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Sudan and South Sudan sign treaty

Sudan and South Sudan have signed a non-aggression treaty, as part of internationally-led efforts to reduce tensions along their poorly demarcated border, local media reported on Feb 12, 2012. The countries have also set up a monitoring mechanism so that complaints can be registered and dealt with peacefully, according to former South Africa president Thabo Mbeki, who has been leading negotiations between the sides in Addis Ababa on behalf of the African Union. The deal was signed by South Sudan's intelligence chief, Thomas Douth, and his counterpart from Khartoum, Mohammed Atta. Juba last month halted oil production, after the north started seizing shipment to cover what it says are unpaid transit fees, heightening regional tensions.

Landlocked South Sudan must export its natural resources through the north, but the sides cannot agree on a price sharing deal. Sudan lost about two-thirds of its oil production when the south split last year to form the world's newest sovereign state. Both countries depend heavily on oil sales to fill their coffers.

The two countries have also failed to agree on how to share debt responsibilities and where to draw their border. "The moment has come for the leaders of both countries to make the necessary compromises, once again, that will guarantee a peaceful and prosperous future for both nations," UN Secretary General Ban Ki-moon's office said in a statement.

More than 130,000 people have fled three key border regions in recent months, owing to fighting between a militia allied with South Sudan's ruling party and the Sudanese army, according to the United Nations. Khartoum has also been accused of aiding armed groups hostile to the south while conducting aerial strikes inside South Sudan, according to aid groups and Juba.

Sudanese President Omar al-Bashir is also wanted by the International Criminal Court in The Hague for alleged war crimes in the restive Darfur region in the country's west, where a low-level conflict, ongoing since 2003, is still simmering.

Al-Bashir has warned that tensions with South Sudan could lead to a new war. The south became independent in July 2011 after decades of conflict.

54th Annual Grammy Awards

54th Annual Grammy Awards were held on February 12, 2012, at the Staples Center in Los Angeles being broadcast on CBS. LL Cool J hosted the show. It was the first time in seven years that the event had an official host.[1] Nominations were announced on November 30, 2011 on prime-time television as part of "The GRAMMY Nominations Concert Live! – Countdown to Music's Biggest Night", a one-hour special broadcast live on CBS from Nokia Theatre at L.A. Live. Kanye West received the most nominations with seven. Adele, Foo Fighters, and Bruno Mars each received six nominations. Lil Wayne, Skrillex, and Radiohead all earned five nominations.

A total of 78 awards were presented following the Academy's decision to restructure the Grammy Award categories. Paul McCartney received the MusiCares Person of the Yearaward on February 10, 2012, at the Los Angeles Convention Center, two nights prior to the Grammy telecast.

On February 8, 2012, the Academy announced that the 54th Grammy Pre-Telecast Ceremony would stream live internationally. The ceremony took place at the Los Angeles Convention Center and was streamed live in its entirety internationally at Grammy's official website and CBS Television Network. The ceremony was co-hosted by Dave Kozand MC Lyte. A total of 68 awards were presented in the Pre-Telecast ceremony. The official poster was designed by Architect Frank Gehry.

The night before the awards, Whitney Houston died in Los Angeles, and show producers quickly planned a tribute, with Jennifer Hudson performing a tribute, Houston's I Will Always Love You. The awards show began with a Bruce Springsteen performance followed by an LL Cool J prayer for Whitney Houston. Adele won all of her six nominations, tying Beyoncé's record for most wins by a female artist in one night. Foo Fighters and Kanye West followed with five and four awards, respectively.

Nominees and winners

The winners per category were:

General

Record of the Year

"Rolling in the Deep" – Adele

Paul Epworth, producer; Tom Elmhirst & Mark Rankin, engineers/mixers

- "Holocene" – Bon Iver
- Justin Vernon, producer; Brian Joseph & Justin Vernon, engineers/mixers
- "Grenade" – Bruno Mars
- The Smeezingtons, producers; Ari Levine & Manny Marroquin, engineers/mixers
- "The Cave" – Mumford & Sons
- Markus Dravs, producer; Francois Chevallier & Ruadhri Cushnan, engineers/mixers
- "Firework" – Katy Perry
- Stargate & Sandy Vee, producers; Mikkel S. Eriksen, Phil Tan, Sandy Vee & Miles Walker, engineers/mixers

Album of the Year

***21* – Adele**

Jim Abbiss, Adele Adkins, Paul Epworth, Rick Rubin, Fraser T. Smith, Ryan Tedder & Dan Wilson, producers; Jim Abbiss, Philip Allen, Beatriz Artola, Ian Dowling, Tom Elmhirst, Greg Fidelman, Dan Parry, Steve Price, Mark Rankin, Andrew Scheps, Fraser T. Smith & Ryan Tedder, engineers/mixers; Tom Coyne, mastering engineer

- *Wasting Light* – Foo Fighters
- Butch Vig, producer; James Brown & Alan Moulder, engineers/mixers; Joe LaPorta & Emily Lazar, mastering engineers
- *Born This Way* – Lady Gaga
- Paul Blair, DJ Snake, Fernando Garibay, Lady Gaga, Robert John "Mutt" Lange, Jeppe Laursen, RedOne & Clinton Sparks, producers; Fernando Garibay, Lady Gaga, Bill Malina, Trevor Muzzy, RedOne, Dave Russell, Justin Shirley Smith, Horace Ward & Tom Ware, engineers/mixers; Gene Grimaldi, mastering engineer
- *Doo-Wops & Hooligans* – Bruno Mars
- B.o.B, Cee Lo Green & Damian Marley, featured artists; Dwayne "Supa Dups" Chin-Quee, Needlz & The Smeezingtons, producers;Ari Levine & Manny Marroquin, engineers/mixers; Stephen Marcussen, mastering engineer
- *Loud* – Rihanna
- Drake, Eminem & Nicki Minaj, featured artists; Ester Dean, Alex da Kid, Kuk Harrell, Mel & Mus, Awesome Jones, Makeba Riddick,The Runners, Sham, Soundz, Stargate, Chris "Tricky" Stewart, Sandy Vee & Willy Will, producers; Ariel Chobaz, Cary Clark, Mikkel S. Eriksen, Alex da Kid, Josh Gudwin, Kuk Harrell, Jaycen Joshua, Manny Marroquin, Dana Nielsen, Chad "C-Note" Roper, Noah "40" Shebib, Corey Shoemaker, Jay Stevenson, Mike Strange, Phil Tan, Brian "B-Luv" Thomas, Marcos Tovar, Sandy Vee, Jeff "Supa Jeff" Villanueva, Miles Walker & Andrew Wuepper, engineers/mixers; Chris Gehringer, mastering engineer

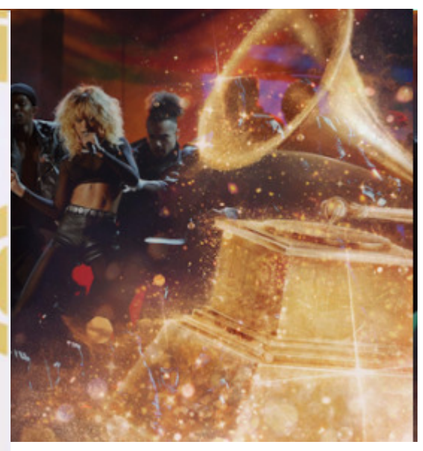
Song of the Year

"Rolling in the Deep"

Adele Adkins & Paul Epworth, songwriters (Adele)

- "All of the Lights"
- Jeff Bhasker, Stacy Ferguson, Really Doe, Kanye West & Malik Yusef, songwriters (Kanye West featuring Rihanna, Kid Cudi &Fergie)

- "The Cave"
- Ted Dwane, Ben Lovett, Marcus Mumford & Country Winston, songwriters (Mumford & Sons)
- "Grenade"
- Brody Brown, Claude Kelly, The Smeezingtons & Andrew Wyatt, songwriters (Bruno Mars)
- "Holocene"



- Justin Vernon, songwriter (Bon Iver)

Best New Artist

Bon Iver

- The Band Perry
- J. Cole
- Nicki Minaj
- Skrillex

Pop

Best Pop Solo Performance

"Someone Like You" – Adele

- "Yoü and I" – Lady Gaga
- "Grenade" – Bruno Mars
- "Firework" – Katy Perry
- "Fuckin' Perfect" – Pink

IATA calls for UN deal to avert carbon trade war

Global airlines called on Sunday for a deal brokered by a United Nations agency to avoid an impasse between China and the European Union over jet pollution spilling into a trade war.

China's decision to order its airlines not to join an EU carbon trading scheme, and the EU's refusal so far to back down on its plans, have wedged airlines between conflicting laws, the head of the International Air Transport Association said.

"This is an intolerable situation which clearly has to be resolved. It cannot go on like this," IATA Director General Tony Tyler told Reuters in an interview. Airlines have called on the EU to abandon a recently launched scheme to charge for emissions and negotiate a global agreement at ICAO, the aviation arm of the United Nations.

"I very much hope of course that we are not seeing the beginning of a trade war on this issue and eventually wiser counsels will prevail," Tyler said.

He also said airlines faced a tough year in 2012 and warned of further airline bankruptcies in Europe or elsewhere if the region failed to resolve its sovereign debt crisis.

A **carbon tax** is an environmental tax levied on the carbon content of fuels. It is a form of carbon pricing.Carbon is present in every hydrocarbon fuel (coal, petroleum, and natural gas) and is released as carbon dioxide (CO_2) when they are burnt. In contrast, non-combustion energy sources—wind, sunlight,hydropower, and nuclear—do not convert hydrocarbons to CO_2. CO_2 is a heat-trapping "greenhouse" gas. Scientists have pointed to the potential effects on the climate system of releasing greenhouse gases (GHGs) into the atmosphere (see scientific opinion on global warming). Since GHG emissions caused by the combustion of fossil fuels are closely related to the carbon content of the respective fuels, a tax on these emissions can be levied by taxing the carbon content of fossil fuels at any point in the product cycle of the fuel.

Carbon taxes offer a potentially cost-effective means of reducing greenhouse gas emissions.From an economic perspective, carbon taxes are a type of Pigovian tax. They help to address the problem of emitters of greenhouse gases not facing the full (social) costs of their actions. Carbon taxes are a regressive tax, in that they disproportionately affect low-income groups. The regressive nature of carbon taxes can be addressed by using tax revenues to favour low-income groups.

A number of countries have implemented carbon taxes or energy taxes that are related to carbon content. Most environmentally related taxes with implications for greenhouse gas emissions in OECD countries are levied on energy products and motor vehicles, rather than on CO_2 emissions directly.

Opposition to increased environmental regulation such as carbon taxes often centres on concerns that firms might relocate and/or people might lose their jobs. It has been argued, however, that carbon taxes are more efficient than direct regulation and may even lead to higher employment (see footnotes). Many large users of carbon resources in electricity generation, such as the USA, Russia and China, are resisting carbon taxation.

Euro Group

The **Euro Group** or **Eurogroup** is a meeting of the finance ministers of the eurozone, i.e. those member states of the European Union (EU) which have adopted the euro as their official currency. It is the political control over the euro currency and related aspects of the EU's monetary union such as the Stability and Growth Pact. Its current President is Jean-Claude Juncker.

The ministers meet a day before a meeting of the Economic and Financial Affairs Council (Ecofin) of the Council of the European Union. This group is related to the Council of the European Union (only eurogroup states vote on issues relating to the euro in Ecofin) and was formalised under the Lisbon Treaty.

The group has no official name, but is colloquially called the "Euro Group" (formerly Euro-X and then Euro-XI in relation to the number of states adopting the euro), was established at the request of France as a policy co-ordination and consultation forum on eurozone matters. The December 1997 European Council endorsed its creation and the first meeting was held on 4 June 1998 at the Chateau de Senningen in Luxembourg .

To begin with, the chair of the eurogroup mirrored that of the rotating Council presidency, except where the Council presidency was held by a non-eurozone country, in which case the chair was held by the next eurozone country that would hold the Council presidency. In 2004 the ministers decided to elect a President (see "President" below for details) and in 2008, the group held a summit of heads of state and government, rather than finance ministers, for the first time. This became known as the Euro summit and has had irregular meetings during the financial crisis.

Since the beginning of the monetary union, its role has grown in regards to the euro's economic governance. The fact the group meets just before the Ecofin council means it can pre-agree all Ecofn's decisions that on Eurozone affairs. In 2009 the Lisbon Treaty formalised the group and its president.

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Weekly Current Affairs

Africa Cup of Nations 2012: Ivory Coast on Verge of a Perfect Tournament

The Ivory Coast will easily handle Zambia and cap off an impressive and thoroughly dominant Africa Cup of Nations.

They started off this tournament as the favorites, and they will end as champions. And despite not quite achieving their ultimate goal, this has still been a successful run.

Unlike their upcoming opponents, Zambia was not expected to contend for this title. They have paved an upset path to reach the finals, but they simply don't have the talent to seal the deal. The elephants are a perfect 5-0 in this tournament, but that is not their only perfect number. They have yet to allow a goal while netting nine of their own. They have a talented front line and an impressive defense. Drogba has been leading the goal scoring charge, and he is joined by fellow Premier League players Gervinho, Yaya and Kolo Toure.

The fact that they are pitching a tournament shutout puts them in rare company. Only two other sides have won this tournament without yielding a goal.

Cameroon accomplished the feat in 2002, and the Ivory Coast did so in 1992, which is their only Africa's Cup winning run.

This talented team is going to overwhelm Zambia. They will be able to control possession, keep the ball on Zambia's side of the field and dictate the tempo.

U.S. and EU Clear Google's Motorola Buy

Google Inc.'s $12.5 billion acquisition of smartphone and tablet developer Motorola Mobility Holdings Inc. received antitrust clearance Monday from the U.S. Justice Department and the European Union, but regulators said they will monitor how Google and others use essential patents in the wireless industry.

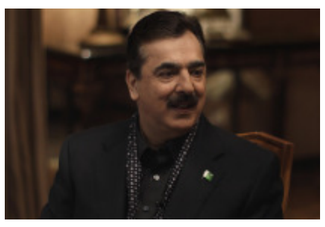
The Justice Department also cleared a second tech-patent deal Monday that has raised antitrust concerns in the smartphone industry. It will allow a group of tech companies, including Apple Inc., Microsoft Corp. and Research In Motion Ltd. to acquire a trove of patents from bankrupt Canadian telecom-equipment maker Nortel Networks Corp. for $4.5 billion.

Pakistan Supreme Court likely to decide Gilani's fate today

Pakistan's embattled Prime Minister Yousuf Raza Gilani will appear before Supreme Court on Feb 13, 2012 to face contempt charges that could decide his fate and plunge the country into a fresh political turmoil over his refusal to reopen graft cases against the President.

