saline-rich ones mostly “in opposing traffic”, one level below. The traffic flow, however, will get further complicated, as previously stated, by means of cold but salt-poor, warm but salt-rich currents, whereby warm (lighter due to lower density) and salt-poor (due to less weight) currents tend toward the upper level, conversely cold and salt-rich currents tend toward the lower level. Yet the currents require no signals or traffic police, but instead sort this out excellently among themselves, so that the complicated data of warm and cold, salt-poor and salt-rich, including the most subtle nuances, are quickly and reliably processed. Indeed, into the bargain, regardless of even the minutest change in the two on-coming currents, they gain momentum.

Here The Conceptual Model brings a crucial factor into play: Through the millennia of an ice age, the Gulfstream transports colossal water masses into the Arctic Ocean and with its help renders triple duty as supplier of warmth, evaporation enhancer and food provider. In the course of evaporation into the atmosphere to end up permanently on the glaciers, a portion of the water escapes. Over the decades, centuries, millennia, and tens of thousands of years, evaporation loss caused the sea level of all oceans to drop at least 100 meters if not more! But, because of the continuous inflow of the Gulfstream, the evaporation loss was but a small percentage of the total water that was present. The predominant part of the Arctic's water influx, therefore, must have drained off rapidly. In the direction of the Gulfstream, this could take place at the earliest in the Bering Strait, then through the Union Strait, Banks Strait into the Melville Sound, and through the jumble of the Parry Islands with the two exits of the Barrow Strait, Lancaster Sound, and Jones Sound, then lastly between Grant Land and North Greenland through the Robeson Channel. *As convincing as all these exits out of the Polar Sea may strike one on an*

*ordinary map, they do not actually suffice to again remove all of the Gulfstream's water influx into the Arctic.* The Greenland current had to contribute extensively to that function on the North Atlantic "Schwelle" in on-coming traffic with the Gulfstream. This does not come to pass without friction, but only with tremendous cyclonic vortices.

Now, all connecting straits between Polar Sea and Pacific, and Polar Sea and Atlantic respectively, are shallower than the North Atlantic "Schwelle". Meanwhile, however, The Model has played through most parts of an ice age with all of its consequences. Thereto belongs, among others, that as a result of the take-up of water in the glaciers the sea level of the oceans is considerably lowered. *With that all connecting passages to the Polar Sea from the Bering Strait to the Robeson Channel, have risen from the sea.* It is the Greenland current which now has to cope alone with the transport of water back out of the Arctic Sea -- against the on-coming traffic of the Gulfstream -- and on the North Atlantic "Schwelle", which, at the same time is enormously weakened in its flow-through capacity due to the drop in sea level. Doubled opposing traffic on only half a road -- every expert knows the diagnosis: it is just a matter of time before the traffic grinds to a halt.

When this condition ensues, the ice advance is terminated.

As this unstoppable point in time approaches, the Gulfstream must reduce its performance capacity, because it can no longer flow over the North Atlantic "Schwelle" with sufficient energy, regardless how slow this process develops over great periods of time. The Model makes it clear: not only did the sea drop constantly in the course of the ice age, but also new land rose constantly; from North Cape-Spitzbergen as far as Alaska a broad band of land emerged from the sea -- from the Polar Sea, where the surface had already been reduced by one third (!) due to the emergence of the rim areas. This does not happen without consequences for the heat balance of the polar region. While in one respect the Gulfstream delivers ever less warm water for the described energy output over the North Atlantic "Schwelle", it is not required to perform as much in order to achieve the same effect. Even that is based on the laws of physics.

The Gulfstream's central heating system has it easier warming air over the new lands than previously with the standing Polar water. This is aside from the fact that over the millennia during the Gulfstream's development the surface of the Polar water had already warmed considerably. The newly arriving Gulfstream's warm water finds the Arctic surface water already "preheated" at the height of the ice age. These physical facts sharply brake the slow deterioration of the Gulfstream's capacity over the North Atlantic "Schwelle" in its effect. *To be sure, with that the approach of the end of the ice age is only*

*delayed, not prevented. Examination of The Model shows clearly that the available reserve of the continental shelf is exhausted. Even if the Gulfstream, as an evaporation energy source, were not already decisively weakened, no further new land would be able to emerge. Under the geophysical mechanism of The Conceptual Model, this is the end of the ice age -- exactly stated: the end of the ice advance has been arrived at and explained.*

Precisely how does this take effect? -- Does the ice age film “play in reverse”, as it were? To be sure, the question arising, first of all, is how the Gulfstream comes to terms with this situation.

Aside from normal annual variations, the Gulfstream always carries the same water masses, which it drags with constantly diminishing capacity over the North Atlantic “Schwelle”. Simply turning back is not possible. There is only one possibility remaining, i.e., to strengthen its east- and west-reaching branches appropriately. When the slackwater before the “Schwelle” makes itself strongly felt, it would appear, according to geographic facts, that the Gulfstream has missed by far any possibility to branch off via the east along the European coast and toward the south. Essentially, it will allow the excess to flow west-northwest along the “Schwelle”, then west and southwest around the tip of Greenland into the Davis Strait and Baffin Bay. *Inasmuch as all water passages from the Polar Sea have gone dry at this point, the Labrador Current is hardly able to cause trouble.* Such an intensive Gulfstream effect on the Labrador coast and (although weaker) on the European coast could not remain without consequence. While in northern Europe the glacial movement would have stopped and slowly begun to recede, a new ice age must have been set in motion in eastern America from the direction of Labrador. Likewise, the increasingly strengthened efflux of the Gulfstream along the west European Coast must have once again activated the Alpine glaciers. This scenario has the following validation: “The *Wisconsin glaciation* consisted of four ice advances, the last of which, referred to as the *Mankato Phase*, occurred only as the glaciation of Europe was mostly melted away, although even there the general warming was interrupted by a cold relapse of 900 year duration. In the Alps this was the time of the stage or closing ice age, as the local mountain glaciers advanced forcefully once more, but without coming to complete formation of an alpine ice-power supply” (E. Ebers).

Now, however, even the quite marked Mankato-glaciation must come to an end. That is able to occur because, *after* the termination of the ice age, the glaciers began to grow vigorously in the north and east of Greenland, which was considerably warmer during an ice age due to the influence of the Gulfstream. Their continuously melting tongues, draining into the Arctic Ocean, sailed south in the form of icebergs together with the ever increasing pack-ice, then slid laterally into that arm of the Gulfstream which transported

them around Greenland into the Davis Strait. The Mankato glaciation also sent broken-off icebergs into the Gulfstream and created a swimming ice-edged shelf. These enormous "ice briquettes" melted in the Gulfstream, thereby consuming its warming energy and paralyzing the glacier-enhancing energy, until, after tens of thousands of years, the post-glacial warming was stabilized.

For the last glaciations, which have been established by science beyond any doubt, the "Schlern Phase" of the European Alps and the essentially more marked "Mankato Phase" of the Wisconsin glaciation in North America remain unexplained at this time. *However, both fit harmoniously into the picture, as developed through the geophysical facts pertaining to The Conceptual Model, which they confirm and plausibly explain .* Even the myths appear to have saved this last phase, which is known to date as the last ice age, from oblivion. Tilak states: "There are clear traditions presented in the Rig-Veda, which show legends that cannot be accounted for, except on the Arctic theory". He continues, "the most important part of the second Fargard is the warning... that fatal winters were going to fall on the land... and the description of glaciation". Tilak then sums up: "All guesses and speculations about the origin of the Aryan race and its civilization will now have to be revised in the new light... by the theory of the Arctic home in pre-glacial times."

Now to the ending of the ice age, and the beginning of a warm or interglacial period, and its effect on the climate and therewith upon flora and fauna. As logical as it appears that all such changes which were affected by the ice age must reverse themselves, certainly slowly and over vast time periods, yet on the whole structurally and uniformly, just as considerably does the picture in practice differ from this theory. To be sure, the development of an ice age proceeded by no means uniformly or without disturbances, reverses or oscillation through weather and climate. But now all such manifestations will become dissimilarly stronger, more troublesome, and contradictory, i.e., physically unforeseeable and unpredictable in their appearance. Another equally curious yet commonly known physical fact might illustrate this: a (turned-on) garden hose lies on the grass spraying in one direction. Suddenly -- as a result of some slight earth tremor or minute change in water pressure -- the nozzle begins to move, the hose follows, hesitatingly at first then faster, in wild contortions; the nozzle senselessly beats and sprays with violent jerks and oscillations, for a moment it may lie perfectly still only to start all over again. After half an hour, the gardener finds his beds, which did not receive the amounts of water intended, largely destroyed. Such event, correspondingly enlarged with climate variations in ice age scale, produces a chain of catastrophes.

Water, “invested” in whatever form, reacts more slowly than air. The larger the volume -- and with the subject ice age one deals with unimaginable masses -- the longer it takes till water warms or cools off, forms glacial ice or melts again. The very fundamental difference between the beginning of an ice age and the beginning of a warm period consists therein that in the first instance contrasts evolve very gradually, but in the last, they are in sharp opposition. With the retreat of the northern and southern glaciation, the “weather (garden) hose” widens continuously. It should follow then, that the west to east hurricane-like winds, which race through this hose, slacken off gradually, the permafrost thaws and, the middle Eurasian “normal climate” evolves gradually. *However, the ice margin's dominance of 10, 100, or 1,000 meters consumes great amounts of warm air and creates much cold in the melting process. As a result, devastating storms are produced.* Where cold air and warm air rub in passing, they unleash enormous rain floods, hail and snow-flurries. The effect upon flora and more particularly on fauna is as sudden as it is catastrophic and lasting.

