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Science & Learning – Exploration & Science

Scratch a contemporary explorer and the chances are there is a scientist lurking not far beneath the surface. Indeed, when asked, most explorers justify their role as contributing to scientific understanding.

John Blashford-Snell:

Today the role of the explorer first of all is scientific discovery, and there is a very great deal to be found. Because although armies marched all over the globe, there are great areas ... where relatively few scientists have been, and there is a tremendous amount to be learned, particularly I might say in the field of medical research. We're still discovering something about the plants, which after all are the producers of most of the drugs that are used in medicine today.

John Loret:

In my own opinion, it has to have some scientific value. It has to make a contribution to science. I am not a mountain climber and, although there is a great deal to be learned from mountain climbing ... just to climb a mountain is not enough for me. I feel it has to have some scientific value.

Historically this has not always been the case. While it may appear that science and exploration are inseparable, they have quite distinct histories.

Science & Learning – Early Learning

Whilst early cultures and their explorers did not practice science in the way we understand it, they recognized the value of knowledge.

One of the very first things people needed to do in order to get around was to measure time. Fortunately, the sky has always provided the means to do so. All early civilizations developed a calendar based on the movement of the Sun, Moon and other celestial bodies. Studying the sky gave rise to the ability to navigate at sea using celestial markers. Many early peoples, like the Polynesians, were able to interpret their environment in ways that we are only just beginning to

understand.

With the possible exception of medieval Christendom, all cultures contributed to a collective understanding of the globe. The legacy of the Greeks was an intellectual framework for discovery. The Chinese developed many of the technical innovations needed for exploration. And the Islamic Arabs were the custodians and carriers of knowledge.

In most of these cultures, what we now regard as scientific knowledge was seen as an extension of religious learning. Research in a majority of cases was undertaken by the priesthood. Hardly surprising when one considers that in many countries these people held a monopoly on literacy and learning.

Science & Learning – Renaissance & Reconnaissance

After the Dark Ages, the new spirit of humanism and learning of Renaissance Europe coincided with the so-called Age of Discovery. The Renaissance has been described as an age dominated by the discovery of the world and the discovery of man. Renaissance Man, embodied in figures such as Nicholas Copernicus and Leonardo da Vinci, characterized a new spirit of inquiry and progress.

Hugh Thomas:

I've thought carefully about whether one should attribute the new phase of exploration in the 15th century to technical developments, and certainly you can make a case for thinking that the astrolabe and the compass were ... extremely important. The lateen sail which enabled boats to sail against the wind, which they couldn't do in the past; those are all very important things. The cartography which was greatly improved in the 14th century, though it seems laughable in comparison with what we have now ... But I think that the really critical factor was will and curiosity.

Science & Learning – The Age of Reason

By the end of the 17th century Renaissance Man was being replaced by the Man of Science. A concept of science gradually emerged, distinct from philosophy or religious considerations.

Dorinda Outram:

It began to separate out from theology and from history in the 18th century, whereas in Columbus's time it had not been clearly distinguished from it. And the change in science also came with the idea that you can actually, perhaps, maybe get real knowledge of the world, rather than knowledge that is always going to be provisional and temporary. And this makes it possible for, say, Cook to go out with a quite different idea about what he is going to do ... Cook's agenda is absolutely explicit; it's given to him by the Royal Society of London and by the Navy, and Columbus doesn't go out with such objectives. So the other thing that's changed is that by Cook's time, institutions have formed which have explicitly and exclusively devoted themselves to something that we could recognize as science ...

Such scientific expeditions needed to be recorded, and the invention of printing made this possible. Expeditions brought back information that fueled the growing circulation of ideas around the world.

Dorinda Outram:

... Once print starts ... from the beginning of the 15th century and then accelerating after that, you get the possibility of making what knowledge you have portable. And it's also possible, once you start printing, much more easily to put your knowledge in terms of things like tables, graphs, statistical shapes of all kinds.

Science & Learning – New Scientists

To be fully documented, expeditions needed to be illustrated. The inclusion of artists on expeditions was to have a profound influence on both science and exploration.

Dorinda Outram:

... Drawing has a ... scientific importance as well, because it allows the transport back to Europe of much more information than would have come if the scientists and explorers had been totally dependent on actual physical specimens of new things for their information ... There's James Cook's artist, Sydney Parkinson ... and then there's William Hodges who went out with Cook's second ... circumnavigation ... those I think are two artists who are enormously important ... The art produced is also very interesting because it shows the artists themselves often struggling with the new, and trying to make some sort of relationship between the European art in which they've been trained, and the completely strange new things that they've seen ... And

you can see artists trying to draw the first ever kangaroo ... trying to get the kangaroo-ness of the kangaroo, trying to stop themselves filtering it through what they've seen of other animals in Europe.

