March 1, 2015

The **China Money Report**s on China's new Silk Road, the overland trade route between China and Western Europe, and other changes in the country.

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To China's south, Afghanistan, despite the 13-year American war still being fought there, is fast moving into its economic orbit, while a planned China-Myanmar oil pipeline is seen as a game-changing reconfiguration of the flow of Eurasian energy across what I've long called Pipelineistan.

And this is just part of the frenetic action shaping what the Beijing leadership defines as the New Silk Road Economic Belt and the Maritime Silk Road of the twenty-first century. We're talking about a vision of creating a potentially mind-boggling infrastructure, much of it from scratch, that will connect China to Central Asia, the Middle East, and Western Europe. Such a development will include projects that range from upgrading the ancient silk road via Central Asia to developing a Bangladesh-China-India-Myanmar economic corridor; a China-Pakistan corridor through Kashmir; and a new maritime silk road that will extend from southern China all the way, in reverse Marco Polo fashion, to Venice. ...

... If you are following this frenzy of economic planning from Beijing, you end up with a perspective not available in Europe or the U.S. Here, red-and-gold billboards promote President Xi Jinping's much ballyhooed new tagline for the country and the century, "the Chinese Dream" (which brings to mind "the American Dream" of another era). No subway station is without them. They are a reminder of why 40,000 miles of brand new high-speed rail is considered so essential to the country's future. After all, no less than 300 million Chinese have, in the last three decades, made a paradigm-breaking migration from the countryside to exploding urban areas in search of that dream.

Another 350 million are expected to be on the way, according to a McKinsey Global Institute study. From 1980 to 2010, China's urban population grew by 400 million, leaving the country with at least 700 million urban dwellers. This figure is expected to hit one billion by 2030, which means tremendous stress on cities, infrastructure, resources, and the economy as a whole, as well as near-apocalyptic air pollution levels in some major cities.

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These days, China should be thought of not in terms of individual cities but urban clusters — groupings of cities with more than 60 million people. The Beijing-Tianjin area, for example, is actually a cluster of 28 cities. Shenzhen, the ultimate migrant megacity in the southern province of Guangdong, is now a key hub in a cluster as well. China, in fact, has more than 20 such clusters, each the size of a European country. Pretty soon, the main clusters will account for 80% of China's GDP and 60% of its population. So the country's high-speed rail frenzy and its head-spinning infrastructure projects – part of a $1.1 trillion investment in 300 public works — are all about managing those clusters. ...

... In terms of Chinese advantages, keep in mind that the future of the global economy clearly lies in Asia with its record rise in middle-class incomes. In 2009, the Asia-Pacific region had just 18% of the world's middle class; by 2030, according to the Development Center of the Organization for Economic Cooperation and Development, that figure will rise to an astounding 66%. North America and Europe had 54% of the global middle class in 2009; in 2030, it will only be 21%.

Follow the money, and the value you get for that money, too. For instance, no less than 200,000 Chinese workers were involved in the production of the first iPhone, overseen by 8,700 Chinese industrial engineers. They were recruited in only two weeks. In the U.S., that process might have taken more than nine months. The Chinese manufacturing ecosystem is indeed fast, flexible, and smart — and it's backed by an ever more impressive education system. Since 1998, the percentage of GDP dedicated to education has almost tripled; the number of colleges has doubled; and in only a decade, China has built the largest higher education system in the world. ...

... The extent and complexity of China's myriad transformations barely filter into the American media. Stories in the U.S. tend to emphasize the country's "shrinking" economy and nervousness about its future global role, the way it has "duped" the U.S. about its designs, and its nature as a military "threat" to Washington and the world.

The U.S. media has a China fever, which results in typically feverish reports that don't take the pulse of the country or its leader. In the process, so much is missed. One prescription might be for them to read The Governance of China, a compilation of President Xi's major speeches, talks, interviews, and correspondence. It's already a three-million-copy bestseller in its Mandarin edition and offers a remarkably digestible vision of what Xi's highly proclaimed "China Dream" will mean in the new Chinese century.

Xi Dada ("Xi Big Bang" as he's nicknamed here) is no post-Mao deity. He's more like a pop phenomenon and that's hardly surprising. In this "to get rich is glorious" remix, you couldn't launch the superhuman task of reshaping the Chinese model by being a cold-as-a-cucumber bureaucrat. Xi has instead struck a collective nerve by stressing that the country's governance must be based on competence, not insider trading and Party corruption, and he's cleverly packaged the transformation he has in mind as an American-style "dream."

Behind the pop star clearly lies a man of substance that the Western media should come to grips with. You don't, after all, manage such an economic success story by accident. It may be particularly important to take his measure since he's taken the measure of Washington and the West and decided that China's fate and fortune lie elsewhere. ...

From a modern Silk Road to stone age trade. In the **Financial Times** we learn Britain imported wheat from the Mediterranean 2,000 years before it was cultivated indigenously.

Trade in agricultural commodities has been part of the British economy for at least 8,000 years, archaeologists have discovered.

Investigation of a submerged Stone Age site off Bouldnor Cliff shows that people living there around 6,000BC were consuming a primitive form of wheat.

*Yet Britain's hunter-gatherer population did not grow the crop then. The nearest cultivation was 1,000km **(620 miles)** away near the Mediterranean — cereal farming is believed to have started in Britain 2,000 years later.*

The researchers, working at several UK universities, say the explanation is that "sophisticated social networks" promoted trade between the Mesolithic inhabitants of northern Europe and the more technologically advanced Neolithic peoples farther south, who were already farming. The study appears in the journal Science. ...

Scientific American has more.
Early farming began in the Near East about 10,500 years ago. Farming first reached the Balkans in Europe some 8 to 9,000 years ago, and then crept westward. Locals in Britain, separated from the mainland by the relatively newly formed English Channel, did not start farming until about 6,000 years ago.

But an analysis of sediment from a submerged British archaeological site called Bouldner Cliff found something unexpected.

"Amongst our Bouldner Cliff samples we found ancient DNA evidence of wheat at the site, which was not seen in mainland Britain for another 2,000 years." Robin Allaby of the University of Warwick.

"However, wheat was already being grown in southern Europe. This is incredibly exciting because it means Bouldner's inhabitants were not as isolated as previously thought. In fact, they were in touch, one way or another, with more advanced Neolithic farming communities in southern Europe." ...

It wasn't just wheat that moved through these ancient trade routes. A **NY Times** article reports on differing theories about the spread of the Proto Indo-European language; from which came all languages from England to India. (One notable exception is Georgian which is totally different. Stalin and Lavrenty Beria, head of the NKVD, both Georgians, used to have sidebar conversations in Georgian during Politburo meetings. Must have terrified the other participants.)
The peoples of India, Iran and Europe speak a Babel of tongues, but most — English included — are descended from an ancient language known as proto-Indo-European. Scholars have argued for two centuries about the identity and homeland of those who spoke this parent language, but a surprisingly sudden resolution of this longstanding issue may be at hand.