With the gradual melting and retreating of the glaciers, more and more pre-ice age land area reappears. But if man had survived an ice age (a low estimate of 130,000 years for one whole cycle), and could retain the memory of the pre-glacial landscape, he would not have recognized the “new old land”. It had vastly changed: an endless far-reaching gravel plain stretches far beyond the horizon. Elsewhere, a slightly more cheerful moraine landscape was created with hills and dales, and ice-wedge holes. There were monotonously smooth layers of loam. In another place ice age scree slopes pile up in long, stretched-out debris ridges. Old river courses are buried under the debris, new ones spring from different places and in different directions. Small, large, and gigantic lakes are now present by the thousands, even a new sea, the Baltic Sea. From the foot of the Alps to northern Germany, Scandinavia, Finland and deep into Russia, these “blue eyes” sparkle among the moraine hillocks. *From time to time, there are far-reaching connections such as between the Baltic and White Seas, on one hand, and the Black Sea on the other.* North America's Great Lakes were a gift from the ice age. The lowlands are strewn with millions of erratic blocks of all sizes. Mountain slopes are polished smooth as a whale's back. The coastlines are cut through with fjords and inlets. There are high moors and broad swamps. Here land is rising; there it is sinking. In between lie endless loess regions. And over all these roughly delineated, truly “unfinished” areas, unforeseeable weather conditions prevail with storms, deluges, and blizzards. Indeed, the end of an ice age is not the benevolent improvement one might assume.

The outer flank areas are the hardest hit and take the longest time to recover. Inasmuch as the low-pressure area has gradually shifted about 15 latitudes toward the

equator, the southern flank is subjected to powerful and regular pluvials through millennia, indeed, since the beginning of the ice age. Thus, the entire Sahara was gradually transformed into a fertile landscape, the existence of which is legible in the myriad of rock paintings. The same conditions existed, diminishing less and less toward the east, for South Palestine, Northern Arabia, Iran, the Tarim Basin and the Gobi. *These regions now reversed their climate character, point blank.* While fertile and rich in rainfall during the ice age, they became slowly but continuously more or less inhospitable deserts. The change took place more subtly in the Mediterranean region. With the beginning of the ice age, the low pressure areas had advanced hard toward the south, where the eternal blue sky of the Mediterranean covered with rain-clouds and fig and olive trees were supplanted by pine forests, which also extended over wide areas of the Adriatic. This is where more northerly European forests had escaped. With the end of the ice age, even though with intense weather contrasts, the "classic" Mediterranean climate "formed" very slowly. The same is true, albeit in weaker form, in the Near and Middle East. *Even the severe glacial pluvials in North America, between the coastal and Rocky Mountains, ceased.* The giant trees in the north-south valleys, which had relocated southward, returned north again, and slowly the dry regions formed as we know them today between Nevada and New Mexico.

Over the new land that had emerged from the oceans since the beginning of the ice age from western France to Alaska, the end of the ice age pronounced its death sentence. The execution thereof resembled a catastrophe in slow motion. The sand in the Sahara approached slowly but deadly, devouring the blooming landscape and transforming it into desert. In the north the sea level now rose imperceptibly with the melting of the glaciers. As land had formerly been gained continuously, so now it commenced to disappear in the floods. So gradually did this transpire, however, that it would have required exacting instrumentation to measure the rising of the sea level. Soon began devastating and intensifying attacks upon flora and fauna which were already suffering from the new fickle climate. The temperate northern climate belts were for the most part spared from storms during the ice age. Now there appeared unpredictable hurricanes. The shelf-land was very flat. *When sun, moon and earth are in alignment, with the full or new moon, the gravitational forces add up, operate in the same direction and create especially low and high tides.* If, after such an exceptionally low tide a storm rises suddenly -- which unfortunately happens frequently even today to the displeasure of coastal dwellers -- and with the quickly rising water of a spring tide rolling against the coast, then the waves race high onto the beach, deep inland, dig in, tear apart and take with them back out to sea, flora, fauna, gravel, rocks, land and fertile soil.

If build-up of wind was added (i.e., as it occurs often in the so-called “wet triangle” of the North Sea), with a rising tide of up to four meters, then the catastrophe was total. The result was devastating floods. There were no dikes as we have today off the Dutch coast or Hamburg, where, nonetheless, in recent decades flood catastrophes have occurred with dreadful consequences.

To recapitulate:

- The end of the ice age was initially no relief for flora and fauna as it required millennia to set in motion.
- *The northern and southern glaciations melted only slowly, thereby creating great cold and “catastrophic climate”, under which the regions between had to suffer for a long time.*
- *The extended, fertile temperate regions lost their charm and slowly became distinctly life-threatening -- in the north to the new land from the Atlantic to Alaska, in the south the Sahara, Palestine, Arabia, Iran, the Tarim Basin and the Gobi -- which had previously been of special attraction for flora and fauna.*

*From historically substantiated events of endlessly recurring waves of peoples throughout all ancient civilizations, we draw the conclusion that somewhere suitable environments existed which slowly became inadequate. In the test of the geophysical Model, such regions emerged.* This occurred not only in one but in two compass directions, and not as a result of one but two causes, and in peculiarly reversed circumstances. Behind the ice in the north and in front of the ice in the south -- in one place because the sea rises constantly, slowly drowning the land; in the other place because the groundwater drops constantly and gradually dries out the fertile pluvial paradise. From the same basic cause, two contrasting features become evident: at once too much, then too little water! -- accompanied always by the *same end effect, the gruesome lack of habitable space!* All ancient civilizations from Egypt to China, were forever flooded by waves of people, who invaded via either rivers and mountains, from the seas and beaches or the paradisiacal regions, which had turned to desert. We may be satisfied with the projections of The Conceptual Model.

In order to actualize The Model, one would have to start with an assumption: that the shape of the earth is as we know it today, including the existence of the Gulfstream, the high water line, etc. Among all possible suppositions, this is the least subjective, yet just the same, it is only a supposition. If this is correct, why were there only these four ice ages to date? After all, global history has time and has already experienced other ice ages in

the Southern Hemisphere. No sooner after The Model has furnished the barely hoped-for numbers of useful answers under the imposed prerequisites, which fit plausibly into established scientific ice age research, than it is time to prove whether prior to the beginning of the ice age, global conditions, other than those known today, might have existed which possibly excluded an earlier beginning of the Gulfstream mechanism. To determine that, geology must be studied in view of the fact that the inconceivably far distant past is not surprisingly without witnesses -- and because even the broadest outlines of uniformity of interpretation would be out of the question.

Even the age of the world is determined differently. Latest research tends toward acceptance of four to five billion years ago since the earth came into being. One theory sets forth that the earth was created from *a hot, swirly mass* of gassy matter ejected by the sun, another one teaches that earth, like its planet neighbors in the solar system, began in a cold manner. According to a third theory the earth was created *outside the solar system* in a more or less complete, i.e., cooled-off, state and captured by the sun. The first two theories agree that the earth came into being -- cold or hot -- in the beginning as a fire-molten globe, because otherwise the distribution of heavy and light matter within our planet could not be adequately explained. Gradually the globe had to cool more and more due to loss of heat. Unlike the moon or Mars, the earth is fortunately large enough to keep its atmosphere attached to itself due to having a sufficiently large gravitational force. Otherwise, of course, we would not exist. As a result of its adequate proportions, the earth can also retain huge amounts of water, which has a natural tendency to evaporate or sublimate. Otherwise, the world would not have any oceans. The water vapors expelled due to the constant cooling of the earth crust shaped themselves into immense clouds from which endless deluges poured upon the earth. Inasmuch as the temperature as well as the surface rocks exceeded the boiling point, these incessant downpours day in and day out over millennia would have had to evaporate at once. In comparison with this primeval process, the Gulfstream effect, as demonstrated, with its massive evaporation, appears harmless. As a result of the constant loss of warmth due to evaporation, the primary rock cools to such degree that the rain-floods can run off through slowly widened depressions and slowly deepening channels. As long as they do not disappear into crevices, fissures or caverns, or evaporate back into the atmosphere as geysers, they collect in the original seabeds, which, of course, were different than we know them today.

Some of us may still recall from geography class in school where our planet was likened to a shriveled-up baked apple. The comparison was graphic, appetizing, and intelligible. This so-called contracting earth hypothesis seems to fulfill all demands which one could impose upon a theory. It explains the processes of our planet from this one

cause, the contraction of the earth surface: formation of mountains, earthquakes and volcanism, displacement of boundaries between land and sea and much more. At the same time, it must have been a rather comforting thought for us inhabitants on this rather thin earth crust that the major movement of the earth had eased off. Still, it rattles enough. But when Otto Ampferer, in 1906 in Vienna, came out with a totally different theory, according to which all events in the genesis and changes of the earth's crust are based on undercurrents, on flow in the deeper regions of the earth's crust, he could not find any favor among the scientific community. The profound and visionary Ampferer, who had hoped that with his theory he would revolutionize geotectonics, the science of the earth's "architecture" and building style, met with such all-around and intense opposition that he quietly resigned. Only the future was to vindicate him. For the moment peace was restored, "and the quiet of development was once again saved" (K. v. Bülow). Six years later the revolution of geologic thinking came from another camp.

