

SCHOOLS OF ECONOMIC THOUGHT

A BRIEF HISTORY OF ECONOMICS

This isn't really essential to know, but may satisfy the curiosity of many.

Mercantilism

Economics is said to begin with Adam Smith in 1776. Prior to that, nobody thought of economics, or markets, as an object of study. It is not that they didn't pay attention to economic matters, it is simply that they didn't think of it in any systematic or coherent manner. It was all just off-the-cuff intuition and policy proposals by a myriad of merchants, government officials & journalists, principally in Britain.

It is common to denote the period before 1776 as "Mercantilism". It wasn't a coherent school of thought, but a hodge-podge of varying ideas about improving tax revenues, the value & movements of gold and how nations competed for international commerce & colonies. Mostly protectionist, 'war-minded', and all haphazardly argued. (the principal features of the Mercantilist school are discussed in our "Gains from Trade" handout).

There was some opposition to Mercantilist doctrines, notably among French and Scottish thinkers (e.g. Pierre de Boisguilbert, Francois Quesnay, Jacques Turgot and David Hume)

Classical School

The Enlightenment era (mid-1700s) in Europe brought a new spirit of scientific inquiry. Thinkers began looking to apply scientific principles not only to the physical world, but also to human society. In the same spirit that Sir Isaac Newton 'discovered' the "law of gravity" to explain the interaction of natural forces and decipher how the physical world operates, Enlightenment thinkers began trying to discover the "laws" of human interaction, to explain how human society operates. The economy - exchange, prices, markets - are one area of human interaction that seemed amenable to scientific inquiry, where there might be 'laws' to be discovered in how markets operate.

The groundwork for this project began with mid-18th C. French and Scottish Enlightenment thinkers dissatisfied with both the Mercantilist approach and their conclusions.

The first serious attempt to systematically study and look for "laws" in the marketplace was the Scottish philosopher Adam Smith in his *Wealth of Nations* (1776). He didn't get everything right, but at least he opened the door to a new field of study. It is for this reason Adam Smith is commonly regarded as the "father of economics".

The followers of Smith's original principles are commonly called the "**Classical School**" of economics. They dominated thinking in at least the first half of the 19th C. The most important figure here is probably **David Ricardo**, a Dutch-born London stockbroker, who was perhaps the most systematic thinker of the bunch. Ricardo was the one who turned Smith's 'first draft' of ideas and propositions into a coherent, clear and rigorous theory. It became the dominant school of thought in the 19th C., particularly in Britain. As a result, the Classical school is sometimes also called the "Ricardian" or "British" school.

Karl Marx built his economic analysis upon Ricardo's theories. As a result, Marxian economics is usually considered part of the Classical School tradition.

Historical-Institutional School

During the 19th C., the principal challenge to the Classical school came from the '**Historical**' school. The Historicists, principally centered in Germany, did not exactly dispute the Classical theories, but rather questioned whether *any* theory was possible at all. They did not believe any economic theory could hold across time nor remain true in different social and institutional contexts. Consequently, they proposed economists should stop trying to articulate general principles of economic theory altogether, and instead pursue a purely inductive and empirical method of analysis.

By and large, the Historicists limited themselves to describing the historical and institutional details and facts of economic arrangements and deciphering patterns found in masses of economic data. The German Historicist school had an offshoot in the United States known as the American '**Institutionalist**' school, of which Thorstein Veblen was perhaps its most famous champion.

Neoclassical School

In 1871, there was launched what has been called the "**Marginalist Revolution**". Independently of each other, three different economists – William Stanley Jevons (British), Carl Menger (Austrian) and Léon Walras (French) – came up with a wholly new theory that completely discarded the central Ricardian tenets of Classical economics. This new theory was the very theory of 'supply-and-demand' we are so familiar with and have been using through this course.

The 'Marginalist' school is often also called the '**Neoclassical**' school. The Neoclassical school encompasses many variants within itself ('Marshallian', 'Walrasian', 'Austrian', 'Stockholm', etc.), but they all have same underlying theoretical principles.

The Neoclassical school managed to quickly displace the Classical school as the dominant theoretical school. But it also found itself as the new target of the Historical-Institutionalist challengers. From the 1870s until the 1930s, the economic world was basically (and bitterly) divided between Neoclassicals and Institutionalists, with the smaller Marxians (the last remnant of the Classical school) barking at their heels.

