

The 20th century
was shaped by
the rise of
professionals.
But now a new
breed of amateurs
has emerged . . .



The Pro-Am Revolution

How enthusiasts are changing
our economy and society

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1. Pro-Am power

Rap music, the Jubilee Debt Campaign, the Linux open source software movement and *The Sims* computer game have all left their mark on the world in the last decade. Rap infects all popular culture. The Jubilee campaign led to billions of dollars of developing world debt being written off. Linux is one of the biggest challengers to Microsoft. *The Sims* is one of the most popular computer games ever. These developments have one thing in common: they were all driven by Pro-Ams, innovative, committed and networked amateurs working to professional standards. This emerging group, the Pro-Ams, could have a huge influence on the shape of society in the next two decades.

According to many commentators, the 1990s were a decade in which large corporations were rampant, their control over society virtually unchallenged.¹ Yet the rise of Pro-Ams suggests counter trends were at work as well.

Rap started as do-it-yourself music, among lower income black men from distressed urban neighbourhoods in the US, who used their lyrics to draw attention to their feelings of anger, frustration and violence. Most Rap was originally performed by artists in their own homes, with their own inexpensive equipment. It was distributed on handmade tapes, by local independent record labels. Yet within two decades urban black music has become the dominant force in global popular culture. It is not the only Pro-Am movement transforming

popular music. Do-it-yourself file sharing, through Napster and its offspring, Kazaa and others, has created a peer-to-peer Pro-Am distribution system.

Linux, the computer operating system, started life in September 1991, when Linus Torvalds, then a pasty-looking computer student at Helsinki University in Finland, posted the source code for his new operating system on the internet and asked his fellow software enthusiasts to make criticisms, propose improvements, take it away and tamper with it. They responded in droves. Torvalds set off a process of mass, participatory innovation among thousands of Pro-Am software programmers. Many of them program software for a living but became involved in Linux in their spare time because the spirit of collaborative problem-solving appealed so strongly.

By 2004 about 20 million people around the world were using a version of Linux. There were 430 user communities in more than 72 countries and more than 120,000 registered Linux users, many of whom helped with its development.² Linux is just one of several internet-related innovations that have emerged from groups of Pro-Ams.³ Half the websites on the internet depend on Pro-Am, open source Apache software. Most email uses sendmail, a program created by Pro-Ams. Usenet newsgroups are supported by the hacker-created INN program and the internet's plain language address system, eg www.demos.co.uk, depends on the Pro-Am-created BIND program. The personal computer started life in the Pro-Am Homebrew Computer Club.⁴

The Jubilee 2000 debt campaign, which changed the way we think about debt and international development, started life with one campaigner working in a shed near London's South Bank in the mid-1990s. By the year 2000 it had a petition with 24 million signatures, had spawned a network of 69 national campaigns and mobilised hundreds of thousands of people in protest in the UK. At least US\$36 billion of developing world debt has been written off as a result. No mean achievement for a campaign that was largely organised by Pro-Am campaigners, and had little formal structure and few professional staff. The Jubilee Debt Campaign as it is now known, is just one

outstanding example of the way that Pro-Am political campaigners are driving single issue, pressure group politics. The massive growth in non-governmental organisations around the world in the last decade is largely due to Pro-Am political campaigners. Pro-Ams are reshaping the way democracy works.⁵

Finally, take *The Sims* computer game. A *Sims* player can create their own family home on a computer and watch the inhabitants sleep, eat, argue, marry, make love, fight and die. Before the online version was shipped, the designers released tools that allowed players to create their own content for the game: furniture, accessories, even architectural styles for houses. Within a year of the game's initial release there were hundreds of independent content creators, more than 200 fan websites displaying more than half a million collectable items available to the game's millions of players. More than 90 per cent of the content in the *Sims* game is now created by a Pro-am sector of the *Sims* playing community. One estimate is that there are 30,000 Pro-Am modifications to the *Sims* game that can be downloaded from the internet. The *Sims* community is a distributed, bottom-up, self-organising body of Pro-Am knowledge, in which players are constantly training one another and innovating.⁶ This is just one among many examples of how communities of Pro-Am gamers are helping to co-create the games they play.

Pro-Am power is not confined to the high-tech, developed world. It also works in some of the poorest communities. Many of the social and medical advances of the twentieth century – especially in health, social work, finance and education – have relied on providing people with access to professional expertise: teachers deliver education, doctors cure disease. Many of these advances have bypassed people in the developing world where professionals are scarce and expensive. Professionals create a distribution bottleneck. That is why many of the most imaginative social innovations in the developing world employ Pro-Am forms of organisation.

