OPUNTIA

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Whole-numbered OPUNTIAs are sercon, x.1 issues are reviewzines, x.2 issues are indexes, x.3 issues are apazines, and x.5 issues are perzines.

LETTERS TO THE EDITOR

[Editor's remarks in square brackets]

FROM: Franz Zrilich 2006-05-27
4004 Granger Road
Medina, Ohio 44256-8602

I am curious. How does the Canadian postal code system work?

[The first letter is the province or part of province (for heavily populated Ontario and Québec). Thus all Alberta addresses have the letter T. The next two digits indicate the city or part of city, thus 2P is downtown Calgary. (I actually live in a suburb but I get my mail at the downtown post office.) The final three digits are a lettercarrier walk or postal box group. Large-volume mail addresses have their own individual postal code.]

[Re: uranium reserves] I remember a vague statement from over thirty years ago that most granite has enough trace uranium in it to give us an infinite supply, but I am not certain if current technology can economically extract it.

[The uranium concentration in granite is too low to be economic. This is why prospectors spend so much time buzzing about the Canadian Shield with a Geiger counter looking for mother lodes.]

[Re: the 1936 Alberta Prosperity Certificate] Germany in the 1920s and 1930s introduced varied types of currency for internal use, paying for foreign trade, national debt, and so forth. There are proposals even now in the USA to pay off the foreign trade deficit with foreign trade dollars that could be used only to export American agriculture and manufactured goods. Foreigners thus could not buy up more American firms.

[This would trigger an international trade war against the USA, since American firms own many overseas companies.]

FROM: Lloyd Penney 2006-06-02
1706 - 24 Eva Road
Etobicoke, Ontario M9C 2B2

In this Internet era, I must wonder if some of the youngest children know what an envelope is. Paper mail must be an oddity, perhaps one they'll never have to deal with once life becomes totally computerized and digitized.

[Latest figures show that while first-class mail is declining, direct mail is increasing because businesses are getting better results with the Papernet than the Internet. People are reluctant to open unsolicited e-mails, assuming the spam filters didn't block them altogether, and few click on banner ads anymore. Direct mail, on the other hand, is not threatening, and if properly targeted, is considered useful.]

I Also Heard From: John Held Jr, Sheryl Birkhead, Kris Mininger, Chester Cuthbert, Ficus, Terry Jeeves, Brant Kresovich, Ned Brooks, Henry Welch, Don Mabie, Diane Bertrand, Phlox Icona, Jeanette Handling, C.Z. Lovecraft, Peter Netmail

WORLD FANTASY CONVENTION 2008

Calgary will host the World Fantasy Convention the weekend of October 31 to November 2, 2008, at the Hyatt Regency Hotel in the downtown core. Attending membership is $100 until September 30, 2007. Cheque, money order, Visa, or Mastercard accepted. The mailing address is Box 61178, Calgary, Alberta, T2N 4S6.

In an unrelated note, it appears that Con-Version, Calgary's annual SF convention, is being revived. Much talk but no details yet. Keep watching the skies!

THERE'S SOMETHING THAT HAPPENED HERE

by Dale Speirs

For What It's Worth.

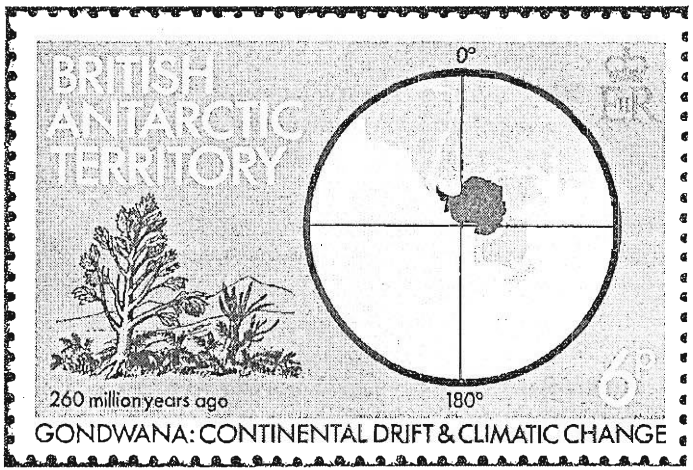
The planet Earth has had five major extinctions of life, known as mass extinctions, in the four billion years since life first evolved. The mass extinction that most people can name is the K-T extinction, when dinosaurs died out at the end of the Cretaceous era, and the succeeding Tertiary era opened with the rise of the mammals. The K-T extinction was not the worst though. 251 megayears ago, give or take a million years, 95% of all life died out, the greatest extirpation short of a complete kill-off. The geological record of that event straddles the boundary line between the Permian and Triassic eras, and is known as the end-Permian extinction event.

