University of Birmingham

Expedition physiology: The history of extreme medical research

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Intro VO : *Welcome to the Ideas Lab Predictor Podcast from the University of Birmingham. In each edition we hear from an expert in a different field, who gives us insider information on key trends, upcoming events, and what they think the near future holds*.

Sam: Today we're with Dr Vanessa Heggie who is a Birmingham Research Fellow in the History of Medicine, here in the Primary Care Clinical Services at the University of Birmingham. Hello Vanessa.

Vanessa: Hello.

Sam: So, can you tell us what you do here at the university, what your research is in?

Vanessa: OK, well I've got one of these Birmingham Research Fellowships which are an excellent opportunity where they give you five years of fairly protected time with not too much teaching, not too much admin, to get some really big research done and then become a permanent job afterwards, and my research project at the moment is on the history of extreme physiology, but particularly looking at the sort of science, particularly biological sciences and medical sciences, that are done on expeditions to extreme environments - high altitude, extreme spaces of cold - if I have time in the five years, also possibly space and very hot environments.

Sam: What kind of experiments are these that are going on up there in these extreme conditions?

Vanessa: All sorts. There's quite a lot of work that's already been done on bio-physics, meteorology and that sort of area. Much, much less I found though on life sciences and particularly on the sort of medical research that's done in these spaces. So that's really where I'm focusing my attention. So I'm looking at questions of how people survive, basic survival issues on mountains and so on, but also how these spaces are used to produce knowledge that's useful for the rest of us and the classic example is the current extreme, or **Caudwell Everest expeditions (http://www.xtreme-everest.co.uk/)** , that take medical researchers to Everest where they perform studies that are useful to understand the health problems of people in, for example, intensive care units. So they use the mountain as a model to make mountaineers unhealthy, to then study them in a way that they couldn't study people who are in accident and emergency. And I'm interested in that sort of research.

Sam: And is it the kind of ethics around that? I mean how safe is that when you're up there in these extreme conditions?

Vanessa: That is an excellent question and that's one of the reasons I got interested in looking in this particular area because this sort of research challenges some of the assumptions we have about how scientific research is done. The history of science very roughly sort of stated for the 19th and 20th century talks about the rise of the laboratory, how science becomes disciplined and experimental and it's controlled and it's big science and it's molecular biology and it's those sorts of questions. There's a lot less research or work done on the sorts of science that don't fit that model and obviously if you're up Everest it's actually quite difficult to do experiments because you're affected by the altitude, you're extremely cold, the work itself is very difficult because you're wearing big gloves. Just the practical aspects of it are quite hard and also of course that's research that's quite hard to replicate. The point of scientific experiments is supposed to be that you perform it, you get a result and then other people can copy that work and see if you were right. But if to do the experiment you have to go to Everest, that limits it to a fairly small number of people who can do the work and I was really interested in how scientists dealt with that particular problem. And then on top of that, just as you asked, there's a huge ethical query here. The risk of death on Everest is something like 1 in 10, 1 in 15 of summiteers. I mean that's a huge risk, it would not be acceptable in any other sort of ethical experiment in a laboratory and yet the people going to Everest do sometimes get funding from the **NIH (http://www.nih.gov/)** , from the **MRC (http://www.mrc.ac.uk/index.htm)** . There are really good reasons for that but I want to see how they negotiate those sorts of ethical problems and dilemmas. And also how they select people to go on these experiments? Who is it who volunteers to be a doctor and a climber on something like that? Why are they going? Is it just about the science? Is it also about excitement? Is this the last area where we have great heroes of science doing exciting things? All of those sorts of questions make these spaces and that sort of science really interesting and almost entirely unstudied by historians.

Sam: And so before this you were sort of focusing in a lot of sports medicine weren't you? How did you come to do this sort of extreme version of that as it were?