Dealing a major blow to Gilani, 59, Pakistan's apex court headed by Chief Justice Iftikhar Chaudhry on Friday had rejected his appeal against framing of contempt charges over his failure to act on its repeated orders to revive cases of alleged money laundering against Asif Ali Zardari in Switzerland.

Gilani personally appeared in the court when it took up the contempt case on January 19 and said the government could not reopen the cases against the President because he enjoys complete immunity in Pakistan and abroad



Refusing to buy his arguments, the court told Gilani that he had no option but to write to Swiss authorities to revive graft cases against Zardari as no one was above the law.

Insiders in the ruling Pakistan People's Party on Sunday said the premier is expected to stick to this position when he appears in court again.

If Gilani is convicted, he could be imprisoned for six months and face possible removal from office after being disqualified from holding public office for five years.

However, legal experts pointed out that the President had the power to pardon him after his conviction. SM Zafar, a noted lawyer and parliamentarian, said such a presidential pardon would apply only to the punishment handed down by the court while the conviction would remain on record.

Therefore, the premier could be disqualified despite the pardon, he remarked.

The apex court has been pressuring the government to reopen the cases since December 2009, when it struck down the National Reconciliation Ordinance, a graft amnesty issued by former military ruler Pervez Musharraf that benefited Zardari and over 8,000 others.

The PPP has been reluctant to act because top leaders believe any action on the cases in Switzerland could give the Supreme Court an opportunity to interpret the constitutional provision related to presidential immunity.

"Once the Swiss cases are reopened, then the court could say it wants to review the President's immunity. And all this will pave the way to launch a 'get Zardari' movement on legal grounds," a PPP leader, who did not want to be named, told.

At the same time, the PPP's top leadership has considered the possibility that Gilani may have to be replaced if the apex court acts against him.

Religious Affairs Minister Khursheed Shah and Defence Minister Chaudhry Ahmed Mukhtar have emerged as possible contenders for the premier's slot if Gilani is disqualified, insiders said.

There is a section in the PPP which believes that any action taken by the Supreme Court against Gilani could boost the party's standing, especially in the premier's home province of Punjab, at a time when its fortunes are at a low.

"People are already saying that the courts have never acted against military dictators and those who violated the Constitution. Imagine what will happen if the court decides to act against the Prime Minister who freed the judges who were detained by Pervez Musharraf," said another PPP leader, who too did not want to be named.

"We are fully convinced that Gilani's sacrifice will give a boost to the party and help lay a strong launch pad for the next election," a presidential aide said.

In an indication of the thinking within the PPP, Gilani told a public meeting in Punjab on Saturday that now the party's leaders, and not the workers, would make "sacrifices".

Legal expert SM Zafar, however, said it would be "bad for the country" if the premier is punished by the apex court.

The court could also issue an order that whoever occupied the post of premier, in the event of Gilani's possible removal, would have to write to Swiss authorities to revive the corruption cases against Zardari.

Such a move, Zafar said, could lead to more tensions between the government and the judiciary.

Such fears have prompted some of the PPP's allies in the ruling coalition to suggest that the government should act on the court's orders, sources said.

During the hearing on Gilani's appeal, the court had said that USD 60 million that were allegedly laundered will come back to Pakistan only if the letter is written to Swiss authorities.

Gilani is expected to take the PPP's allies into confidence about his strategy for the contempt proceedings in the apex court, party insiders said.

Within the PPP, no leaders have differed with the top leadership's decision not to reopen the cases in Switzerland, they said.

Kamil Ali Agha of the PML-Q, a key ally of the PPP, said his party did not want a clash of state institutions.

"There should not be a clash between the government and the judiciary as all institutions should work within their constitutional ambit," he said.

Rupert Murdoch launch "Sun on Sunday" newspaper

Rupert Murdoch has told staff at the Sun newspaper in London he will launch the Sun on Sunday tabloid. The News Corporation boss, 81, offered his support to Sun journalists at News International's offices in Wapping.Ten current and former senior staff at the paper have been arrested since November in connection with alleged corrupt payments to public officials. Mr Murdoch lifted all staff suspensions pending police inquiries, a move Labour MP Chris Bryant called "cynical".

The high-profile campaigner against and victim of phone hacking, said the decision to lift the suspensions was hypocritical. "It is massively premature because one would have thought the Murdoch empire would want to wait until Leveson had completed his inquiry and the police and prosecuting authorities had completed their investigations," he said.

"**News International** has tirelessly campaigned for people who have been charged to be suspended from public office and yet journalists who have been charged at News International are apparently not going to be suspended."

Mr Bryant was awarded £30,000 in damages after his phone was hacked by the now defunct News of the World (NoW). Lord Justice Leveson's ongoing inquiry is examining press standards and ethics.

It has been suggested that the bail conditions of the arrested Sun journalists might prevent them from returning to work, but a News International spokeswoman confirmed there were no conditions affecting the staff.

Mr Murdoch arrived on a private plane at Luton Airport from the US on Thursday evening and was taken to Wapping in a vehicle with blacked-out windows.

The meeting followed anger at the way in which the News Corporation's management and standards committee - set up to investigate allegations of wrongdoing - passed on information to the police.

But Labour Leader Ed Miliband said it was right that News International had provided evidence to the police that led to the arrests. "Of course News International should be co-operating with the police. If the company had co-operated with police years ago, we would not be in "this mess", he added.

Last year News Corporation closed the NoW over impropriety.

Revelations that staff employed by the newspaper hacked the phones of public figures prompted the closure of the 168-year-old publication. The National Union of Journalists has said news organisations have a duty to protect their sources, and is considering a legal challenge to the company.

General secretary Michelle Stanistreet (NUJ) told Mr Murdoch could have stemmed the "huge anger and frustration" by calling off the committee and acknowledging its action had been a "huge mistake". "It's done a huge disservice to press freedom because we have a situation now where confidential sources have been betrayed... it's been handled so badly," she said. Media commentator Steve Hewlett said Mr Murdoch was facing the kind of "ructions" in his company he had never seen before. "What he's trying to say to the people here is 'look we really are on the same side', but the fact is he is between a rock and a hard place and these are both of his and his company's own making," he said.

Europe's first Vega rocket blasts off successfully

Europe's first Vega rocket blasted off from French Guiana Monday in a successful inaugural flight aimed at giving Europe a vehicle for scientific satellite missions.

The rocket took off from the European Space Agency's launch site in Kourou, French Guiana, on the northeast coast of South America at 7 a.m. local time (5 a.m. ET), with nine scientific satellites on board.

Its main payload, the LARES satellite that will test aspects of Einstein's general theory of relativity, separated from the rocket 55 minutes later.

Vega will complement the family of rockets currently available for launch from Guiana — the Ariane 5 heavy-lift launcher introduced in 1996; and the Soyuz, a medium-class launcher.

"A new member of the (European) launcher family has been born," ESA Director General Jean-Jacques Dordain said after the 90-minute orbital operation.

"Today is the first day of a new operational life which we hope will be a long and successful one. Vega is a launcher that is necessary for ESA," Dordain said.

Vega's maiden launch follows years of delays and budget disputes since it was proposed in the mid-1990s. ESA decided to back the rocket in 2003.

They argued that a rocket for small satellites fulfilled a niche market, and that rockets for those satellites would be scarce.

Most rockets from the former Soviet Union are based on stages of ballistic missiles that are no longer in production.

American competitors in this segment have encountered problems. SpaceX — the brainchild of PayPal founder Elon Musk — has pulled resources from its Falcon 1e rocket to concentrate on its heavier Falcon 9. Only one Falcon 1e launch in 2015 is now scheduled. Taurus XL, launched by Virginia-based Orbital Sciences Corp., has suffered two failures since 2009.

$1.3 billion to develop

In a break from previous European rocket programs that were heavily financed by France, Vega's development price tag of more than 1 billion euros ($1.3 billion), including inaugural flights, has been 60 percent financed by Italy.

Rome-based ELV SpA, a joint venture company between Italian rocket-propulsion manufacturer Avio and the Italian space agency ASI, is Vega's prime contractor.

In French Guiana, Vega's launchpad is on the site of the Ariane 1 rocket put into service in 1979.

Using an already cut and concreted area of jungle saved between 50 and 100 million euros ($66 million to $132 million). .

Vega stands 30 meters (98 feet) tall and consists of three solid propellant stages and a Ukrainian-built restartable liquid propellant upper stage. ESA is expected to ask member states for permission to upgrade Vega and replace the liquid stage with a new version built in Germany.

Monday's flight qualified Vega, and future Vega flights and contracts will be handled by the Arianespace commercial launch consortium.

Arianespace chief executive Jean-Yves Le Gall said: "We are off to a good start as we've already signed two commercial launch contracts to launch [satellites] aboard Vega."

China Limits Foreign-Made TV Programs

In its latest move to reshape what Chinese viewers can watch on television, the government agency that oversees mass media has issued a new set of regulations that seek to restrict comedies, dramas and movies from abroad.

The new regulations, announced Monday, ban all imported programs during prime time and limit such shows to no more than 25 percent of a channel's offerings each day, according to a circular posted by the State Administration of Radio, Film and Television. Stations that violate the rules will be hit with increased fines, although the announcement did not provide details.

In the past year, the agency has sharply reducedentertainment and reality programming, eliminated advertising from the middle of dramas and banned shows employing time travel as a plot device.

Popular talent shows like "Super Girl" have been yanked, while racy dating shows like "If You Are the One" have been forcibly imbued with socially salubrious values.

Although Communist Party leaders have lately sought to bolster Chinese culture at home and abroad, and President Hu Jintao wrote last month about the West's potentially pernicious effect on the nation, the latest rules were aimed at giving the domestic television industry a leg up on Asian competition.

China Daily, the state-run newspaper, said the new rules were intended to create "a favorable environment for TV shows made by companies on the Chinese mainland." Of the 30 imported shows that were approved last year by mainland regulators, most originated in Hong Kong, Taiwan and South Korea, according to the agency's Web site. Western programming is almost nonexistent on Chinese television.

The new rules, like those before them, seek to micromanage what viewers encounter on their television sets. One limits trailers for imported shows to less than three minutes, while another seeks to prevent any one country or region from dominating the airwaves, though the wording was vague on how that would be determined. One rule capping foreign-made series at 50 episodes may be focused on the sprawling South Korean soap operas that have enraptured so many Chinese viewers.

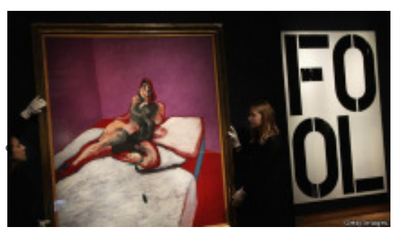
Even as many people in mainland China have long given up on television or turned to the Internet and pirated DVDs for popular entertainment, users of the microblog service Sina Weibo reacted with a collective groan on Tuesday. "Banning time travel and then dating shows and then imported shows," one person complained. The agency "wants us all to go to bed early."

Another person wrote, referring to the agency: "They should really put Sarft in charge offood safety and have the State Food and Drug Administration regulate TV shows — that way we'll have safe food and good entertainment."

Some television producers and film directors fret that the increasing number of rules will keep driving audiences away. These days, anyone with an Internet connection can log on to the Chinese Web site Youku and watch hundreds of television shows and films from the United States, Singapore and beyond.

Francis Bacon work sells for over •25m

A painting by Irish-born artist Francis Bacon has been sold at Christie's in London for over •25m.



A painting by Irish-born artist Francis Bacon has been sold at Christie's in London for £21.3m (•25.36m).

The Portrait of Henrietta Moraes had been in the hands of a private collector for 30 years and unseen in public for 15 years.

The price exceeded expectations, making the painting the second

most valuable work of post-war contemporary art ever sold at the auction house, behind another Bacon work, Triptych, which sold in 2008 for just over £26.3m (•31.3m).
The 'Portrait of Henrietta Moraes' was painted in 1963 and was sold to an anonymous bidder at last night's sale.
The price was more than £1m higher than the top estimate.

UK and France sign nuclear energy agreement

The UK has signed a deal with France to strengthen co-operation in the development of civil nuclear energy. The government said it reiterated the UK's commitment to nuclear energy "as part of a diversified energy mix".
The coalition said the agreement would create a number of commercial deals in the nuclear energy field, worth more than £500m and creating 1,500 UK jobs.
The deal was signed at a summit between PM David Cameron and President Nicolas Sarkozy in Paris.
'Joint framework'
"This joint declaration will signal our shared commitment to the future of civil nuclear power, setting out a shared long term vision of safe, secure, sustainable and affordable energy, that supports growth and helps to deliver our emission reductions targets," a statement from Downing Street said.
The two governments will work together with the International Atomic Energy Agency (IAEA) "to strengthen international capability to react to nuclear emergencies and establish a joint framework for cooperation and exchanging good practice on civil nuclear security".
The move comes 11 months after a tsunami in Japan wrecked the nearby Fukushima Daiichi nuclear plant, leaking radioactive material into the air and sea.
UK and French public and private sector bodies in the civil nuclear power industry will also work more closely in a number of areas.
These include education and training, research and development, and security.
"As two great civil nuclear nations, we will combine our expertise to strengthen industrial partnership, improve nuclear safety and create jobs at home," said Mr Cameron.
Eight sites
Last June, ministers announced plans for the next generation of UK nuclear plants.

The government confirmed a list of eight sites it deems suitable for new power stations by 2025, all of which are adjacent to existing nuclear sites.
The sites are: Bradwell, Essex; Hartlepool; Heysham, Lancashire; Hinkley Point, Somerset; Oldbury, Gloucestershire; Sellafield, Cumbria; Sizewell, Suffolk; and Wylfa, Anglesey.
Rolls-Royce is expected to win a £400m ($632m) share in the building of the first of the planned power plants.
France's Areva will supply the core of the nuclear reactors and Rolls-Royce will supply other engineering work.
"Rolls-Royce will become our prime manufacturing partner to supply some £100m of key critical components of the reactor for each EPR [next generation nuclear power plant] that's constructed in the UK," said Robert Davies from Areva UK.
Rolls-Royce plans to build a factory in Rotherham to meet orders resulting from the deal.
Earlier this month, the US Nuclear Regulatory Commission approved the first nuclear reactors to be built in the country since 1978.

German President Wulff quits over corruption claims

German President Christian Wulff has announced his resignation, after prosecutors called for his immunity to be lifted.
An ally of Chancellor Angela Merkel, Mr Wulff, 52, stepped down over corruption claims involving a dubious home loan. He denies any wrongdoing.
Mrs Merkel cancelled a visit to Italy on Friday to deal with the crisis, and said she regretted that he had quit.
German media say the crisis is unprecedented in post-war Germany.
Mrs Merkel had fought to get Mr Wulff, from her centre-right Christian Democrat party (CDU), appointed as president. He had been in the job for less than two years.