Many origins have been proposed for the birthplace of the Indo-European languages, but only two serious candidates are now under discussion, one of which assumes they were spread by the sword, the other by the plow. ...

... From the reconstructed vocabulary, the speakers of proto-Indo-European seem to have been pastoralists, familiar with sheep and wheeled vehicles. Archaeologists find that wheeled vehicles

emerged around 4000 B.C., suggesting the proto-Indo-European speakers began to flourish some 6,500 years ago on the steppe grasslands above the Black and Caspian Seas. This steppe theory, favored by many linguists, holds that the proto-Indo-European speakers then spread their language to Europe, India and western China, whether by conquest or the appeal of their pastoral economy. ...

Using core samples from Cape Cod ponds, researchers have found some periods of mega-storms on the northeast coast of the US. Forgetting the globalony stuff, the cycles are interesting. We get this from **Futurity.org**.
Ancient sediments from a coastal pond in Cape Cod, Massachusetts, show that enormous storms have battered the region for 2,000 years.

The hurricane strikes deposited a distinct layer of sand mobilized from the adjacent beach.

The analysis, published in the journal Earth's Future, suggests some of the hurricanes would have dwarfed recent storms like Hurricane Sandy in 2012 that caused $65 billion in damages. ...

The China Money Report
The 21st century belongs to China: Why the new Silk Road threatens to end America's economic dominance
Beijing is building a trans-Siberian railway system that rivals the Marshall Plan in its ambition and global reach
by Pepe Escobar
China holds more than $15 trillion in bank deposits, which are growing by a whopping $2 trillion a year. Foreign exchange reserves are nearing $4 trillion.

- The country still produces 80% of the world's air conditioners, 90% of its personal computers, 75% of its solar panels, 70% of its cell phones, and 63% of its shoes.

From 1980 to 2010, China's urban population grew by 400 million, leaving the country with at least 700 million urban dwellers. This figure is expected to hit one billion by 2030

BEIJING — Seen from the Chinese capital as the Year of the Sheep starts, the malaise affecting the West seems like a mirage in a galaxy far, far away. On the other hand, the China that surrounds you looks all too solid and nothing like the embattled nation you hear about in the Western media, with its falling industrial figures, its real estate bubble, and its looming environmental disasters. Prophecies of doom notwithstanding, as the dogs of austerity and war bark madly in the distance, the Chinese caravan passes by in what President Xi Jinping calls "new normal" mode.

"Slower" economic activity still means a staggeringly impressive annual growth rate of 7% in what is now the globe's leading economy. Internally, an immensely complex economic restructuring is underway as consumption overtakes investment as the main driver of economic development. At

46.7% of the gross domestic product (GDP), the service economy has pulled ahead of manufacturing, which stands at 44%.

Geopolitically, Russia, India, and China have just sent a powerful message westward: they are busy fine-tuning a complex trilateral strategy for setting up a network of economic corridors the Chinese call "new silk roads" across Eurasia. Beijing is also organizing a maritime version of the same, modeled on the feats of Admiral Zheng He who, in the Ming dynasty, sailed the "western seas" seven times, commanding fleets of more than 200 vessels.

Meanwhile, Moscow and Beijing are at work planning a new high-speed rail remix of the fabled Trans-Siberian Railroad. And Beijing is committed to translating its growing strategic partnership with Russia into crucial financial and economic help, if a sanctions-besieged Moscow, facing a disastrous oil price war, asks for it.

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Don't think of this as the twenty-first-century Chinese equivalent of America's post-World War II Marshall Plan for Europe, but as something far more ambitious and potentially with a far vaster reach.

China as a Mega-City

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Not surprisingly, this process is intimately linked to what in the West is considered a notorious "housing bubble," which in 1998 couldn't have even existed. Until then all housing was still owned by the state. Once liberalized, that housing market sent a surging Chinese middle class into paroxysms of investment. Yet with rare exceptions, middle-class Chinese can still afford their mortgages because both rural and urban incomes have also surged.

The Chinese Communist Party (CCP) is, in fact, paying careful attention to this process, allowing farmers to lease or mortgage their land, among other things, and so finance their urban migration and new housing. Since we're talking about hundreds of millions of people, however, there are bound to be distortions in the housing market, even the creation of whole disastrous ghost towns with associated eerie, empty malls.

The Chinese infrastructure frenzy is being financed by a pool of investments from central and local government sources, state-owned enterprises, and the private sector. The construction business, one of the country's biggest employers, involves more than 100 million people, directly or indirectly. Real estate accounts for as much as 22% of total national investment in fixed assets and all of this is tied to the sale of consumer appliances, furnishings, and an annual turnover of 25% of China's steel production, 70% of its cement, 70% of its plate glass, and 25% of its plastics.

So no wonder, on my recent stay in Beijing, businessmen kept assuring me that the ever-impending "popping" of the "housing bubble" is, in fact, a myth in a country where, for the average citizen, the ultimate investment is property. In addition, the vast urbanization drive ensures, as Premier Li Keqiang stressed at the recent World Economic Forum in Davos, a "long-term demand for housing."

Markets, Markets, Markets

China is also modifying its manufacturing base, which increased by a multiple of 18 in the last three decades. The country still produces 80% of the world's air conditioners, 90% of its personal computers, 75% of its solar panels, 70% of its cell phones, and 63% of its shoes. Manufacturing accounts for 44% of Chinese GDP, directly employing more than 130 million people. In addition, the country already accounts for 12.8% of global research and development, well ahead of England and most of Western Europe.

Yet the emphasis is now switching to a fast-growing domestic market, which will mean yet more major infrastructural investment, the need for an influx of further engineering talent, and a fast-developing supplier base. Globally, as China starts to face new challenges — rising labor costs, an increasingly complicated global supply chain, and market volatility — it is also making an aggressive push to move low-tech assembly to high-tech manufacturing. Already, the majority of Chinese exports are smartphones, engine systems, and cars (with planes on their way). In the process, a geographic shift in manufacturing is underway from the southern seaboard to Central and Western China. The city of Chengdu in the southwestern province of Sichuan, for instance, is now becoming a high-tech urban cluster as it expands around firms like Intel and HP.

So China is boldly attempting to upgrade in manufacturing terms, both internally and globally at the same time. In the past, Chinese companies have excelled in delivering the basics of life at cheap prices and acceptable quality levels. Now, many companies are fast upgrading their technology and moving up into second- and first-tier cities, while foreign firms, trying to lessen costs, are moving down to second- and third-tier cities. Meanwhile, globally, Chinese CEOs want their companies to become true multinationals in the next decade. The country already has 73 companies in the Fortune Global 500, leaving it in the number two spot behind the U.S.

