Les Cottrell reference question regarding details of bringing the world-wide web to China

Accessions:

2009-034 1976-1998 (OffSite) B1 f1-10 Networking with China--emails
2007-049 1982-1985 videotapes
2007-040 1967-1979 Group A
2007-041 1979-1985 SCS
2007-004 1988-1989 SCS
2001-001B 1966-1993 videotapes
1997-022 1990 Nobel presentations
2001-001A 1966-1993 videotapes
2000-072 1990-1999 WWW collection B1f16 Networking with China
1991-003 1968-1968 Nobel presentation, Cottrell

1972		Zhang Wenyu, leading physicist in China interested in high-energy physics visits W. K. H. "Pief" Panofsky at SLAC.[1]
1976	October	W. K. H. Panofsky travels to the People's Republic of China, making stops in Beijing, Guilin, Guanzhou, Shanghai and Nanjing.[2]
1979	January 15-19	A group of eight scientists from the People's Republic of China visit SLAC as part of their overall visit to each of the large high energy physics laboratories in the United States.[3]
1979	January 31	United States and the People's Republic of China (PRC) sign an agreement to cooperate in the field of high-energy physics.[4]
1981	October 21	Fang-Yi, Vice-Premier of the People's Republic of China, visits SLAC.[5]

[1] Panofsky on Physics, Particles and Peace, p. 129-130. NOTE: Date published in book is wrong: 1972 is correct year.
[2] Panofsky on Physics, Politics and Peace. P. 130-131.
[3] SLAC 40th Anniversary photo book, page 55, photo ja007
[4] BL, Mar-Apr. 1980, p. 14.

1993	March 1	Direct computer networking link from SLAC to China's Institute for High Energy Physics (IHEP) established. [6]
1994	May 17	With assistance from SLAC, Beijing's Institute for High-Energy physics (IHEP) becomes the first Chinese institution to have a fully operational world-wide networking connection to the internet.[7]
2001	February	W. K. H. Panofsky receives the International Scientific and Technological Cooperation Award of the People's Republic of China for his "important contributions to the development of science and technology" in China.[8]

http://www.slac.stanford.edu/history/LesCottrell.shtml

I came to SLAC in 1967 fresh out of getting a PhD in Nuclear Physics at Manchester University England. At Manchester the relationship with the head of the physics department was very arms-length, and I do not believe I ever talked to him. At SLAC within 2 weeks I was invited to a meeting at Pief's home (at that time, he had regular evening meetings on High Energy Physics that he hosted at his home) and I met him face-to-face. It was not just a brief formal handshake, but we had a conversation where he asked me about my recent experiences and I remember being so impressed I blurted out the pleasant comparison to my previous experience at Manchester. I also recall soon after arrival my wife and I were coming back from a trip to the Sierras and decided to stop off at the Delta and see the birds, etc. Whom should we see there but Pief and Adele. I waved "Hi" and was wonderfully surprised when he replied and without hesitation knew my name.

I was part of the End Station A Inelastic Scattering experiments that later were rewarded with the Nobel Prize. We were running shifts and I recall in the evenings, long after normal work hours, Pief would come by and chat at length with the physicists on shift concerning progress and results so far. More recently, in 1990, Pief had invited Chinese physicists from IHEP in Beijing to discuss building a storage ring like SPEAR and a detector to go with it. I was asked to talk with them about computing and

[5] BL, Nov.-Dec. 1981 p. 4
[6] BL March 1993, p. 11.
[7] BL June 1994 , p 7.
[8] http://www.slac.stanford.edu/~pkreitz/pief.chinaward.html

networking requirements. At the meeting they invited me to visit to help set things up. Unsure whether this was just a polite gesture or whether I would be able to help (bear in mind this was less than a year after the Tiananmen Square massacre) I went to talk to Pief to ask advice. Pief stepped away from his desk to a couch in his office and sat me down in an armchair opposite. He then went on to say he wanted this collaboration not to be just in name for prestige, but to be very effective in producing excellent physics. As such he encouraged me to go and made sure the wheels were put in place. I mentioned that they did not even have a phone with automatic international dialing (all calls having to be made through a a human operator). He called Nobel prize winner T. D. Lee, who had a lot of influence in China, and when I arrived in China two weeks later, lo and behold there were two just-installed phone lines with automatic International access. The trip was an enormous success: we managed to get dial-up computer access to SLAC, and out of that, a couple years later extended it to the first permanent Internet access to mainland China.