An outstanding example is Bangladesh's Grameen Bank founded in 1976 by Muhammad Yunus, a Bangladeshi economics professor, to provide very poor people with access to microcredit to allow them

to improve their houses and invest in businesses. Traditional banks, reliant on professional expertise, regarded poor people seeking small loans as unprofitable. Grameen built a different model, based on Pro-Am expertise. It employs a small body of professionals who train an army of barefoot bankers. Village committees administer most of Grameen's loans. This Pro-Am workforce makes it possible to administer millions of tiny loans cost-effectively. By 2003, Grameen had lent more than US\$4 billion to about 2.8 million Bangladeshis, including 570,000 mortgages to build tin roofs for huts to keep people dry during the monsoons. Had Grameen relied on traditional, professional models of organisation it would only have reached a tiny proportion of the population.⁷

These five examples show that when Pro-Ams are networked together they can have a huge impact on politics and culture, economics and development. Pro-Ams can achieve things that until recently only large, professional organisations could achieve.

The twentieth century was shaped by the rise of professionals in most walks of life. From education, science and medicine, to banking, business and sports, formerly amateur activities became more organised, and knowledge and procedures were codified and regulated. As professionalism grew, often with hierarchical organisations and formal systems for accrediting knowledge, so amateurs came to be seen as second-rate. Amateurism came to be a term of derision. Professionalism was a mark of seriousness and high standards.

But in the last two decades a new breed of amateur has emerged: the Pro-Am, amateurs who work to professional standards. These are not the gentlemanly amateurs of old – George Orwell's blimpocracy, the men in blazers who sustained amateur cricket and athletics clubs.⁸ The Pro-Ams are knowledgeable, educated, committed and networked, by new technology. The twentieth century was shaped by large hierarchical organisations with professionals at the top. Pro-Ams are creating new, distributed organisational models that will be innovative, adaptive and low-cost. An outstanding example of how Pro-Ams are transforming a field is astronomy.

Pro-Am, open source astronomy

On the night of 23 February 1987, light reached Earth from a star that had exploded on the edge of the Tarantula nebula 168,000 years earlier. The supernova was enormous and was the first to be witnessed by the naked eye since 1604. In the Chilean Andes, Ian Shelton, an avid amateur astronomer who was on the verge of turning professional, took a photograph with a 10" telescope. Shelton went down in history as the man who discovered supernova 1987A.⁹

That night two other dedicated amateur astronomers were at work. Albert Jones, a veteran with more than half a million observations to his credit, had taken a good look at the Tarantula nebula earlier but had seen nothing unusual. Robert McNaught, another Pro-Am, photographed the explosion at 10.30 UT in Australia.¹⁰

Together these amateurs played a vital role in confirming a theory that explains what happens when a star explodes. Astrophysicists theorised that when a star explodes most of its energy is released as neutrinos, low-mass, subatomic particles which fly through planets as if they are not there. When a star explodes the neutrinos should exit at high speed and arrive on earth two hours before the light.

On the night of 23 February a large storm of neutrinos from Shelton's supernova was detected by labs in the US and Japan at 7.35 UT. According to the theory the first light should have arrived at 9.35 UT. Jones checked his meticulous records and confirmed that when he was looking at Tarantula at 9.30 UT he had not seen any sign of an explosion. That meant the neutrinos had already arrived yet the light had not, just as the theory predicted. When McNaught's photograph from Australia was taken at 10.30 UT, the light of the explosion was visible. A key theory explaining how the universe works had been confirmed thanks to amateurs in New Zealand and Australia, a former amateur turning professional in Chile and professional physicists in the US and Japan. These were the joint authors of the discovery made by a loosely connected Pro-Am team.

As Timothy Ferris points out in *Seeing in the Dark*, his history of modern amateur astronomy: 'If one were to choose a date at which

astronomy shifted from the old days of solitary professionals at their telescopes to a worldwide web linking professionals and amateurs . . . a good candidate would be the night of February 23rd 1987.¹¹ Astronomy is fast becoming a science driven by a vast open source Pro-Am movement working alongside a much smaller body of professional astronomers and astrophysicists.

Amateurs laid the foundations for modern astronomy. Copernicus, who moved the sun to the centre of the universe, was only a sometime astronomer. Johannes Kepler, who discovered that the planets orbit in ellipses made most of his money from horoscopes. But by the twentieth century the pendulum had swung decisively in favour of the professionals, for one simple reason: scale. Professional astronomers had access to huge telescopes, like Jodrell Bank in the UK or the Mt Wilson Observatory near Pasedena where Howard Shapley established that the Sun is located to one edge of our galaxy and Edwin Hubble determined that the galaxies are being carried away from one another into cosmic space. Professionals probed the outer depths of space, home to the most troubling scientific mysteries. Amateurs, with their puny telescopes, concentrated on closer, well known and brighter objects.