Studies as to what caused the event have historically been hampered by the fact that the best Permian strata of rocks happen to be in places like Iraq, Afghanistan, Kashmir, and China. All manner of causes for the end-Permian extinctions have been proposed, such as mass volcanic eruptions, asteroid impact, mass methane release from the ocean floor, and climate change. Even the timescale is not 100% certain. Once the extinction event was thought be instantaneous or to have taken as long as 10 megayears but it is now believed that the mass extinction occurred within the space of a few kiloyears [1]. It also appears that there was not a single short, sharp shock, but rather several stressors prior to the decline, a main extinction, and some follow-on extinctions as the Earth's ecosystems collapsed. The Permian extinction was therefore not a single event [2].

There's Something Happening Here.

Analysis of end-Permian rocks shows massive global warming by an average of 6 degrees Celsius (in our modern times, we are getting excited because the Earth is warming by a couple of degrees) and a huge input of carbon into the atmosphere [3]. The average temperature rise on a global scale may not sound like much, but bear in mind that it is an average. Warm regions might heat up slightly, but cool areas will warm up immensely. Unlike our current warming episode, which still allows some cold spots, the Permian Earth heated up everywhere. The Permian warming was exacerbated by the fact that the Earth was just coming out of massive and extended glaciation during the previous 50 megayears [4]. Most of the existing life forms were adapted to this cooler climate. The sudden change to an oppressively warm climate put almost all species of plants and animals under stress just before the end-Permian events struck. This stress made life forms more susceptible to the events that were about to prevail.

During the Permian-Triassic interval, the shallow seas regressed, eliminating habitat for large numbers of marine animals. Coral reefs disappeared, and ecosystems had low species diversity. Diversity is important because the more species an ecosystem has, the more stable it is. There were abundant evapourite deposits, indicating many bodies of water dried up and left only salt deposits behind [5]. Land plants died off almost entirely, and coal bed deposits stop at the Permian boundary. There is no early Triassic coal. As a result, erosion increased substantially, and the boundary line is represented in the geological record by a sudden change from coal or gradually-deposited sediments to thick layers of sediment [39].



During the Permian, there was only one supercontinent, called Pangea. The climate became uniform worldwide; in a word, hot. CO_2 began increasing and ran away, warming up the ocean and delivering more heat to the poles. This dried out the middle latitudes as the temperature increased. The ocean heated up so much that the water expanded in volume and sea levels then rose 20 metres, re-flooding the shallow areas but with deoxygenated water that would not support life [6]. The air was heavily laden with sulphides and CO_2; humans visiting via a time machine would need breathing apparatus to survive any length of time.

What It Is Ain't Exactly Clear.

Originally, because of difficulty in finding good strata of rocks straddling the Permian-Triassic division, it had been thought that there was a single massive extinction. China has opened up considerably in recent decades, and among other things, it happens to have excellent fossil beds. Other countries have had their Permian strata re-studied by newer technology and techniques, although it is doubtful that there is much being done with the Permian strata of Iraq, Afghanistan, and Kashmir. Few palaeobiologists are dedicated enough to excavate fossils while under incoming artillery fire. It is now believed that rather than a single event, there was a gradual decline just before the main event, and then subsequent smaller extinctions as ecosystems

toppled like dominoes. The gradual decline was due to the end of a 50-megayear glaciation which covered large portions of the planet. Plant and animal life had adapted to a cool climate, but were now re-adapting to a warmer climate. (As indeed is happening today in the polar regions.)

Matters are complicated by having to take into consideration whether any species changes or extinctions at a fossil site are due to global events or just a regional event, local climate change, or fossil preservation bias [7]. However, with enough properly dated fossil sites, a picture can slowly be built up of global extinctions and changes.

The extinctions were not simultaneous for all types of life forms because some ecosystems held on longer than others, or took more time to decay. It does appear that when they started, the extinctions initially affected both marine and terrestrial life at the same time, a strong indicator that there was a global, not local, cause. However, the ecosystems did not collapse together in lock-step. There was a significant delay between the collapse of the terrestrial ecosystem and extinction of various plant groups, while at the same time the marine invertebrates were rapidly declining [36].

