Newsletter of the New Orleans Chapter

Society of Independent Professional Earth Scientists

Volume 12, Number 5 **May 2011**

Chairman's Message

At our April meeting, Randy Brunet delivered an interesting and informative talk on financial matters. Once again, Randy's appearance resulted in a number of questions and comments!

This month on May 17, we wind up the 2010-2011 meeting year with the annual dinner meeting for members, spouses and guests. We have lined up what promises to be an entertaining and informative talk by local TV and radio personality, Jeff Crouere, whose specialty is "politics with a punch".

An excellent menu has been planned, including a complimentary beverage before dinner and wine with our meal. We will have a choice of three entrées, along with soup, salad and dessert. As in the past, we would welcome any contributions to the "wine fund".

So far the appeal for new officers and committee chairmen has not resulted in any offers. The Chapter cannot continue indefinitely without new leadership!

As we close out the year, I want to recognize and thank our officers and committee chairmen, **R.T. Cerniglia**, Co-Chairman, **Reese Pinney**, Treasurer, **Al Baker**, Secretary, **Tom Klekamp**, newsletter editor, **Tony Carollo**, membership chairman and **David Broadbridge**, our webmaster. Last, but not least, **Carol St. Germain** and **Ed Barry**, for continuing to do their usual great job!

As always, after this meeting, we will take a three month break and reconvene in September.

Louis Lemarié

May Dinner Featured Guest Speaker

Jeff Crouere

May 17th Andrea's Ristorante, Metairie
Social and cocktails (1-complimentary drink) 6:30 PM
Seating for dinner 7:15 PM
Choice of 2-3 entrees - Wine served with dinner

Jeff Crouere

Since January of 1999, Crouere has been a radio talk show host based in New Orleans, LA. His programs are dedicated to examining the top issues of the day on the local, state and national levels. Crouere offers listeners political debate, analysis, and interviews with interesting political leaders and commentators. Currently, Crouere is host of a morning program, Ringside Politics, which airs weekdays from 7-11 a.m. on WGSO 990 AM and can be heard on several affiliate stations and on the Internet at WGSO.com.

Crouere is also host of Ringside, a television version of the radio program, which airs on WLAE-TV, Channel 32 in New Orleans. New Orleans area television viewers can also watch Crouere on ABC-26 TV, where he has served since 2002

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as the political analyst and provides his insight on local, state and national politics.
The website for the radio and television program RingsidePolitics.com provides a web poll, political rumors, a schedule of guests and links to a variety of Crouere's columns. He writes daily, weekly and monthly political analysis columns and editorials for a select number of print and on-line publications, including Bayoubuzz.com, the Northshore Conifer, Kenner Star, New Orleans City Business, St. Tammany News, and the Slidell Monthly. He was provides regular columns and serves as the Political Editor for NewOrleans.com.

He also is the editor of a weekly e-mail newsletter, which has a circulation of 5,000 readers. Once a month, Crouere hosts a local version of "Politically Incorrect" at the Blue Room in New Orleans called Politics with a Punch which includes a panel of comedians, politicians, media personalities and news makers.

Crouere has served as moderator for political debates and forums featuring candidates contending for elective office, such as St. Bernard and Plaquemines Parish President, New Orleans City Council, U.S. Congress, U.S. Senate, LA Governor and U.S. President. He has been the featured speaker or emcee at events across Louisiana, speaking to over 200 clubs, organizations and schools across the state, such as Loyola University and the Alliance for Good Government.
He has held many leadership positions in the Louisiana Republican Party, including Deputy Chairman and Executive Director. In 2000, he served as the Louisiana Chairman of the Republican National Committee Catholic Task Force. For four years, he held the position of President of the Northshore Republican Men's Club, a dynamic GOP organization in the state's only Republican majority parish. In March of 2009, he founded the Northshore Tea Party, which has sponsored several popular citizen rallies.
As a respected columnist, analyst and talk show host, Crouere has been interviewed for his perspective by the New York Times, national radio networks such as National Public Radio, Talk America, Radio America and Catholic Radio and national cable television networks such as Fox News, CNN, CNN Headline News, CNBC and MSNBC.

