TVP M

- THE EVOLUTION OF PURPOSE AND THE PURPOSE OF EVOLUTION

- PART HUMAN, PART MACHINE: ENHANCEMENTS

- FACEBOOK'S BUSINESS

no. 19

TVP MAGAZINE UPDATES

by Tio

SEARCH THROUGH ALL OF TVPM ARTICLES:

We've added a very useful feature to tvpmagazine.com that will allow anyone to run a deep search through all of the TVPM issues that we've produced. So, let's say you want to search for information on education. Simply type 'education' and wait a few seconds for the 'live' results, or hit enter and you'll get the results in a new page with the term you searched for highlighted in excerpts from all articles where the term appears. You can even search for short phrases, such as "How can we create an abundance of goods and services?" and you will get properly related results.

The more articles we add, and the more you search (giving us hints as to how we can tag articles to become more relevant), the better the results will become.

You will also find all of our articles organized by main categories, by author, and by keywords. So, all in all, it's now very easy to find articles about topics you want to read, or that you can use to help answer other people's questions.

FUNDRAISING CAMPAIGN:

The deadline for our campaign has ended, but the need for funding has not! You can still donate!

All of the money that has been raised will be used to keep our work going for TVP Magazine for as long as we can and, if we are unable to raise the remaining amount in a few months time, we will need to try launching a new (hopefully shorter) campaign to prolong the magazine. We highly encourage you to donate now, if you can, so we can 'move on' :).

A HUGE thank you to all of you, as not many choose to donate their 'valuable papers' to others in this system. We highly appreciate you!

SEE THE CAMPAIGN PAGE HERE

TVPM ANDROID APP:

We've also released a new Android app, which provides you with direct access to the main tvpmagazine.com website, but rendered in a native way for Android display. Head to the Play Store, install the app, and you will have a very quick and handy access for reading TVP Magazine.

We are also going to try to publish an app for iOS, but we cannot say for sure when that will be ready.

Facebook's Busine$$

by Tio

How would you feel if Google were to make the following statement tomorrow:

"Since there are so many search results and people cannot possibly look through all of them, we are only going to display the results that 'you like' (only a few, out of potentially millions), and what you 'like' will be decided by an algorithm that we have created, so you can't adjust that." that we use, and you can't change that."

I Agree

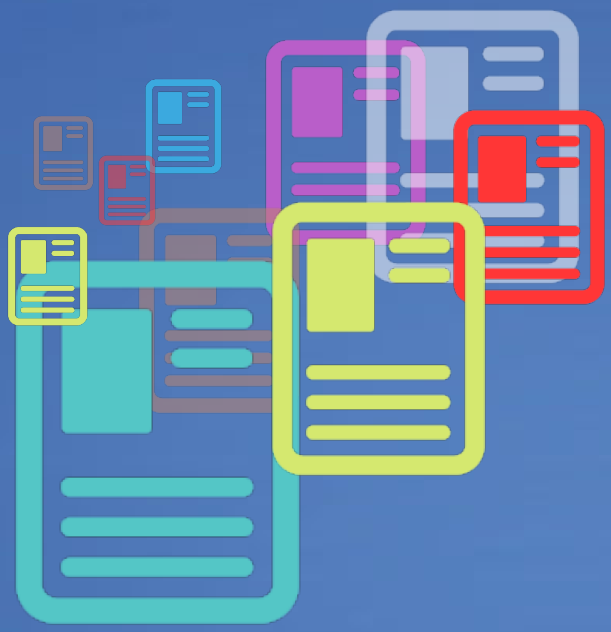
Such a move might piss many people off and it would definitely limit what any search engine can do for you. Deciding what is 'good' for you to watch/read, or what is 'important', can be a very neat solution to filter the huge amount of information that you are exposed to online every day, but that should be an option, rather than a default setting that you cannot change, especially because such an algorithm may or may not do a good job of 'predicting' what each individual might be interested in at any given moment.

WELL, FACEBOOK DOES EXACTLY THAT!

