Exactitude is not the same as truth.

– Henri Matisse

Two extremes:
to exclude reason,
and to use nothing but reason.

– Blaise Pascal

Truth

How can we, as scientists, create space in our world-picture, in our interpretation and arrangement of "the facts", so that others can find their way, or even get lost in them? We do it quite literally by leaving holes in the picture. We don't have to tell them everything. Information overload is information overkill.

Like artists , scientists need to decide which dimensions, which colours and shapes of the world as they see it they must leave out in order to show the "right" picture. Truth is not always the whole truth. L'exactitude n'est pas la vérité; exactitude is not the same as truth. Selecting true (correct) elements of the truth (as we see it) constructs a valid picture and a structured space which is open to and for others. Space gives people room for manoeuvre, allows them to bring themselves in and to create their picture, their own truth, with the elements we have offered them.

Scientists have the urge to tell the truth. But each of us only sees his or her own truth. Other people can only make sense of our truth if they have the room to construct their own, if they can find and see their own place in the picture.

This is the way that they can relate, establish relations to what we have to say. We are all egocentric: we all see the world from where we stand and from where we (think) we are going.

Yes, we do have to simplify our version of the facts. Another word for simplifying is selecting. We do it all the time, anyway. We do it every time we build theories, and every time we give examples to illustrate them. A theory is a generalisation from observed facts. It is the formulation of a common denominator, of regularly occurring connections between individual instances. We cannot ever have seen all the individual instances which our theory covers. And that is why we formulate a theory: whether in science or in "everyday life", making theories – i.e. generalizing – frees us from the necessity of constant empirical observation, from the tyranny of the individual instance and the particular case.

I touch something hot and burn my hand. After one or two such instances, I have formed a theory: I have recognised the connection between heat and hurt. I no longer have to try it out anew each time. It frees me from the burden of the purely practical, relieves my cognitive load, enables me to expect regularity, and to act accordingly. My theory is built on a finite number of experiences and enables me to predict an infinite number of potential occurrences. Theory-building is an inherent part of our survival make-up. Scientific theories are essentially the same and have (or should have!) the same relation to

actual occurrences, i.e. to practice, to life.

To illustrate our theory, we take the inverse route. We select an individual occurrence – a hot fire – and let it represent what always happens. In other words, it represents a regularity, a general law: it is an example. Thus we relate the individual to the universal.

As we all know, people don't relate to generalisations. Telling a child that "fire burns" will teach her nothing: she has to try it out for herself, by getting burnt (or at least too hot) by one or two individual, particular fires. She has to feel it. Telling someone that global warming is endangering the world doesn't get us very far either. Show someone one island state that is sinking and the plight of its inhabitants, or how one village in Austria is going broke because the skiing industry which sustained it is no longer viable, and he will nod in sympathy. Examples are "the real thing", generalisations are not.

Art shows us what we already know, what we have already experienced, in a different way. It offers a new composition of the seemingly familiar. Perfect reproduction of what we already know, have already seen, is neither desirable nor possible. It teaches us nothing. And this "nothing" bores us. Science does not give us perfect reproductions either. Once we formulate a theory, or generalisation, from a finite number of individual instances, we move to the level of the abstract. And on this level, there can be no "faithful copy", no exact reproduction, no complete equivalence. We have to leave out the marks of individuality. That is the point of the exercise.

Similarly, no example or any illustration of "the real thing" can ever be an exact copy of another "real thing". Each instance, or occurrence, each example, is an individual, unique event; exactly the same condi-

tions will not prevail again. They will, of course, be similar, if they are to possess any explanatory value, but they will not be the same.

The value of a work of art resides in its ability to make us look at events, occurrences, states in the world with a fresh vision, as if we had not seen them before. As if we had not yet seen them. The crux is that we must have seen them before in order to see them anew, to experience them differently. It is the new juxtaposition of events (objects, words, notes, colours) in space that creates the freshness of vision. A new order, the re-composition of details that are familiar to us throws them into relief, gives us a new perspective. Familiarity is the necessary condition for novelty of perception, for our ability to re-cognise what we are seeing (hearing, feeling...).