Shale Gas Blessing or Curse?

Dick Selley has held a torch for UK shale gas exploration for over 30 years and was the first witness summoned to give evidence to the Parliamentary Energy & Climate Change Committee inquiry in February. (An interesting read, Editor)*

GSL's Geoscientist, May 2011

In the US, the recent boom in shale-gas production has boosted gas reserves to an all-time high and caused a drop in the gas price from a recent high of $8 to the 70's price of $4. Shale gas exploration is booming, from Argentina to India, from Canada to South Africa. The 'land grab' for shale gas acreage in Europe is over, with shale gas wells being drilled in Sweden, Poland, and Lancashire (UK). By providing secure domestic gas supplies, shale gas yields a high 'peace dividend.'

So, what's not to like? Well, plenty if you listen to outraged environmentalists. A boom in shale gas production will continue to release carbon dioxide and methane into the atmosphere and delay the dawn of a non-carbon economy. The artificial fracturing of shale gas reservoirs apparently triggers earthquakes, pollutes aquifers with carcinogens, ignites methane-laden water flowing from taps, causes the sky to rain flocks of dead birds - and probably fire and brimstone too in the Bible Belt.

A LITTLE HISTORY

In 1821 gas was produced from a natural seepage in fractured Devonian shales in the Appalachian Mountains at Fredonia, New York. An enterprising entrepreneur piped the gas through hollowed-out logs, later replaced by lead pipes, to illuminate a local bar. Thereafter shale gas production was carried on throughout the Appalachians as a 'cottage business' by small-time operators. Profit margins were too small to interest major companies. Exploration methods were basic. Seismic was out of the question as too expensive. Serendipity ruled. When one British potential investor questioned the geological rationale for picking a particular well location, the landowner replied 'Well ma pappy has been drillin' wells along that thar creek bottom for years,

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so I guess I'll jus' carry on'.

Wells were air-drilled to save on drilling mud. Fracturing, artificially stimulating and compressing the gas were also deemed too expensive. Instead, one well would be allowed to flow naturally - which it would often do for many decades, supplying enough gas for an adjacent farm, school, hospital or shopping mall. There were no pipelines, no infrastructure. A shale-gas well was silent, steady, undemanding and generated minimal environmental trauma.

The UK's first well to encounter shale gas was drilled in 1875 by the Subwealden Exploration Company. This company was set up by a group of academics purely to investigate the depth to the Palaeozoic rocks beneath the Weald. According to Sir Andrew Ramsay, then Director of the Geological Survey, this was the last geological problem that remained to be solved in Great Britain. The borehole had no commercial objectives. The company was funded by private gentlemen (Including one C Darwin) with subventions from the Royal Society, the Geological Society of London and the British Association for the Advancement of Science.

Two wells were drilled on the crest of the Battle anticline at Netherfield in West Sussex. Both were cored throughout by the Diamond Boring Company. The first well stopped drilling for mechanical reasons at 1018 feet TD. The Kimmeridge Clay had indications of petroleum throughout, smelt strongly of petroleum, was often brown in colour and burned with a brilliant flame. A second well drilled nearby reached 1905 feet, having drilled though the Kimmeridge Clay and penetrated the Coral Rag. Cores of the Kimmeridge Clay were extensively fractured. Some fractures were cemented with calcite; others were open and saturated with oil. Subsequently while measuring the bottom-hole temperature a naked light was injudiciously lowered down the hole. This resulted in an explosion of shale gas1.

In 1976 the US Department of Energy initiated the Eastern Gas Shales Project at a cost of some $70 million. This work evaluated geology, geochemistry, exploration and production. At that time the only shale gas production in the USA (indeed in the world) was from Devonian and Mississippian (Lower Carboniferous) shales in the Appalachian basin. The US Department of Energy reports[2] led to the establishment of the Gas Research Institute (Later Gas Technology Institute) and also stimulated research at Imperial College, London, into an evaluation of UK shale gas resources.

