

Former Intel chief Andrew Grove dies aged 79

Andrew Grove, one of the architects of semiconductor giant Intel's success, has died aged 79.

Grove was the third employee at Intel and one of the leaders of its engineering team.

He helped the company move from making memory chips to processors, a decision that let to its

dominance in the supply of chips powering PCs.

He served as chief executive of Intel from 1987 to 1998 and then became chairman of its board until 2005.

Intel was "deeply saddened" by Grove's passing, said current chief executive Bryan Krzanich. (BBC)



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Dr Merlin Tuttle is a respected American ecologist, conservationist and wildlife photographer with a lifelong passion for bats. He's visiting Trinidad right now, photographing our bats and helping to field-train two volunteer teams organised by the local bat group Trinibats. PHOTO COURTESY WWW.MERLINTUTTLE.COM

The real batman

Dr Merlin Tuttle shares his passion for bats, and says why we should treasure them: they replant forests, kill tons of insects, pollinate food crops, and are essential to healthy ecosystems

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If you've ever enjoyed a delicious, juicy mango, or sweet local bananas, crunchy cashews, sapodillas, sugar apples, or creamy home-grown breadfruit meals, remember to thank the bats.

Bats are among the important pollinators of these and many other of our tropical food plants, and without bats, there'd be far less local fruit. There would, in fact, be no bananas at all—the original wild banana stock, from which all modern bananas descend, is pollinated by bats, as I learned from Dr Merlin Tuttle last week.

Originally from Tennessee, but now based in Austin, Texas, Dr Tuttle is a highly respected American ecologist, conservationist and wildlife photographer with a lifelong passion for bats. He's been a key force in changing the way the world perceives bats, educating thousands of people about the essential ecological role bats play. Dr Tuttle is visiting Trinidad right now, helping to field-train two volunteer teams organised by the local bat group Trinibats, and generously taking photographs to donate to the group to help their bat conservation efforts here.

Dr Tuttle's fascination for bats first began as a teenager when he discovered a large colony of grey bats in a cave near his Tennessee home. Now 75 years old, Dr Tuttle's passion for bats remains undiminished by time or naysayers, and he's taken photos of several hundred species of bats in 30 countries. In an interview with the Guardian, he



A Commissaris's Long-tongued Bat (*Glossophaga commissarisi*) approaches a calabash flower. The calabash tree is found in South America and in Trinidad. Its night-blooming flowers rely heavily on bats for pollination. This photo first appeared in National Geographic.

PHOTO: MERLIN TUTTLE

said:

"Bats are among the least-known animals on the planet, and yet they're just incredibly fascinating. There are little tiny bats that just weigh less than three grams; there are bats with almost two-metre wingspans; there are bats that are snow-white, jet black, black with white stripes, bright orange—many right here in Trinidad...the ones with six-foot wing spans aren't here, but you do have one with a three-foot wingspan here—the Spectral—which eats rats!"

With a doctorate in bat biology, Dr Tuttle published important academic research in grey bat migrations early in his career, in

the 1970s. But it's his conservation and educational work since then that has made his name synonymous with bats. He founded Bat Conservation International (BCI) in 1982 at a time when most Americans feared and loathed bats, and would ruthlessly and routinely burn thousands of the innocent animals alive in their roosts, without understanding that the bats were no threat. At first a small organisation, BCI today has grown to be the world's leading bat advocacy group with members in 60 countries, and has dramatically changed attitudes to bats in the US, where now, many folks will even build a bat house in their back yard to encourage the benefits of

bats.

Tuttle now leads another non-profit group, Merlin Tuttle's Bat Conservation (MTBC), founded in 2014, which uses science, field knowledge and photography to help save millions of bats each year. He has also published a book of his own personal, sometimes hair-raising bat adventures around the world, illustrated with his own gorgeously shot bat photos—The Secret Lives of Bats: My Adventures with the World's Most Misunderstood Mammals (2015, available on Amazon).

Peaceful pollinators and planters

The T&T Guardian joined the Trinibats bat group and Dr Tuttle last Wednesday night, as they set up mist nets and examined bat species in the Arena Forest Reserve.

Dr Tuttle was sitting quietly in a clearing in the rainforest, surrounded by photographic equipment. He'd hold individual bats gently in one hand while taking photos of them with the other. "This one can hover like a helicopter," he commented in his gentle Southern drawl, as he carefully held up one tiny, velvety but understandably scared female bat.

Most bats, it turns out, aren't at all scary, or dangerous, or dirty; they are fascinating, gentle flying mammals who groom themselves endlessly while roosting, and who are miracles of adaptive design, each species being intelligently adapted to niches

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in their environment in sophisticated ways, from the shapes of their ears to the lengths of their tongues.

Most bats don't even suck blood, but prefer insects or fruit or the sweet nectar from flowers, with a few kinds preferring to dine on small creatures like frogs or fish.

"I'm particularly fascinated by bats because they're so important ecologically and economically. This whole forest here would be unhealthy without its bats. The bats are the primary carriers of seeds to new locations. Just one bat can carry 60,000 seeds to new locations in a single night. If even a fraction of those seeds survive to become seedlings, one bat can plant thousands of new plants a year," noted Dr Tuttle.

"If it weren't for bats, nocturnal insects would destroy this forest," said Dr Tuttle.

"Bats are very necessary to keeping insects in balance. Houseflies have enormous reproductive rates, as do mosquitoes and other insects, and if you don't have a good balance of everything from frogs to birds to bats, the insects get way out of balance — and that endangers us. Most of our main crop and yard pests are insects that are active at night. They wouldn't have primary predators if it weren't for bats."