Vanessa: Yeah, sports medicine was my first post-doctoral project after my PhD and I wrote a book on that that came out in 2011 on the **history of British sports medicine (http://www.amazon.co.uk/History-British-Sports-Medicine/dp/0719082617)** , and it was while I was researching - again, it's an area that had had almost no historical attention from historians of medicine, or indeed historians of sport, who had also ignored it as a topic and it was while I was researching that that I began to come across these questions of how do we get the ethical approval for these experiments, who are the sort of people doing this kind of work and also the work in extreme environments seemed to tell an awful lot of other stories about other areas of history. I've found connections between, for example, 1930s German research on mountaineering and NASA's space projects that involved all sorts of complicated ethical problems with taking researchers who'd been involved in the Holocaust and so on. So right in there there was an immediate huge political question that I thought was really interesting. And also there are issues relating to topics such as doping and cheating, which seems like an obvious topic in sport, you know, the taking of banned substances and so on is very well studied in sport but then you had questions like should you use oxygen to climb Everest? Does that count as cheating? Is it not cheating? How are these negotiations played out? So those sorts of questions kept cropping up in the work on sports medicine and that's what pushed me into looking at these extreme environments that also allow me to take a much more global approach. My initial work had generally been – my PhD had been local history in Manchester, I'd broadened that out to a history of Britain and now I'm hoping to get sort of pan-global with studies of how people move around and do international studies in these areas because of course you have to have international support to participate in these activities. All of these projects have international staff and crew, they have local people and foreign people involved, so it's also about how you negotiate parties of people from different countries and with different aims to get them to do a single scientific or exploratory project.

Sam: So you're actually working on a book which is going to come out of the project overall eventually. What will you discover from the project in the future?

Vanessa: Well my hope for the book is partly to encourage other people to look into these areas as being interesting. I'm very keen on trying to make connections between different areas of history and indeed between different subjects. I mean that's part of the interest of being based in the Medical School even though I'm a Historian. I think generally historians of science and medicine have not looked at these areas of field studies and of human physiology and there's an awful lot of interesting stories in there that we can tell about it. Equally I think it's a good opportunity to get other sorts of historians involved, like historians of sport have an awful lot to contribute to these stories but they don't necessarily engage with the biology or the medicine that's involved because it falls outside of their remit. But what I'm particularly focused on is recovering some stories that are useful to help us understand science today and that is firstly this international collaborative nature of it which I think is really well demonstrated by expeditions and exploration, not just because the people involved are international but also things like the objects that they use are sometimes international. People will take air samples from inside their lungs on Everest and then send them to laboratories all around the world where they can be analysed or kept in store and it's how do those objects move around, where they go, who controls them, who looks after them. There are really interesting stories to be told there that then tell us other things like the movement of drugs or the movement of biological samples, DNA and so on. As a sort of secondary point in there too, this is to encourage historians of science to look more global in the work that they do, but I'm also interested in telling some stories that are perhaps a little bit difficult. There are some racial aspects into the way that altitude and adaptation to environments are discussed which are quite well handled in other areas of history of science and history of sport but haven't necessarily been brought up in these particular topics and I think there'll end up being at least one chapter on the way that local people are used to produce this knowledge and how they're talked about by scientists. And then in a more positive light this is also a space where citizen science is very very strongly used and there isn't really a good history of citizen science in the 20th century. There's loads for the 19th, it's all about Charles Darwin and the Voyages of Exploration and people sending samples to museums and things like that, but then that seems to disappear in our stories in the 20th century and as we've seen quite recently, citizen

science is a really big thing. Getting people involved in huge scientific projects is increasingly popular, very dependent upon the internet and I want to talk a little bit about the ways in which exploration has used citizen science, or has used people like climbers and explorers and guides to help do science, to help us understand where this movement has come from so we don't have a story that's sort of there in the 19th century, vanishes for a hundred years and then magically appears in the 21st century. So I'm looking back a bit to try and find the roots of citizen science as well.

Sam: Fantastic, well that's an adventure that I look forward to hearing the results of. Dr Vanessa Heggie, thank you very much.

Vanessa: Thank you, I've enjoyed it.

Outro VO : *This podcast and others in the series are available on the Ideas Lab website:* ***www.ideaslabuk.com (http://www.ideaslabuk.com)*** *. There's also information on the free support Ideas Lab has to offer to TV and radio producers, new media producers and journalists. The interviewer and producer for the Ideas Lab Predictor Podcast was Sam Walter.*