

Invitation to join a voyage of discovery

'It's the little things that run the world!'

"It's the ultimate big picture," she says. And as I listen to Dr Mary White I have to admit she's not exaggerating. I hear myself saying, "Mary, this is the most astonishing story of the 21st Century" ... **Bob Walshe** talks with the prominent Sydney science writer.

BETWEEN us on the table a large book, gloriously illustrated. Its dramatic cover, planet earth in a green mist, announces *Earth Alive! From Microbes to a Living Planet*.

It's Mary's seventh big book, and several are still in demand around the world. I'm here to find what makes this prolific writer so special.

"You say your research made you excited and you had to write *Earth Alive!* What turned you on?"

"I'd been reading E.O.Wilson – he's probably the world's greatest biologist – and he wrote, 'It's the little things that run the world'. I only had a glimmering of what he meant, and my book is my three-years-long bid to find out.

"The essence of what I found is this: **Rather more than half of the total life on earth – half of its total 'biomass' – consists of micro-organisms. In other words a mass of invisible life-forms outweighs all the visible forms, all the forests, plants, animals, birds, fish and insects put together, including six billion humans.**"

"But that's staggering," I say. "If the big story in the life-sciences of the 20th Century was genetics, then surely the ubiquity of micro-organisms is the most astonishing story of the 21st."

"Exactly!" she says. "That's what excited me and I'm still excited. Until now, no-one even faintly imagined this could be so. Only a handful of scientists are fully aware of it today, and yet the whole world needs to know, because it has huge implications for the future of life on our lovely but lonely planet."

Quite a woman

Mary is no stranger to Sutherland Shire. Council invited her in 1996 to be its honorary Ambassador in promoting the United Nations message of ESD, Ecologically Sustainable Development. She has since given

talks and interviews. Local writer Laurel Dumbrell interviewed her for *Shire Life* (September 1998) under the title 'Quite a Woman'...

> South African born, but grew up in Rhodesia ("I think I was born a botanist").

> Came to Australia with her geologist husband in the mid-1950s.

> Worked in dating and describing plant fossil collections at the Bureau of Mineral Resources in Canberra from 1956 to the mid-1980s.

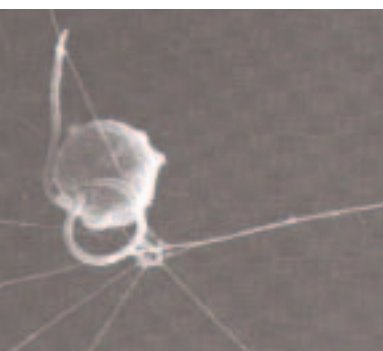
> Moved to Sydney, settled near Manly, and raised five children.

> Researched in botany at the Australian Museum in Collins Street, and helped her husband prepare a yacht for their retirement, intending to visit Pacific islands.

> Death of her husband forced a change of direction. At 60, no less, she picked up a pen – and has never stopped writing.

Seven successful books

The work with fossil plants prompted Mary to think a book was needed on the long evolution of flora of our continent (ancient 'Gondwana').



Phaeocystis, a microscopic algal organism, can live in arctic and antarctic seas, where it predominates over countless other species. An 'extremophile', it can live under ice, then bloom as the ice retreats.



What resulted was her instantly successful *The Greening of Gondwana*, a survey of 400 million years of Australian plants.

Five other major books have extended that story: *After the Greening*, *Listen—Our Land Is Crying*, *Running Down—Water in a Changing Land*, *Time in Our Hands*, and *Reading the Rocks*. Interspersed were lectures, articles and four books for children.

That sort of output demands discipline. "I'm at my desk at 4:00am and work through intensively till 9:00. Later I do more casual things. My hours wouldn't suit everyone. But if you want to write successfully, you must find the time that suits your individual creativity – for me the words flow more freely then."

Expanding the 'big picture'

Mary has dug with geologists, peered through ultra-microscopes with micro-biologists, and conducted eco-tours all over the continent.

"I'm telling a 4 billion year story," she says. "Life has been around for that stretch of time: *life beginning with microbes*. We'd thought we had the 'big picture' when we tracked the trees, fish and animals in the fossil record of the past 700 million years. But now we've expanded that picture vastly – in fact by five or six times! – with discovery of traces of microbial activity that started 4 billion years ago.