CLOSING THE GAP

Plate-tectonic reconstruction of the Atlantic Ocean implied that the Appalachian basin and fold belt extended across the United Kingdom and into mainland Europe (*See maps, Page 6*). At this initial stage, Imperial College research concentrated on the US paradigm of 'cottage industry' operations run by small private operators. It applied the 'Goldilocks' model to the stratigraphic sequence. Old mudrocks, metamorphosed into slate, were too cooked and indurated to produce gas. At the other extreme, shallow un-compacted clays were both too immature to generate gas, and too under-compacted to fracture, naturally or artificially. In between these two extremes there is a 'Goldilocks' interval of shales that are both thermally mature and naturally fractured, (or sufficiently indurated to be artificially fractured).

Several potential shale gas sequences were identified within the British stratigraphic column. In the early 1980s it was generally believed that shale gas could only be generated by the thermal maturation of kerogen beyond the oil win-

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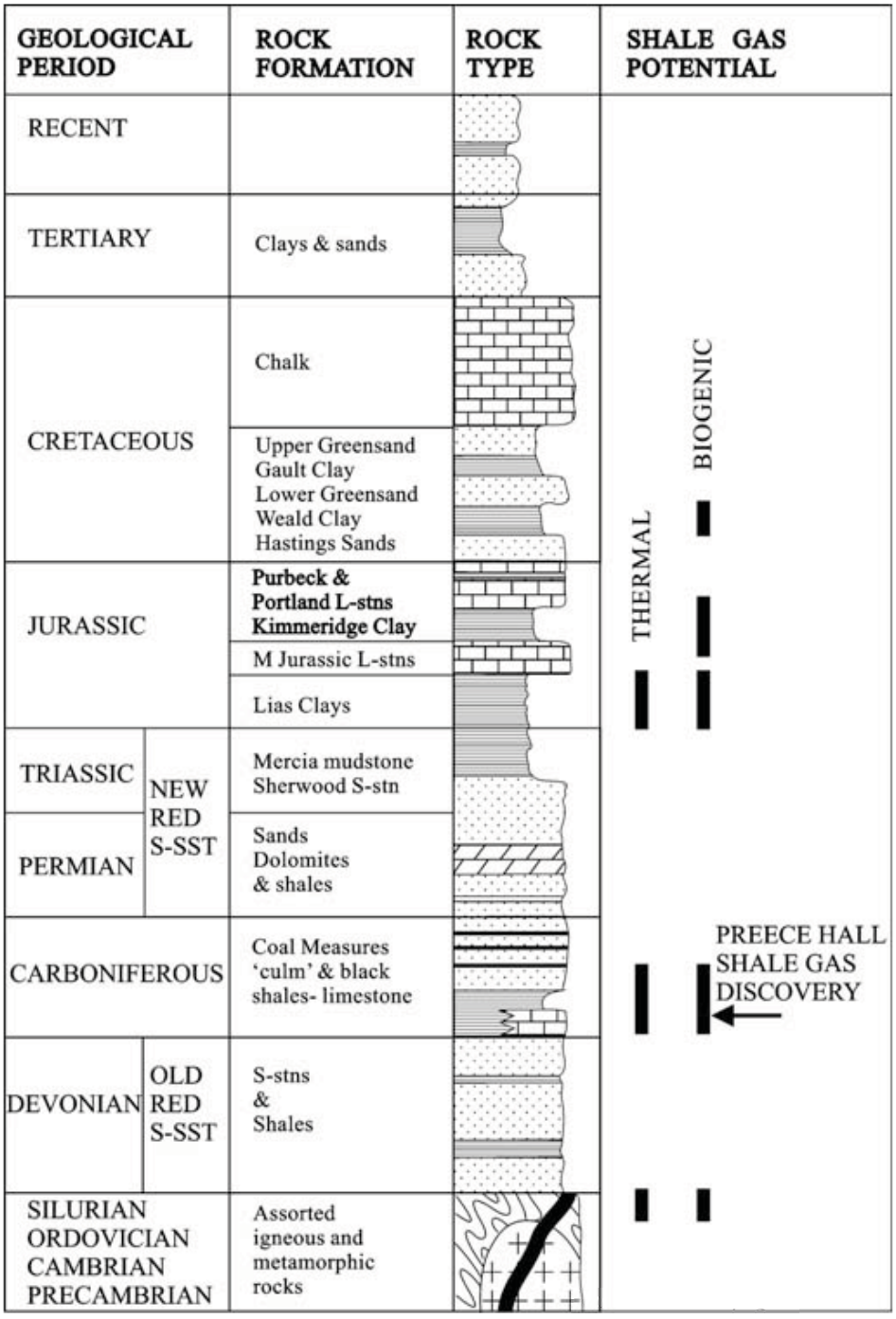