WHEN YOU Like A PAGE (SUPPOSEDLY BECAUSE YOU ARE INTERESTED IN WHAT THAT PAGE POSTS), FACEBOOK WILL NOT MENTION ITS SECRET TO YOU:

THAT YOU WILL RARELY SEE THAT PAGE'S POSTS, VERY RARELY.

POSTS MADE BY PAGE



This will also happen with posts from your friends, as you will not receive notifications of all of their posts, either. This is because Facebook sorts and delivers to you only the ones that 'you may consider important'. It is all in their algorithm, based on what links you clicked and from what pages, what other pages you liked, and so on.

They do this because, as they say, people are unable to manage all of the posts and updates from all of the pages they have liked, or friends they have.

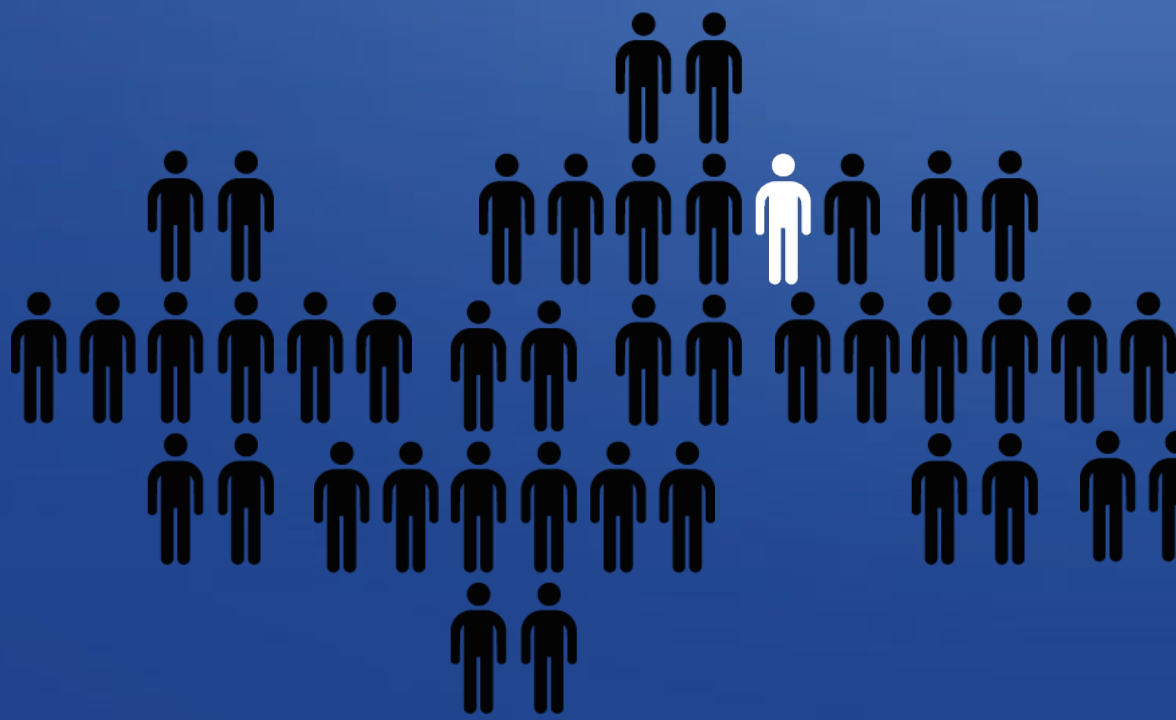
But shouldn't this be something that you, as the user, chose how to handle? I use an RSS feed reader (a way to get updates from multiple sources you like - websites, google keywords, etc.) and many times I do get too many updates, but I manage this myself by simply removing sources that I no longer find interesting.

Facebook could add simple options for people to help them cope with the potentially huge flow of information. It wouldn't be hard to add a "See important updates" and "See all updates", and then explain what 'important' means and how their algorithm works. Don't be fooled by the options you have now with "Most recent" and "Top stories", as they are strongly filtered by Facebook. Even if you want to see all of a page's most recent posts, those also get filtered by FB's algorithm.