In terms of Chinese advantages, keep in mind that the future of the global economy clearly lies in Asia with its record rise in middle-class incomes. In 2009, the Asia-Pacific region had just 18% of the world's middle class; by 2030, according to the Development Center of the Organization for Economic Cooperation and Development, that figure will rise to an astounding 66%. North America and Europe had 54% of the global middle class in 2009; in 2030, it will only be 21%.

Follow the money, and the value you get for that money, too. For instance, no less than 200,000 Chinese workers were involved in the production of the first iPhone, overseen by 8,700 Chinese industrial engineers. They were recruited in only two weeks. In the U.S., that process might have taken more than nine months. The Chinese manufacturing ecosystem is indeed fast, flexible, and smart — and it's backed by an ever more impressive education system. Since 1998, the percentage of GDP dedicated to education has almost tripled; the number of colleges has doubled; and in only a decade, China has built the largest higher education system in the world.

Strengths and Weaknesses

China holds more than $15 trillion in bank deposits, which are growing by a whopping $2 trillion a year. Foreign exchange reserves are nearing $4 trillion. A definitive study of how this torrent of funds circulates within China among projects, companies, financial institutions, and the state still does not exist. No one really knows, for instance, how many loans the Agricultural Bank of China actually makes. High finance, state capitalism, and one-party rule all mix and meld in the realm of Chinese financial services where realpolitik meets real big money.

The big four state-owned banks — the Bank of China, the Industrial and Commercial Bank of China, the China Construction Bank, and the Agricultural Bank of China — have all evolved from government organizations into semi-corporate state-owned entities. They benefit handsomely both from legacy assets and government connections, or *guanxi*, and operate with a mix of commercial and government objectives in mind. They are the drivers to watch when it comes to the formidable process of reshaping the Chinese economic model.

As for China's debt-to-GDP ratio, it's not yet a big deal. In a list of 17 countries, it lies well below those of Japan and the U.S., according to Standard Chartered Bank, and unlike in the West, consumer credit is only a small fraction of total debt. True, the West exhibits a particular fascination with China's shadow banking industry: wealth management products, underground finance, off-the-balance-sheet lending. But such operations only add up to around 28% of GDP, whereas, according to the International Monetary Fund, it's a much higher percentage in the U.S.

China's problems may turn out to come from non-economic areas where the Beijing leadership has proven far more prone to false moves. It is, for instance, on the offensive on three fronts, each of which may prove to have its own form of blowback: tightening ideological control over the country under the rubric of sidelining "Western values"; tightening control over online information and social media networks, including reinforcing "the Great Firewall of China" to police the Internet; and tightening further its control over restive ethnic minorities, especially over the Uighurs in the key western province of Xinjiang.

On two of these fronts — the “Western values” controversy and Internet control — the leadership in Beijing might reap far more benefits, especially among the vast numbers of younger, well educated, globally connected citizens, by promoting debate, but that’s not how the hyper-centralized Chinese Communist Party machinery works.

When it comes to those minorities in Xinjiang, the essential problem may not be with the new guiding principles of President Xi’s ethnic policy. According to Beijing-based analyst Gabriele Battaglia, Xi wants to manage ethnic conflict there by applying the “three Js”: *jiaowang, jiaoliu, jiaorong* (“inter-ethnic contact,” “exchange,” and “mixage”). Yet what adds up to a push from Beijing for Han/Uighur assimilation may mean little in practice when day-to-day policy in Xinjiang is conducted by unprepared Han cadres who tend to view most Uighurs as “terrorists.”

If Beijing botches the handling of its Far West, Xinjiang won’t, as expected, become the peaceful, stable, new hub of a crucial part of the silk-road strategy. Yet it is already considered an essential communication link in Xi’s vision of Eurasian integration, as well as a crucial conduit for the massive flow of energy supplies from Central Asia and Russia. The Central Asia-China pipeline, for instance, which brings natural gas from the Turkmen-Uzbek border through Uzbekistan and southern Kazakhstan, is already adding a fourth line to Xinjiang. And one of the two newly agreed upon Russia-China pipelines will also arrive in Xinjiang.

The Book of Xi

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The U.S. media has a China fever, which results in typically feverish reports that don’t take the pulse of the country or its leader. In the process, so much is missed. One prescription might be for them to read *The Governance of China,* a compilation of President Xi’s major speeches, talks, interviews, and correspondence. It’s already a three-million-copy bestseller in its Mandarin edition and offers a remarkably digestible vision of what Xi’s highly proclaimed “China Dream” will mean in the new Chinese century.

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Behind the pop star clearly lies a man of substance that the Western media should come to grips with. You don’t, after all, manage such an economic success story by accident. It may be particularly important to take his measure since he’s taken the measure of Washington and the West and decided that China’s fate and fortune lie elsewhere.

As a result, last November he made official an earthshaking geopolitical shift. From now on, Beijing would stop treating the U.S. or the European Union as its main strategic priority and refocus instead on China’s Asian neighbors and fellow BRICS countries (Brazil, Russia, India, and South Africa, with a special focus on Russia), also known here as the “major developing powers” (*kuoda fazhanzhong de guojia*). And just for the record, China does not consider itself a “developing country” anymore.