In 1912, Alfred Wegener (1880-1930) submitted his continental drift theory, whereby the mainland plates drift upon a comparatively liquid substratum, like ice floes on the water. This brilliant geophysicist's theory fascinates because of its geographic quality and the fact that it lucidly explains a series of open questions. Wegener ranks highly as an outstanding personage, not only because he was a gifted scholar, but also an eminent polar explorer who participated as leader in three Greenland expeditions (1906-1908, 1912-1913, 1929-1930). Just prior to the second expedition, he published his continental drift theory; on the last expedition, he lost his life in the service of science.

Wegener rattled continents, the symbol of dependability. He set them in motion -- a revolutionary thought! Snyder had already recognized in 1858 that the east and west coasts of the Atlantic conspicuously fit into one another. This impression intensifies when, instead of coastlines, one inspects the respective continental shelf boundaries, which Wegener developed into a brilliant total. The new science, a study of physical properties of the earth, recognized that the earth crust consists of two mantles: one of a deeper, darker, heavier rock, the upper of bright, lightweight rock. Why then shouldn't motion be possible, the drifting of the upper (lighter weight) rock on the lower (heavier) rock layer? Of course, this would require much time. Geology has time. Take for instance a motion of 10 cm per year, that would be ten million cm or 100 km in one million years. However, it is generally held that more than 500 million years have elapsed since the Cambrian, and that the land is now unchangeably anchored, firmly or loosely, but moveable. Such motion would have had time to cover a distance of 50,000 km or 5/4 of the equator's circumference. One sees already that essentially smaller processes of movement in geologic time could lead to staggering results.

Wegener has developed graphic descriptions of the younger carboniferous period approximately 300 million years ago, during the tertiary 50 million years ago, and at the beginning of the quaternary approximately one million years ago. According to this explanation, the continents of North and South America, Europe, Asia, Africa, Australia and Antarctica are still joined fast in a united mainland body which, of course, reveals distinct indications of break-up and half of which is covered by shallow seas. In the beginning of the tertiary, the drifting apart of the continents-to-be had already taken prominent form. India and Madagascar had separated from Africa, Australia and Antarctica had already substantially drifted apart, yet still hung together; South America was still connected to Antarctica, while the North Atlantic had widened; the shallow seas had largely receded. In the beginning of the quaternary, a picture which approximates today's appearance of the earth had developed.

What captivates us mostly in our context is the circumstance that Wegener only now, at the beginning of the ice age, lets the break-up of North America-Greenland and Greenland-Europe take place!

Between Greenland and a broad land bridge on either side of the 60th parallel of northern latitude, connecting Alaska and northeast Asia, lies an enclosed, warm sea, which later develops into the Arctic Ocean. The comparatively small North Atlantic extends from the equator to the 30th parallel of southern latitude. A connection to the subsequent Polar Sea did not exist in the carboniferous period nor at the beginning of the tertiary, although the continents, by then, had substantially drifted apart, and the erstwhile warm sea between Greenland and the Bering land-bridge had relocated across the North Pole and froze. Only at the beginning of the quaternary, as the Atlantic was by then already extensively developed (including its warm currents), does a rift occur between North America-Greenland and Greenland-Europe, which slowly splits apart from south to north until it develops today's formation. The resulting consequences fit perfectly into the outline of The Conceptual Model:

- *Glaciation of Northern Europe before the beginning of the ice age was not possible.*
- *With the beginning of the tertiary, the "arctic" sea, which had slowly wandered across the pole, had to freeze shut.*
- *The first ice age could only begin after the surface shape of the northern hemisphere corresponded essentially with today's configuration; the rupture to the Polar Sea opened and sufficiently widened so that the Gulfstream could begin its function in the Arctic Ocean.*

Wegener's brilliant outline found no lack of enthusiastic approval in the scientific world. But opposition made itself known, multiplied and formed arguments, which could not be ignored. It appeared -- and this impression strengthened over the years -- that growing opposition did not focus on Wegener's representation of development itself, but instead rejected as inadequate the forces which Wegener chose as the basis for his displacement of the continents. Therefore, we must delve deeper into the matter (*viz.*, geotechnique), literally several earthen floors below, to understand the significance of this conflict: The considerable drifting of the lighter-weight mainland plate on the heavier lower stratum, according to Wegener, is facilitated on one hand mechanically through the polar flight; *i.e.*, the urge of the mainland plate to relocate toward the equator, on the other, through so-called *west-drift*, which has its cause in the *tidal friction*. The first concept, based on centrifugal force, is obvious at once. The second one is substantially more complicated. The tides along the North Atlantic coasts produce two high and low tides in the course of 24 hours and 50 minutes. The high tide occurs 50 minutes later each day, by the same amount by which the moon lags behind the sun from one high tide to the next. The main cause for the tides is the moon; the variations are partially brought about by the sun, which, however, exerts only half as much influence on the tides.

Now, the distance between sun and earth and moon and earth, respectively, is not always the same, and neither constellation stands above the equator. As a result, the tide-producing forces are subjected to variations. (Thus, it can result in substantial irregularities, inasmuch as the formation of a tide lasts an entire day.) The famous French mathematician P. S. Marquis de Laplace (1749-1827) established already in 1775 that tides are substantially more complex due to the inertia of water and the earth's rotation than Newton had presented. Diverse shapes of coasts and depths of waters, the oscillation of the water in the oceanic basin once disturbed, its diverse oscillation periods and resonances, bring about all manner of peculiarities of which only the frictional effect of tides are relevant here. Indeed, exceptional quantities of ocean water are being moved to and fro horizontally, especially as a result of resonance (the tendency to swing along and the rocking of certain portions of the sea).

Tidal energy which enters from the Atlantic Ocean in the west into the English Channel produces approximately 240 million horse power. However, from that 87% of the friction is consumed by the ocean floor. Globally seen, this friction power of the tides acts as a sort of brake, which is barely noticeable but measurable, slowing global rotation so that in 100 years the day lengthens by 1/1000 sec. At the same time, as a result of tidal friction, the distance between moon and earth enlarges; thereby requiring more time for one rotation about the earth: the month becomes longer. To be sure, these effects as measured

in human life spans are minute, in the course of millennia, however, they become considerable. K. F. Bowden, whom we have to thank for these deliberations, states that the moon initially turned quickly on its own axis, until the tidal friction slowed down its rotation so far that it “froze”. This is why today we only see one side of the moon. *Astronomers predict the same for our earth in 50,000 million years.* The days will become steadily longer, the moon will distance itself ever farther until day and month are equally long. One day will be approximately 47 times longer than today. There would also then be no more tides, if the oceans have not already evaporated due to increase in solar radiation. The huge factor of tidal friction has led us seriously into difficulty in understanding various points of view, which, however, makes the opposition of the professional world to the drift mechanism of Wegener’s theory intelligible. To be sure, tidal friction has enormous consequences. Barely a soul can contemplate this without a measure of uneasiness, and mitigated only by the knowledge that this all-life extinguishing effect will commence in the unimaginably far-distant future.

*For the tremendous movement of this original continent (which Wegener, in the elaboration of his theory, lets places drift apart by nearly half the global circumference in “only” 500 million years), according to the obvious judgement of science, the westward operating tidal friction in the plane of the latitudes and the operating polar flight toward the equator in the plane of longitudes do not suffice.* Does Wegener’s theory herewith sacrifice its conviction for The Model? Have fissures formed in that certain area around Greenland through which in due course the Gulfstream could begin to flow, and to which Alfred Wegener was more closely, deeper and structurally tied than any other scientist before and since? Convinced of the logic and perspicuity of continental drift, the author did not admit defeat. Perhaps there are other possibilities regarding the problem of the flowage of the earth’s crust which are tied closely to the question of polar wandering. However, that leads us into the dangerous proximity of abstract hypotheses. Certainly there is much which to the layman might appear as mere fantasy, but is not in the least unfounded, if one overlooks the abundance of ‘geotectonic theories’ which often oppose or cancel out one another. One might want to resign and lower sail, and leave to the far distant future the answer to the last earthly questions. “Aren’t conflicting viewpoints proof that sufficient facts are not yet known, which decide irrefutably among the opposing parties?” This was K. von Buelow’s careful formulation in his *Genesis of the Continents and Oceans* (1963), upon which, among others, we rely here.

Thus the contracting earth hypothesis (dried apple theory) was shaken by Wegener, and Ampferer had already published his theory of the undercurrents, although without resonance. According to the latter, the flowage in the lower earth layers are called upon

through weight and temperature variations of the sial and sima layers on the margin of the upper earth mantle, which in their effect correspond with what we have already learned through the Gulfstream. The thermal imbalances of the earth crust can also be caused through radioactive thermal production depending on the concentration of radiating elements contained in the rocks. Rittmann formulates the rule which governs the crust plus outer mantle as follows: "Every event is the consequence of a disturbed balance and is pointed in such a manner that it attempts to correct the imbalance". Today, the Ampferer theory has found numerous followers. Moreover, after the contracting earth hypothesis, the idea of an expansion was established and, in the interim, has been modified into a pulsation, which today is favored by scientists of rank. One might be tempted to believe that even in science something akin to pulsation can exist which presents itself as an up-and-down of theories. As is the rule with such hypotheses, they are surprising, pose an abundance of interesting considerations and -- as happens with this book as well -- set heaven and earth in motion on behalf of their concept. With sober investigation, however, one gains the impression more and more that the various phenomena eager for earth expansion, explain themselves without difficulty through continental drift; that, however, contrary occurrences, which speak strongly for the Wegener theory (as perhaps certain geotectonic and paleontologic connections between Africa and South America) according to the earth expansion hypothesis, cannot be explained in terms of space and time. If one combines the many theories of which only a few could be alluded to in the context of our inquiry, then we could modify Galileo: "But the earth does move". To be sure, the forces of the polar wandering and tidal friction do not suffice in any case, as Wegener had in mind, to overcome the resistance, which the sima sets against the drifting sial. But Egyed opened new possibilities for the Wegener theory and the Swiss geologist Staub pursued Wegener's intellectual property and the theory of undercurrents, thereby indeed showing other paths which, however, lead to similar results.