Strata in east Greenland show that the initial extinctions on land and sea happened over 10 to 60 kiloyears, although it took another few hundred kiloyears for the final disappearance of the Permian flora [8]. Italian strata show that a group of marine shelly algae known as foraminifera died out within 30 kiloyears of the start of the main event [21]. Studies on fossil soil layers (palaeosols) in the Antarctica show that a sudden change in chemical weathering of the palaeosols took place at the Permian-Triassic boundary. Sudden, in this case, means less than 10 kiloyears, almost instantaneous in geological terms [22].

Everybody Look What's Going Down.

On land, large herbivorous animals had adapted themselves to munching on the dominant type of Permian plants, called glossopterids. These plants had initially evolved prior to the megaherbivores, and by the pressure of natural selection, began evolving into woodier, less palatable plants. That process, coupled with climate change, stressed the megaherbivores, and left them vulnerable to the first main extinction event [10, 11]. A study on Russian vertebrate fossils across the Permian boundary showed a 90% loss of species during the end-Permian. In the early Triassic, as the Earth was recovering from the crisis, the terrestrial ecosystem had low diversity. Even after 15 megayears of recovery, there were still no small fish or insect eaters, large herbivores, or top carnivores [35]. This was not due to sampling effects of the fossil beds, as hundreds of specimens were analyzed over 13 strata.

A mass die-off of rooted land plants triggered an increase in erosion, since there was nothing left to hold the soil. (As an aside, the emergence of land plants 200 megayears earlier is dated in part by the exact opposite observation, that as plants spread on land, sediment deposit into the ocean declined.) Australian strata show layers of burnt glossopterids, then eroded soil, and then finally new plant remains from fern-like species [27]. The land plant die-off resulted in the subsequent deposit of sediments into the ocean and freshwater bodies. The influx of sedimentary organic matter into the ocean marked the sediments with a distinct layer of polysaccharides derived from the decay of plant matter. The influx of sediments into the ocean is also simultaneous with the extinction of almost all vertebrates [14 to 16].

In the ocean, shelly animals disappeared faster than bottom crawlers as anoxic (no oxygen) waters spread [9]. In the following era of the early Triassic, shelly species were unusually small and usually rare. There was also low species richness [19]. Alterations in seawater salinity can disrupt shelly species, since it is from the water that they must take their calcium or magnesium to build their shells. A change in salinity also affects metabolism. The end-Permian event is marked by major changes in atmospheric and water chemistry, so this would have a definite effect on ecosystems [28].

On the ocean floor, sediments rapidly changed to flat-pebble conglomerates and microbial mats, both of which require lack of turbidity or digging by animals [17].

The mixing of sediments is considered a marker of mobile multicellular life with legs. Bioturbation, as it is called, is a distinctive sign of digging or burrowing aquatic animals. Such animal tracks or burrows are not easily confused with wave action or current flow. As in the case of land plants reducing erosion, the presence or absence of bioturbation tells a lot about the ecosystems even in the absence of fossils.

Resistance From Behind.

Most types of life forms died out or were severely thinned during the end-Permian crisis. Some did alright though, and actually prospered. Most such groups were those which had been pushed to the margins during life's earlier evolution, but now had a chance to come back from behind in the absence of their superiors. Microbes in particular expanded considerably after the major faunal and floral die-offs [20].

Coral reefs died out from the over-heated waters, and the early Triassic is defined in part by the absence of corals. Reefs were replaced by stromatolites, which are built-up layers of mat-growing algae and photosynthetic bacteria [18]. Stromatolites date back to the dawn of life, but are very rare today because they have difficulty withstanding bioturbation. With no bottom-living

marine animals to disrupt them, mat-forming microbes were able to grow up into reefs.

Woody plants died back more severely than herbaceous plants during the end-Permian crisis. This resulted in a large outburst of a type of fungi known as saprophytes, which feed on decaying wood or dead matter. The crisis was a good time to be a mushroom. Large biomasses of fungi fossils are found everywhere during the end-Permian, regardless of ecosystem type [13]. This is another indicator that the crisis was a global affair.

Many families of life forms dwindled down to a few species living in what had now become the marginal habitats, the cooler places such as the poles or mountaintops. Cooler might mean only a few degrees, but enough that a species could hang on, albeit not thrive.