Rough seas slow PNG ferry rescue effort

Rough seas are slowing rescue efforts for as many as 130 people

missing after the ferry MV Rabaul Queen sank off the east coast of Papua New Guinea.
Authorities have confirmed that 219 survivors have been pulled from rough seas between PNG's second largest city, Lae, and New Britain after their ferry sank this morning.
But rapidly diminishing light and poor weather mean the search is likely to be put on hold until Friday.
"It is hampering efforts," said the rescue coordinator and acting CEO of PNG's National Maritime Safety Authority, Captain Nurur Rahman.
"We cannot transport people from the four (rescue ships) to smaller ships and then to Lae."
He said he was waiting on confirmation that another 13 people had been found alive, and said there were few signs of injuries among survivors.
However, he was hopeful of finding more survivors in the coming days.
"I'm always hopeful," he said.
"People have survived up to two days in these waters. We have warm waters."
However, one survivor was exhibiting signs of hypothermia and another had a dislocated shoulder.
The Australian Maritime Safety Authority said 219 people had been rescued and taken aboard some of the six merchant vessels that were directed to the disaster site by maritime authorities.
PNG awoke to news that as many as 350 people might have perished when the ship went down as it travelled from Kimbe in New Britain to Lae, PNG's second largest city, about 6am (AEST).
PNG Prime Minister Peter O'Neill said he had received a phone call from Australian High Commissioner Ian Kemish, who pledged Australia's support.
Australia sent several aircraft to the area where the ferry went down.
"Our sympathies go out to the families," Mr O'Neill said.
"We need to bring some safety measures back into this industry."
The ship went down in what's understood to be extremely bad weather.
Australian Foreign Minister Kevin Rudd said Australia stood ready to help in any way it could.
"I spoke to my counterpart, PNG Foreign Minister Ano Pala, earlier today to inform him that Australia stands ready to offer all necessary assistance," Mr Rudd said in a statement. The Australian Maritime Safety Authority (AMSA) arranged for ships in the area to conduct rescues and for aircraft to fly over the area.
The aircraft will assist with dropping rescue equipment, including life rafts.
The Australian High Commission in Port Moresby is still trying to confirm whether any Australians were on the vessel.
The Department of Foreign Affairs and Trade said the shipping company had advised them there were unlikely to be any foreigners on board.
Prime Minister Julia Gillard earlier said there was likely to be a very high loss of life from the tragedy.
"This is obviously a major tragedy," she said.
"We have been asked to provide assistance to PNG and we are providing assistance to PNG."
The opposition said it supported the government's decision to help in the search for survivors.
"It is vital that every effort is made to locate and rescue any of the people in the water," foreign affairs spokeswoman Julia Bishop said.
"The coalition extends its sympathies to the families of those on board the MV Rabaul Queen and extends its support to the efforts of PNG and Australian rescuers."

India court scraps telecom licences in graft row

India's Supreme Court scrapped 122 telecom licences awarded in a 2008 sale at the centre of a corruption scandal, further embarrassing

the government and causing upheaval in the flagship sector.
Mis-selling of the second-generation (2G) mobile licences was estimated by the country's public auditor to have cost the treasury up to $40 billion in lost revenue.
The minister in charge of the sale, A. Raja, is currently on trial accused of fraud and cheating, one of several corruption cases to have buffeted the government of Prime Minister Manmohan Singh.
While the cancellation order reopens a damaging episode for the government, there was a reprieve for Home Minister P. Chidambaram who activists had wanted investigated by a special court trying suspects in the case.
The Supreme Court declined to rule on the issue, saying it was up to the special court to decide if there was evidence against Chidambaram, who was finance minister at the time of the 2008 sales.
Raja, a member of the DMK, a regional party in the Congress party-led national coalition, is suspected of rigging rules over the sale of the licences to favour some firms in return for kickbacks.
Lawyer Prashant Bhushan, who brought the case to the Supreme Court, welcomed the cancellations and fines of up to $1 million for the telecom firms involved.
"This is a historic judgement for the reason that now these companies which were the beneficiaries of these illegal licences... will have to effectively refund the benefit," he told reporters.
He added that it would send a "strong signal" to dissuade corrupt corporations and public officials from conspiring together.
Justice G.S. Singhvi told the New Delhi court the Telecom Regulatory Authority of India would make recommendations about a fresh auction within four months.
Among the companies affected are Tata Teleservices, Dubai-based joint venture Etisalat DB, and Uninor, a joint venture between Norway's Telenor and India's Unitech.
All three companies were handed fines of 50 million rupees ($1 million) as they had "benefited by a wholly arbitrary and unconstitutional action taken by the DoT (Department of Telecommunications)", the court ruling said.
Uninor said it was "shocked" at the penalty, adding "we have been unfairly treated as we simply followed the government process we were asked to".
Graft has become a hot political issue in India due to high-level scandals such as the so-called "2G scam" and contracts awarded for the 2010 Commonwealth Games in Delhi, as well as a street-level campaign by activist Anna Hazare.
Hazare galvanised millions of people last year when he held a 12-day anti-corruption hunger strike in New Delhi that triggered huge rallies of supporters across the country.
Many Indians complain that corruption is part of daily life for transactions ranging from getting a driving licence to property sales. Graft is also seen as a major deterrent to international investment in India.
"This decision has multiple ramifications for the telecom sector, India's image as a destination for foreign investment and a political impact for the ruling Congress," said Jigar Shah, head of research with Kim Eng Securities.
The prime minister, who previously enjoyed a blemish-free reputation, has vowed to tackle the problem but his efforts to pass an anti-corruption law failed in December due to political wrangling.
The failure was a further blow to Singh, whose administration also had to withdraw major reforms late last year to allow foreign supermarkets to operate in India.
Kapil Sibal, the current telecoms minister, pinned the blame for the 2G scandal firmly on Raja, who denies all charges, and said the prime minister was "in no way responsible".
Sibal said the court decision would bring clarity to the telecoms sector, which had "greatly suffered because of this period of uncertainty".
But Hemant Joshi, a partner at accountants Deloitte, said the scam would "open a can of worms" and add to industry nervousness.
The latest set-back for the government comes amid a flurry of local elections, including one starting next week in Uttar Pradesh, India's biggest state where Singh's party was hoping to make gains.

Samsung shifts to new TV technology with LCD spin off

South Korea's Samsung Electronics Co, the world's biggest maker of televisions, is shifting its focus

towards new generation OLED display technology, and said it will spin off its loss-making LCD flat-screen business into an affiliate.
The outlook for liquid crystal display TVs has dimmed as shoppers in developed markets have traded in their bulky cathode-ray tube TVs for flat screens, and competition has intensified from low-cost Chinese manufacturers.
Annual global sales of LCD TVs will contract by 8 percent to $92 billion by 2015, flat panel industry research company DisplaySearch has forecast, while the OLED display market could top $20 billion by 2018, accounting for 16 percent of the total display industry, up from a current 4 percent.
Japans' Sony Corp agreed to exit its LCD joint venture with Samsung in December, while Sharp Corp said it would halve LCD output for January-March at a plant in western Japan.
Together, Panasonic, Sony and Sharp expect to lose $17 billion this year, highlighting the savaging of Japan's electronics industry, and TV makers in particular, by foreign rivals such as Samsung, weak demand and a strong yen.
Samsung's LCD division made an operating loss of 750 billion won ($666 million) last year.
With TVs becoming smart - linked to other devices like tablets and smartphones - an inability to win in the TV market risks hobbling sales across the Japanese groups' wider consumer electronics line-ups.
SHIFT TO OLED
Provisionally named Samsung Display Co Ltd, the spun-off LCD unit will officially be launched as a new business on April 1, with 750 billion won in capital, Samsung said.
Samsung and others such as rival LG Display Co are shifting to newer organic light-emitting diode (OLED) flat-screen display currently used mainly in high-end smartphones, reckoning this technology will replace LCD in larger-sized panels such as TV screens.
Samsung Electronics said earlier this month it was considering fully taking over Samsung Mobile Display (SMD), its OLED joint venture with its Samsung SDI subsidiary.
SMD is a near monopolistic supplier of OLED displays, which are thinner, more power-efficient and boast better clarity and color contrast than LCD screens.
There has been speculation Samsung could drop a full acquisition of SMD, which may cost 1.6-2.0 trillion won, and instead transfer its LCD business to the OLED maker and receive a significant number of new SMD shares.
In a statement on Monday, the company said it aimed to be more competitive in a rapidly changing market with the new technology and a more streamlined decision-making process.
Shares in Samsung Electronics last traded down 0.1 percent at 1.174 million won ($1,000), after earlier touching an intra-day life high of 1.194 million won.

Water skiers set new world record as 145 people are pulled behind a single boat

Dozens of water-skiers have set a new world record after 145 people were pulled behind a single boat.
Some 154 skiers from around the world gathered in Macquarie Harbour in Strahan on the west coast of Tasmania for the record attempt.
The skiers needed to stay upright for a full nautical mile in order to qualify for the record

Armada: Dozens of water-skiers have set a new world record after 145 people were pulled behind a single boat in Macquarie Harbour in Strahan, Tasmania
But even though nine unlucky participants were unable to last the distance, the 145 who did manage to remain on their skis easily beat the previous record of 114.
That world record was set by the same team in the same place two years ago.
Organisers modified the 114ft-long World Heritage Cruises catamaran Eagle in order for it to drag the small army of water enthusiasts behind it.
The 3,000 horsepower craft was fitted with different propellers and a 308ft-long aluminium boom to prevent the skiers' ropes from tangling.
The youngest entrant, Alexandria Seaton, was just 12 years old.
Perfect weather conditions last Friday helped the record breakers achieve their objective.
The record is expected to be confirmed by Guinness World Records officials, who witnessed the event, in the coming weeks.
On their way: Nine of the 154 participants were unable to last the distance, but the 145 who did manage to remain on their skis easily beat the previous record of 114
Team work: A number of small boats hovered behind the record attempt to pick up those skiers who fell over
Upping the ante: The previous world record of 114 skiers was set by the same team in the same place two years ago

Dead for 32,000 Years, an Arctic Plant Is Revived

Living plants have been generated from the fruit of a little arctic flower, the narrow-leafed campion, that died 32,000 years ago, a team of Russian scientists reports. The fruit was stored by an arctic ground squirrel in its burrow on the tundra of northeastern Siberia and lay permanently frozen until excavated

by scientists a few years ago.
This would be the oldest plant by far that has ever been grown from ancient tissue. The present record is held by a date palm grown from a seed some 2,000 years old that was recovered from the ancient fortress of Masada in Israel.
Seeds and certain cells can last a long term under the right conditions, but many claims of extreme longevity have failed on closer examination, and biologists are likely to greet this claim, too, with reserve until it can be independently confirmed. Tales of wheat grown from seeds in the tombs of the pharaohs have long been discredited. Lupines were germinated from seeds in a 10,000-year-old lemming burrow found by a gold miner in the Yukon. But the seeds, later dated by the radiocarbon method, turned out to be modern contaminants.
Despite this unpromising background, the new claim is supported by a firm radiocarbon date. A similar avenue of inquiry into the deep past, the field of ancient DNA, was at first discredited after claims of retrieving dinosaur DNA proved erroneous, but with improved methods has produced spectacular results like the reconstitution of the Neanderthal genome.
The new report is by a team led by Svetlana Yashina and David Gilichinsky of the Russian Academy of Sciences research center at Pushchino, near Moscow, and appears in Tuesday's issue of The Proceedings of the National Academy of Sciences of the United States of America.

Operation Linda Nchi

Operation Linda Nchi is the codename for a coordinated military operation between the Somalian military, theKenyan military, the Ethiopian military, the French military, and allegedly the United States military that began on an unspecified date in mid-October

2011, when troops from Kenya crossed the border into the conflict zones of southern Somalia. The soldiers were in pursuit of Al-Shabaab militants that are alleged to have kidnapped several foreign tourists and aid workers inside Kenya. According to the EthiopianForeign Minister, the operation represents one of the final stages in the Islamist insurgency of the Somali Civil War.

Former Prime Minister Kevin Rudd resigns as Foreign Minister

Former Prime Minister Kevin Rudd resigns as Foreign Minister after "attacks on credibility".

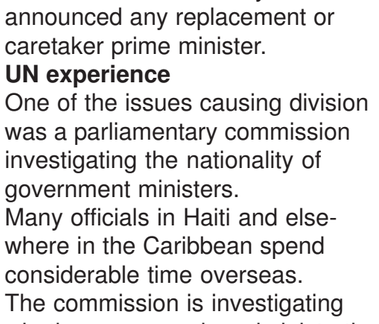
Kevin Rudd has announced this afternoon at a Washington press conference his resignation as Australia's foreign Minister.
Mr Rudd says he'll return to Brisbane on Friday and will make a full statement on his future before parliament resumes on Monday after consulting with family and colleagues.
"While I am sad to leave this office I am sadder still that it has come to this," Mr Rudd said.
He said a number of ministers and "faceless men" had publicly attacked his credibility.
Mr Rudd's decision comes after four days of frantic speculation he was threatening Prime Minister Julia Gillard's authority.
Senior Labor figures had today urged Ms Gillard to bring the leadership to a head.
Mr Rudd said the Australian people regarded the speculation as little more than a soap opera. "They are right," he said.
"Under the current circumstances, I won't be a part of it."
To continue in the job, would mean be distracting for the government, Mr Rudd said.
"The simple truth is I cannot continue to serve as foreign minister if I do not have Prime Minister Gillard's support," he said.
"I therefore believe the only honourable thing, and the only honourable course of action, is for me to resign."
Australia must be governed by the people, not party factions, Mr Rudd said.
"I promise you this - there is no way, no way, that I will ever be part of a stealth attack on a sitting prime minister elected by the people," he said.
"We all know that what happened then was wrong and it must never happen again."
Mr Rudd said it was now up to caucus to decide on the leadership.
"There is one overriding question for my caucus colleagues and that is who is best placed to defeat Tony Abbott at the next election," Mr Rudd said.
"Mr Abbott, I believe, does not have the temperament or the experience to ever be elected to hold the high office of prime minister of Australia."But at present and for a long time now he has been on track just to do that."
Mr Rudd thanked his family for their support.Mr Rudd said he had few options in announcing his resignation overseas.
"The truth is I feel very uncomfortable doing this from Washington and not in Australia," Mr Rudd said.
"But I don't feel like I have a choice given the responsibilities over the days ahead."
Mr Rudd said the ongoing leadership speculation about the federal party was hurting Labor's prospects in the coming Queensland election.
He said the saga was bad for his friend, Queensland premier Anna Bligh.
"I believe the good people of Queensland deserve some clear space over the coming month as they make up their minds on a very important decision on the future of Queensland, my home state," he said.
Mr Rudd's daughter Jessica tweeted: "Effing proud of you, Dad xxxx".
His wife Therese Rein responded: "Me too, Kevin xxxx".
Mr Rudd said he would fly out of Washington on Wednesday and arrive home in Brisbane on Friday morning.
Other Australian officials would replace him at the scheduled international events.
"Under no circumstances do I want Australia's international reputation brought into disrepute because of this ongoing saga," Mr Rudd said.
"Therefore, Ambassador (Kim) Beazley will discharge my functions here on my behalf in Washington tomorrow and the permanent secretary of my department, Dennis Richardson, will represent me in London and in Tunis."
Mr Rudd said he was proud of his department's work to re-engage with Europe, Africa and Latin America, which he labelled the "major economic regions of the future".
He also cited the appointment of Australia's first ever ambassador for women and girls and hoped the government would still honour a commitment to appoint its first indigenous Australian as an overseas ambassador.
He thanked his family - wife Therese and children Jessica, Nicholas and Marcus.
"Chatting to them over the course of the last several hours, I thank them for their encouragement and their support as always," he said.
Mr Rudd said he now had "much, much to do" and ended his press conference without taking questions.