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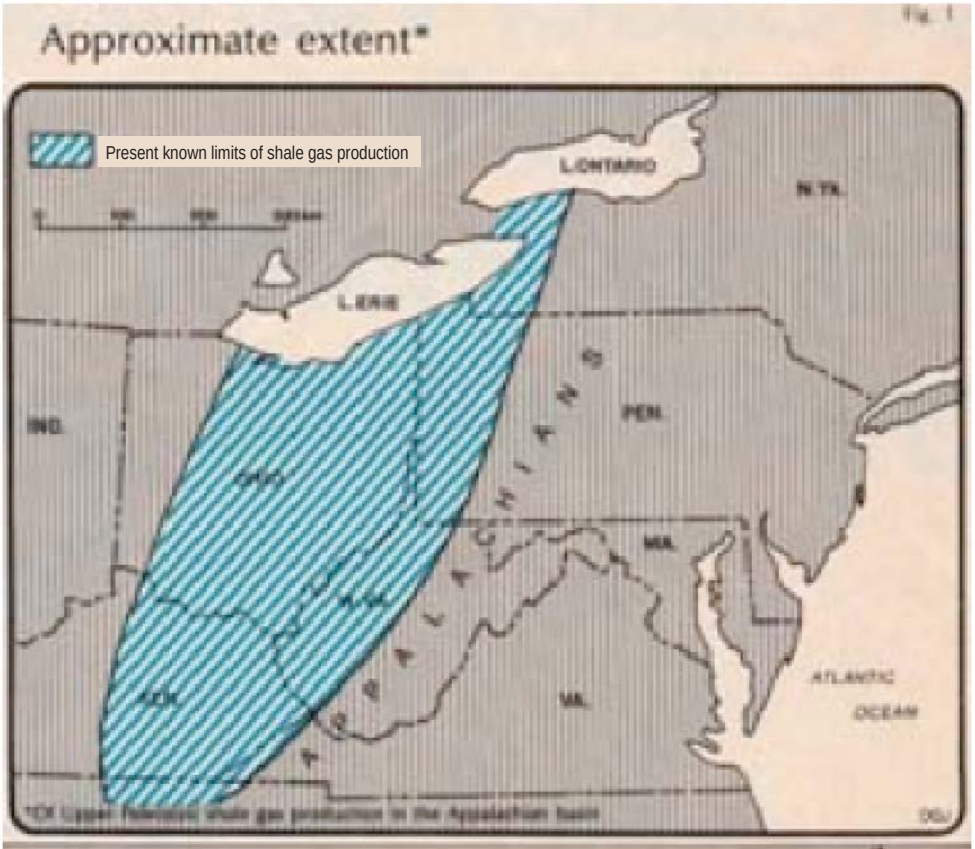

