

**EXTINCTIONS:
PAST AND PRESENT**
UNIVERSITY OF CAPE TOWN



WEEK 5 Landscape changes: interview with a plant ecologist

ACT – Anusuya Chinsamy-Turan

TH – Timm Hoffman

ACT Hi everyone. Today we have the wonderful opportunity of coming onto the Pipe Track, here in Table Mountain. And it's even such a privilege to be here today with Professor Timm Hoffman, who is Director of the Plant Conservation Unit in the Biological Sciences Department at the University of Cape Town. Welcome Timm.

TH Thank you, Anusuya.

ACT So, I'm sure for most of you, when you look at a mountain, you think about a stable environment. But we know that in the mountains, there are often changes, there are subtle changes that we don't really see very quickly. But over time, we know that there are certainly landscape changes. And Timm has a wonderful way of being able to understand these changes that occur over time. Timm, can you tell us a little bit about your work?

TH Sure. Well one of the things about natural landscapes is that some are very stable over long periods, like in the desert. But others, like this, in fynbos environments which are fire-adapted, they can change very quickly.

ACT And by using old photographs, which date up to maybe even 130 years ago, we have our own little time machine. And we can go back in time and see what the landscape looked like. For example, in this photograph over here, which was taken of the pipe track in 1887 just soon after it was completed.

TH There's the pipe track there and this was built to take water from the Disa River, on the top of Table Mountain, down along the pipe track to feed the city, over the mountain on that side. And you can see in this landscape, that in the 1880s, it's a very open landscape. Two things really strike you. The first is the large amount of rocks that you see in this landscape.

ACT Absolutely.

TH And when you look at the landscape today, there's almost... The rocks are very hidden, and it's only the very big rocks that you can see in the landscape. And this suggests that the vegetation cover, has increased a great deal in the last 120 odd years.

ACT And why is that so? I mean, why is there such a big change in vegetation?

TH Well, the most important reason, we think, is because of the role of fire. In that around the 17th, 18th and 19th centuries, this area was used primarily as a farming area. So, especially for goat and sheep grazing. And if you're going to be grazing with goats and sheep, you need to burn the vegetation.

ACT Yes.

TH And so the farmers and their herders were burning, burning, burning and burning the landscape as often as they could. Which brings me to the second thing that you see in this picture, today, that you didn't see in 1888. And that is the amount of forest cover. This ravine, itself, had a very slim sort of ribbon of trees down through the middle. But if you look today, forest species, and forest precursor species, have spread out and expanded beyond this little ravine. And so now this whole area here, because of the protection from fire, the forest species have now expanded out of this landscape.

ACT Wow, that's so interesting. And so would you say that this landscape now is what would have been pre-1887? Do we have any idea what the landscape was like before that?

TH Well, that's a very good question. We don't really know, because prior to European settlers arriving in the 1650s and settling, this landscape was also utilised by indigenous pastoralists for about 2 000 years. And before that, but hunter-gatherers. And they would have spent a lot of their time grazing animals and burning the vegetation. Both for food and for their cattle. And so the value and importance of paleo ecology, so fossil pollen, if we can get some. And other techniques, isotopes might also be useful, to help us get further back in time, and to get a better sense of what this landscape looked like just at the time of European settlement. But then also at the time that indigenous cultures were using this landscape for their hunting-gathering and herding activities.

ACT That's actually very interesting. So, one of the things that we're seeing nowadays that a lot of the natural environments are being protected to maintain, and to, kind of, protect the indigenous environment. But in so doing we find that there are certain restrictions that are being imposed on the landscape. So, for example, the fynbos is adapted for fire. But in the protected environments, fire is not happening as frequently as it would in the wild. Is that true?

TH Well, certainly in some parts of the Cape Peninsula, this is certainly the case. Although the records from the 1970s suggest that the fire-frequency has increased. We see a lot of protection on the Cape Peninsula because the costs of burning, the costs of run-away fires for the suburbs, for the houses that are on the fringes, are huge. But if we relate fire, say over the last 50 years, relative to the frequency of fires in the 19th and 18th centuries, there's almost no comparison. I think. I think around the time that this photograph was taken, the fires were being set every few years. And now, in a place like this, the last fire was in the 1980s. So that's 30 odd years ago. And so, we're seeing a lot of protection from fire, because of the costs of fire. And so, on the back table, around Orange Kloof, over here, and all along the little kloofs and ravines along the Twelve Apostles, we see this expansion of forest cover, as a result of fire protection.

ACT So these Afro-montane forests are expanding at the expense of the fynbos then. Is that correct?

TH Right. And there's some concern because this is a very rare, or relatively rare form of fynbos. And there's some concern that with the expansion of forest and, not just forest, but without regular burning, there's concern that some of this diversity that's part and parcel of this sandstone fynbos might be compromised. If we don't have fires on a fairly regular 15-, 20-year basis.

ACT Okay. That's very interesting. I think it's fascinating to see how land use can actually change and transform landscapes. And I think when we're looking at protecting environments, we also have to consider what we do and how we do it. Because these changes that can happen, that we think is for the best for the environment, may not in fact be that good. So, I guess, by understanding how we actually change environments is really fundamental to conserving the environments as well.

TH Very much so. And it's complex, because land-use is a factor. But then we have temperature changes. We have changes in rainfall seasonality. And we also have the role of carbon dioxide enrichment in the atmosphere. And understanding this complex interplay between in all these factors, is very difficult.

ACT Exactly. And I think that's probably one of the things that we haven't even begun to understand, is how the increase in carbon dioxide is actually changing landscapes. And maybe what we're seeing here is maybe protection from fire, but also maybe the expansion of the forest because of the increase in carbon dioxide in the atmosphere.

TH My colleagues would like that.

ACT What do you mean, they would like that?

TH Because they work on CO₂. And CO₂ enrichment. And I think they see a lot of the changes... In some environments, it seems to be a very good explanation for the change in, for example, woody plant cover, bush encroachment and so on. I'm not sure that fynbos species respond as actively or as favourably to CO₂ enrichment

as some of the legumes in the, and trees, in the savannahs. So that's why I have a little bit of a...

ACT Well nevertheless. Thank you very much. It's been fascinating talking to you. I think we've learned so much and seen what a complex environment this is and how so many different factors have to be considered to understand what natural environments are, and in fact how we protect them is also very, very important. Thank you very, very much. Thank you Timm.

TH Pleasure.



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