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http://news.idg.no/cw/art.cfm?id=BF96082A-1A64-67EA-E4E2B7893EC1709B Pioneers of China's first Internet connection recall work 18.10.2010

Pioneers of China's first Internet connection recall work
o Michael Kan
18.10.2010 kl 13:35 | IDG News Service\Beijing Bureau

In 1993, Xu Rongsheng helped drop a bomb on Beijing. That bomb was the Internet.

In 1993, Xu Rongsheng helped drop a bomb on Beijing. That bomb was the Internet.

"This bomb is not a nuclear reaction. It's like information exploded," the Chinese scientist said.

Xu and physicist Les Cottrell worked to set up the first Internet connection in China. The two were reunited on Monday, videoconferencing by the very technology that they helped pioneer in the country.

The two scientists, who established the Internet connection during the early 1990s, reminisced about the experience at China 2.0, a technology conference in Beijing that was hosted by Stanford University.

"I can see you very clear by Internet now," Xu said to Cottrell, who was viewable through real-time video. "I see you didn't change much. But Beijing has changed very much."

China has the world's largest Internet population, with more than 420 million users, according to the Chinese government. But more than 15 years ago, hardly anyone in the country was using the Internet, except for a group of China's scientists.

The initial Internet connection was the result of a partnership between the Institute of High Energy Physics (IHEP) in Beijing and what is now the SLAC National Accelerator Laboratory in Menlo Park, California. The institutions had simply wanted to improve overseas communication to conduct research. Originally, IHEP could communicate to SLAC through a dial-up X.25 connection that allowed only one e-mail be exchanged once per day. The connection cost US$100 per hour.

In 1991, the institutions began working to establish a direct link with each other. Cottrell, who works at SLAC, traveled to Beijing, helping to first set up a direct modem connection between IHEP and SLAC.

Cottrell recalled initially thinking that the experience would be a "nice tourist trip." But he soon realized it had become a mission. The institutes faced challenges that included IHEP needing to install international phone line connections for the modem, as well as language barriers. Cottrell resorted to writing down all he said to ensure everyone understood his instructions.

"It was very easy to make a mistake because you didn't understand," he said. "It was increasingly difficult as we went on, but increasingly rewarding."

In March 1993, the two institutes had managed to establish a faster dedicated link at 64K bps (bits per second) using AT&T's SkyNet satellite service, an action which was approved by the U.S. Department of Energy.

The link allowed the institutes to exchange an average of 2,500 e-mail messages per day. But more importantly, certain physicists at IHEP could remotely log into SLAC's computers via the connection to access the Internet. A year later, after the U.S. government gave approval, IHEP would be allowed a direct link to the Internet without the need for remote access.

Xu, who works at IHEP, recalled that people at the institute thought establishing the connection was like "sending someone to the moon."

Only until 1995 was the first public Internet connection made available. Now China's Internet population is expected to exceed 470 million by the end of the year, according to Beijing based technology consultancy BDA.

The development of the Internet in China has been a surprise, said Cottrell, noting that he originally believed the Chinese government would forbid access to the Internet.

"I thought this would be due to the Chinese government trying to keep a lid on society," he said. "Of course as time has gone on, it's always been exciting how China has forged ahead, and how the Internet is really helping this."

http://www.pcworld.idg.com.au/article/128099/china_celebrates_10_years_being_connected_internet/?