Haiti Prime Minister Garry Conille resigns

The prime minister of Haiti, Garry Conille, has resigned after a power struggle within the government.
His resignation is likely to set back efforts to re-build the country after the January 2010 earthquake which devastated the capital Port-au-Prince.
He was President Michel Martelly's third nomination when appointed in October, ending a long stalemate.
For several weeks there have been reports of power struggles that prompted the UN to intervene.
Mariano Fernandez, the special representative of the UN secretary general in Haiti, said there were "repeated crises" between the parliament, president and prime minister.
"[These] undermine the proper functioning of the institutions and the democratic process," he said.
So far President Martelly has not announced any replacement or caretaker prime minister.
UN experience
One of the issues causing division was a parliamentary commission investigating the nationality of government ministers.
Many officials in Haiti and elsewhere in the Caribbean spend considerable time overseas.
The commission is investigating whether some senior administration officials have dual citizenship, which is prohibited under the constitution.
Mr Conille originally trained as a doctor and had previously worked with the UN.
He was an aide to former US President Bill Clinton when he was a UN envoy to Haiti.
When Mr Conille took office he pledged to create thousands of jobs by attracting foreign investment to help rebuild the country.

Al Qaeda kill 26 as new Yemeni leader is sworn in

"The strength of the explosion shattered glass windowpanes and



doors in buildings near the explosion."
Sanaa, the scene of much fighting in recent months between factions of the army supporting protesters and units loyal to the former leader, was relatively quiet.
After taking the oath, Hadi singled out al Qaeda, whose active Arabian Peninsula branch is based in Yemen, as a top priority for his new administration, saying: "Continuing the war against al Qaeda is a national and religious duty."
The former army general was the sole election candidate to replace Ali Abdullah Saleh, who ruled Yemen for three decades with an iron fist but was pushed out by months of street protests sparked by the Arab Spring.
While the protests and bouts of bloody repression by security forces have subsided, Yemen remains mired in mass poverty, unemployment and corruption, rocked by rebellions in the north and south, and threatened by al Qaeda.
Saudi Arabia and the United States long saw Saleh as the main bulwark against al Qaeda in Yemen, which sits on one of the world's main oil shipping routes, but threw their weight behind a power transfer deal as protests against him grew.
Some 42 percent of Yemen's population of 23 million live on less than $2 per day, fuel and water shortages are chronic and inflation is rampant.
CHAOS
Hadi said in a speech that Yemen must draw a line under a year of protests and violence and turn its attention to economic problems and the job of returning those displaced by the crisis to their homes.
"I stand here at a historic moment ... I look to the Yemeni people and give them thanks. The crisis reached every city and village and house, but Yemen will continue to go forward," Hadi said.
"If we don't deal with challenges practically, then chaos will reign."
Jamal Benomar, U.N. envoy to Yemen, said: "Yemenis want an end to the crisis, and to turn a new page. Now it's time to rebuild, for consensus and concord ... and to bring people into an inclusive political process."
The U.S. ambassador to Yemen, Gerald Feierstein, said: "We are seeing the beginning of a process that I believe will deliver great results over the next two years."
Hadi now has the job of overseeing a two-year political transition that foresees parliamentary elections, a new constitution and a restructuring of the military, in which Saleh's son and nephew still hold power.
An inauguration ceremony is scheduled for Monday. Saleh, who returned to Yemen early after seeking treatment in the United States for injuries suffered in an assassination attempt last year, is due to attend.
After the speech, protesters in the southern city of Aden clashed with security forces, killing a soldier, a local security official said. Two soldiers and two protesters were injured, medics added.

Brawl follows Klitschko's unanimous decision win vs. Chisora

Vitali Klitschko's 10th successful defense of his WBC heavyweight title ended in chaos on Feb 18, 2012, when defeated challenger Dereck Chisora brawled with former WBA champion David Haye at the post-match news conference.

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Chisora found very little support from the sellout crowd of 12,500 after slapping Vitali Klitschko's face at the weigh-in on Friday, and ensured the ill feelings continued when he spat in the 40-year-old's face as the champion's record was being called out before their bout.
"I wanted to knock him out, to be honest," Klitschko said. "Such a cheek."
Wladimir acted as a buffer as Chisora continued to goad his older brother.
Vitali was clearly incensed, but it took some time before he could assert control against the Briton's aggressive approach. His greater reach and experience made the difference.
The judges scored it 118-110, 118-110 and 119-111.
Chisora said after the bout he wanted a rematch, or a bout with Wladimir.
"He won't fight me again. I don't blame you. I wouldn't fight me either," Chisora said.
Klitschko improved his record to 44-2 (40 KOs) with the 10th successful defense of the title he won from Corrie Sanders in 2004.
It was arguably the toughest bout he's had to endure since losing on a technical knockout to Lennox Lewis in 2003.
"I'm not proud of my performance tonight because I feel I let my fans down," Klitschko said.
The Zimbabwe-born Chisora dropped to 15-3 (9 KOs) after his third defeat in his last four fights, but he had the fans in Munich's Olympiahalle worried as Klitschko appeared to tire from his relentless attacks.
Sensing an upset, they chanted the Ukrainian's name in the seventh round before Klitschko reasserted his dominance with a series of precision blows.
Chisora was bleeding from the lip after the first round, but seemed more than capable of taking Klitschko's repeated punishment.
Klitschko eventually took control of the bout in the ninth round, catching Chisora with a huge right and seemingly picking his punches at will.
Chisora was barely hanging on in the 10th.

27th Independent Spirit Awards

The 27th Independent Spirit Awards announced its nominees on November 29, 2011. The winners

were announced on February 25, 2012 during an awards ceremony hosted by Seth Rogen. The Artist wins four awards including best film at the Independent Spirit Awards 2011 held in Santa Monica.

Peru fire destroys Lima school book warehouse

A fire at an educational materials warehouse in Peru has destroyed around 500,000 school textbooks and 60,000 laptop computers, officials say.
Firefighters battled for hours to control the blaze in the capital Lima.
Much of the lost material was intended for primary school children in poor rural areas.
The fire struck a week after the start of the new school year in Peru, but the books had not yet been distributed because of floods in some areas. The losses amount to around 60% of the material for primary school children across Peru this year, officials said.
Most of the computers were low-cost models purchased from the US-based programme, One Laptop per Child. The cause of the fire has not yet been established.
Education Minister Patricia Salas said. "The worst affected are the children in the rainforest regions of Peru, as we had delayed the distribution of textbooks there because of the rains," she added.
The lost materials were valued at more than $100m (£63m).
President Ollanta Humala said he would make sure that replacement books reached school children as soon as possible.

OPINION - EDITORIALS

SSC HANDLED OVER 91 LAKH APPLICATIONS IN 2011-12

Chitra Singh Rajput

The Staff Selection Commission (SSC) held a day long Workshop on Objective Type Multiple Choice Questions in Statistics in New Delhi today. Shri V. Narayanasamy, Minister of State in the Ministry of Personnel, Public Grievances & Pensions and PMO delivered the Inaugural Address. In his address Shri Naraynasamy lauded the work of SSC in ensuring impartiality and objectivity in the selection process and selecting the right candidates for different jobs. He assured all support to strengthen SSC in carrying out its plans for modernization so as to make the selection process faster. This, he felt, had become imperative in view of large number of applications that SSC has to handle. The minister felt that it was appreciable that no complaints were received so far SSC selections were concerned. The Minister asked the commission to have a moderation system so that candidates from the rural background do not suffer because of their social condition.

Chairman SSC, Shri N.K. Raghupathy, in his remarks said that the number of applications received by SSC in the past 3-4 years had gone up substantially. The Commission handled 61.78 lakh applications in 2010-11 compared to 19.64 lakh in 2009-10 and 10.27 lakh in 2008-09. In 2011-12 it had received 91.00 lakh applications as on 22.3.2012. In order to deal with the huge numbers, the Commission has mooted a proposal for A single Common Screening Test for different levels. The aim is to limit the ratio of second stage applications to vacancies. Presently this ratio is 260:1, he added. He further said that despite the large volume, the time taken by SSC to complete recruitment process is 12-13 months, compared to European nations' 18-20 months.

Shri Raghupathy detailed the various measures/initiatives taken by SSC in the recent years to improve efficacy of the Commission. These include:

(i) Restructuring of all examinations and regrouping of posts based on the recommendations of the 2nd Administrative Reforms Commission and an Expert Group constituted with the approval of the Government.

(ii) Revamping of website and its continuous updation with the objective of making the Commission's ten websites the most important source of information relevant to the candidates. The revamped and user-friendly website of the Commission launched in October, 2009 has attracted a viewership 2.20 crore so far and has emerged as one of the largest viewed websites in the Government sector.

(iii) Placing of marks of the candidates at each stage of the examination.

(iv) Placing of answer keys of objective type examinations on the website, inviting objections, consideration of objection of the candidates with the assistance of experts and initiating corrective measures.

(v) All results and marks are placed on the website in PDF format, results on the same day of finalization and marks immediately thereafter.

(vi) Administration of skill tests on computer with no cost to the candidates and introduction of Computer Proficiency Test for certain posts. It is estimated that almost 75% of candidates selected by the Commission in 2010-11 have proficiency or working knowledge of computers.

(vii) Introduction of online applications since February, 2010, to the interest of the candidates and Government. It is estimated that each candidate registering online saves Rs.25 in postal and other costs and the Commission's precious time as application processing is not required and data entry cost of Rs.4 to 5 per application. This has helped in reducing the duration of recruitment cycle too. Approximately 35 lakh applicants have registered online since its introduction and the per centage of online registration has been showing steady increase and touched 50% or above in recent examinations.

(viii) Introduction of measures in the HQ of the Commission for ensuring Zero error tolerance in vital confidential work.

(ix) Introduction of Quality Management Systems in Regional Offices with a view to effect continual improvement in the processes and to improve customer satisfaction levels. All nine Regional Offices of the Commission have obtained ISO 9001 : 2008 Certification for their Quality Management System. Western Regional Office at Mumbai is the last region to obtain the certification in March, 2012.

Examination restructuring and updation of syllabi require a well stocked and continuously replenished Question Bank of objective type question items. Therefore, the Commission has held 10 Question Bank Workshops so far. This is the 11th in the series. Through the Workshops held so far the Commission has added about 40,000 pre-validated objective type questions to its well stocked Question Bank in several subjects.

The Staff Selection Commission has been mandated with recruitment of Group 'C' non-technical and Group 'B' non-gazetted posts in various Ministries/Departments of Government of India and their Attached and Subordinate Offices except those for which recruitment is made by the Railway Recruitment Boards and Industrial Establishments.

The number of applications in the Commission's recruitments and finally successful has increased manifold in the past three years as shown below:-

The number of candidates selected in 2011-12 may exceed 80,000 as some examination results are in the final stage of processing.

The credibility and improved efficiency of the Commission have been appreciated by its client organizations and candidates population as evidenced by the growing popularity of its recruitments. Ministry of Home Affairs has been utilizing the services of the Commission in recent years for recruiting Intelligence Officers, Sub-Inspectors, Assistant Sub-Inspectors (for CISF), Constables (GD)/Riflemen/Sepoy, etc. in the Central Armed Police Forces and A&N Administration. The Commission is also assisting the Food Corporation of India this in recruitment to lower middle levels. A proposal of Ministry of Home Affairs to utilize the services of the Commission for recruitment of Sub-Inspector in Delhi Police has been accepted in principle. A proposal to entrust recruitment of autonomous / statutory bodies to the Commission has also been under consideration of the Commission.

Future of Hydrogen Energy

Hydrogen - a colourless, odourless gas is increasingly gaining attention as a future source of energy free from environmental pollution. Its new use has been found in the automobile and power generation sector. The biggest advantage with hydrogen is that it has the highest energy content per unit mass among known fuels and it burns to produce water as a by-product. It is, therefore, not only an efficient energy carrier but also an environmentally benign fuel as well. In fact, the Ministry of New and Renewable Energy have been supporting a broad based research, development and demonstration (RD&D) programme on different aspects of hydrogen energy for over two decades. Consequently, a National Hydrogen Energy Road Map was prepared in 2005 which provides for various pathways for development of hydrogen energy i.e. production, storage, transport, safety, delivery and applications. However, the current technologies for use of hydrogen are yet to be optimized and commercialized but efforts for the same have already started.

Hydrogen is found only in combined state on earth and therefore its production involves the process of its isolation from its compounds, a process which itself requires energy. Globally, about 96% of hydrogen is produced presently using hydrocarbons. About 4% hydrogen is produced through electrolysis of water. Refineries and fertilizer plants are major in-situ producers and consumers of hydrogen in India. It is also produced as a by-product in chloro-alkali industry.

Hydrogen production falls into three categories: thermal process, electrolytic processes and photolytic processes. Some thermal processes use energy resources while in others heat is used in combination with closed chemical cycles to produce hydrogen from feed-stocks such as water. These are known as "thermo-chemical" processes. But this technology is in early stages of development. Steam Methane Reformation, gasification of coal and gasification of biomass are other processes of production of hydrogen. The advantage with coal and biomass is that both are locally available resources and biomass is a renewable resource too. Electrolytic processes use electricity to split water into hydrogen and oxygen and can even reduce the emission of green house gases emission if the source of electricity is 'clean'.

Hydrogen storage for transportation is one of the most technically challenging barriers to widespread commercialization of this technology. The most common method of storage is in gaseous state in pressurized cylinders, however, it being the lightest element requires high pressures. It can be stored in liquid form in cryogenic systems but would require high amounts of energy. It is also possible to store it in solid state in the form of metal hydrides, liquid organic hydrides, carbon nanostructures and in chemicals. The Ministry of New and Renewable Energy is presently supporting R&D projects in this field.