*Now as ever, no cause exists to modify or abandon one's trust in Wegener's continental drift theory, particularly with reference to consequences in the Greenland area.* The only possibility of that happening would be if, on the basis of new and convincing findings, research comes to a clear rejection of Wegener's assumption, viz., a land barrier which existed at the end of the tertiary, between the Atlantic and Polar Ocean. So far, this is not the case. Instead, among the various theories about distribution of the mainlands and oceans from earth's antiquity to the quaternary -- with all variations in detail and with a view to dating -- time and again we meet a land barrier between the primitive Arctic ocean and the primitive northern Atlantic. In view of the blurred image of earth's development to this date, this is "more than can be said about most theories". *With that, the question*

*appears convincingly answered why there could not have been glaciation in the Northern Hemisphere prior to the Great Ice Age.*

Postscript: This chapter was concluded some time ago, when recently, and in a different context, various research results began to accumulate whose outcome belatedly, but for that the more impressive, validate Wegener's continental drift theory. For that reason cited here are just three examples: E.J.W Jones and J.F. Ewing of the Lamont-Doherty Geological Observatory, Columbia University, New York, in the fall of 1969, report certain measurements and paleo-magnetic examinations of that particular Spanish-French coastal shelf which is also of interest in our context. *According to that article the Iberian Peninsula turned nearly 20° counterclockwise in the early tertiary whereby the continental block had to rupture and which formed the Bay of Biscay. Exactly this movement of the Spanish Peninsula was described by Wegener more than 50 years ago.*

In October 1969, the Director of the National Science Foundation in Washington advised of additional 12.6 million dollar financing upon the return of the deep sea explorer ship "Glomar Challenger" from 18 months of immensely successful exploration. That ship was to spend the next three years exploring in the Atlantic, Pacific, Indian Ocean and Mediterranean. One of the most significant discoveries to date was the fact that *as a result of the rising of deeper-lying stone masses the ocean floor on either side of the Atlantic "Schwelle" wanders 1 - 4 cm per year. This, too, is an impressive endorsement of Wegener's thesis.*

In December 1969, the American geologists M. Gould and Murray telephoned home from the Arctic to report a sensational discovery they made on the Beardmore Glacier. It was about skeletal parts of a Lystrosaurus, which they described not only as the most momentous finds in the Arctic, but one of the most important fossil finds of all time. The similarity of this Lystrosaurus to others found in Asia, Africa, Australia and America is persuasive and without doubt. It compellingly established that part of Wegener's continental drift doctrine which deduced the existence of Godwanaland in which India, Africa, Australia, Antarctica and Patagonia were once united -- all the more reason to rely optimistically on the continental drift theory.

No sooner is an intelligible answer found to "why no ice age previously", when literally in the same breath the next question arises "and afterwards?" The Conceptual Model is not at a loss for an answer.

The first glaciation could not begin sooner because the crucial prerequisites were previously missing -- the function of the North Atlantic "Schwelle" and the Gulfstream effect in the Arctic Ocean. As these prerequisites were created in the course of the continental drift, the Gulfstream mechanism began to start up -- glaciation -- sinking of sea

level -- reduction of Gulfstream -- interglacial -- melting of ice -- rise of sea level -- Gulfstream -- and so forth. It will remain in effect so long as the prerequisites therefore continue to exist. Thus, according to the exigencies of The Model, must there be a new ice age? If so, when? This is a question which surely must make all inhabitants of the Northern Hemisphere uneasy . . . and the answer the more so:

*It has already begun!*

On the basis of many reflections, comparisons and observations by the author, the conviction established itself over the years that a new glaciation period had commenced approximately around the turn of the last century. With that, it appears from current expert opinion that it is not a matter of a *new ice age*, i.e., the close of an *interglacial* which immediately followed the 4th ice age, but about the end of the so-called interstitial of the Wurm ice age, hence one of those glacial retreats of “short” duration which then again is followed by a new *glacial stage*, a new ice advance. This would mean: *the last ice age has not come to an end; it continues in a new glacial stage.* And although, according to the popular Milancovič-Soergel table, it should in any event already have lasted twice as long as the other ice ages, it would possibly produce additional glacial stages in future.

If our theory is correct (i.e., that instead of additional polar cold, by contrast the warming of the Arctic Ocean through the Gulfstream was, is and remains the cause of the ice age), then after complete melting of the glacial ice advances a record sea level must have been reached. *According to the interpretation of science, this is the case today.* Synchronous with that record sea level, the Gulfstream’s maximal potential must have come into effect across the North Atlantic “Schwelle”, resulting in continuous warming of the Polar Sea, increased moisture transport to the glaciers, and a slow but sure beginning of a new ice advance. This chain reaction is logical and conclusive according to the laws of physics. The most decisive proof of our contention must rest in the thermal budget of the Northern Hemisphere.

The British oceanographer G. E. R. Deacon said, in 1962: “The observations in the Arctic, for instance, clearly show that the sea in the past two decades has become warmer.... The global climate appears to have become milder, glaciers retreat and return their water into the sea -- the sea level rises in many places by 1-2 mm per year.... In some Pomeranian areas the coastline recedes 2 m per year. Their erosion is speeded up when during storm surges water level is considerably increased”. These sentences illustrate the diversity of the connections. The logical conclusion that “the global climate appears to become milder” is of interest here, because it once again demonstrates the common

scientific notion, which is incorrect according to our theory. When the Arctic Ocean becomes warmer, a milder climate ensues only immediately adjacent to islands and coastal areas. As for the rest, so far and as long as warming of the Polar Sea lasts in the Northern Hemisphere it produces glacial formation in ice age proportions. Accordingly, there are also no characteristic symptoms for warming of the entire earth or merely the Northern Hemisphere.

In 1960 the geophysicist Julius Bartels said; “The last *ice age* ended for us approximately 11,000 years ago. The retreat of glaciers and the warming of the north Polar Sea in the recent past is particularly obvious in the Arctic area of the Gulfstream by about 2° since the begin of the century. The *fish* have adjusted rapidly to this temperate change. Since 1938, more cod have been caught near Novaya Zemlya, and since 1920 tuna have become increasingly abundant in the North Sea and even near Iceland. The advance of the sardine from Mediterranean latitudes as far as Stavanger had a sensational effect on fishery experts (1957). Above all, the winters in the north have become milder: In Upernivik (West Greenland on the Baffin Bay), the monthly mean temperatures for the 30 years 1882-1911 was -22.8°C in January, whereas for 1926-1955, it was -16.3°C”. According to our experience with the time factor these are quite surprising facts which corroborate our contention convincingly. Thereby it is particularly noteworthy that the warming obviously occurs precisely in the winter months, when *solar irradiation is not the direct cause*. The warming occurs in the Gulfstream region.

Alan Villiers also was occupied with the same problem as early as 1957: “Scientists are now convinced that the last ice age is in the process of continual retreat. Hydrographers are determining that the North Sea is warming.” It is precisely from this fact that we conclude the opposite, viz., that a new ice advance is beginning to develop! Villiers muses: “But it appears as if a great mass of warm water from the ever-present Gulfstream somehow penetrates into the North Sea.... Indeed one finds ever greater numbers of tuna and sardines in the North Sea.... On Greenland the ice shrinks, glaciers disappear. Ships, which could approach the Greenland coast only during a few summer months, now travel there the year around. How does all this come about?” A legitimate question, which we believe we can answer: these are all the first symptoms of an ice advance-in-progress. And, as we have shown, to set it in motion one requires not increasing cold but additional warmth in and around the Polar Sea. In the polar region the tundra advances steadily towards the ice desert, which is clearly observed in Spitzbergen, where between 1920 and 1949 the winter temperatures became milder by about 9° C. As early as 1939, C. Scherhag was of the opinion: “The December climate of Spitzbergen corresponds approximately today to temperature conditions as they existed in Berlin during the previous century!”