China celebrates 10 years of being connected to the Internet

- IDG News Service staff (IDG News Service)

Networking a place in Chinese history

The origin of China's first Internet connection fittingly lies in an ongoing project to study energies and particles similar to those created during the formation of the universe.

The project, called the Beijing Electro-Spectrometer (BES) Collaboration, brought together physicists from the Institute of High-Energy Physics (IHEP) in Beijing and Stanford University's Stanford Linear Accelerator Center (SLAC).

While the written record of the events that led to China's first Internet connection is incomplete and the memories of those involved have faded with time, an internal document written in early 1994 records the establishment of the first full Internet connection between SLAC and IHEP on May 17, 1994.

That first Internet connection was the result of a joint effort between IHEP and SLAC that was designed to improve communications between physicists in the U.S and China who were working on the BES collaboration.

"By 1990, it was recognized that if people were going to be collaborating they needed to be able to communicate easily," said R. "Les" A. Cottrell, assistant director of SLAC's computer services department.

At that time, IHEP was connected to SLAC over a dial-up X.25 connection that ran between CNPAC, then China's national public data network, and the Lawrence Livermore National Laboratory in California. This connection, which was used to exchange e-mail once per day, was slow and expensive - costing around US$100 per hour and running up monthly bills of around US$10,000.

In addition to the link with SLAC, IHEP also had an X.25 connection through CNPAC with the European Center for Nuclear Research (CERN) in Geneva. The dial-up link with CERN, which was used to exchange e-mail, was established in 1987 and upgraded to X.25 in 1990.

By 1991, SLAC scientists working on the BES Collaboration were regularly travelling to Beijing. However, the daily exchange of e-mail left these researchers feeling out of touch with SLAC and unable to access programs and data that resided on SLAC's computers. To overcome this problem, several researchers involved with the BES Collaboration suggested establishing a direct link between SLAC and IHEP.

A delegation from IHEP that included Xu Rongsheng, then the deputy director of IHEP's computer center who would lead the Chinese effort to establish a direct link, was visiting SLAC at that time and was receptive to the suggestion of a direct link. A visa was quickly arranged for Cottrell to visit Beijing in March 1991 to look into the possibility of establishing a direct link between SLAC and IHEP.

The first step would be to establish a modem connection between IHEP's Digital Equipment Corp. VAX computers and SLAC using the DECnet protocol.

"We knew that if we could just plug a modem into the VAX, and then use the modem to talk to the phone to dial up, theoretically we ought to be able to make a connection all the way to SLAC," Cottrell said.

There was just one problem: IHEP had only one phone line that was capable of making international calls, a line that was used by the institute's international relations department to send and receive faxes. The only phone lines available at IHEP's computer center were connected to an operator and could not be used to establish a data connection.

"There's no point in me going unless there's a phone line," Cottrell recalled telling the IHEP delegation, requesting that three phone lines capable of making international calls be installed ahead of his visit - one line to experiment with a modem connection to SLAC, a second line to allow direct voice connections and a third to be used as a backup in case something went wrong.

When Cottrell arrived in Beijing carrying a 9600-bps (bits per second) Telebit Corp. T2500 modem in his luggage, the three phone lines had been installed and were waiting for him. Before long, Cottrell, working with Charles Granieri, a computer systems specialist at SLAC, was able to get a direct modem connection between IHEP and SLAC that transmitted data at about 900 bps.

"We were able to log on to SLAC and we were able to do some real work," Cottrell said.

In addition to allowing access to SLAC's computers from IHEP, the DECnet connection was cheaper than the X.25 link, costing around US$4,000 per month.

While the DECnet connection between SLAC and IHEP offered significant improvements over the X.25 link, the experiments being conducted by the BES Collaboration still required a better connection. To that end, SLAC approached the U.S. Department of Energy and quickly won approval and funding to establish a dedicated 64K bps link using AT&T's SkyNet satellite service.