Battle Lines Are Being Drawn.

The cause of the end-Permian extinctions is still being argued by palaeobiologists. This is a classic case of how everything looks like a nail to a man with a hammer. Vulcanologists believe the main cause of the catastrophe was massive floods of lava that covered eastern Siberia. Astrophysicists, bolstered by the dinosaur crowd, believe that the end-Permian events were caused by an asteroid impact. Petroleum geologists push the case for sudden massive releases of ocean-bed methane gas causing runaway warming. Oceanographers support a sudden release of sulphides into the air as a result of sulphide buildup in the ocean bottoms suddenly breaking loose.

With the success of the asteroid impact hypothesis to explain dinosaur extinction, astrophysicists began looking at the other mass extinctions, hoping for another iridium layer and buried crater. The end-Permian crisis was an obvious suspect, since there were sudden increases in greenhouse gases, apparently sudden increases in extinctions, chemical changes in palaeosols, and sulphur all over the place. Unfortunately for impact theorists, the Siberian lava flows are dated to the exact boundary of the end-Permian, while no one has been able to locate a good crater. All of the aforementioned signs of an impact can also be explained by flood vulcanism as well. In short, the impact hypothesis is fading fast and seems likely to be an also-ran [24 to 26].

Another hypothesis that appears to be an also-ran is sulphide turnover [29 to 30]. The basic idea is that there are anoxic basins in the ocean which accumulate hydrogen sulphide. Eventually it accumulates past the holding capacity of the water and the ocean burps it out into the atmosphere at greater than 2,000 times the current annual output from volcanoes. Besides being toxic even in very low concentrations, hydrogen sulphide in such quantity would destroy the ozone layer

that shields us from radiation and trigger a greenhouse effect. The problem here is that while sulphide concentrations did increase at the end-Permian, the increase could just as easily be explained by impact or vulcanism [34].

Not so far removed but not so far back in the pack as the sulphide hypothesis is the proposal that the end-Permian was triggered by massive releases of methane gas hydrates from the ocean floor [31 to 33]. Methane is explosive at 5% to 15% concentration in the atmosphere, and the initial release would trigger explosions and tsunamis. It is also a greenhouse gas and would oxidize to CO_2, thus triggering runaway climate warming. There is no reason why it could not have happened together with the Siberian vulcanism, and the mechanism is plausible.

What A Field Day For The Heat.

In recent times, the evidence for the main cause of the end-Permian crisis seems to be shifting towards flood vulcanism. There have been no flood volcanoes since humans evolved, for which much relief. These are not the usual volcanoes blowing their tops, nor just a larger than average volcano. Flood vulcanism is the result of a rift in the Earth which pours out lava in endless tsunamis and affects the entire planet's climate adversely.

It happens that there is one such episode that is precisely dated to the end of the Permian, which took place is what is now eastern Siberia [23]. The lava deposits cover eastern Siberia to a depth of 6.5 kilometres. Not metres, but kilometres. Taller than modern volcanoes, enough to bury the Rocky Mountains under a plateau.

Hooray For Our Side.

Life is not easily beaten down. Certainly the microbes can survive extreme conditions, and much multicellular life did make it past the Permian crisis. When the recovery began in the early Triassic, there were still large fluctuations in carbon as the ecosystems bounced back and forth, and it was about 8 to 10 megayears before the planet began to settle down again. This was due to intermittent degassing of CO_2 along the continental margins, and it took megayears to finish burping up all the remaining pockets of gas [38, 42]. The best surviving species were ecological generalists who could adapt or at least survive a wide range of ecosystems [43]. The high latitudes cooled off sooner, and life recovered faster from the poles than in equatorial regions [44].

It was in many ways a random dice shoot as to which species made it through and which didn't. Small reptiles survived [37]. In the ocean, crinoids (sea lilies) and ammonites (shelled squids) re-appeared first. Other shelly animals had a long slow recovery

because of continuing anoxic conditions [8]. Ammonites, by the way, didn't make it past the K-T extinction and died out with the dinosaurs. (See stamp below for ammonite depiction.)