In 1958, the oceanographer Rachel Carson, cited previously, wrote: "By this time it is an established fact that around 1900 a decisive change in arctic climate set in, that this became particularly noticeable around 1930 and that this now expands to the sub-arctic as well as temperate regions. The ice cold apex of the globe warms quite obviously.... For instance, in the year 1932 the 'Knipowitsch' circumnavigated Franz Joseph Land for the first time in Arctic shipping history...." For the first time in written history perhaps, but whether for the first time in actuality is not at all certain. We may be sure that the Nordic coastal inhabitants, at the latest during the ice advances of the Riss glaciation, engaged in lively fishing expeditions. In August 1940, the German ship "Komet" under Capt. Eyssen, sailed from Norway eastward through the Barents Sea, assisted by Soviet tugs and icebreakers, via the northern sea route through the Bering Strait into the Pacific for the purpose of economic warfare. Although on September 1, 1940, the Soviet assistance failed in the latitudes of the North Siberian Islands and requested the return of the cruiser, Eyssen continued on alone, arrived safely in the Pacific and, after successful action, returned home by way of the Atlantic. The voyage of a merchant ship, without any form of reinforced hull, along the northern sea route created a sensation among both friend and foe. Aside from the fact that this required expert seamanship of captain and crew, it was an uneventful trip.

"In 1940, the entire north coast of Europe was notably free of ice during the summer months and more than 100 ships followed their trade along the arctic routes. In 1942, during the Christmas week, a ship unloaded wares in complete winter darkness in the West Greenland harbor of Upernivik (72°, 43' northern latitude). In the 1940's the season for shipping coal to the Harbor of Spitzbergen had lengthened to seven months, compared to only three at the beginning of the century. The time of year in which Iceland is surrounded by pack-ice was shortened by about two months compared to a century ago. Between 1924 and 1944 the drift-ice in the Russian part of the Arctic Ocean decreased by one million square km and in the Laptev Sea two islands of fossil ice melted so completely that their position now is marked only by submarine cliffs." As Rachel Carson was writing this in 1958, it was reported at an international congress that the thickness of the ice in the last 15 years has decreased by about 40%. These "facts", which are certainly no longer needed to prove our theory, impress and astound us, even though we are accustomed to great results from minute facts (with the aid of the element of time). What is impressive are the high percentages of change in such a small space of time. One could continue with such examples, through the significant immigration of warmth-loving fauna, from fish to birds to mammals in the arctic latitudes. *The reality corresponds without question to the*

*picture gained from our model, according to which we are in the early beginnings of a new ice advance.*

The unforeseeable change over time in the heat budget of the Northern Hemisphere had led in the past decade to the fact that science is beginning to concern itself with a new ice age. However, the tiresome cold bias blocks their vision.

Scientific deliberation based upon totally different prerequisites than The Conceptual Model are neither uniform to any degree in content nor convincing in their direction. Nevertheless, voices increase -- although quite cautiously, at times with a certain embarrassment or more or less vague -- which express their supposition that we are "still in the ending of the Wurm ice age" or that we live "possibly in an interglacial", or that "soon a new ice age will come" (of course "soon" meaning geologically within 20,000 or 50,000 years). A certain insecurity of such statements is understandable. *The enumerated proofs of warming of the Polar Sea and adjacent land regions are overwhelming.* As long as one clings to the false concept of particular cold in polar regions and Polar Sea as ice age cause, one can view warming only as ice retreat (end of an ice age) or warm period (interglacial). But even that seems to be seen incorrectly. Because during an ice retreat or an interglacial, respectively, the polar region and the Polar Sea become continuously and noticeably *colder*, because the Gulfstream can no longer flow with adequate capacity over the North Atlantic "Schwelle". The fact is, however, that since the past half century it is just the reverse: the Polar Sea is constantly becoming *warmer*, because the Gulfstream flows with maximum capacity over the "Schwelle":

"The lands in which the most noticeable changes take place (namely powerful warming) are those whose climate is directly subject to the North Atlantic currents. Greenland, Iceland, Spitzbergen and all northern Europe experience heat and cold, drought and precipitation depending upon the changing energy and temperature of the easterly and westerly moving currents of the Atlantic. Oceanographers, who studied these matters during the 1940s, discovered many important changes in the temperature and distribution of large masses of ocean water. Obviously each arm of the Gulfstream, which flows past Spitzbergen, has increased in volume to such an extent, that it now carries along enormous masses of warm water. The surface waters of the North Atlantic show rising temperatures; the same holds true for the lower levels around Iceland and Spitzbergen. The sea temperatures in the North Sea and on the Norwegian coast have likewise become warmer since the 1920s" (R. L. Carson). Consequently, *even in view of the causes for warming of the polar region, the thousand-fold identifiable and verifiable facts do not forsake us: it is unequivocally the Gulfstream that is the cause of these phenomena.*

What do scientific prognoses of a coming ice age rest upon now? In the absence of other concrete criteria, the majority still begins with the Milancovič curve. And indeed: had the Milancovič effect hitherto been the cause of glaciation, so it must follow, through the eccentricity of the earth's orbital influence on the heat budget, that it should similarly also create ice ages in the future. Why the Milancovič curve is not convincing has already been explained. It has already been emphatically rejected as ice age causation. Only with force will it fit into the (graph's) curved peaks of the glacial process (the Wuerm ice advances). In the Ericson-Wollin conception, they do not fit at all. With the recently possible verification through the C-14 method, the curve could not stand up to the test. Should one perhaps do without such an uncertain method instead of relying on it "because nothing better is at hand"? It would be far more useful and important "for science to continue unbiased to prove the facts on site and not, prejudiced by the curve, to read these into the terrain conditions" (E. Ebers). Here the danger to scientific objectivity may aptly be called by name. The American physicist, George Gamow, linked up the unworkable components of the Milancovič effect with the important components of the creation of mountain ranges. We have already discussed the emergence and disappearance, over time, of the mountain folds, as well as the prerequisite for the creation of the snow line. Gamow is of the opinion that, although *mountains may climb higher and higher in the coming millennia, that will not create glaciers on an ice age scale*. Snow delivery belongs to a snowline, and the Milancovič effect does not deliver snow with certainty.

Other scientists are concerned over the rapid decline of glaciers in recent times and the related rise in sea level based on the record of previous glacial periods. What if the ice would melt completely from the glaciers? M. Schwarzbach paints a realistic picture when he suggests "one should imagine Cologne to sit on the bottom of the shallows". He could just as well have said London or Copenhagen. But even this perspective is not seen correctly. Perhaps here and there glaciers have diminished to such an extent that their ice-cellar effect no longer suffices to prevent total melting during the few hot summer weeks. On the other hand, there are increasing indications that some glaciers, for example the Zugspitze in the Bavarian Alps, receive more snow in winter than can melt again the following summer. But *even if this were not so, the rest of the glaciers, which could melt further, could hardly create the effect feared by Schwarzbach*. This American astrophysicist, by contrast, is perhaps too optimistic by one zero, when he predicted a new ice advance from the north about the year 50,000 (which would likewise threaten Mr. Anthropos in New York), provided that mankind continues to be unable to come to grips with the cause of the ice age -- i.e., the Gulfstream -- and the fact that the ice advance has already begun to develop.

A certain uneasiness is created when one tries to come to terms with thought processes which are inconsistent and incompatible with one's own views. This unease is hardly mitigated by the knowledge that such thought processes developed in the same good faith as one's own and that such differences of opinion are neither preventable nor unusual. The greater is the joy over a theory which arrives at the same conclusion via new paths and with exacting methods, upon which our own concept is based, for which they become a valuable support. And indeed, this support springs from a source which was not tapped the first time around.

As previously set forth in 1959, Maurice Ewing of Columbia University, New York, assigned colleagues David B. Ericson and Göesta Wollin to conduct research which led to the Ericson-Wollin ice age table. General acknowledgement of this accomplishment remains outstanding (at the time this book went to press [1972]) which should not speak against its credibility, but rather, for its revolutionary significance. The more far-reaching the consequences of a discovery are, the greater the number of scientific disciplines affected, and the longer it takes for the required verification. In any event, Ewing, as chancellor for the Lamont Institute for Geology at Columbia University demonstrated sound instinct with the encouragement of this dissertation. Obviously, it was not just lucky happenstance.

In the summer of 1953, Ewing undertook an exploratory voyage on the Atlantic, Gulf of Mexico and Caribbean Sea on the schooner "Vema". This geophysicist was accompanied by a meteorologist, William Donn from Brooklyn College, who also headed up meteorological research at the Lamont Institute. During the excursion, among other things, core samples were taken from 7000 meters with a new core sampler. Such a core sample fascinates not only scientists. The instrument conveys the sediment core to the surface in the shape of a long pole, as the layers were deposited on the ocean floor over thousands and thousands of years. That alone is very interesting. Now, however, both scientists discovered an idiosyncrasy through repeated borings. Each time, from approximately 30 cm beneath the sea floor, i.e., below the upper edge of the drilled core, the sediment color suddenly changed from salmon pink to gray. Laboratory tests revealed that the upper, i.e. younger, sediments consisted of minute marine animals which thrive only in warmer waters; the lower, i.e. older, sediments consisted of gray marine animals, which thrive only in colder waters. Therefore, at some point in time the colder sea temperature must have become warmer. When might that have been? For what reason did this happen?