More to the point, these Facebook algorithms make all of our TVP projects and updates almost invisible. The TVP Facebook page has more than 210,000 likes at the time of this writing, but each post we make has only "reached" an average of about 11,000 of those 210,000 people, over the entire past year.

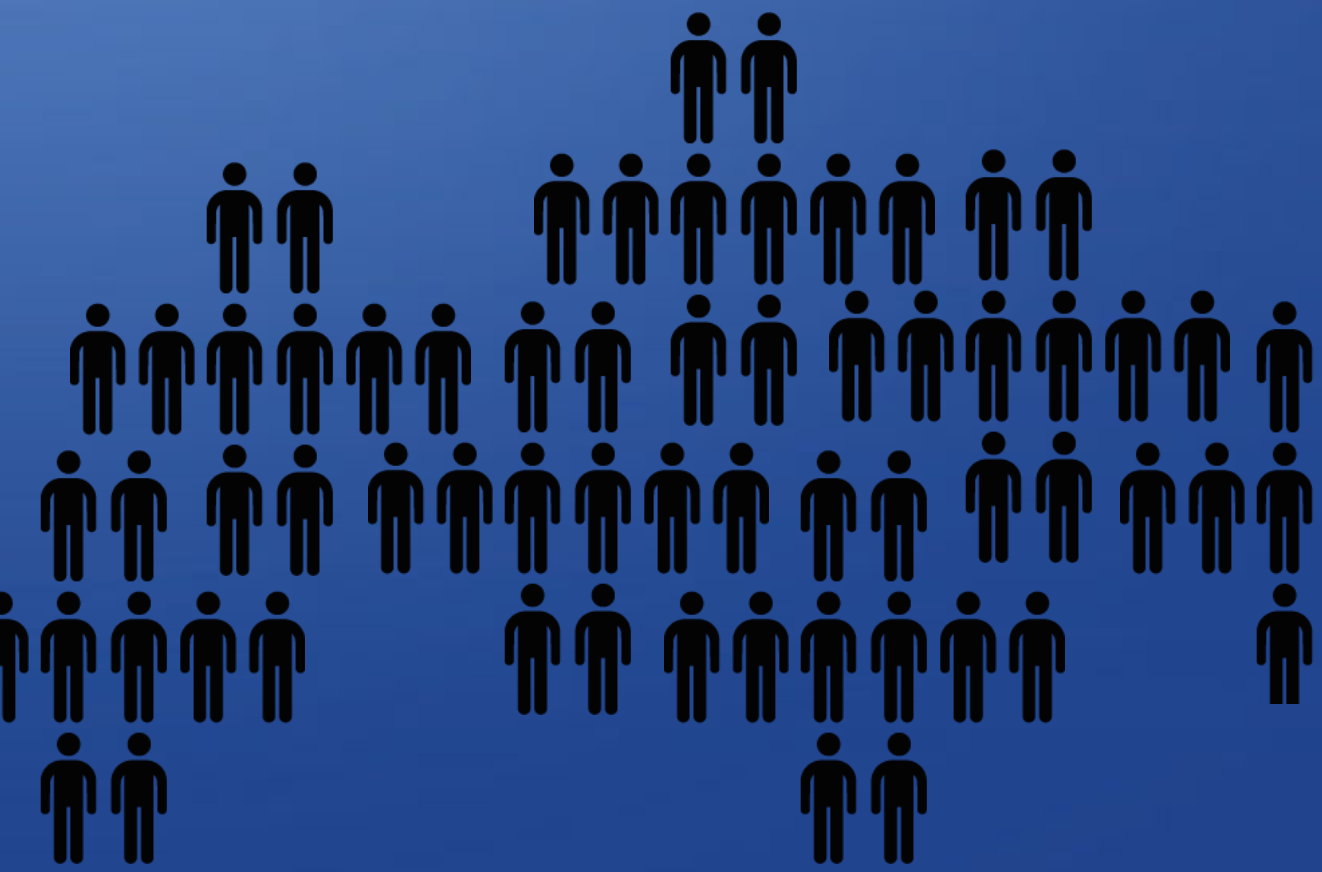
Since the recent 2015 algorithm update, which caused all Facebook pages to more sharply drop in reach, posts to the TVP Global Facebook page now only reach an average of around 4,600 people per post. That is just a bit over 2% of the total page supporters. Most of TVP Magazine's original posts, which include photos and text, have only reached 1-2 thousand supporters over the past 3 months, out of the 210,000 total.