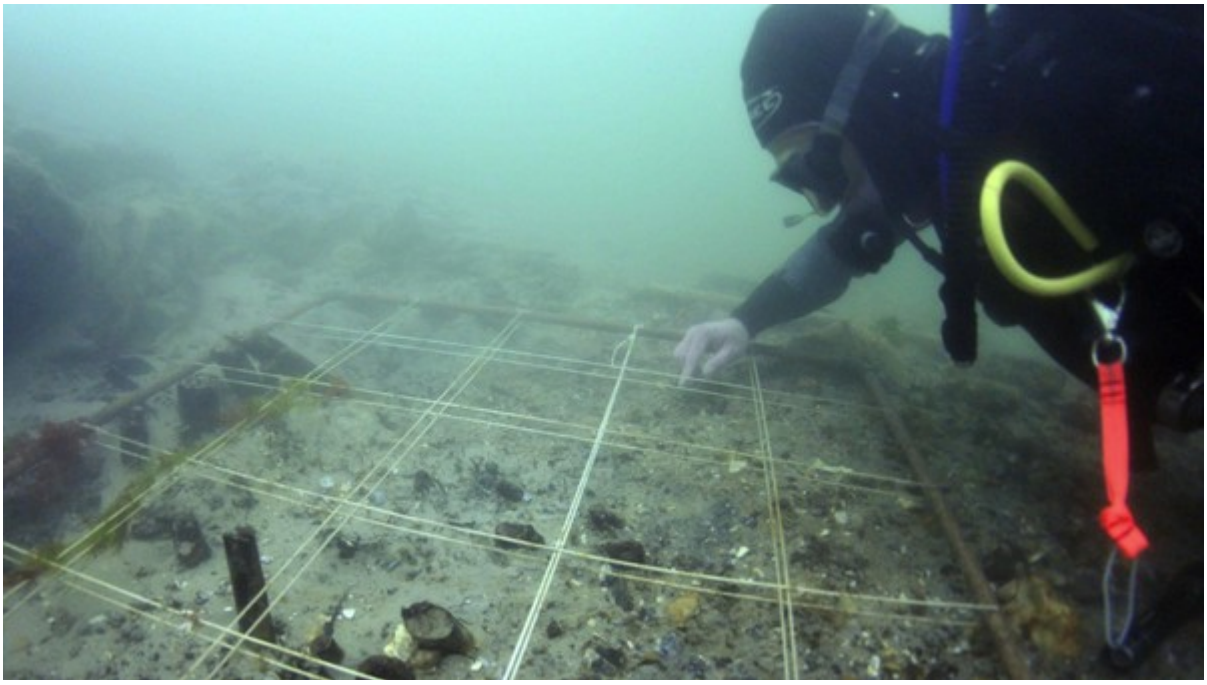
No wonder there's been such a blitz of Chinese mega-deals and mega-dealings across Pipelineistan recently. Under Xi, Beijing is fast closing the gap on Washington in terms of intellectual and economic firepower and yet its global investment offensive has barely begun, new silk roads included.

Singapore's former foreign minister George Yeo sees the newly emerging world order as a solar system with two suns, the United States and China. The Obama administration's new National Security Strategy affirms that "the United States has been and will remain a Pacific power" and states that "while there will be competition, we reject the inevitability of confrontation" with Beijing. The "major developing powers," intrigued as they are by China's extraordinary infrastructural push, both internally and across those New Silk Roads, wonder whether a solar system with two suns might not be a non-starter. The question then is: Which "sun" will shine on Planet Earth? Might this, in fact, be the century of the dragon?

Financial Times

Evidence found of Stone Age wheat trade in UK

by Clive Cookson



Trade in agricultural commodities has been part of the British economy for at least 8,000 years, archaeologists have discovered.

Investigation of a submerged Stone Age site off Bouldnor Cliff shows that people living there around 6,000BC were consuming a primitive form of wheat.

Yet Britain's hunter-gatherer population did not grow the crop then. The nearest cultivation was 1,000km away near the Mediterranean — cereal farming is believed to have started in Britain 2,000 years later.

The researchers, working at several UK universities, say the explanation is that "sophisticated social networks" promoted trade between the Mesolithic inhabitants of northern Europe and the

more technologically advanced Neolithic peoples farther south, who were already farming. The study appears in the journal Science.

“Our story matches the one emerging from palaeontology and molecular anthropology,” said Robin Allaby of Warwick University, who led the subsea project at Bouldnor Cliff.

“Hunter-gatherers in Britain were not isolated societies, as many people believed until recently, but were interacting closely with people across Europe.”

The land bridge connecting Britain with continental Europe had not yet disappeared beneath rising seas.

The study is remarkable, not only for its conclusions, but also for its innovative use of a genetic technique known as metagenomics. This reads genetic material obtained from the environment, such as marine sediment, which includes DNA from many organisms. Sophisticated computer analysis then identifies the various species present.

The scientists analysed all the DNA present in sealed samples of sediment extracted from the Bouldnor site, which lies 11 metres deep in the Solent off the north coast of the Isle of Wight. Previous dives had excavated extensive evidence of human activity there, including the working of timber to make Mesolithic boats.

“These marine sediments are fantastic for preserving ancient DNA,” said Dr Allaby. “They have remained in nature’s fridge at a constant 4C and they are completely stable.”

Among the plants and animals present in the 8,000-year-old soil the scientists found a strong and unambiguous genetic signal of Einkorn wheat, a primitive variety domesticated around the eastern Mediterranean 10,000 years ago. It is genetically very different from modern agricultural wheat.

The researchers investigated possible sources of contamination. They also looked for physical evidence of wheat, such as pollen, stalks or grain, and found none — confirming the crop was not cultivated in the area.

Dr Allaby said the wheat was likely to have been milled close to where it was grown and traded as flour rather than whole grains, although there is no direct evidence of this. The flour would have been mixed with water to form a dough that was baked to make flatbread.

Scientific American

Britain Imported Wheat 2,000 Years Before Growing It

by Cynthia Graber

Early farming began in the Near East about 10,500 years ago. Farming first reached the Balkans in Europe some 8 to 9,000 years ago, and then crept westward. Locals in Britain, separated from the mainland by the relatively newly formed English Channel, did not start farming until about 6,000 years ago.

But an analysis of sediment from a submerged British archaeological site called Bouldner Cliff found something unexpected.

“Amongst our Bouldner Cliff samples we found ancient DNA evidence of wheat at the site, which was not seen in mainland Britain for another 2,000 years.” Robin Allaby of the University of Warwick.

“However, wheat was already being grown in southern Europe. This is incredibly exciting because it means Bouldner’s inhabitants were not as isolated as previously thought. In fact, they were in touch, one way or another, with more advanced Neolithic farming communities in southern Europe.” The work by Allaby and colleagues is in the journal *Science*. [Oliver Smith et al, Sedimentary DNA from a submerged site reveals wheat in the British Isles 8000 years ago]

The researchers showed that the wheat remains are genetically more similar to Near Eastern domesticated wheat than to local distant cousins. And they found no evidence of pollen—meaning that the wheat was almost certainly imported.

In an accompanying Perspectives piece in the journal, archaeologist Greger Larsen of Durham University writes that the findings show that DNA analysis can help scientists tease out details about the historical movement of plant and animal species.

NY Times

The Tangled Roots of English

by Nicholas Wade

The peoples of India, Iran and Europe speak a Babel of tongues, but most — English included — are descended from an ancient language known as proto-Indo-European. Scholars have argued for two centuries about the identity and homeland of those who spoke this parent language, but a surprisingly sudden resolution of this longstanding issue may be at hand.

Many origins have been proposed for the birthplace of the Indo-European languages, but only two serious candidates are now under discussion, one of which assumes they were spread by the sword, the other by the plow.

Historical linguists can reconstruct many words of proto-Indo-European from their descendants. For example, there was probably a word “kwekwlos,” meaning wheel, which is the ancestor of “kuklos” in classical Greek, of “kakra” in Old Indic and – because K shifts to H in Germanic languages – of “hweohl” in Old English, itself the ancestor of wheel in modern English.