The glossopterid plants were gone, but seed ferns survived and spread out into the vacant niches, eventually becoming so dominant that the late Triassic is sometimes called the Age of Ferns [40]. In what is now Europe, coniferous trees had been dominant before the crisis, but were nearly extirpated. For the next four or five megayears, the lycopsids (a primitive moss that in those days looked like horsetail moss but were the size of trees; about 80% of coal from the later Triassic is lycopsid) dominated the forests of Europe. The conifers eventually made a comeback after 0.5 megayears, but it took them longer to regain their previous dominance [41]. The lycopsids had their own problems. The reduced ozone layer increased the strength of ultraviolet light getting through. Lycopsids have exposed spores which are susceptible to ultraviolet radiation. This increased mutation rates, and a large proportion of the fossil spores are abnormal [12]. Plants generally survived along freshwater rivers and lakes, and then slowly spread back into the continental interiors as the aridity receded [45].

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UPU STATISTICS

The Universal Postal Union is the international organization which standardizes the exchange of mails between countries. Among other things, it also collects statistics about the Papernet, which can be seen at its Website at www.upu.int. Because of the time needed to collect the data, they have only up to 2004, but the data are an interesting overview of the Papernet.

	Total number of permanent post offices worldwide	Domestic letters handled (in billions)	International letters handled (in billions)	Domestic parcels handled (in billions)	International parcels handled (in billions)
2000	672,279	434.8	7.39	4.78	0.041
2001	675,504	436.3	6.97	4.78	0.044
2002	665,116	426.4	6.34	4.62	0.048
2003	662,387	425.6	6.07	4.67	0.047
2004	663,045	429.9	5.82	5.4	0.049

The decline in the number of post offices does not appear to be related to the Internet but rather to rationalization by postal systems. Countries in Europe, particularly Britain, are thinning out a surplus of sub-post offices. Canada Post and the USPS are opening new urban retail postal outlets, but this is more than counterbalanced by the number of rural post offices closing because of dwindling volumes due to rural de-population or inability to find new postmasters. It should be noted that in rural areas the general stores are fading away because farmers prefer to drive an extra half hour to a bigger town for better selection from bigger stores. It is the general store that is the traditional location of rural post offices.

That letter mail has been declining is no surprise, since e-mail is obviously replacing letters. Bill payments are now mostly done by automatic debit. What is interesting is that parcel volumes are increasing, because the Internet has increased the mail order business. In most countries, post offices have never had a monopoly on parcels and have always had to compete with private couriers, so the fact that they can hold their own against them is shown by these data.

THINKING ABOUT CONVENTIONS

by Dale Speirs

Recently I bumped into Cliff Samuels at the local supermarket (our houses are in adjacent suburbs) and we chatted a while since I normally only see him and his wife at local SF conventions. Cliff has been involved in running Calgary conventions for decades, and is also active in Worldcons, Costume Cons, and the like. We discussed the death and resurrection of Calgary's convention Con-Version, and I mentioned to him that I didn't volunteer for SF conventions because I am so heavily involved in the local philatelic conventions.

We then discussed the differences and similarities between the two types of conventions. Cliff brought up a point as to why SF conventions are having a more hostile reception in general from hotels than philatelic conventions. Hotels do not appreciate room parties, not because of the noise, but because they'd rather see the guests down in the bar or restaurant, instead of bringing in food and drink to give out free. This is common enough at SF conventions, but rare or non-existent at philatelic conventions. For the latter, the practice is to have the hotel cater a banquet, supply a hospitality room, and cater one or two breakfast meetings. This makes up for the fact that stamp collectors are not heavy drinkers down in the hotel bar, one thing that SF fans and philatelists have in common. (Except in Europe, where the Brits start drinking before noon, something that gets you labeled as an alcoholic in Canada.)

Another difference is that philately is a much older hobby than SF, dating back to the 1850s. There is an international network of philatelists, organized by national societies, specialist societies for every type of stamp collecting topic you can think of, local clubs, and, above all, the Federation International de Philatelie, which sets the basic ground rules for the hobby. Years ago, in a since-defunct Canadian zine, I foolishly said that SF fans had to become more organized to enjoy their hobby better. I was shouted down, and fandom continued its merry way lurching from one disaster to another. The Internet has produced a generation of SF fans whose idea of volunteering is to post a few lines on a discussion board, rather than actually getting out to shift furniture and do the physical work needed.

Garth Spencer (Vancouver, British Columbia), who has long been a voice crying in the wilderness, has documented an endless string of failures in fandom to learn from the past. While philately has its occasional blowouts, such disasters are exceedingly rare. It can't just be because stamp collectors tend to be older and wealthier than SF fans, since the greying of fandom is another chestnut for zine debates.