The Neoclassicals won a complete and final victory over the Institutionalists in the 1930s. This was accomplished by the rise of **econometrics**, the application of new statistical tools to economic analysis. Econometrics allowed the Neoclassicals to finally test their theories against economic data. This took the wind out of the old Institutionalist accusation that the Neoclassical theoreticians were merely spinning cobwebs out of thin air. As Neoclassicism was now able to combine theoretical and empirical work, the appeal of the purely data-mining Institutionalist approach (what Neoclassicals decried as mindless "measurement without theory") declined.

The Neoclassical school continues until today and can be regarded as the "mainstream" or "orthodox" or "conventional" theory of economics. Much of what we see in this course is Neoclassical economics.

Keynesian School

Despite seeing off the Institutionalists, Neoclassicals had little reason to celebrate in the 1930s. The world was caught in the grip of a Great Depression and they were at loss to explain how that had come about or how to solve it. The only thing they suggested was to let prices adjust. Prices were allowed to adjust. But unemployment only kept rising.

In his 1936 treatise, *The General Theory*, Cambridge economist **John Maynard Keynes** proposed a wholly new theory to explain aggregate phenomena in the economy as a whole, the area in which Neoclassical theory had been having immense difficulty explaining. It is important to note that Keynes did not propose to displace Neoclassical theory. The theoretical principles of Neoclassicism were still true. But it was, Keynes contended, incomplete. Neoclassicism was still good for explaining 'micro-level' things such as markets, prices, production and distribution, but poor at explaining 'macro-level' things in the economy as a whole, such as GDP, inflation and unemployment rates. Thus a more "general theory" was needed (hence the title), one that preserved Neoclassicism at the micro level, but proposed a new set of principles for the macro level.

The **Keynesian Revolution** had an enormous impact not only on economics but also on the real world. The entire idea of the relationship between government and the economy was transformed. Many of these changes had already been underway, but Keynes provided the theoretical basis for them. As one US Senator put it, "We knew (what the Neoclassical economists were telling us) was bad policy. Now we know it was also bad economics."

The post-war years (1945-1970s) saw the world of economics glide onwards on two rails: in microeconomics, Neoclassicism ruled; in macroeconomics, Keynesianism ruled. Most economists were happy to articulate both theories in different contexts. But some economists were uncomfortable with this arrangement. They felt the theories were not really compatible with each other, that there were areas of overlap and contradiction, and consequently to continue on 'two rails' was to ask economists to live a bit of a schizophrenic existence.

In the 1960s and 1970s, multiple efforts were made to reconcile the Neoclassical theory of the micro level with the Keynesian theory of the macro level, to reduce the two rails to "one road". The efforts were bold and imaginative – and contentious.

One group, known as the '**Cambridge** school' (led by Joan Robinson) proposed to dump all Neoclassical theory altogether and actually resurrect the old Classical theory to explain the 'micro-level' side, as it seemed more compatible with Keynesian theory. Another group, known as the **Chicago** (or '**Monetarist**') school (led by Milton Friedman) proposed to dump Keynesian theory altogether, and let Neoclassicism take over the macro side again.

Caught in the middle were the '**Synthesis** school' (led by no single charismatic figure, but championed by most leading economists, notably Paul Samuelson, James Tobin, Robert Solow and others). The Synthesists sought to split the difference, arguing that there is no need to go to extremes or dump anything. The Synthesists tried to show how the Keynesian ideas were actually deducible from Neoclassical principles and consequently compatible.

As the 1970s wore on, the debates got more furious and the various sides grew more intractable and bitter. But the ultimate decider turned out not to be the arguments forwarded, but the intrusion of economic reality. The 1970s saw a great period of 'stagflation' (high unemployment plus high inflation), a surprising macro-phenomenon which could not be easily explained by Keynesian theory. After all, Keynesian theory had argued inflation was caused by tight labor markets, and that mass unemployment should be accompanied by price *deflation*, not inflation.

This stagflationary reality of the 1970s diminished the appeal of those who were arguing for a greater role for Keynesian theory. The Synthesists were embarrassed, Robinson & Co. retreated to the insular world of Cambridge, while Milton Friedman's Monetarists, feeling vindicated, came roaring to the fore.

Monetarist School

The Monetarist 'victory' in the stagflationary 1970s was both brief and permanent.