From the reconstructed vocabulary, the speakers of proto-Indo-European seem to have been pastoralists, familiar with sheep and wheeled vehicles. Archaeologists find that wheeled vehicles emerged around 4000 B.C., suggesting the proto-Indo-European speakers began to flourish some 6,500 years ago on the steppe grasslands above the Black and Caspian Seas. This steppe theory, favored by many linguists, holds that the proto-Indo-European speakers then spread their language to Europe, India and western China, whether by conquest or the appeal of their pastoral economy.

This theory was challenged by Colin Renfrew, a Cambridge archaeologist who proposed in 1987 that the languages had been spread by the Neolithic farmers who brought agriculture to Europe. Under this scenario, the homeland of proto-Indo-European was in Anatolia, now Turkey, and its speakers started migrating some 8,000 to 9,500 years ago.

Dr. Renfrew's proposal carried weight because the expansion of farming peoples is an accepted mechanism of language spread, and the migration of Neolithic farmers into Europe is well documented archaeologically. Linguists objected that proto-Indo-European could not have fragmented so early because the wheel wasn't invented 8,000 years ago, yet many Indo-European languages have related words for wheel that must be derived from a common parent. But Dr. Renfrew argued that, long after their dispersal, these languages could all have borrowed the word for wheel along with the invention itself.

Tracing a Mother Tongue

The standoff between the steppe and Anatolian theories of Indo-European origin persisted until 2003. Two New Zealand biologists, Russell Gray and Quentin Atkinson of the University of Auckland, entered the fray with an impressive method of constructing datable trees of language descent. Historical linguists had drawn up trees of how proto-Indo-European had split into its daughter languages, based on sets of related words known as cognates. The word for water is "wasser" in German, "vatten" in Swedish and "nero" in modern Greek. The similar English, German and Swedish words are said to be cognates, derived from an inferred proto-Indo-European word "wodr," but the "nero" of modern Greek is not.

Linguists had hoped that by comparing languages in terms of how many cognates they shared, the Indo-European tree could be dated. But after discovering that the rates of language change varied widely from one branch to another, they largely gave up.

Dr. Gray and Dr. Atkinson realized that statistical methods developed by biologists for tracking the evolution of genes and proteins addressed many of the problems that exist in reconstructing trees of language descent. They represented each Indo-European language as a string of 1s and 0s, depending on whether it shared cognates for a list of words known to resist change. They then computed the likeliest of the many possible trees that would give rise to the observed data.

Their preferred tree of Indo-European languages had the same shape as that constructed by historical linguists. But its lower branches could be dated from historical events like the split between Latin and Rumanian when Roman troops withdrew south of the Danube in A.D. 270. And with the lower branches anchored in time, they could date the root. Proto-Indo-European, they calculated, was spoken 7,800 to 9,800 years ago.

That conclusion provided striking support for the Anatolian theory. Dr. Gray and Dr. Atkinson, with Remco Bouckaert and colleagues, dropped a second shoe in 2012 when they applied to the dispersal of proto-Indo-European a statistical model developed to track the geographical spread of viruses. It showed "decisive support for an Anatolian origin over a steppe origin," the authors concluded in an article in Science.

It seemed that with the biologists' help, the archaeologists' Anatolian theory had triumphed over the linguists' steppe hypothesis. But two findings reported this month have abruptly tilted the weight of evidence toward the steppes.

Though some linguists had dismissed the Gray and Atkinson result, others realized their computational approach had much to offer. Andrew Garrett, a linguist at the University of California, Berkeley, has teamed up with Will Chang, a linguist trained in computational techniques. They and colleagues noticed that in the 2012 article by Dr. Bouckaert and others, in eight cases where an ancient language is the widely assumed ancestor of a modern one, the

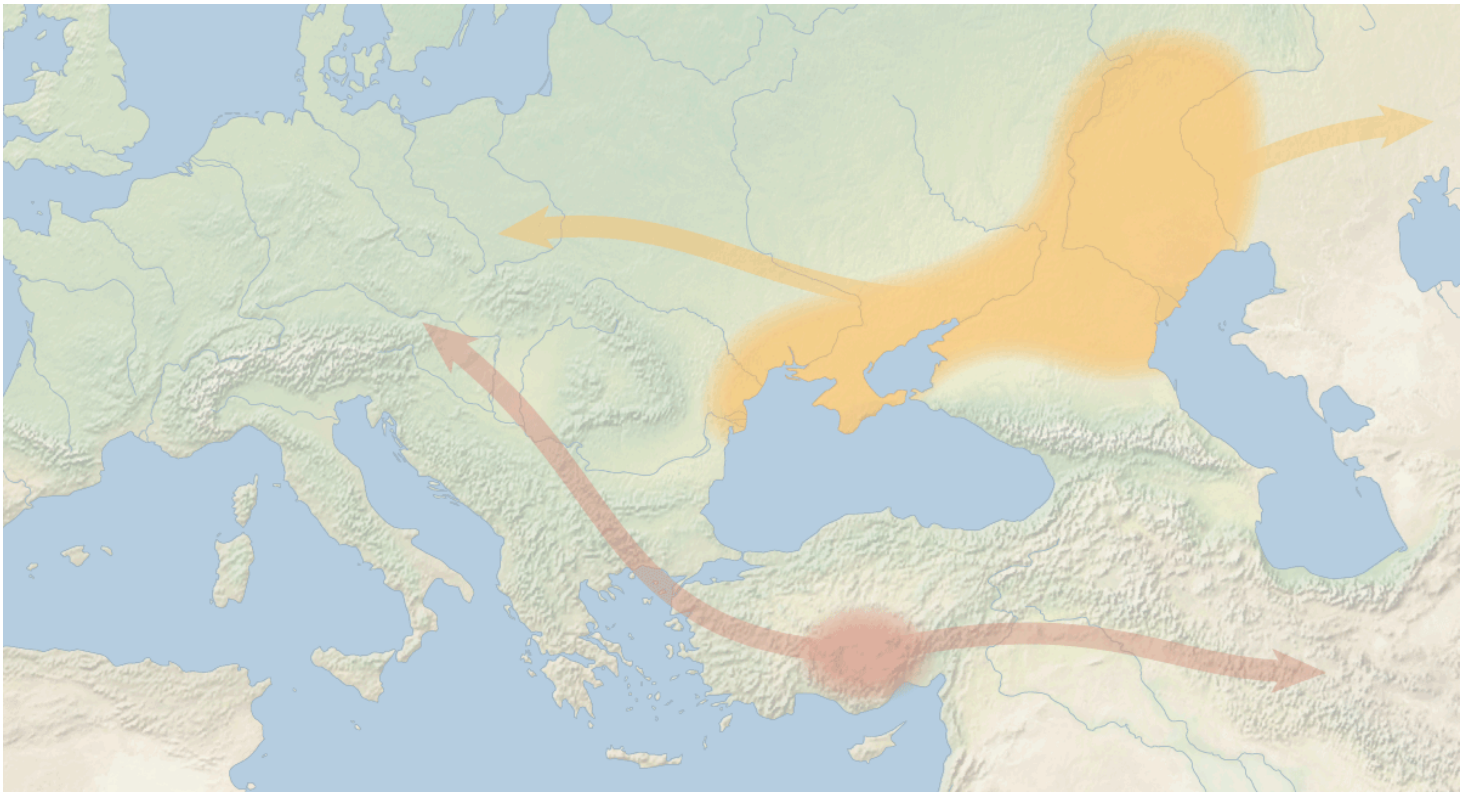
modern language is shown as being descended from a hypothetical cousin of the ancient language.