THAT IS BELOW 1 % OF ALL THE TVP FOLLOWERS, OR JUST 1 IN 105 PEOPLE RECEIVING THE POSTS WE MAKE.



It's no wonder that so many TVP supporters still have no clue that TVP has a free online magazine, even though we've been producing it regularly for the past 2 years and frequently posted 'educational' images on all social networks promoting it, every day, over that time period.

But even that 'reach' number makes little to no sense, because 'reach' only means that the notification of a post we made was included somewhere in your Facebook news feed and you 'saw' it, even if you just quickly scanned through your news feed looking for something else (birthdays, events, a reply from a friend, etc.) and our post happened to be in there somewhere. That counts as 'reach'. More than that, some posts may only reach 800 people, while a rare 'mutant' one hits 180,000 people (extremely rare), and so the averages do not reflect reality well at all, as these occasional 'mutant' numbers will always drive the averages higher than what is 'normally' experienced.



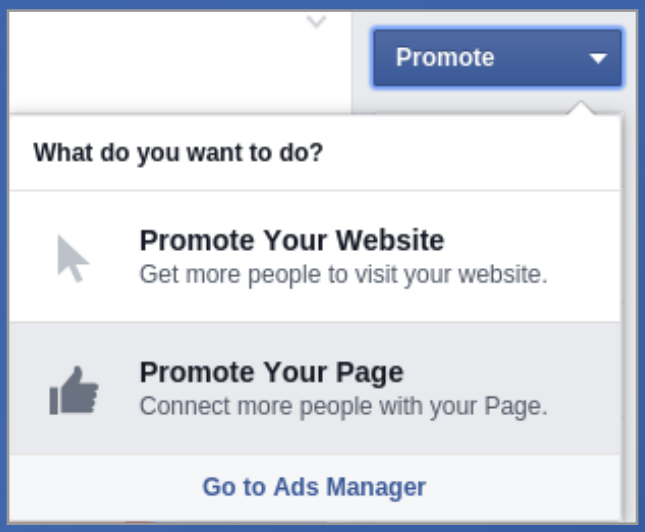
So, either we are failing completely at posting 'relevant' (from FB's perspective) posts, to get them to be seen by more supporters, or that FB is completely failing at providing a good service. We can't fail, though, as we post many new and original posts that are very important for The Venus Project and should be of strong interest to all TVP supporters. Then again, we are not the only ones who have been unable to reach the people who are interested in their pages, as it seems that pages across a wide array of niches are experiencing the exact same problem.

So, if it's not us, then it must be Facebook's 'innocent' fault, right? Maybe they don't understand how to make FB more useful for people, and their algorithm of predicting what is more 'important' for people is just not meeting its intended goals. Even if that is the case, FB should allow people to choose for themselves if they want to use the prediction algorithm, or instead have all their updates showing in the news feed. Or at the very least making the users better aware of their 'rules'.

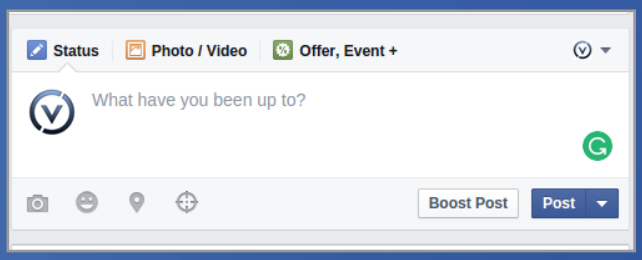
But hang on a minute...
You can now pay Facebook to get your message (post) to reach more people! So... after all of the above rationalization attempts, it turns out that this algorithm isn't at all about offering a smart tool for 'poor users' who cannot possibly cope with so many posts in their news feed, but is instead simply part of a profit-motive business strategy!? This is shocking....until you remember that Facebook is just a business, and recognize that we 'users' are what it sells, to other businesses.