On the permanent front, it certainly revolutionized academic thinking, seemingly taking economics off its "two rails" and reducing it all to one theory: Neoclassicism. In many American universities, a particularly fundamentalist strain of Monetarism (sometimes called the "**New Classical**" school, an unfortunately confusing name), took hold and has remained, on and off, a powerful theoretical force since. The New Classical school is led by **Robert Lucas** and fellow faculty members of the University of Chicago. It brooks little or no tolerance for Keynesian ideas and has expunged most traces of Keynesianism from its analysis.

The looser Monetarists (terribly mislabeled as "**New Keynesians**") try to make room for some Keynesian results at the macro level, even though their theoretical tools remain almost wholly Neoclassical, with only some adjustments here and there. Like the New Classicals, they believe Neoclassicism to be absolutely correct, that all you have to do is allow prices to adjust and the market will fix everything. The difference is that New Keynesians accept that sometimes prices are "sticky", that is, they don't adjust, or don't adjust quickly enough. This may be because of monopolistic conditions, transactions costs, information asymmetries, imperfections, errors, thoughtless government interference or silly regulations. These real-world imperfections may stop the price system from working properly and prevent adjustment, thereby leading to prolonged periods of unemployment. As a result, it may be *practical* to recommend *some* degree of active government policy to smooth over these problems and help the economy transition more quickly to a stable position.

The New Keynesian school is not particularly self-conscious nor dogmatic nor centered anywhere. Popular economists such as Paul Krugman and Joseph Stiglitz are frequently counted among them, although I am not sure if they would welcome that label.

The Future?

While old-fashioned Keynesianism lost a lot of ground in the academy since the 1970s, it was not displaced. Most old Synthesis Keynesians stood firm against the Monetarist intrusion through the 1980s and 1990s, and their theories remain in the principal textbooks, they are still taught in all universities (except perhaps Chicago) and remain the primary handbooks of policymakers.

The reason for Keynesian staying power is that, once the stagflationary 1970s went away, the Monetarists (and their sub-variants) fell into the same quandary their predecessors did back in the 1930s: Neoclassical theory is still quite poor at explaining aggregate macro-level phenomena. They are at a loss to explain things like persistent unemployment and have few or no tools to offer to address it.

For those economics professors at research universities who aren't usually forced to make real policy decisions, this may not be something worth worrying about. The intellectual satisfaction of a single coherent theory applying at both the micro and macro level is more important than how it performs in reality. But those economists who do seek to explain real phenomena, who are asked to tailor policy to it, the Keynesian handbook remains the only one there is.

This is not to say that Monetarism hasn't had a policy impact. Monetarist policy proposals were toyed with in the early 1980s in the early Reagan and Thatcher years. But they were quickly found to be inadequate and discarded and the old Keynesian handbooks reopened. Not as simple-mindedly as before, mind you. The Monetarists did give the Keynesians a kick-in-the-pants and forced them to be a little more careful and cautious in their conclusions. And throughout the 1990s and 2000s, several Monetarist (New

Keynesians) policy totems, like 'inflation-targeting', continued to be advocated and were occasionally adopted.

The Crisis that began in 2007 promises to be a watershed, not only for economic policy, but also for economic theory. Old Keynesian confidence has certainly surged forward, 'cautious' policy approach was thrown out the window and unabashedly Keynesian policy recommendations – the Fed as a liquidity pump, the Congressional stimulus package, – came to the forefront. It remains an open question how this crisis will influence the development of economic theory. It certainly seems as if the old academic 'ceasefire' that has prevailed since the 1980s is on the verge of being broken, and accusatory fingers are being pointed at the New Classicals (and their junior partners, the New Keynesians), as hapless to explain this crisis as any other, for taking economics on a failed intellectual detour for the past couple of decades. If this culminates into a grander intellectual quarrel, it will be one well-worth keeping an eye on.