Apart from using it as a chemical feedstock in industry, it can also be used as a clean fuel in automobile and also for power generation through internal combustion engines and fuel cells. In the field of hydrogen in internal combustion engines, R&D projects for using hydrogen blended compressed natural gas and diesel and development of hydrogen fuelled vehicles are being implemented in India. Hydrogen fuelled motorcycles and three wheelers have been developed and demonstrated in the country. Catalytic combustion cookers using hydrogen as fuel have also been developed. The Banaras Hindu University, BHU has modified commercially available motorcycles and three wheelers to operate on hydrogen as fuel. With a view to provide hydrogen blended compressed natural gas as an automotive fuel, a dispensing station for the same has been set up at Dwarka in New Delhi with partial financial support from the Ministry. This facility provides CNG fuel blended with hydrogen up to 20% in volume in demonstration and test vehicles. A development cum demonstration project for use of H-CNG as fuel in select vehicles (buses, cars and 3-wheelers) is also under implementation. Besides, hydrogen fuelled generator set is being developed by BHU and IIT, Delhi.

Another application of hydrogen energy is the fuel cell, an electrochemical device converting chemical energy of hydrogen directly into electricity without combustion. It is a clean and efficient process of electricity generation. It can be used in UPS systems, replacing batteries and diesel generators. In view of the relevance of fuel cells in automobiles and power generation, several organizations globally are pursuing RD&D activities in this field. Portable applications are also being developed. The present efforts in these fuel cells are focused on reducing its cost and improving its durability. The focus of the Fuel Cell programme of the Ministry of New and Renewable Energy has been on supporting RD&D activities on different types of fuel cells.

EDITORIAL
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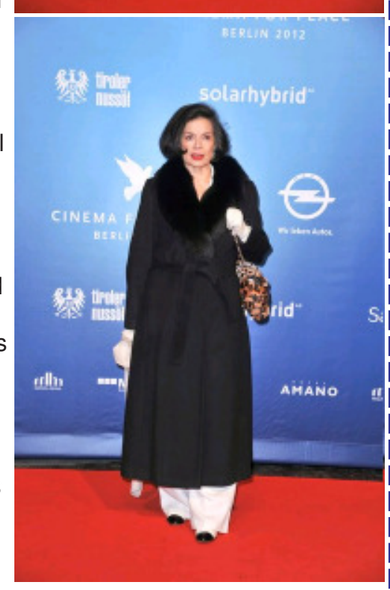
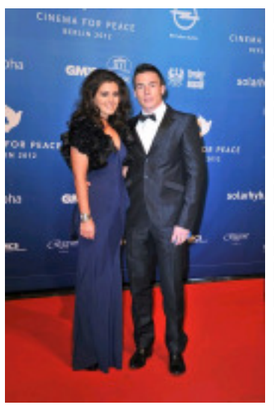
62nd annual Berlin International Film Festival





The 62nd annual Berlin International Film Festival was held from 9 to 19 February 2012. British film director Mike Leigh was the President of the Jury. The first five films to be screened in the competition were announced on 19 December 2011. American actress Meryl Streep was presented with the Honorary Golden Bear on 14 February. Benoît Jacquot's film *Les adieux à la reine* was announced as the opening film. The Golden Bear for Best Film went to the Italian film *Caesar Must Die*, directed by Paolo and Vittorio Taviani.

The following people were announced as being on the jury for the festival:

- Mike Leigh, British film director (Jury president)
- Anton Corbijn, Dutch photographer and filmmaker
- Asghar Farhadi, Iranian film director
- Charlotte Gainsbourg, French-British actress
- Jake Gyllenhaal, American actor
- François Ozon, French film director
- Boualem Sansal, Algerian writer
- Barbara Sukowa, German actress

The following prizes were awarded by the International Jury:

Golden Bear for Best Film: *Caesar Must Die* by Paolo and Vittorio Taviani

The Hollywood Reporter described the outcome as "a major upset". *Der Spiegel* said it was a "very conservative selection." *Der Tagesspiegel* criticised the outcome, "The jury shunned almost all the contemporary films that were admired or hotly debated at an otherwise pretty remarkable festival."[12] Paolo Taviani said "We hope that when the film is released to the general public that cinemagoers will say to themselves or even those around them... that even a prisoner with a dreadful sentence, even a life sentence, is and remains a human being". Vittorio Taviani read out the names of the cast.

Silver Bears

- Jury Grand Prix: *Just the Wind* by Benedek Fliegauf
- Best Director: Christian Petzold for *Barbara*
- Best Actress: Rachel Mwanza for *War Witch*
- Best Actor: Mikkel Følsgaard for *A Royal Affair*
- Silver Bear for Outstanding Artistic Achievement: Lutz Reitemeier for the photography in *White Deer Plain*
- Best Script: Nikolaj Arcel and Rasmus Heisterberg for *A Royal Affair*
- Alfred Bauer Prize for a work of particular innovation: *Tabu* by Miguel Gomes
- Special Award – Silver Bear: *Sister* by Ursula Meier

Honorary Golden Bear

- Meryl Streep

Deep Sea Challenger

Deepsea Challenger (DCV 1) is a 7.3-metre (24 ft) deep-diving submersibledesigned to reach the bottom of Challenger Deep, the deepest known point on Earth. On March 26, 2012, Canadian film director James Cameron piloted the craft to accomplish this goal, becoming the first person to reach Challenger Deep in a one-man craft. Built in Sydney, Australia by the research and design company Acheron Project Pty Ltd, the *Deepsea Challenger* includes scientific sampling equipment and high-definition 3-D cameras, and reached the ocean's deepest point after roughly two hours of descent from the surface.

The *Challenger* expedition of 1872–76 was a scientific exercise that made many discoveries to lay the foundation of oceanography. The expedition was named after the mother vessel, HMS*Challenger*. Prompted by the Scot, Charles Wyville Thomson—of the University of Edinburgh and Merchiston Castle School—the Royal Society of London obtained the use of *Challenger* from the Royal Navyand in 1872 modified the ship for scientific work, equipping her with separate laboratories for natural history and chemistry. The expedition, led by Captain George Nares, sailed from Portsmouth, England, on 21 December 1872. Other naval officers included Commander John Maclear. Under the scientific supervision of Thomson himself, she travelled nearly 70,000 nautical miles (130,000 km) surveying and exploring. The result was the *Report Of The Scientific Results of the Exploring Voyage of H.M.S. Challenger during the years 1873-76* which, among many other discoveries, catalogued over 4,000 previously unknown species. John Murray, who supervised the publication, described the report as "the greatest advance in the knowledge of our planet since the celebrated discoveries of the fifteenth and sixteenth centuries". *Challenger* sailed close to Antarctica, but not within sight of it.

On her 68,890-nautical-mile (127,580 km) journey circumnavigating the globe, 492 deep sea soundings, 133 bottom dredges, 151 open water trawls and 263 serial water temperature observations were taken. Also about 4,700 new species of marine life were discovered.

The scientific work was conducted by Wyville Thomson, John Murray, John Young Buchanan,Henry Nottidge Moseley, and Rudolf von Willemoes-Suhm. The official expedition artist was John James Wild. As well as Nares and Maclear, others that were part of the naval crew included Pelham Aldrich, Lord George Granville Campbell, and Andrew Francis Balfour (one of the sons of Scottish botanist John Hutton Balfour). Also among the officers was Thomas Henry Tizard who had already carried out important hydrographic observations on previous voyages. Though he was not among the civilian scientific staff, Tizard would later help write the official account of the expedition, and also become a Fellow of the Royal Society.

The original ship's complement included 21 officers and around 216 crew members. By the end of the voyage, this had reduced to 144 due to deaths, desertions, being left ashore due to illness, and planned departures.

Challenger reached Hong Kong in December 1874, at which point Nares and Aldrich left the ship to take part in the British Arctic Expedition. The new captain was Frank Tourle Thomson. Second-in-command, and the most senior officer present throughout the entire expedition, was Commander John Maclear. Willemoes-Suhm died and was buried at sea on the voyage to Tahiti. Lord Campbell and Balfour left the ship in Valparaiso, Chile, after being promoted.

The first leg of the expedition took the ship from Portsmouth (December 1872) south to Lisbon (January 1873) and then on to Gibraltar. The next stops were Madeira and the Canary Islands (both February 1873). The period from February to July 1873 was spent crossing the Atlantic westwards from the Canary Islands to the Virgin Islands, then heading north to Bermuda, east to the Azores, back to Madeira, and then south to the Cape Verde Islands. During this period, there was a detour in April and May 1873, sailing from Bermuda north to Halifax and back, crossing the Gulf Stream twice with the reverse journey crossing further to the east.

After leaving the Cape Verde Islands in August 1873, the expedition sailed south-east at first and then headed west to reach St Paul's Rocks. From here, the route went south across the equator to Fernando de Noronha during September 1873, and onwards that same month to Bahia(now called Salvador) in Brazil. The period from September to October 1873 was spent crossing the Atlantic from Bahia to the Cape of Good Hope, touching at Tristan da Cunha on the way.

December 1873 to February 1874 was spent sailing on a roughly south-eastern track from the Cape of Good Hope to the parallel of 60 degrees south. The islands visited during this period were the Prince Edward Islands, the Crozet Islands, the Kerguelen Islands, and Heard Island. February 1874 was spent travelling south and then generally eastwards in the vicinity of the Antarctic Circle, with sightings of icebergs, pack ice and whales. The route then took the ship northeastward and away from the ice regions in March 1874, with the expedition reaching Melbourne in Australia later that month. The journey eastward along the coast from Melbourne to Sydney took place in April 1874, passing by Wilsons Promontory and Cape Howe.

When the voyage resumed in June 1874, the route went east from Sydney to Wellington in New Zealand, followed by a large loop north into the Pacific calling at Tonga and Fiji, and then back westward to Cape York in Australia by the end of August. The ship arrived in New Zealand in late June and left in early July. Before reaching Wellington (on New Zealand's North Island), brief stops were made at Port Hardy (ond'Urville Island) and Queen Charlotte Sound (on New Zealand's South Island) and *Challenger* passed through the Cook Strait to reach Wellington. The route from Wellington to Tonga went along the east coast of New Zealand's North Island, and then north and east into the open Pacific, passing by the Kermadec Islands en route to Tongatabu, the main island of the Tonga archipelago (then known as the Friendly Islands). The waters around the Fijian islands, a short distance to the north-west of Tonga, were surveyed during late July and early August 1874. The ship's course was then set westward, reaching Raine Island (on the outer edge of the Great Barrier Reef) at the end of August and thence arriving at Cape York, at the tip of Australia's Cape York Peninsula.

Over the following three months (September to November 1874), the expedition visited several islands and island groups while sailing from Cape York to China and Hong Kong (then a British colony). The first part of the route passed north and west over the Arafura Sea, with New Guinea to the north-east and the Australian mainland to the south-west. The first islands visited were the Aru Islands, followed by the nearby Kai Islands. The ship then crossed the Banda Sea touching at the Banda Islands, to reach Amboina (Ambon Island) in October 1874, and then continuing to Ternate Island. All these islands are now part of modern-day Indonesia. From Ternate, the route went north-westward towards what is now the Philippines, passing east of Celebes (Sulawesi) into the Celebes Sea. The expedition called at Samboangan (Zamboanga) on Mindanao, and then Iloilo on the island of Panay, before navigating within the interior of the archipelago en route to the bay and harbour of Manila on the island of Luzon. The crossing northwestward from Manila to Hong Kong took place in November 1874.

After several weeks in Hong Kong, the expedition departed in early January 1875 to retrace their route south-east towards New Guinea. The first stop on this outward leg of the journey was Manila. From there, they continued on to Samboangan, but took a different route through the interior of the Philippines, this time touching at the island of Zebu (Cebu). From Samboangan the ship diverged from the inward route, this time passing south of Mindanao (in early February 1875). *Challenger* then headed east into the open sea, before turning to the south-east and making landfall at Humboldt Bay (now Yos Sudarso Bay) on the north coast of New Guinea. By March 1875, the expedition had reached theAdmiralty Islands north-east of New Guinea. The final stage of the voyage on this side of the Pacific was a long journey across the open ocean to the north, passing mostly west of the Carolina Islands and the Mariana Islands, reaching port in Yokohama, Japan, in April 1875.

Challenger departed Japan in mid-June 1875, heading east across the Pacific to a point due north of the Sandwich Islands (Hawaii), and then turning south, making landfall at the end of July at Honolulu on the Hawaiian island of Oahu. A couple of weeks later, in mid-August, the ship departed south-eastward, anchoring at Hilo Bay off Hawaii's Big Island, before continuing to the south and reaching Tahiti in mid-September. The expedition left Tahiti in early October, swinging to the west and south of the Tubuai Islands and then heading to the south-east before turning east towards the South American coast. The route touched at the Juan Fernández Islands in mid-November 1875, with *Challenger*reaching the port of Valparaiso in Chile a few days later. The next stage of the journey commenced the following month, with the route taking the ship south-westward back out into the Pacific, past the Juan Fernández Islands, before turning to the south-east and back towards South America, reaching Port Otway in the Gulf of Penas on 31 December 1875.

Most of January 1876 was spent navigating around the southern tip of South America, surveying and touching at many of the bays and islands of the Patagonian archipelago, the Strait of Magellan, and Tierra del Fuego. Locations visited here include Hale Cove, Gray Harbour, Port Grappler, Tom Bay (all in the vicinity of Wellington Island), Puerta Bueno (near Hanover Island), Isthmus Bay (near the Queen Adelaide Archipelago), and Port Churruca (near Santa Ines Island). The final stops, before heading out into the Atlantic, were Port Famine, Sandy Point, and Elizabeth Island. *Challenger* reached the Falkland Islands towards the end of January, calling at Port Stanley and then continuing northward, reaching Montevideo in Uruguay in mid-February 1876. The ship left Montevideo at the end of February, heading first due east and then due north, arriving at Ascension Island at the end of March 1876. The period from early to mid-April was spent sailing from Ascension Island to the Cape Verde Islands (visited almost three years ago on the outward journey). From here, the route taken in late April and early May 1876 was a westward loop to the north out into the mid-Atlantic, eventually turning due east towards Europe to touch land at Vigo in Spain towards the end of May. The final stage of the voyage took the ship and its crew northeastward from Vigo, skirting the Bay of Biscayto make landfall in England.

Challenger returned to Spithead, Hampshire, on 24 May 1876, having spent 713 days at sea out of the intervening 1,606. The complete set of reports of the Challenger Expedition, published in 50 volumes between 1877 and 1895, are available online.