With reference to this particular point in time, W. Libby's radiocarbon invention of 1950 came to the aid just in the nick of time. The contents of this interesting drill core

could be measured at any desired point using radioactive carbon. The results revealed that the Atlantic Ocean must have warmed relatively suddenly 11,000 years ago, thus about 9000 BC. With that the question of the “when” was solved; the “why” continued to remain in the dark. Ewing and Donn cannot recall today when the illuminating spark ignited. In any event, they read one day about the people on the Yukon, who enlivened their lonely existence on the farthest western edge of Alaska by betting when the big event of the year will occur, viz., when the ice on the Yukon begins to move. Now, the Yukon is no ocean but a river, which does not flow into the Atlantic but the Bering Sea. Just the same, this article prompted a fruitful train of thought which led from another side and in another way to the same end-result as The Model has provided. That train of thought went roughly as follows: over the short term water can change its condition only through freezing or melting, oceans don't freeze with the exception of the comparatively small, mostly enclosed northern ice sea; so when might that melt like the Yukon? But let these two researchers explain the rest themselves. “We told ourselves that the northern Ice Sea must warm up inasmuch as an exchange of more free cold-dissipating water would have a corresponding impact upon the Atlantic, which would become correspondingly colder. And that provided our solution: when the Ice Sea was ice free, warmed by the Atlantic, and warmer than the surrounding land masses, water vapor must have formed which came down on land as snow, and the more snow fell on regions such as northern Europe, Greenland, and northern Canada, the more the glaciers must have grown there”.

Donn and Ewing recognized the effect: ocean warming -- the lock-up of water in the glaciers -- sinking of the sea level -- restriction of warm water supply over the “Schwelle” -- freezing instead of generating vapor -- failure of glacier growth -- end of an ice age. Ewing and Donn were the first scientists to recognize (ocean-)warmth (instead of particular cold) as the cause for the beginning, course and ending of an ice advance. Their merit would be in no way diminished if it should turn out that essential processes, as we believe them to be, are not seen entirely correctly. Donn and Ewing are of the opinion that “the beginning of glacial events came about because one million years ago the north Pole was not situated in the earth-enclosed Ice Sea, but closer to the middle of the Pacific Ocean.” Through “sudden displacement of the earth's crust, which at the time relocated the pole into today's Arctic”, the “system of contrasting climate zones...”, “the cold cluster in the northern Ice Sea (which caused the seas to freeze)”, and “the cycle of ice ages” were created.

We are convinced, supported by Wegener, that the polar site in the Pacific described by Ewing and Donn belongs to geologic antiquity. We also believe that the continental mass, in the process of disintegration, had already pushed across the pole in the

arc of Japan / Kamchatka / Alaska (obviously not as developed as today) 60 million years ago, and that already one million years ago the North Pole (like today) had long since been in the middle of the Polar Sea (which as a result was frozen shut). And we believe that the cause for warming, the partial melting of the arctic ice (and in the course thereof delivery of great snow and rain masses) and the resultant break-up of the America / Greenland / Iceland / Europe connection at the end of the tertiary enabled the break-through of the Gulfstream into the Arctic Ocean.

Ewing and Donn were further of the opinion: "at the present we are living in an interglacial warm period". We, instead, trust The Model, i.e., that since the turn of the last century we have been in the beginnings of an ice advance which will understandably make itself felt more distinctly in hundreds of years, with symptoms of increased warming of the Arctic Ocean, the beginning displacement of pluvials toward the south, increased storms in the "tuba", among other phenomena which, however, are making themselves felt already. Donn and Ewing describe that the ice sea does not freeze shut and why "this allows for glaciers to form through transformation of humidity into snow on the edge of land masses." By contrast, The Model shows that essentially the margin of the land masses remained without ice, warm, foggy (and therefore habitable!) while beyond at that point in time huge glaciers grew in places deep inside the Eurasian and North American inland. It is clear that these are substantially divergent views.

The scientists Ewing and Donn would undoubtedly become aware of this important problem if it should be shown that the warming of the Atlantic is not the result of the choking of the Gulfstream over the North Atlantic "Schwelle". As we have seen from The Model this process is, indeed, very complicated. On the other hand, nature loves to surprise us with a multitude of possibilities. Little is known about the sea floors. But what is known is that the outer earth crust beneath the seafloor is considerably thinner than it is under continents and that for diverse reasons rifts exist which are more or less in motion and in places very deep. The idea that such rifts acted as quasi-heating elements in the course of global history, perhaps temporarily or for long periods of time, should not be rejected out of hand. On the western edge of the Pacific from the Kurils to New Zealand there is a chain of deep rifts in places more than 10,000 meters deep, which obviously are based on the force of movement between the enormous Pacific plate and Eurasia, Indonesia and Australia. For millions of years, a new continent has been slowly ascending out of the ocean in the west -- Africa. As late as in the tertiary the Mediterranean reached beyond Cairo and Suez. The hump of this Afro-Arabian earthen hump lifted ever higher and burst further open; *in its rift the Gulf of Aden developed and the Red Sea combined with the Mediterranean in the younger tertiary. With further rising of the land the natural Suez*

*Canal gradually closed again in the course of early history.* Inasmuch as Africa is still rising, the rift in the Red Sea must still be in motion.

Even in the Atlantic, there is a deep rift. The so-called Puerto Rico trench is located on the southern edge of the Sargasso Sea at a depth of 9,218 meters and is unusually warm down to a great depth. It would be possible that this Puerto Rico trench split further 11,000 years ago in the course of continental drift and functioned, perhaps from time to time if not continuously since, as a "warm stove". Thereby the Atlantic could have been warmed relatively suddenly, while the "Schwelle" with its left-turning branch created the Mankato phase of the Wisconsin glaciation in North America. With its right-branching arm the Schlern phase created a (temporary) end-of-ice age period in Europe whereby it consumed considerable warmth. The Mankato and Schlern phases are said to have lasted about 900 years. In the end, another thermal source comes to mind, which, however, would be of other-worldly nature.

Where oldest myths are handed down they speak surprisingly in essential unison and with forcefulness of a natural catastrophe associated with a great flood in the course of which it also rained stones and mud. An aged priest at Sais reportedly told Solon that the fall of Helios' son Phaeton from the sun chariot should be told as a fairy tale, "the truth therein rests in the deviation of the in-the-heavens-around-the-earth circling stars and, after long periods of time, the destruction by fire of all which exists on earth". It is obvious that the point here is about other worldly forces. Isn't it too convenient to smile away such reports as mere fantasy? Instead, we should admit that we know precious little about such phenomena, and most of that not all for certain. In the USA, between Charleston and Florida, there are strange, diagonally pointed formations, which appear like enormous unexploded bombs partially sunk in the earth with the impacts pointing in the direction of the Puerto Rico trench. These have been explained as gigantic shrapnel of a planetoid which plummeted to earth and whose enormous core plunged into the Puerto Rico trench. The event has also been tied to the mythical Atlantis. We won't pursue this thought further here. Instead, let us focus on another reflection.

If a planetoid should come apart on impact with our earth due to gravitational pull and, with its heated core of unimaginable temperature, have fallen into the trench of the North Atlantic, it would not have been able to cool during its furious plunge to 9000 meters depth and would have had to penetrate the earth's rather thin crust. We will not attempt to describe in detail the frightful desolation through heat waves, hurricanes, tidal waves, cloudbursts, and stone and mud rains of such a constantly lighter and faster spiraling planetoid which circles the earth and the volcanic consequences of its plunge. But we do think of the white-heated core, which now would be stuck with its underside in the hot

earth mantle, and on its topside only covered by a thin crust layer. A more effective “stove-top” (whose output appears virtually inexhaustible according to human measure), would be hard to imagine! If such an event actually took place about 9000 BC, it could possibly explain not only essential mythological and pre-historical events but also certain geophysical findings of fact.

*Such speculations require no actual conviction. They only make clear what one must expect from the many possibilities arising out of various causes and from different directions.* This can hardly shake the theories of Ewing and Donn. A few months after their discovery, the oceanographer Crary took samples from the floor of the Arctic Ocean which demonstrated an abundant life of small marine animals which suddenly became extinct about 9000 BC. All told, we may be convinced that, in addition to the Ericson-Wollin ice age table, the Ewing / Donn ice age theory will find acceptance, at least in their basic tenets (that warmth instead of cold causes an ice age).

Although only a few of the many available pieces of evidence have been presented here, our contention is confirmed: *we are living in the beginnings of a new ice advance.*

This formulation was selected with circumspection. We have seen that there is no agreement on the end or impending end of the last (or presumed to be the last) ice retreat. This uncertainty is strengthened by imprecise and unclear formulations, where one speaks one moment of an ice age, another of ice advances and retreats, of interstitials or warm periods or of warm interglacials, whereby the conceptual boundaries are not always clear and many symptoms have obviously been more or less forcefully projected into conditions of the terrain, based on the Milancovič curve.

Is an ice age, in our case hitherto the last, “ended” when the previous ice advance has ended? In view of the accompanying phenomena and consequences, that would be illogical. Because from that “moment” on (according to geo-historical scale), all deciding value judgements will be reversed: the interval between northern and southern glaciation slowly increases, the cold lets up more and more, the loess storms decrease. On the other hand, the Polar Sea, and as a result, the adjacent lands, become colder because the Gulfstream capacity is no longer sufficient. The sea level rises and floods broad, vast regions of land. All these important symptoms would justify the formulation “ice age concluded”. One can also maintain the point of view that the ice age is only at an end when specific ice age glaciation has melted (i.e., not including the modest remnants of natural, obvious snow-line glaciation). That would have been approximately at the turn of the last century, about 1900. Even here a clear definition still eludes us.