This rough outline of main lines of the development of schools of economic thought is necessarily incomplete. There have been many more schools and quarrels and details which I cannot hope to account for in this brief space. But this should be enough for you to realize that economics has had a perhaps colorful history. If you are interested in more details, take a stroll around the History of Economic Thought Website:

<http://cepa.newschool.edu/het/>

MERCANTILIST SCHOOL (1550s-1776)

Jean Bodin	(French)	<i>Responses aux paradoxes du sieur de Malestroict</i>	1568
Thomas Mun	(English)	<i>England's Treasure by Forraign Trade</i>	1630
Sir Josiah Child	(English)	<i>Brief Observations Concerning Trade and Interest of Money</i>	1668
Sir William Petty	(English)	<i>Political Arithmetik</i>	1676
Nicholas Barbon	(English)	<i>A Discourse of Trade</i>	1690
John Locke	(English)	<i>Some Considerations of the consequences of the lowering of Interest, and raising the value of Money</i>	1691
Sir Dudley North	(English)	<i>Discourses upon Trade</i>	1691
Charles D'avenant	(English)	<i>An Essay on the East India Trade</i>	1697
Sir James Steuart	(Scottish)	<i>Inquiry into the Principles of Political Economy</i>	1767

- identified national prosperity with the accumulation of money (gold & silver), rather than real resources and consumer goods.
- denied there were mutual gains from trade
- identified a positive trade balance as a way to 'suck money' from foreign countries.
- first to articulate the Quantity Theory of Money.

Recommendations:

- maximize exports, minimize imports
- active State promotion of export industries (export subsidies) and imposition of protectionist tariffs and quotas
- focus production on high-value goods
- State-sponsored establishment of national monopolies to control industry and trade (east indies companies, etc.)
- urge colonization and forcible seizure of raw materials sources
- authorize and pursue war against trade rivals.

Enlightenment Liberals (proto-Classical):

Pierre de Boisguilbert	(French)	<i>Dissertation de la nature des richesses</i>	1704
John Law	(Scottish)	<i>Money and Trade Considered</i>	1705
David Hume	(Scottish)	<i>Political Discourses</i>	1752
François Quesnay	(French)	<i>Le Tableau Économique</i>	1758
Jacques Turgot	(French)	<i>Réflexions sur la formation et la distribution des richesses</i>	1766

Ideas:

- Prosperity of a nation measured by real resources & goods, not stock of precious metals.
- There are mutual gains from trade
- the economy is a system of markets with its own natural laws that allocates things properly.
- By preventing these laws from working, the State causes greater poverty & misery

Recommendations:

- Mercantilism is dangerous and wrong;
- Remove State restrictions on trade, commerce and production.

CLASSICAL SCHOOL (1776-1871)

Adam Smith	(Scottish)	<i>An Inquiry into the Nature and Causes of the Wealth of Nations</i>	1776
Robert Malthus	(English)	<i>An Essay on the Principle of Population</i>	1798
Jean Baptiste Say	(French)	<i>Traité d'économie politique</i>	1803
David Ricardo	(English)	<i>On the Principles of Political Economy and Taxation</i>	1817
John Stuart Mill	(English)	<i>Principles of Political Economy</i>	1848
Karl Marx	(German)	<i>Das Kapital: Kritik der politischen Ökonomie</i> (3 vols.)	1867-94

Some of their ideas and contributions include:

- cost theory of value (i.e. costs of production determines the final price)
- the theory of Comparative Advantage (i.e. gains from trade)
- the Malthusian law of population (i.e. higher income causes faster population growth)
- Say's Law (i.e. savings causes investment)
- the Quantity Theory of Money (i.e. money supply drives prices)
- Supply-side thinking: economic growth driven by savings and growth of resources.

Conclusions:

- promoted free trade, freedom of markets, no government interference, etc.
- rejected possibility of economic recessions and general unemployment because (by their supply-side thinking & Say's Law) they assume resources are always fully employed;

But fully earned the epithet "the Dismal Science" because:

- pessimistic about long-run economic growth; believed it would eventually peter out.
- saw income distribution as a "struggle" between classes (wages vs. profits);
- argued in favor of distributing more income to capitalists, as the only way to ensure enough savings to keep the economy growing for a little longer.
- viewed labor as trapped in a vicious Malthusian poverty trap, unable to break out of it and improve their standard of living ('iron law of wages');
- From all this, Ricardo saw inevitability of stagnation, Marx saw inevitability of revolution.