For example, the Romance languages are assigned to a hypothetical cousin of Latin, not Latin itself, and English to an inferred cousin of Old English.

Dr. Garrett and Mr. Chang thought it would be more realistic for the tree to adopt generally accepted language ancestries, even though this required overruling its probability calculations.

Origins of an Ancient Language

Researchers place the homeland of the proto-Indo-European language, the ancestor of many modern languages spoken across Europe and Asia, in either the steppes north of the Black Sea or in Anatolia, modern Turkey.



When the Bouckaert tree was forced to adopt the eight accepted language ancestries, Dr. Garrett and Mr. Chang and colleagues report in the journal Language, the whole tree shrank in age and its root stepped down to 6,500 years old, in agreement with the steppe hypothesis of Indo-European origins.

A second boost for the steppe theory has emerged from the largest study of ancient DNA in Europe, based on analysis of 69 people who lived 3,000 to 8,000 years ago. Patterns in the DNA bear evidence of a migration into Germany some 4,500 years ago of people from the Yamnaya culture of the steppes, the first to develop a pastoral economy based on wagons, sheep and horses. So extensive was this migration that three-quarters of the ancient people sampled in Germany bear Yamnaya-type DNA, says a team led by Wolfgang Haak of the University of Adelaide, Australia, and David Reich of Harvard Medical School. Their report was posted this month on bioRxiv.

If so much of the population was replaced, the newcomers' language probably prevailed, and the migration plausibly represents an expansion of Indo-European speakers from the steppes. "These results provide support for the theory of a steppe origin of at least some of the Indo-European languages of Europe," the authors say.

The three oldest branchings of the Indo-European tree, according to Don Ringe, a historical linguist at the University of Pennsylvania, are first, languages such as Hittite once spoken in Anatolia; second, Tocharian, a language group of western China; and third, the Italic and Celtic language groups of Europe. Archaeological evidence attests migrations out of the steppe in these directions in the right order, say Dr. Ringe and David Anthony, an archaeologist at Hartwick College, writing in the Annual Review of Linguistics.

They also note that proto-Indo-European has borrowed words from proto-Uralic, the inferred ancestor of languages such as Hungarian, Finnish and Estonian, and from languages of the Caucasus. A location in the steppes, but not in Anatolia, would make such borrowings geographically plausible. The evidence for a steppe origin of the Indo-European languages "is so strong that arguments in support of other hypotheses should be re-examined," Dr. Ringe and Dr. Anthony say.

But the case is not yet closed. The two new pieces of evidence, Dr. Garrett's correction of the Bouckaert tree and the ancient DNA data, may not be as conclusive as they seem.

Dr. Renfrew, the author of the Anatolian hypothesis, considers it a "strong possibility" that the migration from the steppes to Europe recorded in ancient DNA may be a secondary phenomenon. In other words, Indo-European could have spread first from Anatolia to the steppes and from there to Europe.

And the biologists who draw up statistically probable language trees do not believe the Garrett team is justified in making the trees conform to ancestry constraints. "The Garrett and Chang model is overzealous in forcing ancient languages to be directly ancestral – the data don't support this," said Dr. Atkinson, referring to new tests he has done.

One reason is that written languages tend to be fossilized, said Paul Heggarty, a linguist at the Max Planck Institute for Evolutionary Biology: Living languages are likely to be descended from a spoken language that diverged from the written version.

"The seemingly innocent assumptions which Garrett introduces," Dr. Renfrew said, "turn out not to be so uncomplicated."

Futurity.org

Dozens of monster hurricanes hit Cape Cod in last 2,000 years

by Keith Randall

On September 11, 2001, Hurricane Erin was making her way northward in the Atlantic Ocean. In this MODIS image, the storm stretches from the latitudes of Virginia in the south, past Massachusetts's boot-shaped Cape Cod, and on up to Maine.

Ancient sediments from a coastal pond in Cape Cod, Massachusetts, show that enormous storms have battered the region for 2,000 years.

The hurricane strikes deposited a distinct layer of sand mobilized from the adjacent beach.

The analysis, published in the journal *Earth's Future*, suggests some of the hurricanes would have dwarfed recent storms like Hurricane Sandy in 2012 that caused $65 billion in damages.

Very stormy periods

The findings could offer clues about global warming and future storm intensity, says Peter van Hengstum, assistant professor of marine sciences at Texas A&M University at Galveston.

"These core sediments act much like a commercial bar code you might find on an item at the grocery store," van Hengstum says. "We were able to 'read' the sediment core and found evidence of 35 hurricane strikes.

"Importantly, there are two periods of very intense storm activity in the Cape Cod area, from 150 to 1150, and again from 1400 to 1675, unlike anything we have observed during the instrumental record."

The storms were likely more intense than almost any storm ever seen in the Cape Cod area, including Hurricane Bob in 1991 and an unnamed storm that hit the area in 1635 and caused storm surges of at least 20 feet, van Hengstum says.