So, the more money you pay to Facebook, the more people (your own supporters?) you can reach with your message. If you want to 'save the world' and present solutions as to how, through science and technology, we can literally save hundreds of millions of lives and dramatically improve everyone's standard of living, but you don't have the money to spread your message, then, well, you will have little chance of getting your message widespread.

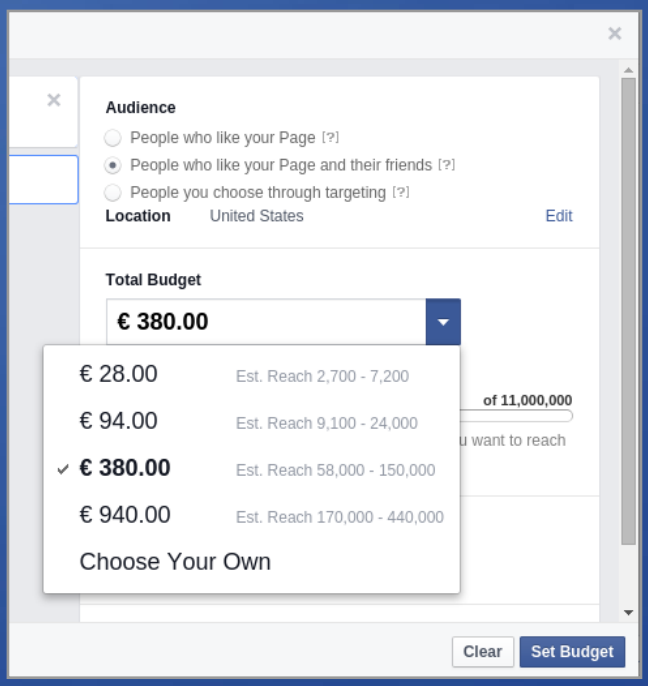
If you have an online presence somewhere (social network, forum, etc.) and your 'fans', followers, people interested in your page, etc., like and want to follow your page, but you then are told that you'll have to pay to reach out those same people (although there was no mention of this when you created the page), then this sounds to me like a low-grade scam.