What is to be done?

SEEN IN THE LITERATURE
noticed by Dale Speirs

Lia, V.V., et al (2007) **Microsatellite typing of ancient maize: insights into the history of agriculture in southern South America.** PROCEEDINGS OF THE ROYAL SOCIETY OF LONDON 274B:1471-2954

"*Archaeological maize specimens from Andean sites of southern South America, dating from 400 to 1400 years before present, were tested for the presence of ancient DNA and three microsatellite loci were typed in the specimens that gave positive results. Genotypes were also obtained for 146 individuals corresponding to modern landraces currently cultivated in the same areas and for 21 plants from Argentinian lowland races. The striking genetic uniformity displayed by the ancient specimens and their close relationship with the Andean complex suggest that the latter gene pool has predominated in the western regions of southern South America for at least the past 1400 years. The results support hypotheses suggesting that maize cultivation initially spread into South America via a highland route, rather than through the lowlands.*"

Speirs: Maize, what North Americans call corn, is a man-made species developed by ancestral Mexicans from a grass called teosinte. It spread north and south through the Americas. This paper shows that its southward spread was along the mountaintop tribes, not through the lowland or coastal tribes.

Evans, P.D., et al (2006) **Evidence that the adaptive allele of the brain size gene microcephalin introgressed into *Homo sapiens* from an archaic *Homo* lineage.** PROCEEDINGS OF THE NATIONAL ACADEMY OF SCIENCES USA 103:18178-18183

"*At the center of the debate on the emergence of modern humans and their spread throughout the globe is the question of whether archaic Homo lineages contributed to the modern human gene pool, and more importantly, whether such contributions impacted the evolutionary adaptation of our species. A major obstacle to answering this question is that low levels of admixture with archaic lineages are not expected to leave extensive traces in the modern human gene pool because of genetic drift. Loci that have undergone strong positive selection, however, offer a unique opportunity to identify low-level admixture with archaic lineages, provided that the introgressed archaic allele has risen to high frequency under positive selection. The gene microcephalin (MCPH1) regulates brain size during development and has experienced positive selection in the lineage leading to Homo sapiens.*

Within modern humans, a group of closely related haplotypes at this locus, known as haplogroup D, rose from a single copy approx 37,000 years ago and swept to exceptionally high frequency (approx 70% worldwide today) because of positive selection. Here, we examine the origin of haplogroup D. By using the interhaplogroup divergence test, we show that haplogroup D likely originated from a lineage separated from modern humans approx 1.1 million years ago and introgressed into humans by approx 37,000 years ago. This finding supports the possibility of admixture between modern humans and archaic Homo populations (Neanderthals being one possibility). Furthermore, it buttresses the important notion that, through such admixture, our species has benefited evolutionarily by gaining new advantageous alleles."

Speirs: Introgression is the transfer of a gene from one species to another by hybridization. When the hybridization stops, the species that received the gene continues to propagate it within itself and modify it through natural selection and genetic drift differently than the original species of the gene.

Sharot, T., et al (2007) **How personal experience modulates the neural circuitry of memories of September 11.** PROCEEDINGS OF THE NATIONAL ACADEMY OF SCIENCES 104:389-394

"Brown and Kulik introduced the term "flashbulb memory" to describe the recall of shocking, consequential events such as hearing news of a presidential assassination. They proposed that the vivid detail of such memories results from the action of a unique neural mechanism. In the present study of personal recollections of the terrorist attacks of September 11, 2001 (9/11) in New York City, we combine behavioral and brain imaging techniques, with two goals: (i) to explore the neural basis of such memories and (ii) to clarify the characteristics of the emotional events that may give rise to them. Three years after the terrorist attacks, participants were asked to retrieve memories of 9/11, as well as memories of personally selected control events from 2001. At the time of the attacks, some participants were in Downtown Manhattan, close to the World Trade Center; others were in Midtown, a few miles away. The Downtown participants exhibited selective activation of the amygdala as they recalled events from 9/11, but not while they recalled control events. This was not the case for the Midtown participants. Moreover, only the Downtown participants reported emotionally enhanced recollective experiences while recalling events from 9/11, as compared with control events. These results suggest that close personal experience may be critical in engaging the neural mechanisms that underlie the emotional modulation of memory and thus in producing the vivid recollections to which the term flashbulb memory is often applied."