Category 4 storms

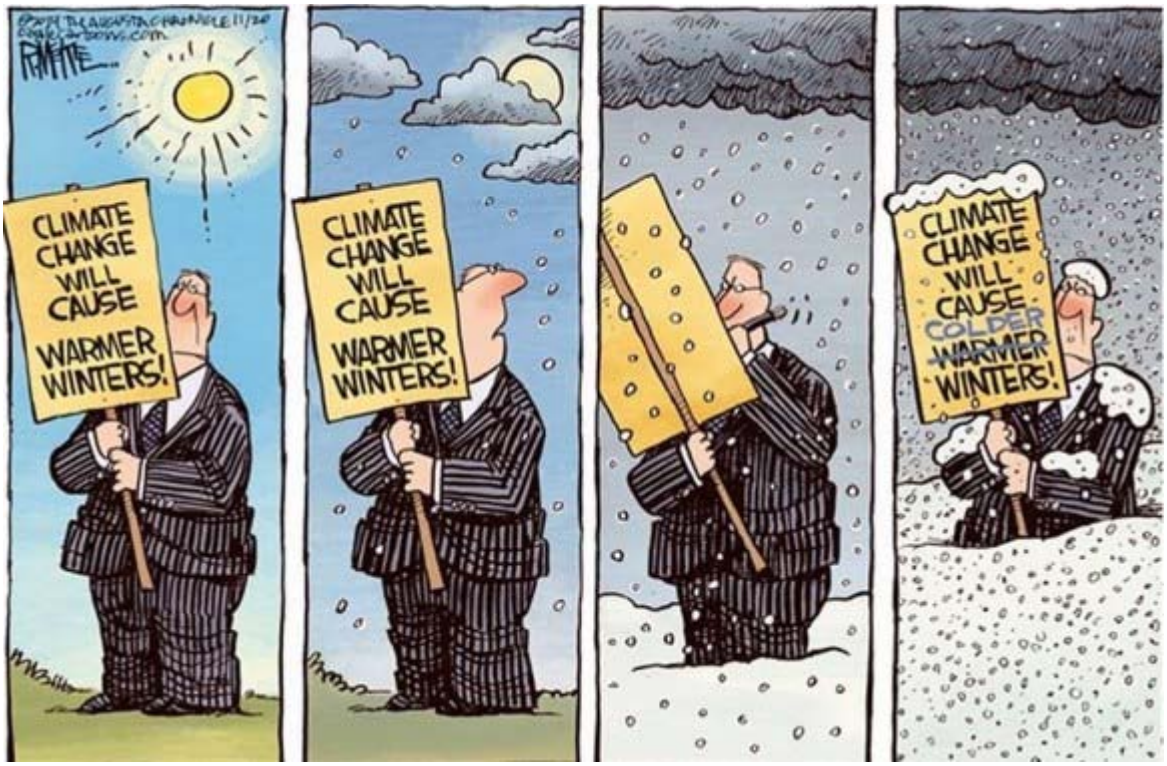
The sediments indicate there was also a period starting in about 1400 that lasted until 1675, when storm activity increased significantly.

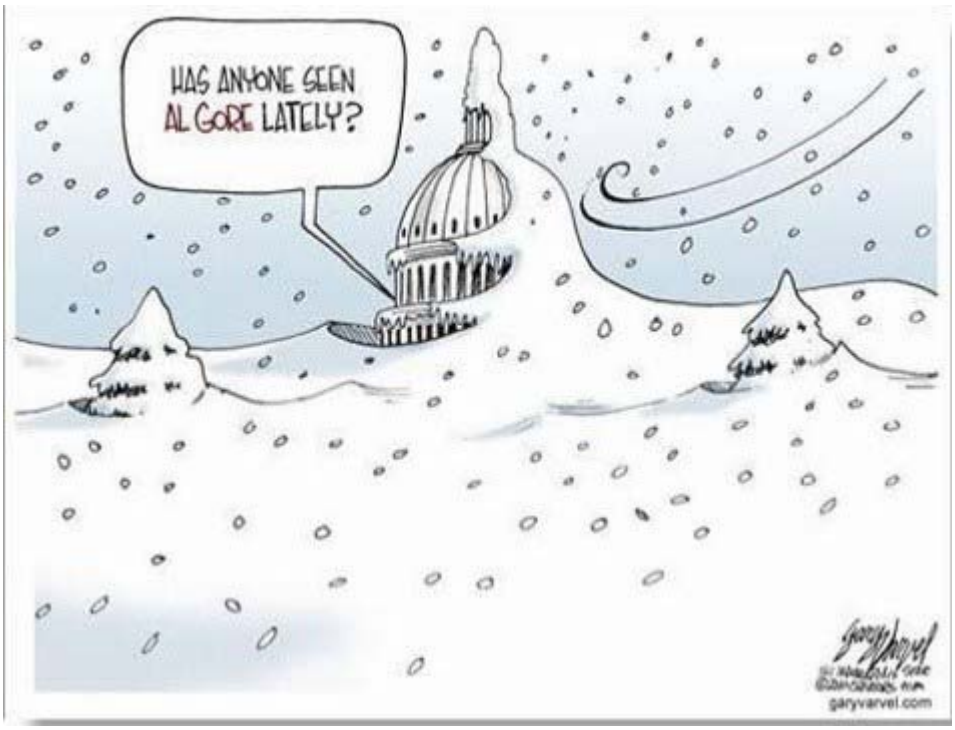
An intense storm pounded the Northeast about every 40 years or so, and most of these would be classified at least as a Category 3 or Category 4 storm—storms that would totally devastate New England if they hit today. By comparison, Hurricane Sandy was a Category 1 storm with winds of 80 miles per hour when it made landfall.

“The period of time from 1400 to 1675 AD was particularly interesting because it coincides with previous evidence for warming in the upper Atlantic Ocean off the North Eastern Seaboard,” van Hengstum says.

“This period of elevated hurricane frequency and intensity perhaps provides a clue into future hurricane activity in our warming climate.”

From a coastal risk perspective, US emergency officials should consider a plan involving a major hurricane—at Category 3 or higher intensity—every 30 to 40 years instead of every 100 or 200 years as currently believed.