Challenger Deep

On March 18, 2012, after leaving the testing area in the relatively calm Solomon Sea, the submersible was aboard the surface vessel *Mermaid Sapphire,* docked in Apra Harbor, Guam, undergoing repairs and upgrades, and waiting for a calm enough ocean to carry out the dive. By March 24, 2012, having left port in Guam days earlier, the submersible was aboard one of two surface vessels that had departed the Ulithiatoll for the Challenger Deep. On March 26, 2012 local time it was reported that it had reached the bottom of the Mariana Trench.

Descent, from the beginning of the dive to arrival at the seafloor, took two hours and 37 minutes - almost twice as fast as the descent of the*Trieste.* Not all systems functioned as planned on the record-breaking dive: bait-carrying landers were not dropped in advance of the dive because the sonar needed to find them on the ocean floor was not working, and hydraulic system problems hampered the use of sampling equipment. Nevertheless, after roughly three hours on the seafloor and a successful ascent, further exploration of the Challenger Deep with the unique sub is planned for later in the Spring of 2012.

Records

On March 26, 2012, Cameron reached the bottom of the Challenger Deep, the deepest part of the Mariana Trench. The recorded depth was 10,898.4 metres (35,756 ft) when the *Deepsea Challenger* touched down. It was the fourth ever dive to the Challenger Deep and the second manned dive (with a maximum recorded depth slightly less than that of the *Trieste*'s 1960 dive). It was the first solo dive and the first to spend a significant amount of time (three hours) exploring the bottom.

Similar efforts

As of February 2012, several other vehicles are under development to reach the same depths. The groups developing them include:

§ Triton Submarines, a Florida based company that designs and manufactures private submarines, whose vehicle, *Triton 36000/3*, will carry a crew of three to the seabed in 120 minutes.

§ Virgin Oceanic, sponsored by Richard Branson's Virgin Group, is developing a submersible designed by Graham Hawkes, *DeepFlight Challenger*, with which the solo pilot will take 140 minutes to reach the seabed.

● DOER Marine, a San Francisco based marine technology company established in 1992, that is developing a vehicle, *Deepsearch* (and*Ocean Explorer HOV Unlimited*), with some support from Google's Eric Schmidt with which a crew of two or three will take 90 minutes to reach the seabed, as the program Deep Search.

Diving Technology Development Pre-industrial

● Several centuries BC: *(Relief carvings made at this time show Assyrian soldiers crossing rivers using inflated goatskin floats. Several modern authors have wrongly said that the floats were crude breathing sets and that they show frogmen in action.)*

● Ancient Roman and Greek times, etc.: There have been many instances of men swimming or diving for combat, but they always had to hold their breath, and had no diving equipment, except sometimes a hollow plant stem used as a snorkel.

● About 500 BC: (Information originally from Herodotus): During a naval campaign the Greek Scyllis was taken aboard ship as prisoner by the Persian King Xerxes I. When Scyllis learned that Xerxes was to attack a Greek flotilla, he seized a knife and jumped overboard. The Persians could not find him in the water and presumed he had drowned. Scyllis surfaced at night and made his way among all the ships in Xerxes's fleet, cutting each ship loose from its moorings; he used a hollow reed as snorkel to remain unobserved. Then he swam nine miles (15 kilometers) to rejoin the Greeks off Cape Artemisium.

● The use of diving bells is recorded by the Greek philosopher Aristotle in the 4th century BC: "...they enable the divers to respire equally well by letting down a cauldron, for this does not fill with water, but retains the air, for it is forced straight down into the water."

● 1300 or earlier: Persian divers were using diving goggles with windows made of the polished outer layer of tortoiseshell.

● 15th century: Leonardo da Vinci made the first known mention of air tanks in Italy: he wrote in his Atlantic Codex (Biblioteca Ambrosiana,Milan) that systems were used at that time to artificially breathe under water, but he did not explain them in detail due to what he described as *"bad human nature"*, that would have taken advantage of this technique to sink ships and even commit murders. Some drawings, however, showed different kinds of snorkels and an air tank (to be carried on the breast) that presumably should have no external connections. Other drawings showed a complete immersion kit, with a plunger suit which included a sort of mask with a box for air. The project was so detailed that it included a urine collector, too.

● 1531: Guglielmo de Lorena dives on two of Caligula's sunken galleys using a diving bell from a design by Leonardo da Vinci.

● 1616: Franz Kessler built an improved diving bell.

● Around 1620: Cornelius Drebbel may have made a crude rebreather:

● 1650: Otto von Guericke built the first air pump.

● 1715: the *chevalier* (sir) Pierre Rémy de Beauve, a French aristocrat who serves as *garde de la marine* in Brest, builds one of the oldest known diving dresses. De Beauve's dress was equipped with a metal helmet and two hoses, one of them air-supplied from the surface by a bellows and the other one for evacuation of the exhaled air.

● the Englishman John Lethbridge, a wool merchant, invents a diving barrel and successfully salvages valuables from wrecks.

● 1772: the first diving dress using a compressed-air reservoir is successfully designed and built in 1772 by *Sieur* (old French for "sir" or "Mister") Fréminet, a Frenchman from Paris. Fréminet conceived an autonomous breathing machine equipped with a helmet, two hoses for inhalation and exhalation, a suite and a reservoir, dragged by and behind the diver, although Fréminet later put it on his back.Fréminet called his invention *machine hydrostatergatique* and used it successfully for more than ten years in the harbours of Le Havre andBrest, as states the explaining text of a 1784 painting.

● 1774: John Day becomes the first person known to have died in a submarine accident while testing a "diving chamber" in Plymouth Sound.

● 1776: David Bushnell invented the *Turtle*, first submarine to attack another ship. It was used in the American Revolution.

● 1797: Karl Heinrich Klingert designes a full diving dress in 1797. This design consists of a large metal helmet and similarly large metal belt connected by leather jacket and pants.

● 1798: in June F. W. Joachim, employed by Klingert, successfully completes the first practical tests of Klingert's armor.

19th century

● 1800: Robert Fulton builds a submarine, the "Nautilus"

● 1839 Canadian inventors James Eliot and Alexander McAvity of Saint John, New Brunswick patent an "oxygen reservoir for divers", a device carried on the diver's back containing "a quantity of condensed oxygen gas or common atmospheric air proportionate to the depth of water and adequate to the time he is intended to remain below".

● W.H.Thornthwaite of Hoxton in London patented an inflatable lifting jacket for divers.

● Around 1842: The Frenchman Joseph-Martin Cabirol (1799–1874) settles a company in Paris and starts making standard diving dresses.

● 1843: Based on lessons learned from the Royal George salvage, the first diving school is set up by the Royal Navy.

● 1856: Wilhelm Bauer starts the first of 133 successful dives with his second submarine *Seeteufel*. The crew of 12 was trained to leave the submerged ship through a diving chamber.

● 1860: Giovanni Luppis, a retired engineer of the Austro-Hungarian navy, demonstrates a design for a self-propelled torpedo to emperor Franz Joseph.

● 1863: H.L. *Hunley* becomes the first submarine to sink a ship, the USS *Housatonic*, during the American Civil War.

● 1866: *Minenschiff*, the first self-propelled (locomotive) torpedo, developed by Robert Whitehead (to a design by Captain Luppis, Austrian Navy), is demonstrated for the imperial naval commission on December 21.

● 1882: Brothers Alphonse and Théodore Carmagnolle of Marseille, France, patent the first properly anthropomorphic design of ADS (atmospheric diving suit). Featuring 22 rolling convolute joints that were never entirely waterproof and a helmet that possessed 25 2-inch (51 mm) glass viewing ports, it weighed 380 kilograms (840 lb) and was never put in service.

Rebreathers appear

● 1808: on June 17, *Sieur* Touboulic from Brest, mechanic in the Napoleon's Imperial Navy,

patents the oldest known oxygen rebreather (but there is no evidence of any prototype having been manufactured). This early rebreather design worked with an oxygen reservoir, the oxygen being delivered progressively by the diver himself and circulating in a closed circuit through a sponge soaked in lime water.Touboulic called his invention *Ichtioandre* (Greek for 'fish-man').

● 1849: Pierre-Aimable de Saint Simon Sicard (a chemist) makes the first practical oxygen rebreather. It was demonstrated in London in 1854.

● 1853: Professor T. Schwann designed a rebreather in Belgium; he exhibited it in Paris in 1878. It had a big backpack oxygen tank at pressure about 13 bars, and two scrubbers containing sponges soaked in caustic soda.

● 1876: An English merchant seaman, Henry Fleuss, develops the first workable self-contained diving rig that uses compressed oxygen. This prototype of closed-circuit scuba uses rope soaked in caustic potash to absorb carbon dioxide so the exhaled gas can be re-breathed.

Diving helmets get improved and commonly used

● 1808: Brizé-Fradin designed a small bell-like helmet connected to a low-pressure backpack air container.

● 1820: Paul Lemaire d'Augerville (a Parisian dentist) invented and made a diving apparatus with a copper backpack cylinder, and with acounter-lung to save air, and with an inflatable lifejacket connected. It was used down to 15 or 20 meters for up to an hour in salvage work. He started a successful salvage company.

● 1825: William H. James designed a self contained diving suit that had compressed air in an iron container worn around the waist.

● 1827: Beaudouin in France developed a diving helmet fed from an air cylinder pressurized to 80 to 100 bars. The French Navy was interested, but nothing came of this.

● 1829: Charles Anthony Deane and John Deane of Whitstable in Kent in England design the first air-pumped diving helmet for use with a diving suit. It is said that the idea started from a crude emergency rig-up of a fireman's water-pump (used as an air pump) and a knight-in-armour helmet used to try to rescue horses from a burning stable. Others say that it was based on earlier work in 1823 developing a "smoke helmet". However the suit was not attached to the helmet, so a diver could not bend over or invert without risk of flooding the helmet and drowning. Nevertheless, the diving system is used in salvage work, including the successful removal of cannon from the British warship HMS Royal George in 1834-35. This 108-gun fighting ship sank in 65 feet of water at Spithead anchorage in 1783.

● E.K.Gauzen, a Russian naval technician of Kronshtadt naval base (a district of Saint Petersburg), offers a "diving machine". His invention was an air-pumped metallic helmet strapped to a leather suit (an overall). The bottom of the helmet is open. The helmet is strapped to the leather suit by metallic tape. Gauzen's diving suit and its further modifications were used by the Russian Navy until 1880. The modified diving suit of the Russian Navy, based on Gauzen's invention, was known as "three-bolt equipment".

● 1837: Following up Leonardo's studies, and those of Halley the astronomer, Augustus Siebe develops standard diving dress, a sort ofsurface supplied diving apparatus.

● By attaching the Deane brothers helmet to a suit, Augustus Siebe develops the Siebe "Closed" Dress combination diving helmet and suit, considered the foundation of modern diving dress. This was a significant evolution from previous models of "open" dress that did not allow a diver to invert. (Siebe-Gorman went on to manufacture helmets continuously until 1975).

● 1855: Joseph-Martin Cabirol patents a new model of standard diving dress, mainly issued from Siebe's designs. The suit is made out of rubberized canvas and the helmet, for the first time, includes a hand-controlled tap that the diver uses to evacuate his exhaled air. The tap includes on its turn a safety valve which prevents water from entering in the helmet. Until 1855 diving helmets were equipped with only three circular windows (for front, left and right sides). Cabirol's helmet introduced for the first time the later well known fourth window, situated in the upper front part of the helmet and allowing the diver to watch above him. Having been presented to the *Exposition Universelle* in Paris Cabirol's diving dress won the silver medal. These original diving dress and helmet are now preserved at the *Conservatoire National des Arts et Métiers* in Paris.

The first diving regulators

● 1838: Dr. Manuel Théodore Guillaumet invented a twin-hose demand regulator. It was demonstrated used as surface-demand. Use duration was limited to 30 minutes by diving in cold water without a diving suit.

● 1860: in Espalion (France), mining engineer Benoît Rouquayrol designs a self contained breathing set with a backpack cylindrical air tank that supplied air through the first demandregulator to be commercialized (as of 1865, see below). Rouquayrol called his invention*régulateur* ('regulator'), he conceived it to help miners to escape from dying drowned in flooded mines.

● 1864: Benoît Rouquayrol meets navy officer Auguste Denayrouze for the first time, in Espalion, and both, on Denayrouze's initiative, adapt Rouquayrol's invention to diving. After having adapted it they called their recently patented device *appareil plongeur Rouquayrol-Denayrouze* ('Rouquayrol-Denayrouze diving apparatus'). The diver still walked on the seabed and did not swim. The air pressure tanks made with the technology of the time could only hold 30 atmospheres, allowing dives of only 30 minutes at no more than ten metres deep; during surface-supplied configuration the tank was also used for bailout in the case of a hose failure. The durations of 6 to 8 hours on a tankful without external supply recorded for the Rouquayrol set in the book *Twenty Thousand Leagues Under the Sea* by Jules Verne, are wildly exaggerated fiction.

● 1865: on August the 28th the French Navy Minister orders the first Rouquayrol-Denayrouze diving apparati and mass-production starts.

Gas and air cylinders appear

● Late 19th century: Industry begins to be able to make high-pressure air and gas cylinders. That prompted a few inventors down the years to design open-circuit compressed air breathing sets, but they were all constant-flow, and the demand regulator did not come back until 1937.

Underwater photography appears

● 1893: Louis Boutan invents the first underwater camera and makes the first underwater photographs.

● 1900: Louis Boutan publishes *La Photographie sous-marine et les progrès de la photographie* (*The Underwater Photography and the Advances in Photography*), the first book about underwater photography.

Decompression sickness becomes a problem

● 1841: First documented case of decompression sickness occurs, reported by a mining engineer who observed pain and muscle cramps among coal miners working in mine shafts air-pressurized to keep water out.

● 1870: Bauer publishes outcomes of 25 paralyzed caisson workers.

● From 1870 to 1910 all prominent symptoms/causes will be established: explanations at the time included: cold or exhaustion causing reflex spinal cord damage; electricity caused by friction on compression; or organ congestion and vascular stasis caused by decompression.

● 1871: The St Louis Eads Bridge employs 352 compressed air workers including Dr. Alphonse Jaminet as the physician in charge. There were 30 seriously injured and 12 fatalities. Dr. Jaminet himself suffered a case of decompression sickness when he ascended to the surface in four minutes after spending almost three hours at a depth of 95 feet in a caisson, and his description of his own experience was the first such recorded.

● 1872: The similarity between decompression sickness and iatrogenic air embolism as well as the relationship between inadequate decompression and decompression sickness is noted by Friedburg. He suggested that intravascular gas was released by rapid decompression and recommended: slow compression and decompression; four hour working shifts; limit to maximum depth 44.1 psig (4 ATA); using only healthy workers; and recompression treatment for severe cases.