Our reasoning that we are in the beginning of a new ice advance and our general concepts have found considerable support. But, with reference to ice age causation, it

would be misguided to rely exclusively on the chain reaction of the Gulfstream effect. The very wealth of nature's heterogeneous possibilities and "notions" alone makes it questionable that beginning, extension, and ending of glaciations can be explained on the basis of just one cause. In a previous paragraph, certain possibilities were alluded to, pointing to oldest myths and their coinciding assertions of catastrophes as well as to other causes. In conclusion the irregularities in the progression of an ice age, as also recognized by science, suggest contributing forces. The question lies close at hand: how does it fare with certain theses which one hoped to rely on by crediting them with the dissolution and preservation of the entire glacial mechanism? The run-through of such theories, (e.g., the corollaries of Dubois or the Milancovič curve) against our Model produces, to be sure, only very limited possibilities of effective results. In accordance with the idiosyncrasy of the ice age mechanism, what is gained on one hand is lost again on the other. It is possible that the tidal rhythm, discovered by Petterson, could have had a strong impact on ice ages, even though half of it went in the opposite direction that Petterson had anticipated. Petterson had established a laboratory on a steep cliff which rose from the depth of the Gulmar Fjord near the southeastern exit of the Oslo Fjord. Day in and day out, the instruments registered the conduct of even the deep water layers and thereby discovered a strong pulsation with maxima at every twelfth hour and, farther down a sharply defined "moonwave", as if clad in a thin skin (of a height up to 30 meters). Petterson concluded that these strong motions originate from cold and saline-rich oceanic tidal waves which, like sloshing in a bathtub, spill from the deep ocean basin over the steep continental platform and flow over the shelf into bays, sounds, and fjords, thereby creating great cold. During a particularly effective sun -- moon -- earth constellation, as happens approximately every 1,800 years, this cold effect is especially pronounced. *On the whole Petterson's tides, while divided, could have exerted long-ranging influences.*

Considerable disturbance of the glacial mechanism could have come even from the atmosphere. Throughout human history up to the present, volcanic activity bears witness that it was also active during glacial epochs. According to reckoning of possibilities there must have existed, in the face of longer time periods, considerable and long-lasting catastrophes, since they are evident even in the comparatively short time span of historical written testimony. An event of this kind and the possible consequences of such a catastrophe in our time may be illustrated as follows: after approximately 200 years of complete inactivity, in 1883, the three craters between Sumatra and Java on the island of Krakatau in the Sunda Strait (the Perbustan in May, the Danan in June, the Rakata in August) became active again. One after another, they spewed first pumice, then ash and small stones. On August 20th, the eruption of the three volcanoes was so sudden and

furious that the ash was driven 30 km high into the air continuously for one week. On the 27th the entire island suddenly exploded and, for the most part, sank into the sea. The enormous explosion yanked people from their sleep 3000 km away in southern Australia. A tsunami more than 30 meters height washed across the beaches of Sumatra and Java destroying cities and killing 35,000 people. The ash rained in extensive amounts over 825,000 square km. Piled in one heap this would have filled 18 cubic km.

Frightening as these effects were, we are particularly interested here in what happened in the upper atmospheric layers. The flung-up ash floated for years in the stratosphere. As breathtaking as the light in the European evening skies became as a result, so were the climatic consequences equally devastating. The mean temperature, with reference to the entire globe, was reduced by not quite one half degree Celsius. As negligible as this amount appears, it is nonetheless proof for what changes can occur over great land areas and for long periods of time due to a cataclysmic event of substantial magnitude. As a result, there were great crop failures in many areas around the globe. To be sure, not all volcanic catastrophes, by far, have been recorded in the course of our history. Among the familiar eruptions was the volcano on the Aegean island of Santorini which exploded around 1,500 BC and was to have brought about the fall of the Minoan culture. The remainder is today's island of Thera and the presumed course of the event was similar to Krakatau. The Santorini-Krakatau catastrophes were in their consequence far more voluminous than the better-known Vesuvius eruption in the year 79 AD to which Stabiae and Herculaneum, the antique Pompeii, succumbed (through which the tourist of today can comfortably stroll, thanks to the expert labors of archaeology). The oldest known volcanic catastrophe was probably the eruption of the Martinsberg near the present cloister Maria Laach in the vicinity of Andernach on the Rhine. This happened ostensibly in two successive eruptions after the end of the fourth ice age during the particularly noteworthy "Alleroedzeit" (so-called after the striking find in the loam layers of a brick works on Sjaelland, Denmark) approximately around 9500 BC. The pumice-sand rain of the Martinsberg volcano came down over a broad radius reaching as far as Berlin. *These kinds of volcanic eruptions during glacial times would likewise have had an effect on the ice age mechanism through climatic disturbances.*

Only the breaking-up of the barrier between the northern ancient Atlantic and the Arctic Ocean in the course of continental drift would have enabled the beginning of an ice age. This factor, so critical to our thought processes, was the last to occur and, to be sure, not a mere crack in the epidermis of the continents. *It must have reached far into the depth of the crust and continues, as the drift motion has not ended to this day.* The constantly widening rifts must have (and must) thus continuously be replenished with rocks which

rise up from the depths and which, while it happens often enough, are not always of volcanic nature. As soon as such rift development and the subsequent replenishment, per geologic time concepts, take their course (“only rather more stormily”), the profile of the North Atlantic ocean floor “Schwelle” can change considerably -- i.e., under some circumstances it can rise or sink over thousands of years. One must take such changes into account, which at times possibly enhance the ice age mechanism or at others hinders them. Whether and how far such processes could be verified through scientific exploration, which fortunately increased in recent times, remains to be seen. (Incidentally, there is one additional area, possibly two, in the northern hemisphere where due to the same cause similar processes must be taken into account: the area between the Mediterranean and the Red Sea, i.e. the area around today’s Suez Canal and probably also the Persian Gulf.) Although only a few possibilities can be discussed here, it would appear the point has been made clear:

- that sufficient bases for interstitial and glacial phases exist
- that possibly more interstitials and glacial phases occurred, at least substantially more nuances, than generally assumed till now
- that together with Petterson’s tidal currents, the motions in and on the North Atlantic “Schwelle” are the most likely to have influenced the ice age mechanism

If one looks closely at the many attempts to explain ice age causes, of which only a few were sketched here, it becomes obvious that they are mostly rather original, and far-fetched, not to say “strange”, solutions projected onto the event. Obviously, one did not with any of these trials attempt to retrace their steps, i.e., to take these other theories seriously, structurally, systematically and patiently, and from certain striking manifestations of the ice age or the demeanor of early man develop what we have attempted here because they did not afford the potential for such discoveries. This is particularly odd in view of the fact that one could have drawn impressive indications with far-reaching conclusions. (For instance, the known fact that man had wandered across the dried land bridge of the Bering Sea from Eurasia into America!) Whatever had been basically missed in the general synopses, taken individually there were often no lack of remarkable, thorough, industrious and ingenious trials to clarify all manner of partial questions. Achievements of this kind, which now and then have brought essential material to light, should not be underestimated. Nonetheless, they can at best illuminate pre- or ancient historical development. They have not contributed towards a solution of basic questions. Indeed, as a rule even the most carefully discussed detail is wrong if not altogether stood

on its head by these misguided theories. It is no small wonder. Departing from fundamentally false premises, it is only with a stroke of luck, mostly called "accident", that one achieves correct results.

Other cases are more troublesome. Inasmuch as such detailed tasks were emotionally charged, they prejudiced the subject at hand the more, the closer they came to the core of the problem. And some came remarkably close in various ways. However, they are exactly the ones to stumble over certain nonsense with which they were unable to cope. Disregarding emotional and ideological derailments, there is no cause to disparagingly push aside the results of the labors of men like Kossinna or Herman Wirth. It was not entirely their fault that they were stuck on an idea in some respects. At least they had the courage and imagination to seek new ways, to find and follow them. With that, they came closer to the truth than the entire lot of their critical colleagues. This fresh approach to glacial, pre- and early historical contexts of Kossinna's and Wirth's labors will prove as useful as, in some instances, actually indispensable.

It is less for merit than sheer luck that the basis of our concept, grown from the essence of the subject, is based on the laws of physics. This circumstance lends our system stability hitherto unknown in the field of pre- and early history. And now it should be applied to man. That requires the assistance of other work principles: man assumes a unique position within creation for which he has to give thanks to *Prometheus' gift of thinking ahead*, the significance of which was already known to the early Greeks (or is it again supposed to be sheer coincidence that the myth which gets to the bottom of Prometheus, the friend of man, who is indebted to him, as the man who thinks ahead, stands in contrast to his *always-too-late thinking brother Epimetheus*?) Only the primate, in perfection, only man, possesses the capability to plan ahead, to deal in space and time, to balance, to dare and to direct. That endows man with unique and exclusive sensitivity. The geophysical mechanism of our Conceptual Model is in the position to force upon early man, with whom we are again concerned here, an inescapable response, to, so to speak, mercilessly press him into a system of coordinates and entrap him into a tightly meshed net of unrelenting concepts to which he had to react. But to understand how he reacted, how and why he moved as he did and not differently, and how he responded appropriately to the enormous challenges he faced requires that disdained and often overrated, yet indispensable (for science) gift of intuition.

## EPILOGUE

With this synoptic presentation, the author outlines for the first time a complete picture of glacial events. This applies not only to those oldest glaciations of the Southern Hemisphere but also to “our” ice age of the Northern Hemisphere. From that follow far-reaching consequences which should not be ignored. They require thorough examination, a study of uncommon complexity, and are the essence and purpose of this proposal. The findings and deductions of research in glacial and post-glacial fields must be carefully thought through, examined without bias, and by application of various disciplines.