HISTORICIST-INSTITUTIONALIST SCHOOL (1840s-1940s)

Some German Historicists and American Institutionalists, and the dates of their principal works:

German Historicists		American Institutionalists	
Friedrich List	(1841)	Richard T. Ely	(1893)
Wilhelm Roscher	(1843)	Thorstein Veblen	(1899)
Karl Knies	(1853)	John R. Commons	(1924)
Gustav Schmoller	(1883)	William C. Mitchell	(1927)
Werner Sombart	(1902)	Allyn Young	(1928)
Max Weber	(1905)	Simon Kuznets	(1941)

Contributions:

- 'linear' theories of the stages of economic growth
- distinction between development and underdevelopment.
- identification of the phenomenon of "business cycles"
- establishment of national income accounts and statistics
- identification of the investment "accelerator"
- emphasize importance of economies of scale, fixed costs and managerial objectives
- emphasize importance of monopoly, oligopoly and imperfect competition

NEOCLASSICAL SCHOOL (1871-now)

W. Stanley Jevons	(English)	<i>Theory of Political Economy</i>	1871
Carl Menger	(Austrian)	<i>Die Grundsätze der Volkswirtschaftslehre</i>	1871
Léon Walras	(French)	<i>Éléments d'économie politique pure</i>	1874
John Bates Clark	(American)	<i>The Philosophy of Wealth</i>	1885
Alfred Marshall	(Austrian)	<i>Principles of Economics</i>	1890
Irving Fisher	(American)	<i>Mathematical Investigations in the Theory of Value and Prices</i>	1892
Knut Wicksell	(Swedish)	<i>Über Wert, Kapital und Rente</i>	1892
Vilfredo Pareto	(Italian)	<i>Manuale di Economia Politica</i>	1906

- reject cost theory of value, propose utility theory of value (i.e. final price determines cost of production)
- introduce supply-and-demand theory and Law of Markets (prices as an adjustment mechanism to clear markets)
- introduce the Marginal Theory of production and distribution
- accept theory of comparative advantage (explained in terms of opportunity cost)
- reject the classical Malthusian law (they just assumed population grows naturally)
- accept classical Say's Law
- accept classical Quantity Theory of Money
- emphasize efficiency in allocation more than long-run growth.

Conclusions:

- promote free trade, free markets, etc.
- reject theoretical possibility of prolonged recessions & unemployment; assume the 'Law of Markets' fixes any imbalances eventually. Any prolonged crisis is simply because the market is "not allowed to work" temporarily for some reason (e.g. government, unions, erratic money).
- saw income distribution as "harmony" between classes, everyone gets what they deserve.
- optimistic about growth - emphasize how productivity growth (technological innovation, capital-deepening) will keep growth going.

Sub-Schools:

- Lausanne School (Walras, Pareto) - mathematically-oriented.
- Austrian School (Menger) - emphasize importance of price mechanism
- American 'Social Value' School (Clark, Fisher) - emphasize harmony of classes
- Swedish School (Wicksell) - elaborate details (& glitches, esp. money)
- Cambridge School (Marshall) - everything reducible to supply & demand.

KEYNESIAN SCHOOL (1936-now)

John Maynard Keynes (English) *The General Theory of Employment, Interest and Money*, 1936

Keynesians can be roughly divided into two schools: the 'Cambridge School' and the 'Synthesis' School. Some names you might come across:

'Cambridge' Keynesians		'Synthesis' Keynesians	
Joan Robinson	(English)	John Hicks	(English)
Nicholas Kaldor	(Hungarian-English)	Franco Modigliani	(Italian-American)
Roy Harrod	(English)	James Tobin	(American)
Abba Lerner	(Anglo-American)	Paul Samuelson	(American)
Luigi Pasinetti	(Italian)	Robert Mundell	(American)

- Cambridge School Keynesians took a more fundamentalist view of Keynesian theory, rejecting Neoclassicism altogether, although they also resurrected and borrowed a lot from the old Classical theory (thus they are sometimes known as the 'Neo-Ricardian' school).

- the 'Synthesis School' tried to combine and merge elements of Neoclassical and Keynesian theories. It is the better-known or 'mainstream' Keynesian school.

- focuses on the economy as a whole (macroeconomics);
- compatible with different micro-level theories (Cambridge prefer Classical; Synthesis prefer Neoclassical)
- introduces the Multiplier
- reject Say's Law, introduce Keynes's Law (investment causes savings)
- introduce emphasis on aggregate demand as determinant of business cycle.