● 1873: Dr. Andrew Smith first utilizes the term "caisson disease" describing 110 cases of decompression sickness as the physician in charge during construction of the Brooklyn Bridge. The project employed 600 compressed air workers. Recompression treatment was not used. The project chief engineer Washington Roebling suffered from caisson disease. (He took charge after his father John Augustus Roebling died of tetanus.) Washington's wife, Emily, helped manage the construction of the bridge after his sickness confined him to his home in Brooklyn. He battled the after-effects of the disease for the rest of his life. During this project, decompression sickness became known as "The [Grecian] Bends" because afflicted individuals characteristically arched their backs: this is possibly reminiscent of a then fashionable women's dance maneuver known as the Grecian Bend.

● 1878: Paul Bert publishes *La Pression barométrique*, providing the first systematic understanding of the causes of DCS.

20th century

● 1900: John P. Holland builds the first submarine to be formally commissioned by the U.S. Navy, *Holland* (also called *A-1*).

● Leonard Hill uses a frog model to prove that decompression causes bubbles and that recompression resolves them.

● 1903: Siebe Gorman starts to make a submarine escape set in England; in the years afterwards it was improved, and later was called theDavis Escape Set or Davis Submerged Escape Apparatus.

● from 1903 to 1907: Professor Georges Jaubert, invents Oxylithe, which is a form of sodium peroxide (Na_2O_2) or sodium dioxide (NaO_2). As it absorbs carbon dioxide it emits oxygen and can be used in a rebreather.

● 1905 Several sources, including the 1991 US Navy Dive Manual (pg 1-8), state that the MK V Deep Sea Diving Dress was designed by the Bureau of Construction & Repair in 1905, but in reality, the 1905 Navy Handbook shows British Siebe-Gorman helmets in use. Since the earliest know MK V is dated 1916, these sources are probably referring to the earlier MK I, MK II, MK III & MK IV Morse and Schraderhelmets.

● 1905: The first rebreather with metering valves to control the supply of oxygen is made.

● 1907: Draeger of Lübeck makes a rebreather called the *U-Boot-Retter.* = "submarine rescuer".

● 1908: Arthur Boycott, Guybon Damant, and John Haldane publish "The Prevention of Compressed-Air Illness", detailed studies on the cause and symptoms of decompression sickness, and propose a table of decompression stops to avoid the effects.

● The Admiralty Deep Diving Committee adopts the Haldane tables for the Royal Navy, and publish Haldane's diving tables to the general public.

● 1910: the British Robert Davis invents his own submarine rescuer rebreather, the Davis Submerged Escape Apparatus, for the Royal Navy submarine crews.

● 1912: US Navy adopts the decompression tables published by Haldane, Boycott and Damant. Driven by Chief Gunner George Stillson, the navy sets up a program to test tables and staged decompression based on the work of Haldane.

● Maurice Fernez introduces a simple lightweight underwater breathing apparatus as an alternative to helmet diving suits.

● Draeger starts the commercialization of his rebreather in both configuration types, mouthpiece and helmet.

● 1913: The Navy also begins developing the future MK V, influenced by Schrader and Morse designs.

● 1914: Modern swimfins are invented by the Frenchman Louis de Corlieu, *capitaine de corvette* (Lieutenant Commander) in the French Navy. In 1914 De Corlieu made a practical demonstration of his first prototype for a group of navy officers.

● 1915: The submarine USS F-4 is salvaged from 304 feet establishing the practical limits for air diving. Three US Navy divers, Frank W. Crilley, William F. Loughman, and Nielson, reached 304 fsw using the MK V dress.

● 1916 With the addition of a battery-powered telephone, the design of the MK V is finalized – however, several more design improvements are made over the next two years.

● The Draeger model DM 2 becomes standard equipment of the German Navy.

● 1917: The Bureau of Construction & Repair introduces the MK V helmet and dress, which then becomes the standard for US Navy diving until the introduction of the MK 12 in the late seventies

● 1918: the Japanese Ohgushi patents his "Ohgushi's Peerless Respirator". It was a constant-flow diving and industrial open-circuit breathing set. The user breathed through his nose and switched the air on and off with his teeth.

● Around 1920: Hanseatischen Apparatebau-Gesellschaft make a 2-cylinder breathing apparatus with double-lever single-stage demand valve and single wide corrugated breathing tube with mouthpiece, and a "duck's beak" exhalent valve in the regulator. It was described in amine rescue handbook in 1930. They were successors to Ludwig von Bremen of Kiel, who had the licence to make the Rouquayrol-Denayrouze apparatus in Germany.

● 1924: De Corlieu leaves the French Navy to fully devote himself to his invention.

● 1925: Maurice Fernez exposes, at the Grand Palais, a new model of his underwater surface-supplied apparatus. Yves le Prieur, assistant at the exhibition, decides to meet the man in person and asks him to transform Fernez's apparatus into a hand-controlled self-containedunderwater breathing apparatus. It delivered air at constant pressure without a demand regulator.

● 1926: Fernez-Le Prieur self contained underwater breathing apparatus demonstrated to the public in Paris, and adopted by the French Navy.

● Draeger displayed a rescue breathing apparatus that the wearer could swim with. While the previous devices served only for ascending to the surface and were designed also to develop lift so that the wearer arrived at the surface without swimming movements, the diving set had weights, which also made it possible to dive down with it, to search and save after an accident.

● The 1930s:

● In France, Guy Gilpatric starts swim diving with waterproof goggles, derived from swimming goggles (which were originally invented byMaurice Fernez in 1920).

● Sport spearfishing became common in the Mediterranean, and spearfishers gradually developed the common sport diving mask and fins and snorkel, with Georges Beuchat in Marseille, France, which created the speargun and Italian sport spearfishers started using oxygen rebreathers. This practice came to the attention of the Italian Navy, which developed its frogman unit Decima Flottiglia MAS.

● **1933:**

● In April Louis de Corlieu registers a new patent (number 767013, which in addition of two fins for the feet included two spoon-shaped fins for the hands) and calls this equipment *propulseurs de natation et de sauvetage* (which can be translated as "swimming and rescue impulse device").

● In San Diego, California, the first sport diving club is started by Glenn Orr, Jack Prodanovich and Ben Stone, called the San Diego Bottom Scratchers. As far as it is known, it did not use breathing sets; its main aim was spearfishing.

● More is known of Yves Le Prieur's constant-flow open-circuit breathing set. It is said that it could allow a 20 minute stay at 7 meters and 15 minutes at 15 meters. It has one cylinder feeding into a circular fullface mask. Its air cylinder was often worn at an angle to get its on/off valve in reach of the diver's hand; this would have caused an awkward skew drag in swimming.

● 1934:In France, establishment of Beuchat, oldest scuba diving and spearfishing company in the world,

● In France a sport diving club is started, called the Club des Sous-l'Eau = "club of those [who are] under the water". It did not use breathing sets as far as is known. Its main aim was spearfishing. ("Club des Sous-l'Eau" was later realized to be a homophone of "club des soulôts" = "club of the drunkards", and was changed to 'Club des Scaphandres et de la Vie Sous L'Eau' = "Club of the diving apparatuses and of underwater life".)

● Otis Barton and William Beebe dive to 3028 feet using a bathysphere.

● 1935: The French Navy adopts the Le Prieur breathing set.

● 1936: On the French Riviera, the first known sport scuba diving club started. It used Le Prieur's breathing sets.

● 1937: US Navy publishes its revised diving tables based on the work of O.D. Yarbrough.

● 1937: The American Diving Equipment and Salvage Company (now known as DESCO) develops a heavy bottom-walking-type diving suit with a self-contained mixed-gas helium and oxygen rebreather.

● 1939: After floundering for years, even producing his fins in his own flat in Paris, De Corlieu finally starts mass production of his invention in France. The same year he rented a licence to Owen P. Churchill for mass production in the United States. To sell his fins in the USA Owen Churchill changed the French De Corlieu's name (*propulseurs*) to "swimfins", which is still nowadays the current English name. Churchill presented his fins to the US Navy, who decided to acquire them for its Underwater Demolition Team (UDT).

● Hans Hass and Hermann Stelzner of Drager, in Germany make the M138 rebreather. It is developed from the 1912 escape set a type of rebreather used to exit sunken submarines. The M138 sets are oxygen rebreathers with a 150 bar, .6 liter tank and appear in many of his movies and books.

● 1941: The Italian Navy's Decima Flottiglia MAS using oxygen rebreathers and manned torpedoes, attacks the British fleet in Alexandria harbor.

● 1944: American UDT and British COPP frogmen (COPP: Combined Operations Pilotage Parties) used the "Churchill fins" during all prior underwater deminings, allowing this way in 1944 the Normandy landings. During years after World War II had ended, De Corlieu spent time and efforts struggling into civil procedures, demanding others for patent infringement.

● 1954: Underwater hockey (octopush) is invented by four navy sub-aqua divers in Southsea who got bored swimming up and down and wanted a fun way to keep fit. The diving regulator reappears

● 1934: René Commeinhes, from Alsace, invents a breathing set working with a demand valve and destined to allow firefighters to breathe safely in smoke environments.

● 1937: Georges Commeinhes, son of René, adapts his father's invention to diving and develops a two-cylinder open-circuit apparatus withdemand regulator. The regulator was a big rectangular box between the cylinders. Some were made, but WWII interrupted development.

World War II

● 1939: Georges Commeinhes offers his breathing set to the French Navy, which could not continue developing uses for it because of WWII.

● 1940-1944: Christian J. Lambertsen of the United States designed a 'Breathing apparatus' for the U.S. military. It was a rebreather.

● 1942: Georges Commeinhes patents a better version of his scuba set, now called the GC42 ("G" for Georges, "C" for Commeinhes and "42" for 1942). Some are made by the Commeinhes' company.

● 1942: with no relation with the Commeinhes family, Émile Gagnan, engineer employed by the Air Liquide company, obtains in Paris a Rouquayrol-Denayrouze apparatus (property of the Bernard Piel company in 1942). He miniaturizes and adapts it to gas generators sincethe Germans occupy France and confiscate the French fuel for war purposes. Gagnan's boss and owner of the Air Liquide company, Henri Melchior, decides to introduce Gagnan to Jacques-Yves Cousteau, his son-in-law, because he knows that Cousteau is looking for an efficient and automatic demand regulator. Both men meet then in Paris in December 1942 and adapt Gagnan's regulator to a diving cylinder.

● 1943: after fixing some technical problems Cousteau and Gagnan patent the first modern demand regulator.

● Air Liquide builds two more aqualungs: there were now three, owned by Cousteau but also at the disposal of his first two diving companions Frédéric Dumas and Taillez. All three men use them to shoot the film *Épaves* (*Shipwrecks*), the first underwater film having been shot by means of scuba sets.

● In July Commeinhes reached 53 metres (about 174 feet) using his GC42 breathing set off the coast of Marseille.

● In October, and not knowing about Commeinhes exploit, Dumas dives with a Cousteau-Gagnan prototype and reaches 62 metres (about 200 feet) off Les Goudes, not far from Marseille. He felt then what is now called a nitrogen narcosis.

● 1944: Commeinhes died in the liberation of Strasbourg in Alsace. His invention was submerged by Cousteau's invention.

● Various nations use frogmen equipped with rebreathers for some of the best known and most spectacular war actions: see Human torpedo.

● Hans Hass later said that during WWII the German diving gear firm Dräger offered him an

Syria says revolt over, army to pull out gradually

Syria says the year-long revolt to topple President Bashar al-Assad is now over, but it will keep its forces in cities to "maintain security" until it is safe to withdraw in keeping with a U.N.-backed peace deal. The agreement proposed by United Nations-Arab League special envoy Kofi Annan says the Syrian authorities must be first to withdraw troops and stop violence immediately.

The army kept up an offensive against opposition strongholds on Saturday, pummelling the Khalidiya district of Homs city. "Mortars are falling every minute and the sounds of explosions are shaking the neighbourhood," an activist report said. A child was killed by rocket fire in the al-Bayyada area and a man was killed in crossfire in clashes near a check point.

Rebels battled army forces near a base in Jaramaneh in Damascus province. Five bodies bearing signs of torture were found near Maarat al-Noaman, the report said. A soldier was killed when rebels ambushed a troop carrier in Deraa province. Despite the violence, Damascus says it has the upper hand.

"The battle to topple the state is over," Syrian Foreign Ministry spokesman Jihad al-Makdissi told Syria TV late on Friday. "Our goal now is to ensure stability and create a perspective for reform and development in Syria while preventing others from sabotaging the path of reform."

His assertion follows army victories over rebel strongholds in the cities of Hama, Homs and Idlib, and Assad's acceptance this week of Annan's plan that does not demand he step down.

Calls by Gulf Arab states to arm the rebels have fizzled. The political opposition remains divided, and prospects of Western-led military intervention are close to zero. Assad has endorsed Annan's six-point peace plan, which has the U.N. Security Council's unanimous backing, but Western leaders say the 46-year-old Syrian leader has broken similar promises before and must be judged by actions not words.

Assad's opponents have not yet formally accepted the plan.

They were due to meet the foreign ministers of allied Western powers, including U.S. Secretary of Sate Hillary Clinton, on Sunday at a "Friends of Syria" conference in Turkey, which provides a safe haven for Syrian rebels.

Makdissi said Annan, who had talks with Assad in Damascus on March 10, had acknowledged the government's right to respond to armed violence during the ceasefire phase of the peace plan. He said Syria's conditions for agreeing to Annan's plan included recognition of its sovereignty and right to security. "When security can be maintained for civilians, the army will leave, he said. "This is a Syrian matter."

However, Annan's plan says Syria must stop putting troops into cities forthwith and begin taking them out.

"The Syrian government should immediately cease troop movement towards, and end the use of heavy weapons in, population centres, and begin pullback of military concentrations in and around population centres," it states. "As these actions are being taken on the ground, the Syrian government should work with the envoy to bring about a sustained cessation of armed violence in all its forms by all parties with an effective United Nations supervision mechanism," it says.

The U.N. peacekeeping department will send a team to Damascus soon to begin planning for a possible ceasefire observer mission, Western diplomats said on Thursday, adding that it was unclear the 200 to 250 monitors envisaged would ever be deployed. "We are very far from a peace to keep," one said.

Western diplomats say the key to the implementation of Annan's ceasefire — the main thrust of the deal — lies in the sequencing of the army pullback and ending rebel armed attacks.

They say the opposition won't feel safe negotiating before the army halts its offensive, but also note it would be impractical to expect a complete government pullout before the rebels are obliged to respond.

In 2011, an Arab League observer mission sent to oversee the promised withdrawal of the Syrian army from opposition flashpoints collapsed partly over the issue of when and how troops could be withdrawn.

More than 9,000 people have been killed by Assad's forces during the revolt, according to the United Nations, while Damascus says it has lost about 3,000 security force members.