Art makes the familiar at the same time unfamiliar and in this way shows us what it wants to tell us.

> I stood tip-toe upon a little hill,
> The air was cooling, and so very still,

These lines from John Keats' poem have re-arranged "what really happens" (the truth?). Was Keats making free with The Truth simply for effect? When poets do it, we call it poetic license and allow them free rein. We do not assume that Keats was actually standing on the tip of his toes. Does it matter? Yes and no. The words he uses matter because they conjure up a truth of feeling, they impart the emotional truth of standing on the hill amidst a clear fresh green.

Poetic fact number three: poetry doesn't have to tell The Truth in order to show a truth.

Scientists can do the same: simplifying truth means juxtaposing selected elements of it a new way. Re-composing or re-designing the truth does not mean falsifying it. Nor does it mean that we are insulting the intelligence of our public. On the contrary: re-designing our truth shows that we trust our public to make sense of it. It shows that we trust them enough to make their own sense, to find the connections to their own lives. It also means that we have enough trust in ourselves and in what we have seen and learned, to pare down our explanations, theories, statements, to the bare essentials and to lay ourselves open to being only partially understood. It is only by discarding the inessential that we can create the space to re-compose the picture – to redesign the interpretation of our truth and allow others to access it. It means trusting ourselves enough to enter into the fray without the bullet-proof armour of stringent logical argument.

Poetic fact number four: art is the communication of perceived truths which is effected through the re-composition of elements of this truth. Art relates the universal validity of this truth to the actuality of life by means of the specific, individual event. Art is thus both particular and universal, it is an expression of its spatio-temporal, cultural, political and social individuality and at the same time a reminder of the fundamental issues of the human condition which transcend these boundaries. Art translates the universal into the particular.

Scientists can be poets. We can adopt the artistic mode without sacrificing validity or truth, without telling non-truths or distorting the facts. There is a difference between distortion and re-composition. The one presents something which is not, or cannot be, while the other presents what is in a new way.

Reality

Re-composition (in other words, translation) pre-supposes that we do in fact have a picture to show, one that is robust enough to be re-designed and still retain its identity.

Translation is the ultimate test: if we have something valid to say, it can be said in any way, in any arrangement, using any language. If there is nothing there but words (or figures or formulae), there will be nothing to re-arrange. Words evaporate when there is no reality behind them, no hub which binds them to human experience.

Communication is a somatic necessity, not just a social one. If we did not communicate with one another, we could not survive, neither as individuals, nor as a species. The urge to communicate is, quite literally, embodied in us. We are hard-wired to relate to other people and to share our life experience with them.

We are also hard-wired to understand – to try to make sense of what is going on around us: structuring ordinary events and things into categories, expecting regularity in the world (in natural occurrences, in the behaviour of other living beings, etc.), language, art, religion, are all a reflection of the "[…] profound human need to grasp the pattern of living […]". This urge to find order, to create a coherent picture in which we can see where we stand, where we fit in, cannot be merely "[…] an emotional exercise, but [must take place] within a […] personal emotional experience".

Scientists, like artists, can help people "grasp the pattern of living". But to do so, we need to provide a clear picture, one that can shed

more light, create greater clarity. Filling in the picture with overzealous detail clouds the issues at stake, dims the light, confounds rather than clarifies. "Science, once the great explicator, garbles life with complexity and perplexity". The whole truth and nothing but the truth, presented in technical language in logically stringent argument is unlikely to be a personal emotional experience. It may take us from fact A to fact B and all the way to fact Z but there's nothing as boring as a straight line. Boredom is at best a negative emotional experience.

Science can only be successful if it can capture the public's imagination, if it enlightens us and does not weigh us down with undigested and indigestible data. Scientists need to embody the facts before they can express them – need to think them, feel them, care about them. Only then can we put them out there for others to see and to care about.

Poetic fact number five: we can never "tell it like it is". There is no such thing as literal translation. We always have to leave something out, add something else, say we're standing on tip-toe when we're not, so that people get the real message behind the apparent one. Telling it obliquely – not quite like it is – can show what we mean more clearly than the clearest logic.