Darwin and Inheritance

Mendel and Heredity

JOHN MAYNARD SMITH:
Well it's a very odd story because Mendel's work was rediscovered round about 1900 independently by several different people. There's no question now that it's right, essentially, but it was initially treated not as a sort of support for Darwinism but actually as an alternative explanation of evolution to Darwinism.

PETER CAPALDI:
Mendel was a monk, later abbot, of the Augustinian monastery in Brunn, a thriving provincial town in what was then a part of the Austrian Empire. Between 1856 and 1863 he raised nearly 30,000 plants, crossing varieties that demonstrated clearly identifiable characteristics, all the while counting the number of times each characteristic appeared in each succeeding generation.

COLIN TUDGE:
He did the thing which as absolutely essential in experimental science, he posed himself a problem which he knew he could answer. Science is the art of the soluble, and if you set yourself a problem that you really can't tackle you're wasting your time. But Mendel very deliberately set out to look at hereditary patterns in a plant, in which he knew that the hereditary patterns were actually rather simple.

STEVEN ROSE:
What Mendel observed is, for example, if you cross a pink and a white flower pea plant, then all the offspring in the next generation are pink - so what had happened to the white, and that was the mystery that he started with. Now what happens if we cross two pinks in this generation, well that's when the famous ratios pop out in the next generation you get three pinks and one white. Now why is that the case? And Mendel was able to be clear that somehow the white had been masked in the middle generation, but it was still there ready to pop out at the end, and this is what we would now call the pink being dominant, the white being recessive.

STEVE JONES:
The essence of Mendel's idea is that inheritance is based not on fluids but on particles, and of course he worked on peas, he worked for example on round or wrinkled peas. His amazing breakthrough really was to find, and it seems simple, that when you cross a round with a wrinkled pea you don't get a pea that's partly wrinkled you get a pea that's round - that pea if you make those, those peas together then you in the next generation get the wrinkled peas back again quite unchanged. So that inheritance is a matter of separate units that are passed down the generations quite distinct from that which they produce.

PETER CAPALDI:
Mendel had uncovered a crucial aspect of inheritance - the fact that somehow an individual's characteristics - the colour of hair or eye, for example - are passed on through the generations, sometimes showing themselves in a particular individual, sometimes not to be seen again for several generations to come.How, and just what this means for the way species might change over time, were of no concern to Mendel. But for Darwin an understanding of the way inheritance works was critical.

COLIN TUDGE:
Darwin's great idea of evolution by natural selection starts with two fundamental ideas really. One is that as like begets like, in other words human beings have human children and horses

have horsy children, and furthermore big horses have, tend to have big foals and little horses have little foals, like begets like. On the other hand, despite that, there is variation. Even peas in a pod are all very slightly different. Because you have variation, you have the possibility of selection, some in any one environment are bound to fair better than others, the ones that fair better will be the ones that survive, the others go to the wall. What Darwin has to explain in order that evolution by means of natural selection can actually work, is why on the one hand, like begets like, but why on the other hand, all the creatures, all the offspring of any given couple are actually varied, and that's actually a difficult problem and Darwin never got the answer to it, and he knew to the end of his life that evolution didn't work unless he had a proper explanation for how heredity works.