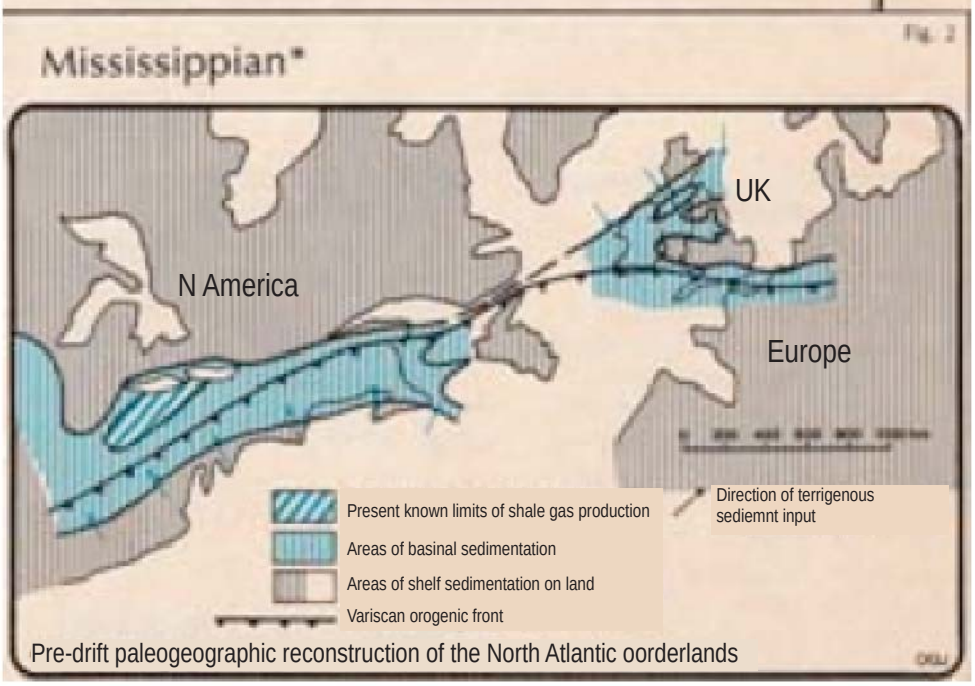

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dow. The study concluded that PreCambrian and Lower Palaeozoic shales were generally too metamorphosed to be potential reservoirs. Most Cretaceous and younger organic-rich mudrocks were deemed too un-compacted to fracture, and too immature to generate gas. Carboniferous shales in general, and Namurian shales in particular, were thought to be ideally suited, both in terms of maturity and in the degree of natural fracturing (*See Stratigraphic Chart*). At that time, profit made by the extraction of petroleum was liable for both Corporation Tax and Petroleum Revenue Tax (introduced 1980). Shale gas production was not economic under this tax regime.

On 8 January 1985 the conclusions of the Imperial College study were presented to the UK Department of Energy. The Department expressed polite interest, but the exempting of shale gas from Petroleum Revenue Tax was a non-starter. Subsequent attempts to inform the wider world of the UK's potential shale gas resources failed miserably. Publication was rejected by several UK journals including Nature and a certain major geological society in London. (One editor returned the manuscript opining Janus-like that the paper was too speculative and contained nothing new.) Finally however, the conclusions of the research were published in the USA[3].

WAGONS ROLL

Meanwhile, back in the USA, the US Department of Energy research set the shale gas bandwagon rolling out from the Appalachians, geographically, stratigraphically and technologically. The Appalachian basin from New York State through Ohio to Kentucky and Illinois was the main historic area for shale gas production. But there was shale gas production in other basins.

In the Williston Basin, for example, the Bakken Shale had produced gas since 1953. Stimulated by the Department of Energy and the Gas Research Institute shale gas plays were found in the Cretaceous Lewis Shale of the San Juan Basin, the Mississippian (Lower Carboniferous) Barnett Shale of the Fort Worth Basin and the Devonian Antrim Shale of the Michigan Basin. The latter play was of particular interest. Geochemical studies revealed that the gas was not thermogenic, but instead produced by bacterial methanogenesis. The bacteria had entered the fractured shale from groundwater, percolating from overlying glacial drift.