Policy conclusions:

- market economies are susceptible to business cycles and can create permanent unemployment and/or persistent inflation, which it may be unable to fix by itself
- government can and should influence aggregate demand to counter the business cycle, minimize unemployment and inflation.
- use of government fiscal policy (spending & taxation) to stabilize economy
- use of central bank monetary policy (interest rate targeting) to stabilize economy
- use of treasury foreign exchange policy (exchange rate targeting) to stabilize economy
- introduce automatic stabilizers (unemployment insurance, etc.) to help stabilize economy.
- government should only use the broad tools listed, and not try to micromanage the economy with miniscule regulation.
- government policy should always be functional, i.e. how does it affect the broad economy, not whether or not it adheres to some ideal (e.g. deficits).

MONETARIST SCHOOL (1968-now)

Milton Friedman (American) *Studies in the Quantity Theory of Money* 1956

Same theoretical principles as Neoclassical economics, but now addresses Keynesian macro-level points. Post-Friedman Monetarists can be roughly divided into two schools.

"New Classical" (Chicago School)

Robert Lucas (Chicago)
Thomas Sargent (Chicago)
Robert Barro (Harvard)
Edward Prescott (Minnesota)

"New Keynesian"

N. Gregory Mankiw (Harvard)
John Taylor (Stanford)
David Romer (Berkeley)
Michael Woodford (Columbia)

- New Classics are "fundamentalist" Monetarists
- New Keynesians are "loose" Monetarists, recognize that certain real-world imperfections and stickiness may delay adjustments and thus may require broad government policy response (but not based on Keynesian theory or principles).
- emphasize compatibility with Neoclassical micro-level theory.
- assert multiplier is very weak ('Ricardian Equivalence')
- restore Say's Law, ignore Keynes's Law.
- erratic money supply is the prime determinant of business cycle; aggregate demand irrelevant.
- market economy is self-correcting; impossibility of persistent unemployment; It will always stabilize at the 'natural rate of unemployment';
 - prolonged unemployment is not a natural outcome of the market, but only the result of an accident, imperfection, stickiness or thoughtless government interference
- impossibility of the government to affect output permanently
- permanent inflation only as a result of excessive money supply.

Policy conclusions:

- government intervention unnecessary; economy always stabilizes itself around the natural rate of unemployment
- government action prone to mistakes and causes more problems that it solves;
- government should ignore unemployment; pay attention only to inflation.
- central banks should not target or adjust interest rates to stabilize economy; they should ignore the cycle and make sure only that the total money supply is adequate.
 - if governments and central banks cannot be trusted to keep these rules, other means (e.g. legislation) should be undertaken to straightjacket them.
- focus of government should be on maintaining fundamental things right, e.g. property rights, law and order, transparency, etc.
- To all of the above, the New Keynesians make note of caveats and suggest that policy may sometimes be necessary or useful to smooth out temporary adjustment problems.

Post-Script: Economics as a Science

This brief outline of the history of economics and differing schools of thought may give rise to the question: "Is economics a science?" If it is a science, how is it that so many intelligent and talented men and women can find so much disagreement on basic principles? If it is not a science, why should we pay attention to what is taught here?

I find it rather silly to have to argue this, but here goes. As John Maynard Keynes (1931) put it, economics is the "most agreeable branch of the moral sciences, in which theory and fact, intuitive imagination and practical judgment, are blended in a manner comfortable to the human intellect". Whether that implies economics is a "science" or a "discipline" or an "art" or a "religion" or whatever, I don't know and, frankly, I don't care.

Now, I am not going to take refuge, as some economists like to do, in the excuse that economics is "only a young science". That is untenable. Economics is not young, certainly not younger than any other science. After all, Sir William Petty, the founder of econometrics, was a rather senior colleague to Sir Isaac Newton in the Royal Society!

Nor am I going to argue that it is not a science because it cannot conduct controlled experiments. Astronomy is also unable to conduct controlled experiments, yet no one questions its scientific status.

Rather, my basic position is this: I believe economics is a science like any other science – it is a *human* construction that attempts to get a grip on the world by proposing various theories meant to unify all sorts of differing factual phenomena. This implies that we identify as the body of modern economics is nothing else but the outcome of the history of human inventiveness and discovery. Economics is the edifice built by economists, generation after generation, via mentors and protégés, conjecture and proof, criticism and correction, rivalry and cooperation, ideology and rebellion, waves of fashion and isolated flashes of brilliance.

When so many humans are involved in such a big construction project, quarrels, disagreements and failings are inevitable. But that doesn't make it any less a science, nor does it serve as an excuse to overlook its lessons.