"And although larger forms of life have evolved to what we see today, the sobering thought is that the micro-organisms are still with us as abundantly as ever and they currently make up over half of Earth's biomass."

She laughs. "You've been walking on it, swimming amongst it, breathing it, and been only slightly aware of its presence, not only around you but also within your body.

"So up to know we clever humans have been in a state of ignorance about the real 'big picture'. While our telescopes have scanned the heavens for the vastness of space – which we can't do much about – we've overlooked the vastness of our planet's invisible life – which we can and must do much about, and quickly."

The 'Magnificent Mite' here magnified thousands of times, typifies the tenacity of the tiniest of organisms by living under rocks in sub-polar regions: chilled for most of the year and reviving only in the brief thaw, it yet lives for many years. Micro-organisms exist in soils in incredible numbers – 40,000–130,000 per square metre in eucalypt forests of southern Australia – but are devastated by land-clearing, herbicides and pesticides.



How 'little things run the world'

"You know," says Mary reflectively, "E.O.Wilson wasn't overdoing it when he said that those little things run the world. *Earth Alive* gives many examples.

"Bacterial cells have been the building blocks from which higher living things, including us, are constructed.

"For the first two billion years they beavered away to make a life-friendly environment in the Biosphere, the thin outer layer of the planet inhabited by organisms – thin in one sense, but life-forms are being found even at depths of 10-12 km in the crust!

"They've contributed hugely to changing the atmosphere, to weathering the rocks, and to modifying the waters. Merging of simple bacterial cells led to creation of more complex cells such as characterise organisms of all the Kingdoms except the bacterial one.



Emiliania, a single-cell plankton, flourishes in astronomical numbers and contributes to the seafloor's sediments that tie up carbon. With a host of other marine algae, it affects climate patterns and temperature throughout the world.

"Today, the Biosphere is *shared* almost equally, you might say, by the invisible and visible forms of life. They are interconnected, interdependent. Can't do without each other. *Symbiotic!*" And with a laugh: "You'll have to read all about it if you want details."

"Think of it, if you like, as all the food-chains on the planet beginning with the micro-organisms... Where would we be without them?"

So much to learn

"There's so much to learn from this truly big picture," says Mary. "A great voyage of discovery lies ahead!"

"We humans have been so arrogantly unaware of how sensitive our *Earth Alive* really is. Too much dominance. Too much greedy plunder. And now we're seeing the breakdown of natural life-support systems – think of the Murray-Darling, the Barrier Reef, all the deforestation and

the salting of farmlands and much much more, worldwide.

"In order to have a future, we must accept responsibility to the rest of life, must arrest gross overpopulation, stop our heavy-handed impact on the environment, and implement the SUSTAINABILITY agenda with conviction.

"In short, we humans' honeymoon with unbridled 'development' is over – otherwise the damage we'll do will be irreparable, will cause untold suffering."

No armchair critic

There's a touch of wistfulness when Mary condemns 'the dominance' and 'the plunder', but she quickly goes on to speak of finding "a deep spiritual contentment" in "the wonders I have glimpsed in this ultimate big picture of an Earth vibrantly alive, vibrantly a part of the Greatest Mystery".

No patience here for "fundamentalists and their so-called creation science which is anti-science" – "Where did Noah put all the micro-organisms, I wonder?"

"It's a time for action," she says, "and I hope *Earth Alive!* will stir its readers to act."

ACT is exactly what she's doing herself. Whilst already planning a book for schools to spread the message of *Earth Alive!*, Mary has just sold her harbourside home so she can buy a tract of rainforest on the slopes of Middle Brother Mountain between Taree and Port Macquarie – "to save the rainforest and establish a centre where scientists and schools can study the multifarious forms of North Coast life, from micro-organisms to the platypuses that abound in the pristine river on the property."... Indeed, quite a woman. *

Tasmanian rainforest, the legacy of 60 million years. Its continued logging, says Dr White, is 'environmental vandalism' which destroys a rich biodiversity to enrich foreign papermakers.



Mangroves on the sand flats at Cape York. Tidal eco-systems like this carry vast numbers of microscopic organisms.