CLIMATE CHANGE WILL CAUSE WARMER WINTERS!
CLIMATE CHANGE WILL CAUSE WARMER WINTERS!
CLIMATE CHANGE WILL CAUSE COLDER ~~WARMER~~ WINTERS!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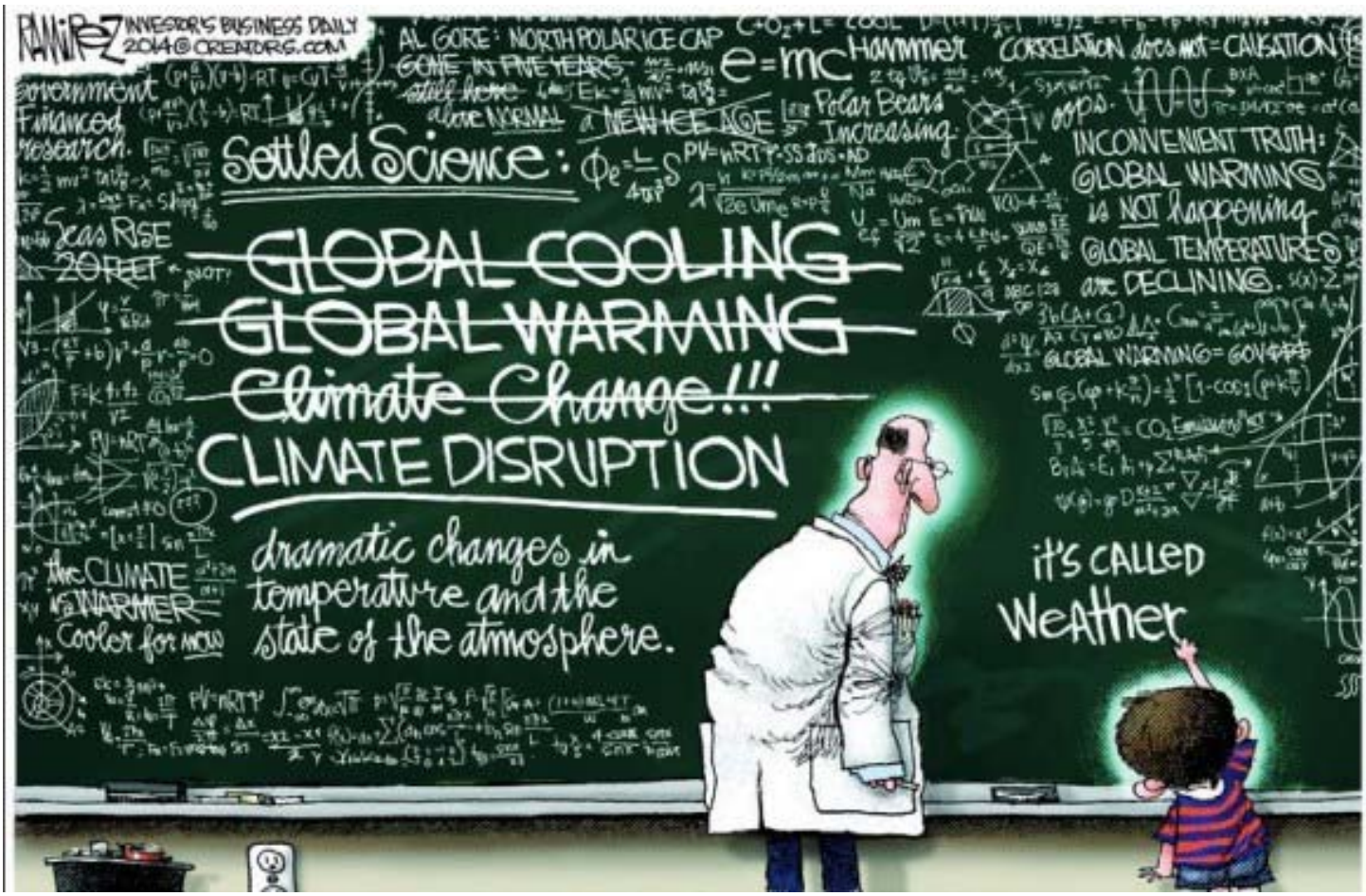
• BALDING CLIMATE SCIENTISTS NOT BEING ABLE TO GET DATES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CLIMATE DISRUPTION
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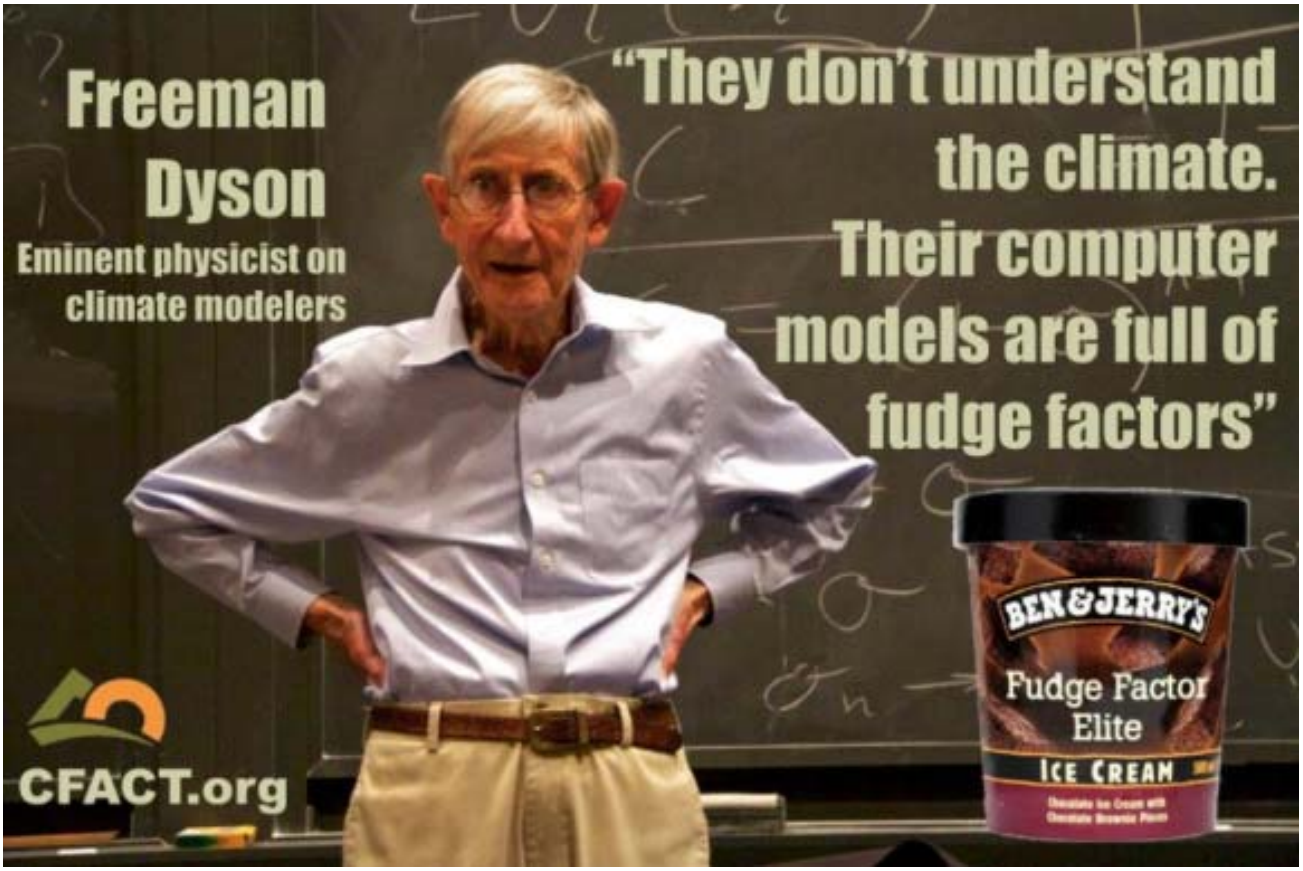
Freeman Dyson
Eminent physicist on climate modelers
"They don't understand the climate. Their computer models are full of fudge factors"
BEN & JERRY'S
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