But in the last two decades three linked innovations have turned astronomy into an open source, Pro-Am activity. A disruptive innovation made powerful telescopes cheap enough for the average astronomer. John Dobson, a one-time monk and lifelong star gazer designed a crude but powerful telescope using discarded and secondhand materials. Dobson's philosophy was pure open source: 'To me it's not so much how big your telescope is, or how accurately your optics are, or how beautiful the pictures you can take with it; it's how many people in this vast world less privileged than you have had a chance to see through your telescope and understand this universe.'¹² Dobson refused to profit from his invention, which he never patented. Soon many companies were making Dobsonian telescopes. Observers armed with a mighty Dobsonian could invade the deep space that had previously been the preserve of the professionals. Then the CCD (charged coupled device) came along, a

highly light-sensitive chip, which could record very faint starlight much faster than a photograph. Amateurs who attached a CCD to a large Dobsonian found themselves with light-gathering capacity to match the giant 200" telescopes professionals had used 20 years earlier.

An open source catchphrase is that 'many eyes make bugs shallow': the more programmers looking at a problem, the easier it is to solve. The same is true of some aspects of astronomy. Thanks to Dobsonian telescopes with CCD sensors the Earth acquired hundreds of thousands of new eyes, probing deep space, recording events that would have gone unnoticed by the much smaller body of professionals. This distributed capacity for exploration and observation was vastly enhanced by the internet. Before the internet, an amateur who had discovered something new would send a telegram to the Harvard College Observatory. Once the professionals had checked out the claim, they would mail a postcard to observatories around the world. These days if amateurs finds something interesting they can email the image to friends, colleagues and professionals within minutes. Crude Dobsonian telescopes armed with CCDs have given the Earth thousands of new eyes, says Ferris; the net provided it with new optic nerves.

In the 1990s, thanks to these three innovations, new forms of organisation started to emerge. Astronomy used to be done in 'big science' research institutes. Now it is also done in Pro-Am collaboratives. Many amateurs continued to work on their own and many professionals were still ensconced in their academic institutions. But global research networks sprang up, linking professionals and amateurs with shared interests in flare stars, comets and asteroids. Pro-Am astronomers tracked the weather on Jupiter and craters on Mars as accurately as professionals. They detected echoes from colliding galaxies and more than one million Pro-Am astronomers in more than 200 countries are contributing their computers' idle time to analyse data that might be evidence of extraterrestrial life.

There are limits to what Pro-Ams can achieve. Amateurs do not produce new theories of astrophysics. Sometimes amateurs do not

know how to make sense of the data they have acquired. Yet the future of astronomy, and perhaps after it biology and other sciences, will be as a Pro-Am activity, with dedicated amateurs and professionals working in tandem, motivated by the same sense of excitement about exploring the universe. As John Lankford, a historian of science put it in *Sky & Telescope* magazine, the bible of US amateur astronomers: ‘There will always remain a division of labour between professionals and amateurs. But it may be more difficult to tell the two groups apart in future.’¹³

Some professionals will seek to defend their endangered monopoly. The more enlightened will understand that knowledge is widely distributed, not controlled in a few ivory towers. The most powerful organisations will combine the know-how of professionals and amateurs to solve complex problems. That is true in astronomy, software development and online games. It should be the path that our health, education and welfare systems follow as well.

Notes

- 1 N Klein, *No Logo* (London: Flamingo, 2000); N Hertz, *Silent Takeover: global capitalism and the death of democracy* (London: William Heinemann, 2001).
- 2 I Tuomi, *Networks of Innovation* (Oxford: Oxford University Press, 2001).
- 3 For an account of a Pro-Am culture that preceded and paved the way for the internet, see D Gregory and P Share, *Hello World: a life in ham radio* (New York: Princeton Architectural Press, 2003).
- 4 P Himanen, *The Hacker Ethic* (London: Secker and Warburg, 2001).
- 5 P Miller, 'The rise of network campaigning', in H McCarthy, P Miller and P Skidmore (eds), *Network Logic: who governs in an interconnected world?* (London: Demos, 2004).
- 6 JC Herz, *Gaming and the Art of Innovation* (Amsterdam: Doors of Perception Conference, Nov 2002); available at: www.doorsofperception.com
- 7 For an account of Grameen's growth and other social entrepreneurs, see David Bornstein, *How to Change the World* (Oxford: Oxford University Press, 2004).
- 8 L Allison, *Amateurism in Sport* (London: Cass, 2001); A Smith and D Porter, *Amateurs and Professionals in Post-War British Sport* (London: Cass, 2000).
- 9 T Ferris, *Seeing in the Dark* (London: Simon and Schuster, 2002).
- 10 UT is Universal Time, the standard astronomers use, the equivalent of Greenwich Meantime.
- 11 T Ferris, *Seeing in the Dark*.
- 12 See www.space.com/scienceastronomy/astronomy/dobson_astronomer_000507.html
- 13 J Lankford, in *Sky & Telescope*, November 1988.
- 14 One of the few books to explore the nature of amateurism and professionalism is R Stebbins, *Amateurs, Professionals and Serious Leisure* (Montreal: McGill-Queens University Press, 1992).
- 15 R Abrams, *The Playful Self* (London: Fourth Estate, 1997).
- 16 R Putnam, *Bowling Alone* (London: Simon and Schuster, 2000).
- 17 See www.pewinternet.org