To bring this about would require a special discipline. While such a branch would be new, it would not be unusual. Its counterpart, Futurology, strives to form a most likely, complete and in-depth picture of the future, hastening ahead of time in search of concepts, for which timely decisions can be anticipated and prepared. Praeteritology (to suggest a name for this new discipline) strives appropriately in the sector of the past.

Only on a solid basis of the past is a stable and three-dimensional picture of the future possible. Such a foundation would have to be placed in those spaces of time in which the mental potential of man was formed. Until now, a “solid foundation” in this area was out of the question because knowledge was fragmentary, contradictory and in critical points not convincing. The idea presented here offers a consistent view, which, in the main, requires no re-touching or manipulation to conform to science’s diligent and tediously developed facts.

Though the causes of certain past and future tension-filled conditions, such as the population explosion, complicated food supply, shelter, transport, etc., are different, their consequences are confoundingly similar and offer a broad field for intensive, productive collaboration of Praeteritologists and Futurologists.

In pre- and early history, notable cultures succumbed to severe natural catastrophes. Many, if not most, of the better known ones perished through their own folly and ignorance, which disturbed the balance of their universe. Through thoughtlessness or indolence, because it may have been irksome or not advantageous, problems were overlooked, kept quiet, embellished or postponed. Such life-threatening folly is as old as mankind. It still exists today, even more so, with potentially disastrous consequences. It is unlikely that our concerns here -- pressing though they may be -- will be spared such nonchalance. But, then again, perhaps experiments will be undertaken sooner or later with the ocean, the Gulfstream, the climate, of which we know so little, and which, after all, are so vital and so sensitive in their reaction. Mankind has never suffered any shortage of blind zeal, threadbare reasons and poorly selected opportunities. Economic and political

interests make use of the ways and means, even complement one another to manipulate nature's assets. With complete ignorance of the interrelationships presented here, wrong decisions with catastrophic consequences are more than probable.

The US National Academy of Sciences (NAS) Committee on Polar Research determined (1970) that "international scientific collaboration on the Arctic was a pressing necessity". For instance, if the polar ice were to be reduced through natural or human influences, the sea route from Europe to Asia could be shortened by 10,000 km. The responsibility of such considerations leads to new ways of thinking. Be that as it may, the significance of the glacial Model presented herein, should require no further discussion.

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Editor's note: Although *Ex Nocte Lux*, is nearly three decades old, we have decided to publish this extensive review-summary of it because the book is not well known, yet deserves greater circulation and consideration, especially in light of recent discussions in a variety of fields that it touches upon. Although the Model presented in *Ex Nocte Lux* is complex, abstract, and at times difficult to follow, it offers much food for thought and possesses great explanatory power. After 28 years, the basic ideas presented in *Ex Nocte Lux* still seem to hold up well: glaciers are shrinking (it was just announced that Greenland has lost 6% of its mass); northern coastal waters are warmer; Venice is slowly but surely sinking beneath the sea; the Alpine mountain tops are increasingly exposed in summer (hence the sensational discovery of Ötzi the 5,800 year-old Iceman in September, 1991); and so forth.

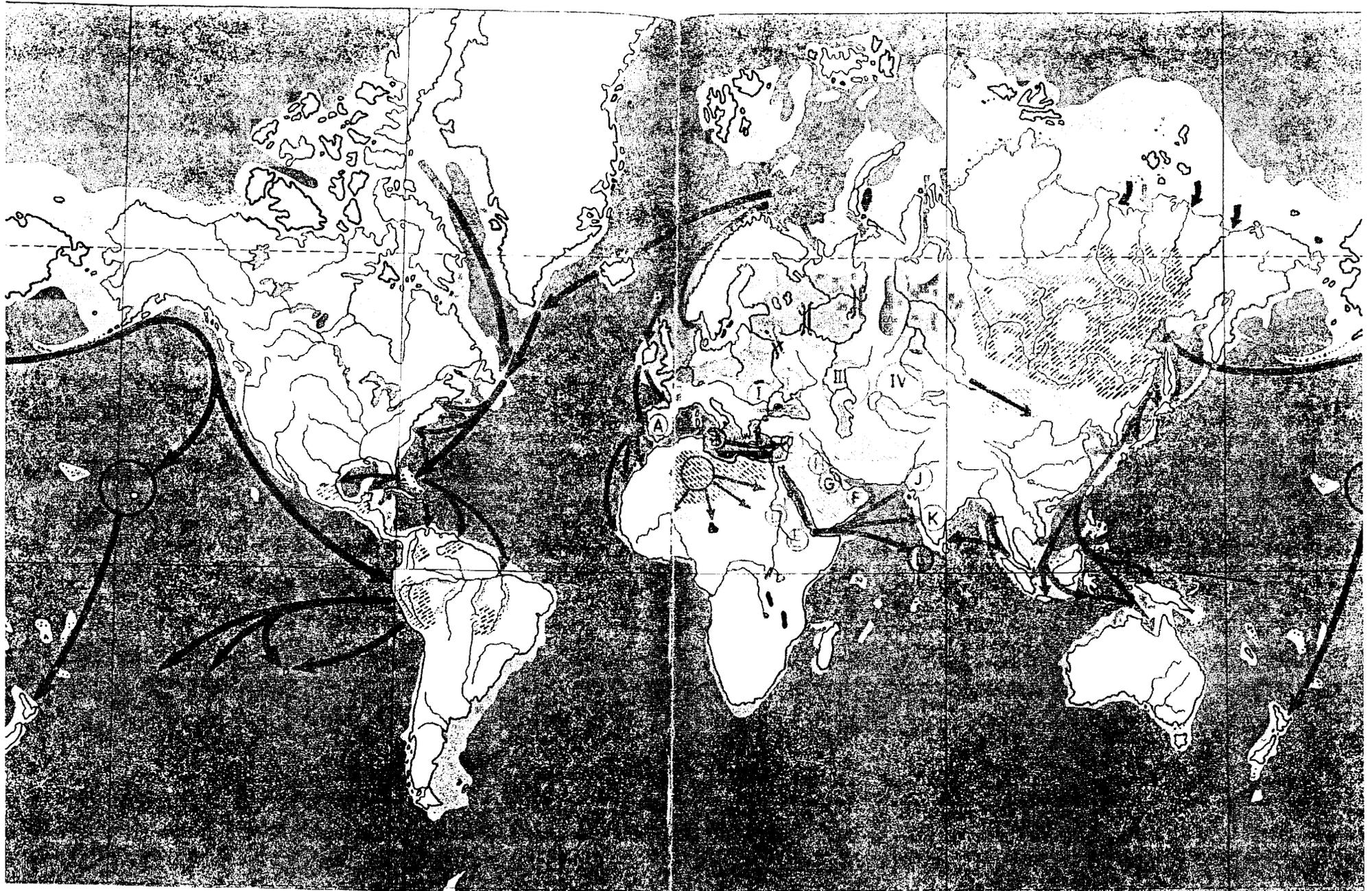
The last couple of pages of Eugene Linden Churchill's "The Big Meltdown," *Time* (September 4, 2000), 52-56, particularly paragraphs 7-4 from the end, explaining the Younger Dryas period (a European deep freeze lasting for about 1,300 years beginning c. 12,000 BP), completely corroborate the ideas expressed in *Ex Nocte Lux*. Indeed, so closely do the explanations of the *Time* author match those of the theories propounded by H. K. Horken that one can hardly escape concluding that *Ex Nocte Lux* has had a formative (if heretofore unrecognized) impact on current geographic and oceanographic thinking.

It should be noted that, in this review-summary, "Nordic" means simply "Northern (European)" -- no more and no less. This is, after all, what the French-derived word actually signifies, despite all of the subsequent overlays.

The reviewer has omitted full bibliographical references because they may be found in the work under review.

Finally, it may be mentioned that the author of *Ex Nocte Lux* -- because of a distinguished career in the navy -- was intimately familiar with the waters of the North Atlantic and adjoining seas. It is this familiarity which permits him to speak of the ocean currents almost as living organisms.

N.B.: Quotations of English and all other texts have been back-translated from German. It has not been possible to check the original texts for precise accuracy of wording.



Nacheiszeitliche  
Zwangskurse und  
ihre Endstationen

-  = Fluchtwege über Seen u. Flüsse
-  = zeitweise befahrbare Wasserwege
-  = explosible Ballungsräume
-  = eiszeitliche Pluvialparadiese trocknen allmählich aus

-  = Neue Siedlungsräume
-  = Endstationen, Etappen oder „Drehscheiben“
-  = postglazial zeitweise überschwemmte oder versumpfte Gebiete
-  = Bewohner werdender Wüsten müssen fortgesetzt ausbrechen

Nacheiszeitliche  
Zwangskurse und  
ihre Endstationen:

TRANSLATION

POST GLACIAL  
ESCAPE ROUTES AND  
FINAL DESTINATIONS

- = Flightpaths via lakes  
and rivers
  - = Occasionally passable  
water routes
  - = Explosive mass  
accumulation areas
  - = Pluvial paradises during  
ice age are slowly becoming  
desert
- 
- = New settlement areas
  - = Final destinations, stages  
or "turnstiles"
  - = Occasionally flooded  
or bogged post-glacial areas
  - = Settlers from expanding  
deserts must constantly  
relocate

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