This second process for gas generation opened up new areas for exploration - areas where the source-rock was previously considered immature for thermogenic gas generation. The renaissance was enhanced by improved methods of drilling and completion. The ability to drill multiple wells from a single pad was financially and environmentally rewarding. While being able to drill not only vertically, but horizontally, and to steer the bit towards 'sweet spots', enabled permeable gas-charged zones to be tapped into.

Seismic techniques, which could use the fracturing process as an energy source, enabled gas charged 'sweet spots' to be imaged in 3D. More dramatic hydraulic and explosive fracturing techniques were developed. So there is nothing new in artificial fracturing - it has been used in the oil industry for some 60 years, and applied

to hydrogeology since the days of Moses4 and Poseidon (according to the foundation myth of Athens).

NO CHANGE

Meanwhile back in the UK nothing had changed on the shale gas front. Published reviews of the future petroleum potential of the UK by staff of the Oil and Gas Directorate of the Department of Trade & Industry (successor to the Department of Energy) omitted any mention of shale gas resources. The only positive step was the repeal of the Petroleum Revenue Act (1 January 2003). The 6th Petroleum Geology Conference on the Global Perspectives of NW Europe took place at the Queen Elizabeth II Conference Centre, London, in the same year. The three-day programme concluded with a session on non-conventional petroleum. The last presentation was on the shale gas resources of the UK. There were four people in the vast auditorium: one delegate, the session chairman, the speaker and the projectionist. The presentation updated the conclusions of the earlier study of some 15 years before. It applied the advances in US shale gas exploration and production technology to the UK, in particular recognition that gas may have been generated, not only by the thermal maturation, but also by bacterial methanogenesis. New drilling and well completion techniques enabled higher initial flow rates. The presentation was published two years later[5]. More publications on the UK's shale gas potential have now followed [6&7].

Announcement of the UK's 13th round of onshore licensing in 2006 aroused the interest of several companies in applying for shale-gas acreage. In 2008, Wealden Petroleum Development Ltd., on behalf of Eurenergy Resources Inc., were successful in being awarded PEDL 247. This license covered large areas of the Weald, where the potential for shale gas had been recognised in Lower Jurassic (Lias) and Upper Jurassic (Kimmeridge) shales. Island Oil & Gas (IGas), an established Coal-bed methane producer, holds acreage in several areas of the Midlands, notably Point of Ayr. Cuadrilla Resources Corporation holds acreage to test for shale gas in Lancashire and has embarked on a three-well exploration programme. The first well (Preese Hall No 1) was completed in last December. At 0330 on 1 April there was an earthquake of magnitude 2.2 some three kilometres from the well site. Testing has since been halted. A second well is currently (March) being drilled at Singleton. Coastal Oil & Gas have announced plans to drill well to test for shale gas at Llandow (Vale of Glamorgan). Interestingly, with the exception of Cuadrilla, all the other operators are exploring for shale gas in combination with conventional petroleum or CBL. Watch this space[8].

The USA shale-gas boom is now over - prices are now so low as to make further exploration uneconomic US gas reserves are now reportedly oil-equivalent to Saudi Arabian oil reserves. The number of rigs drilling for shale gas is in decline. The new boom is in now applying shale-gas fraccing technology to oil production from the same shale formations, where they have yet to enter the gas generation zone, and are still in the oil window. The Eagleford, Niobrara and Bakken shales are the major targets. The 'land grab' for shale-gas acreage in Europe is also now over, with active ex-