"The armed opposition is incapable of toppling the regime," said Sayyed Hassan Nasrallah, leader of Assad's Lebanese ally Hezbollah. Foreign intervention was a "closed subject", he said.

"Betting on military efforts to topple the regime is a losing gamble and the burden is too great: more bloodshed and loss of life and property, to no avail," he said.

Western and Arab foreign ministers backing Syrians trying to topple Assad head for Istanbul on Saturday for what diplomats predict will be a challenging "Friends of Syria" conference.

They will seek clear endorsement of the Annan plan from the Syrian National Council (SNC), although their own governments are sceptical that Assad will genuinely try to implement it.

In Libya a year ago, the West and the Arabs quickly granted recognition to a revolutionary national council as the sole legitimate government of Libya. They are not close to doing the same for the splintered SNC in Syria, diplomats say. There is also little chance they will agree to arm rebels. The Istanbul conference is instead expected to declare strong support for Annan's peace proposals, which do not include an opposition and Arab League demand that Assad go now. It is expected to demand that he order a ceasefire without delay. If he does not withdraw his forces, the opposition can hardly be expected to begin a dialogue with him, diplomatic sources said. If he does, one question will be how effectively they can persuade disparate armed rebel groups to stop shooting.

The Istanbul conference may press for immediate steps "to accept and implement a daily two-hour humanitarian pause", as Annan's plan stipulates, until all fighting ceases. If Assad fails to keep his word, Annan would have to decide whether to call time and tell the United Nations he has failed to make peace through a "Syrian-led process". The issue would then return to the U.N. Security Council, with increased pressure on Assad's allies Russia and China, which have endorsed Annan's mission, to get tough with Damascus. Russia, however, has warned in advance that it is not up to the "self-styled friends of Syria" to pronounce on Sunday on whether Assad is keeping his part of the Annan deal or not.

Diplomats say "Friends of Syria" powers construe the carefully-worded terms of Annan's six-point plan as intending that Assad will eventually cede power in a political transition. but the language is nuanced to get a step-by-step process going. "I think inevitably we will see frustration this weekend. We are all frustrated," said one Western diplomat, speaking on condition of anonymity. "It is frustrating that after more than a year, the violence continues in Syria and has been particularly brutal over the last two or three months and at the moment does not seem to be stopping."

open-circuit scuba set with a demand regulator. It may have been a separate invention, or it may have been copied from a captured Commeinhes-type set.

● Early 1944: the USA government, to try to stop men from being drowned in sunken army tanks, asked the company Mine Safety Appliances (MSA) for a suitable small escape breathing set. MSA provided a small open-circuit breathing set with a small (5 to 7 liters) air cylinder, a circular demand regulator with a two-lever system similar to Cousteau's design (connected to the cylinder by a nut and cone nipple connection), and one corrugated wide breathing tube connected to a mouthpiece. This set was stated to be made from "off-the-shelf" items, which shows that MSA had that regulator design before; also, that regulator looks like the result of development and not a prototype; it may have arisen around 1943. In an example recovered in 2003 from a submerged Sherman tank in the Bay of Naples the cylinder was bound round in tape and tied to a lifejacket. These sets were too late for the D-day landings in June 1944, but were used in the invasion of the south of France and in the South Pacific war.

● 1944: Cousteau's first aqualung is destroyed by a mis-aimed artillery shell in an Allied landing on the French Riviera: that left two.

Postwar

● The public first hears about frogmen.

● 1945: In Toulon, Cousteau shows the film *Épaves* to the Admiral Lemonnier. The Admiral makes then Cousteau responsible for the creation of the underwater research unit of the French Navy (the GRS, Groupe de Recherches Sous-marines, nowadays called the CEPHISMER). GRS' first mission was to clear of mines the French coasts and harbours. While creating the GRS, Cousteau only had at his disposal the two remaining Aqua-Lung prototypes made by l'Air Liquide in 1943.

● 1946: Air Liquide creates La Spirotechnique and starts to sell Cousteau-Gagnan sets under the names of *scaphandre Cousteau-Gagnan*('Cousteau-Gagnan scuba set'), CG45 ("C" for Cousteau, "G" for Gagnan and "45" for 1945, year of their first postwar patent) or Aqua-Lung, the latter for commercialization in English-speaking countries. This word is correctly a tradename that goes with the Cousteau-Gagnan patent, but in Britain it has been commonly used as a generic and spelt "aqualung" since at least the 1950s, including in theBSAC's publications and training manuals, and describing scuba diving as "aqualunging".

● Henri Broussard founds the first post-WWII scuba diving club, the Club Alpin Sous-Marin. Broussard was one of the first men who Cousteau trained in the GRS.

● Yves Le Prieur invents a new version of his breathing set. Its fullface mask's front plate was loose in its seating and acted as a very big, and therefore, very sensitive diaphragm for a demand regulator: see Diving regulator#Demand valve.

● The first known underwater diving club in Britain, "The Amphibians Club", is formed in Aberdeen by Ivor Howitt (who modified an old civilian gas mask) and some friends. They called underwater diving "fathomeering", to distinguish from jumping into water.

● The Cave Diving Group (CDG) is formed in Britain.

● 1947: Maurice Fargues becomes the first diver to die using an aqualung while attempting a new depth record with Cousteau's Undersea Research Group near Toulon

● 1948: Auguste Piccard sends the first bathyscaphe, *FNRS-2*, on unmanned dives.

● Siebe Gorman and/or Heinke start making Cousteau-type aqualungs in England. Siebe Gorman made those first patented aqualungs at Chessington from 1948 to 1960, popularly known as *tadpole sets*. Captain Trevor Hampton had a dive with one. Siebe Gorman and the Royal Navy expected aqualungs to be used with weighted boots for bottom-walking for light commercial diving.

● Ted Eldred in Australia starts designing the first open-circuit single-hose scuba set known: see Porpoise (make of scuba gear).

● Georges Beuchat in France creates the first surface buoy.

● 1948 or 1949: Rene's Sporting Goods shop in California imports aqualungs from France. Two graduate students, Andy Rechnitzer and Bob Dill obtain a set and begin to use it for underwater research. Hollywood sees Aqualungs and gets interested.

● 1949: William Beebe and Otis Barton makes record dive to 4,500 feet in the Benthoscope.

● 1950: a British naval diving manual printed soon after this said that the aqualung is to be used for walking on the bottom with a heavy diving suit and weighted boots, and did not mention Cousteau.

● A report to Cousteau said that only 10 aqualung sets had been sent to the USA because the market there was saturated.

● The first camera housing called Tarzan is released by Georges Beuchat,

● 1951: The movie "The Frogmen" is released. It is set in the Pacific Ocean in WWII. In its last 20 minutes, it shows USA frogmen, using bulky 3-cylindered aqualungs on a combat mission. This equipment use is anachronistic (in reality they would have used rebreathers), but it shows that aqualungs were available (even if not widely known of) in the USA in 1951.

● 1951: The US Navy starts to develop wetsuits, but not known to the public.

● 1951: In December, the first issue of *Skin Diver Magazine* (USA) appears. The magazine ran until November 2002.

● Cousteau-type aqualungs go on sale in Canada.

● 1952: UC Berkeley and subsequent UC San Diego Scripps Institution of Oceanography physicist Hugh Bradner, invents the modern wetsuit

● 1952: Cousteau-type aqualungs go on sale in the USA.

● Ted Eldred in Melbourne, Australia starts making for public sale the Porpoise (make of scuba gear). This was the world's first commercially available single-hose scuba unit and was the forerunner of most sport SCUBA equipment produced today. Only about 12,000 were made.

● After World War II Lambertsen called his 1940-1944 rebreather LARU (for Lambertsen Amphibious Respiratory Unit) but as of 1952 Lambertsen renamed again his invention and coins the acronym SCUBA (for "self-contained underwater breathing apparatus"). During the following years this acronym was used, more and more, to identify the Cousteau-Gagnan apparatus, taking the place of its original name (Aqualung). In Britain the word *aqualung*, used for any demand-valve-controlled open-circuit scuba set, still continues to be used nowadays; in old times it was sometimes inaccurately for any scuba set including rebreathers.

Public interest in scuba diving takes off

● 1953: *National Geographic Magazine* publishes an article about Cousteau's underwater archaeology at Grand Congloué island near Marseille. This started a massive public demand for aqualungs and diving gear, and in France and America the diving gear makers started making them as fast as they could. But in Britain Siebe Gorman and Heinke kept aqualungs expensive, and restrictions on exportingcurrency stopped people from importing them. Many British sport divers used home-made constant-flow breathing sets and ex-armed forces or ex-industrial rebreathers. In the early 1950s, diving regulators made by Siebe Gorman cost £15, which was an average week's salary.

● After the supply of war-surplus frogman's drysuits ran out, free-swimming diving suits were not readily available to the general public, and as a result many scuba divers dived with their skin bare except for swimming trunks. That is why scuba diving used often to be called skindiving. Others dived in homemade drysuits, or in thick layers of ordinary clothes.

● After the supply of war-surplus frogman's fins dried up, for a long time fins were not available to the public, and some had to resort to such things as gluing marine ply to plimsolls.

● Captain Trevor Hampton founds the British Underwater Centre at Dartmouth in Devon in England.

● Rene's Sporting Goods shop (now owned by La Spirotechnique) becomes U.S. Divers, now a leading maker of diving equipment.

● 15 October 1953: The BSAC is founded.

● 1954: USS *Nautilus*, the first nuclear-powered submarine, is launched.

● The first manned dives occur in the bathyscaphe *FNRS-2*.

● First scuba certification course in the USA is offered by the Los Angeles County Department of Parks and Recreation. Program created by Albert Tillman and Bev Morgan now known as LA County Scuba.

● 1954: In the USA, MSA advertises (in Popular Mechanics magazine) a two-cylinder aqualung-like open-circuit diving set using the MSA regulator.

● 1955: In Britain, "*Practical Mechanics*" magazine publishes an item "Making an Aqualung".

● 1955: Jacques-Yves Cousteau and assistant director Louis Malle, a young film maker of 23, shoot *The Silent World*, one of the first films to use underwater cinematography to show the ocean depths in color.

● 1956: Wetsuits become available to the public.

● 1956: US Navy publishes tables that allow for repetitive diving.

● Around this time, some British scuba divers start making home made diving demand regulators from industrial parts, including Calor Gas regulators. (Since then, Calor Gas regulators have been redesigned, and this conversion is now impossible.)

● Later, Submarine Products Ltd in Hexham in Northumberland, England designed round the Cousteau-Gagnan patent and made sport diving breathing sets accessibly cheap. This forced Siebe Gorman's and Heinke's prices down and started them selling to the sport diving trade. (Siebe Gorman gave its drysuit the tradename "Frogman".) Because of this better availability of aqualungs, BSAC's policy towards rebreathers became merely "Here be dragons: keep out!" and remained so for a long time. In the USA, some oxygen diving clubs developed down the years. Eventually, the Cousteau-Gagnan patent time-expired and any firm could legally copy it.

● 1956: *The Silent World* receives an Academy Award for Best Documentary Feature, and the Palme d'Or award at the Cannes Film Festival.

● 1957: The television series *Sea Hunt* begins. It introduces scuba diving to the television audience. It ran until 1961.

● 1958: USS *Nautilus* completes the first ever voyage under the polar ice to the North Pole and back.

● 1958: The CMAS (World Underwater Federation) is founded in Brussels.

● 1959: NAUI is founded by Albert Tillman and Neal Hess.

● 1960: Jacques Piccard and Lieutenant Don Walsh, USN, descend to the bottom of the Challenger Deep, the deepest known point in the ocean (about 10900m or 35802 feet = 6.78 miles) in the bathyscaphe *Trieste*.

● USS *Triton* completes the first ever underwater circumnavigation of the world.

● In Italy, sport diving oxygen rebreathers continued to be made well into the 1960s.

● 1962: Robert Sténuit lives aboard a tiny one-man cylinder at 200 feet for over 24 hours off Villefranche on theFrench Riviera, becoming the world's first aquanaut.

● 1964: In France, Georges Beuchat creates the Jetfins, first vented fins.

● 1964-1969: The U.S. Navy's SEALAB underwater habitat project.

● 1965: Robert D. Workman of the U.S. Navy Experimental Diving Unit (NEDU) publishes an equation for computing decompression requirements suitable for implementing in a dive computer, rather than a pre-computed table.

● The film version of James Bond in *Thunderball* (using both sorts of open-circuit scuba) is released and helps to make scuba diving popular.

● 1966: PADI starts.

● 1968: First known rebreather with electronic parts is made: the Electrolung.

● 1971: Scubapro introduces the Stabilization Jacket, now in England commonly called stab jacket, and elsewhere Buoyancy Control (or Compensation) Device (BC or BCD).

● 1972: Scubapro introduces the decompression meter (the first analogic dive computer).

● 1976: Professor Albert A. Bühlmann publishes his work extending the equations to adapt to diving at altitude and with complex gas mixes.

● 1983: The Orca Edge (the first electronic dive computer) is introduced.

● 1985: The wreck of RMS *Titanic* is found. Air India Flight 182, a Boeing 747 aircraft, is found and salvaged off Cork, Ireland during the first large scale deep water (6,200 feet) air crash investigation.

● 1986 Apeks Marine Equipment introduced the first dry sealed 1st Stage developed by Alan Clarke engineering designer, later to house a patented electronic pressure sensor named STATUS.

● 1989: The film *The Abyss* (including an as-yet-fictional deep-sea liquid-breathing set) helps to make scuba diving popular.

● The Communist Bloc falls and the Cold War ends (*see Fall of Communism and dissolution of the Soviet Union*), and with it the risk of future attack by Communist Bloc forces including by their combat divers. After that, the world's armed forces had less reason to requisition rebreather patents submitted by civilians, and sport diving automatic and semi-automatic mixture rebreathers start to appear. See "rebreather history" link below.

● 1995: BSAC allows nitrox diving and introduced nitrox training.

● 1996: PADI releases their Enriched Air Diver Course.

● 1997: The film *Titanic* helps to make underwater trips onboard MIR submersible vehicles popular.

● 1998 August: Dives on RMS *Titanic* occur using Remotely Operated Vehicle controlled from the surface (Magellan 725). First ever live video broadcast from the sunken White Star liner is made.

● 1999 July: The *Liberty Bell 7* Mercury spacecraft is raised from 16,043 feet (4891 m) of water in the Atlantic Ocean during the deepest commercial search and recovery operation to date.

21st century

● 2001 December: The BSAC allows rebreathers to be used in BSAC dives.

● 2006 August 1: Equipped with an ADS 2000 atmospheric suit a US Navy diver establishes a new depth record: 2,000 feet deep (609 metres).

● 2009 June: NAUI approves the first Standard Dress Sport Diving course. The course is conducted in Australia, bringing antique helmet diving back. ●●●

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