Getting the dedicated 64K bps connection up and running would prove more difficult than expected, lasting nearly two years. The initial plan was to connect SLAC with satellite earth stations in California and at Beijing's Capital International Airport. From the airport, a 35-kilometer microwave link would connect the earth station with the local phone exchange's fiber optic network, which would cover the last 15 kilometers to IHEP.

But problems getting the connection to work forced planners to instead use a copper link to cross the final two blocks between IHEP and the fiber optic network.

By early 1993, the Beijing Telecommunications Administration had succeeded in getting the connection to work with acceptable error rates and the link was officially handed over to IHEP on the morning of March 2, 1993.

"That was the first leased line in China," Xu said.

The improvements offered by the dedicated 64K-bps link, which initially used the DECnet protocol, were immediately noticeable. Tests showed the link offered a file copy rate of around 42K bps, a significant improvement over the 9600 bps modem that had previously been used to connect IHEP and SLAC. During 1993, the link was used to exchange an average of 2,500 e-mail messages per day, many of which were forwarded by SLAC to recipients in other countries via the Internet.

The dedicated link also allowed Internet access for physicists at IHEP who had an account that allowed them to access SLAC's computers. By remotely logging in to SLAC's computers, these researchers were also able to access the Internet. However, this connection did not offer full Internet access to all of the researchers at IHEP.

The IHEP-SLAC connection cost around US$10,000 per month, split between the U.S. and Chinese sides, less than the combined monthly cost of the X.25 and dial-up DECnet connections in 1991, which could cost as much as US$14,000 per month.

In the beginning, about 300 of China's top professors and scientists had access to IHEP's computers over dial-up connections but the dedicated connection soon drew interest from other academic and research institutions and raised hopes for a dedicated connection from China to the Internet.

Connecting IHEP to the Internet would have been possible when the dedicated link with SLAC was established in March 1993, but the U.S. government -- whose concerns were heightened in 1993 by tensions over alleged human rights violations in China and evidence that Chinese users were using the dedicated link with SLAC to access the Internet and copy files located on other U.S. servers -- would not allow the connection to be made, instead limiting use of the link to communication between researchers at IHEP and SLAC.

With the 64K bps connection operational between SLAC and IHEP, the final requirement necessary for Internet access was U.S. government approval to expand the scope of connectivity with IHEP and for the installation of a TCP/IP (Transmission Control Protocol/Internet Protocol) router. The approval was held up by U.S. government concerns that the router -- which was from Cisco Systems Inc. -- would be unable to handle connections above 64K bps.

In addition to SLAC and IHEP, plans to upgrade the link to a TCP/IP connection with the Internet also involved the U.S.-based Energy Sciences Network (ESnet), which was overseen by the U.S.

Department of Energy and provided Internet connectivity to SLAC. Approval to use a TCP/IP connection was slow in coming, with the U.S. Department of Commerce finally issuing approval for the export to China of the first TCP/IP router at the end of 1993.

The Cisco router arrived in Beijing in February 1994 and was installed at IHEP in March. At that point, ESnet took over management of the U.S. end of the link from SLAC, one of the final steps towards opening the Internet connection with China.

Two months later, on April 18, 1994, ESnet sent out an e-mail to announce it planned to begin carrying Chinese IP traffic and on May 17, 1994, a full Internet connection was established by ESnet that linked the IHEP-SLAC connection with FIX-West, at that time the interconnection point on the U.S. West Coast for all of the major IP networks.

China never looked back.

Sumner Lemon and Stephen Lawson

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http://www.youtube.com/watch?v=hzqr5x8dPV0 China's first Internet Connection

Uploaded on Oct 15, 2010

Today China's online population probably can't imagine life without the Internet. But in early 1994, China didn't even have an Internet connection. This is the story of how the first connection was established between the then-Stanford Linear Accelerator Center (SLAC) at Stanford University and the Institute of High Energy Physics (IHEP) in Beijing.

3/2/1993 – first connection from US to China

Connection to IHEP in 1993