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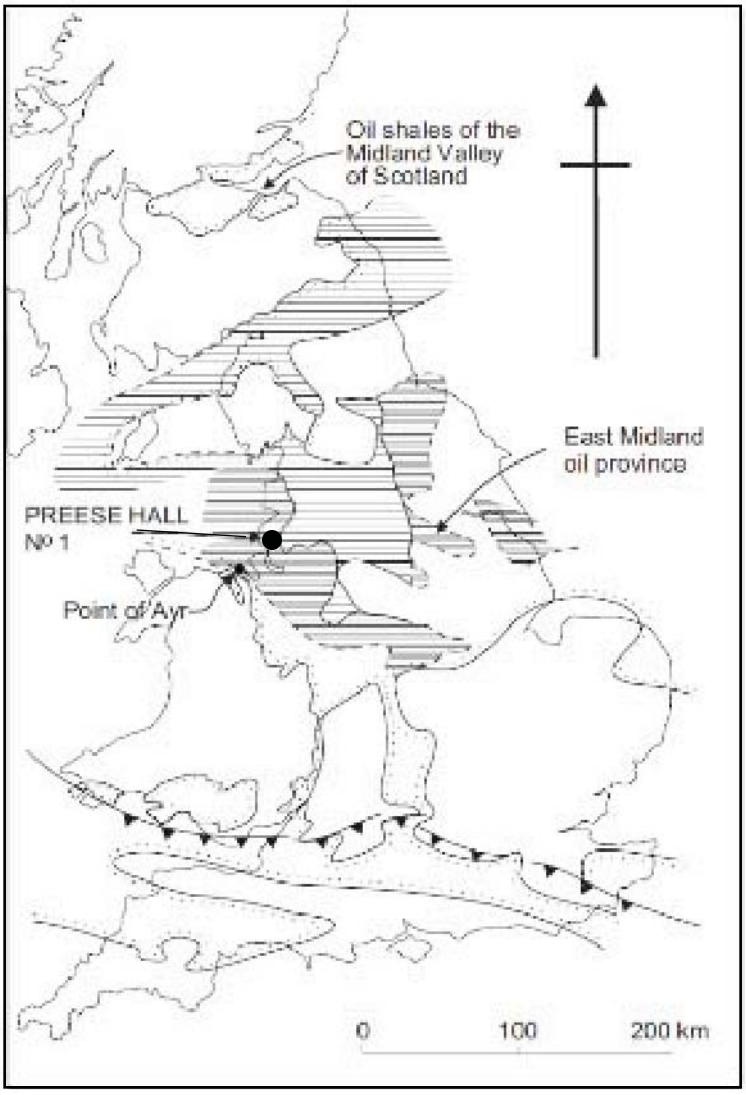

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ploration taking place in Sweden, Poland, Germany France and elsewhere.

OPPOSITION

Shale-gas production is, however, being violently opposed by a range of individuals and organisations. The opposition is led in particular by Josh Fox's film 'Gasland' which is marketed as a "documentary". This contains the astonishing film of ONE Mike Markham, of Weld County, Colorado, setting fire to water emerging from a his bathroom tap. This has nothing whatsoever to do with adjacent shale gas production. The phenomenon was investigated by the Colorado Oil & Gas Conservation Commission in 2008 who concluded that the gas was biogenic methane.

This conclusion was not as exciting as the film clip, and so has passed the media by. In Texas last year there were reports of groundwater contamination by shale gas. The Environmental Protection Agency slapped an emergency protection order on Range Resources production of gas from the Barnett Shale in Parker County. Subsequent investigation revealed, however, that the contamination predated the shale-gas fraccing. The contaminating gas consists of a mix of methane and nitrogen, and nitrogen does not occur in the Barnett Shale gas. It is, however, characteristic of gas from the Paluxy Sands in the much shallower Strawn sequence. These were drilled several years ago and have been producing gas conventionally. A point-by-point rebuttal of these and other allegations made in the Gasland film has been made by the American Natural Gas Alliance[9].

Earlier this year, the Parliamentary Energy & Climate Change Committee launched an inquiry into UK shale gas under the chairmanship of Tim Yeo. Written evidence was submitted by 22 individuals and organisations. These included BGS, The Old Rectory, IGas Energy, CPRE, the Tyndall Centre for Climate Change, Cuadrilla Resources Holdings Ltd., Ofgem, Shell, The Co-op, Friends of the Earth, the World Wildlife Fund, Imperial College - and the Geological Society, naturally. The first hearings were held on 9 February (Imperial College, BGS, the World Wildlife Fund and the Tyndall Centre) and are ongoing at the time of writing.

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