I asked Dr Tuttle whether bats were ever on the vermin list in the States, as they are now in T&T. He replied:

"Never, thank goodness. Bats are anything but vermin. Bats got on the vermin list here, I suspect, originally because of vampire bats. But in reality, there are only three kinds of vampire bats in all of Latin America, and hundreds of other species. Vampire bats are just a tiny fraction, and yet they get all the attention.

"The vast majority of bats are pollinating flowers, carrying seeds needed to reforest, and they're consuming vast numbers of insects." He referred to a 2013 agroforestry study of cacao plantations in Indonesia which found that the natural pest control activities of birds and bats, through their eating of many insects, significantly increased crop yields of cacao; trees from which birds and bats were excluded, produced up to 31% less cacao (2013 study, University of Gottingen).

Money from bat tourism

"We tend to fear most what we understand least," commented Tuttle. "And we're afraid of bats when we don't need to be."

He gave a personal example.

"I come from Austin, Texas. We have a bridge in the middle of town that houses a million and a half bats. When they began to move into that bridge, 35 years ago, people said: 'Oh, they're rabid, they're dangerous.' The news media made big headlines about how dangerous the bats were. And the people of Austin almost killed them. I finally convinced them that it would be a big advantage to keep the bats.

"The bats are now one of the state's biggest tourist attractions. They attract \$12 million tourist dol-

lars to Austin every year. And they eat 15 tons of insects on average every night. Imagine how many pesticides it would take to control that many insects in your yard, or on crops?"

Tuttle said studies show that bats are worth more than \$22 billion a summer in the USA.

"Worldwide, bats greatly benefit people growing corn, cotton, sugar cane, macadamia nuts, cacao, and rice," said Tuttle.

Bats: the natural (non-toxic) pesticide

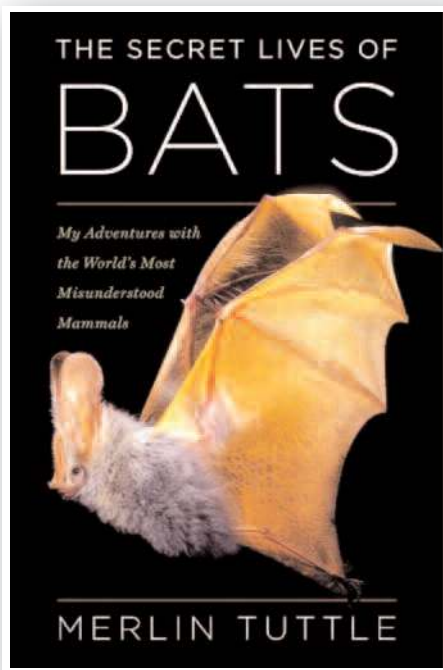
Dr Tuttle referred to an exciting recent study which showed that in some cases, bats could actually eliminate the need for toxic chemical pesticides. The study is "Pest control service provided by bats in Mediterranean rice paddies," published May 2015 in the journal *Mammalian Biology* (vol 80 issue 3).

Tuttle explained: "In the 10-year study, they put up small bat houses around rice fields in Spain. They found that all they had to do was attract 12 bats a hectare to totally eliminate the need to spray pesticides."

The study found that the soprano pipistrelle bat controlled (by eating) the rice borer moth, a major pest to rice growers all around the world. The study said the value of this bat-provided ecosystem service was at least 21 Euro (TT\$156) per hectare, equal to the avoided pesticide costs alone.

Tuttle criticised people's excessive use of chemical pesticides: "Pesticides end up coming back to poison our food, our water, they're messing everything up. In fact, at the time of World War II when we first started using pesticides, our (American) crop damage was actually going down, because we were inventing better ways to rotate crops and do things that kept pests in control. Within 10 years of the time we started using pesticides, our crop losses (in the whole of the US) doubled. Now that's not saying much for pesticides.

"The reason for that is what we call the pesticide treadmill. For example, you spray pesticides and they'll kill maybe 95 per cent of your mosquitoes in a spraying. But the remaining five per cent, in almost no time flat, will reproduce so fast that once again there will be huge numbers of them. And you won't have their natural predators anymore, because the predators, when they ate the poisoned mosquitoes, died. So you end up killing bats and birds and things that are helping you, and then when they're gone, the mosquitoes come back to



Merlin Tuttle's book, *The Secret Lives of Bats: My Adventures with the World's Most Misunderstood Mammals*, was released on October 20, 2015. Amazon featured it on its top-10 book list in non-fiction, and it received uniformly outstanding reviews, including in *The Wall Street Journal*, *The New Yorker*, *The Huffington Post*, *National Geographic Book Talk* and *Nature*.

eat you much worse than ever before."

"Especially, in our generation, we're coming to a point where we're changing the world so much. It used to be that nature was in control; but now it's humans in control. And that's really scary because we don't know how to control nature and do it right yet."

"We need to be very careful how we just spray pesticides and think we can solve all our problems that way, and ignore animals like bats. It's not just

bats we need; we need birds, bats, frogs, a lot of animals that are very helpful. But bats are a very, very important part of that. We can't ignore bats and have a healthy ecosystem or even a healthy economy."

MORE INFO

Dr Merlin Tuttle's Bat Conservation:
<http://www.merlintuttle.com/>
 Bat Conservation International:
<http://www.batcon.org/about-us/about-bci/mission-vision>