Artists were just one example of a whole host of new disciplines and specialists that became involved in exploration. Both Bougainville and Cook were accompanied by scientists; Bougainville had a naturalist and an astronomer on his round-the-world voyage; Cook sailed with, among others, the naturalist Joseph Banks. Banks later became President of the Royal Society and was knighted for his services to the burgeoning science of botany. Increasingly, exploration needed science and science needed exploration.

Dorinda Outram:

If we think in terms of modern scientific disciplines, obviously some disciplines have been much more affected by exploration than others, and the disciplines I think most affected have been natural history, obviously all forms of geographical knowledge, oceanographical knowledge, and, if you like, sort of geophysics; how the earth is made and formed.

From the late 18th century the flora and fauna of other continents became a strong attraction for Europeans. Botanists and zoologists ventured into little-known areas in search of new specimens. Certain regions were especially attractive to naturalists, particularly the Pacific and the Americas.

David Warren:

The Malaspina expedition all the way up into lower British Columbia literally had its scholarly impacts ... in terms of looking at flora and fauna, the whole review of botanical knowledge, scientific knowledge in that regard. The amount of material brought back by Malaspina is extremely important for us today, because he brings back material not only from lower California, upper California, but all the way into southern Alaska. Both drawings as well as artifactual materials, some linguistic information, and ... some Polynesian materials were also acquired.

In the 19th century science began to dominate, and the scientist became almost more important than the expedition itself. This was particularly true of those scientists who wrote best-selling accounts of their explorations.

Hugh Thomas:

The first European non-Spanish traveler in South America who really wrote anything scientific about what he saw was Humboldt, who was there in the very early 19th century. It's true that he had more or less a diplomatic mission, but he was the first and the only really scientific explorer for many hundreds of years.

Robin Hanbury-Tenison:

One of the greatest of all the explorers in my book was Alfred Russell Wallace, who was one of those extraordinary eclectic Victorian scientists who studied everything, although he was primarily a botanist, zoologist, collector of specimens. He did a huge amount of research and collecting in South America and, like so many of them, lost most of the specimens on the ship on the way home, and then got to collecting again in South East Asia. During the course of which, and lying one night with a fever, he came up with the brilliant idea that evolution has occurred as a result of the selection and survival of the fittest, and wrote to his friend, Darwin, saying this, who was prompted to publish; having come up with the same conclusion, some ten years before.

Science & Learning – Search & Research

The ideas that we have about exploration today are inherited from those 19th century expeditions which sought to collate, classify, and catalog the entire natural world.

Robin Hanbury-Tenison:

Victorians thought they understood the world; they had discovered most of the big species, mammals and birds, but they had only begun to scratch the surface of all the huge diversity that exists on this planet ... Today, scientists are finding, to their astonishment ... how little they know about the diversity of this planet. Recent research by the National Institute of Science in America has revealed that, in one study, less than 7% of species of life on earth have actually been examined, studied, and given a name.

Science & Learning – Exploration & Environment

The marriage of science and exploration has given us a much greater understanding about our world, but it also raises an increasing amount of questions.

Dorinda Outram:

Our own sort of questionings about industrial society, environmental pollution, our own awareness of the enormous amounts of folk knowledge or natural knowledge that we have actually destroyed in order to make modern science, have caused a refocusing on indigenous societies as places where Europeans can maybe either escape European society and its inauthenticity, or where they can, if you like, see the final resting places of natural knowledge, of a complete authentic relationship to nature. The focus has shifted from the 18th and 19th century ... objective of acclimatization, of maximizing the range that certain useful plants have, to trying to save from extinction and ... make ... a complete historical record of species that now exist, but may not exist in the future.

Luke Holland:

... If one takes this question of exploration exclusively in terms of technology, in terms of resources, in terms of the impact on native peoples, an area that I'm particularly interested in and indeed involved in at the moment is the question of genetics, biotechnology, and research for genetic material among indigenous peoples. ... I recently documented what's happening with a major international project called the Human Genome Diversity Project, part of the rather larger Human Genome Project ... It's a plan which involves many scientific institutions, commercial institutions, government agencies around the world, to collect the DNA, the genetic materials, of indigenous peoples who are considered are in danger of disappearing ... So this is another phase, another type of exploration which is insidious, is sinister; it begs questions about commerce, about ethics, and about survival in the last few years of the 20th century.

Dorinda Outram:

And that does also really hit against a very strong enlightenment idea which drove a lot of interest in exploration, which is the universality of mankind. Because once you start taking DNA and saying, oh well, this is a sort of a Wichita Indian or that's another sort of racial DNA, then you're saying that we're not interested in the universality of mankind, we're interested in maintaining certain groups of men as almost ... human species in a human zoo.