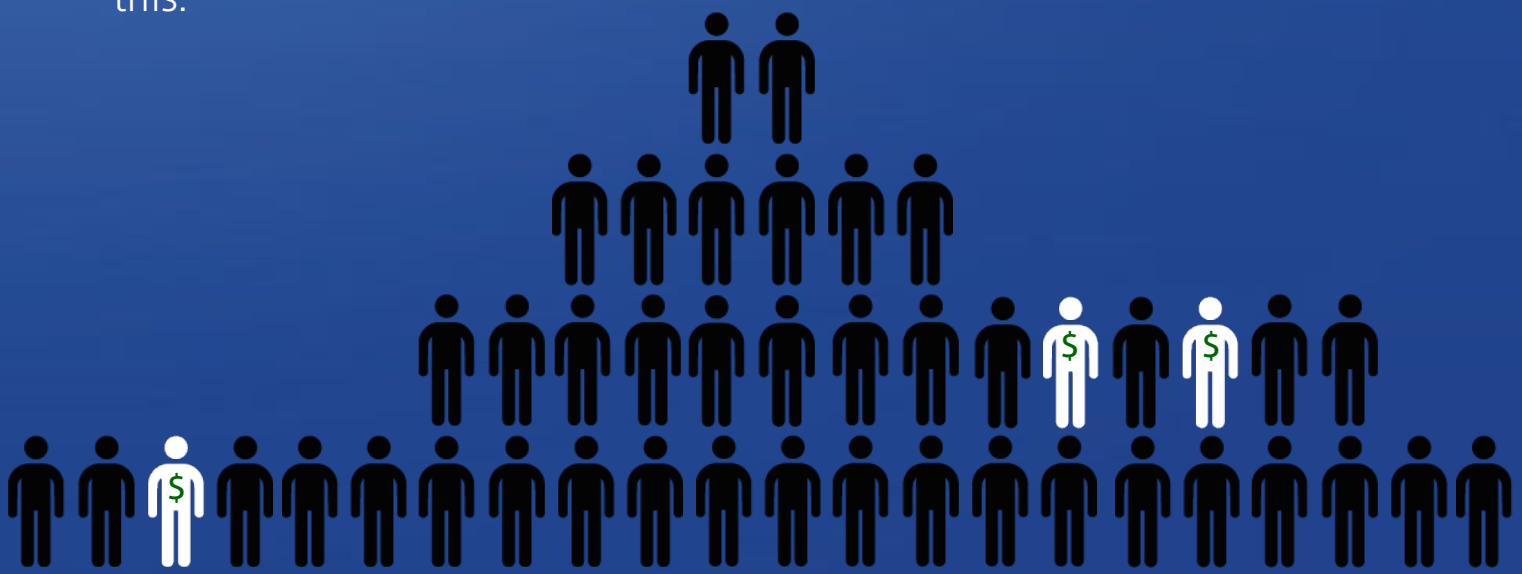


Every time a page 'owner' makes a new post to a page, FB pops up a loud recommendation to 'boost' the post, meaning for you to pay them money for your post to reach more people, and it will show you many ads encouraging you to 'promote' your entire page, for some more money, of course. Not to mention the many ads that are displayed to everyone that has a FB account, ads that track your online activity to, again, recommend what you should buy.



They don't just appear in your sidebar, but also in your news feed, similar to regular posts. This is not a conspiracy - this is simply how Facebook works, and you can read all about this on their website, as it's part of their business plan. The goal in today's world is to make money, and Facebook has gotten pretty good at doing this.





They are so good at doing 'business' that Facebook is worth 212 billion dollars as of this writing. It is worth more than 120 of the 180 currently recognized countries around the world. Over 67% of Facebook's fortune is owned by just a handful of people (11 or so), while it has 9,200 employees and 1,39 billion customers (users) that helped create a $12,47 billion revenue for Facebook in 2014 alone, as Facebook relies entirely on its users to sell advertising or their premium content/features.(source)

But it doesn't stop there. Not only does Facebook intentionally restrict your page's outreach to your supporters and their ability to see content that they requested to view as interesting (or important) to them, all the while making a huge amount of money from users like us through ever-present intrusive ads, but Facebook also 'sells' Likes. Not in a direct way, of course, because that would look bad for any business, but indirectly through 'paid promoting' that increases the number of Likes to your page and individual posts (their monetized solution to the scarcity problem they created above).

Since this recent 'monetization of Likes' approach was introduced by Facebook, many other companies have sprung up to compete for your "Likes" cash, while the entire 'fiasco' behind getting more likes and reaching more people is little more than a byproduct of the monetary system's push for profit, which creates these abhorant behaviors. As a side note, when you buy likes, it is usually done via click farms (a bunch of poor people that are paid low wages to create facebook accounts and 'Like' pages they are told to Like).

THIS VERY WELL-DONE VIDEO BY A SCIENCE-FOCUSED YOUTUBE CHANNEL DESCRIBES THE 'SCAM' THAT FACEBOOK IS ENGAGING IN

Because our Facebook posts reach such a tiny percentage of the people supporting TVP's page, we are made to feel a strong need to repeat many posts, similar to how a spammer aggressively sends thousands of similar messages to reach more people. If we want to inform people that a new TVP documentary is now available, for example, this forces us to post it 2 times a day, every day, for months in a row, just to reach as many TVP supporters as we can. And of course, this is not sustainable, and a major waste of time, effort and the precious patience of those who directly watch the page more closely than others.

Facebook encourages pages to post "original and engaging content" to attract more people to Like, Comment and Share the posts to their own profile walls and other groups, because when supporters do that, a post can become more popular and reach more people (but it will never reach all the supporters). These recommendations may be helpful for pages that want customers and sell products, but TVP is all about growing knowledge and expanding Global RBE awareness among its supporters, rather than trying to sugar-coat posts to look so nice that you, the supporters, are emotionally enticed to click on links intended to sell you something. Not all pages are used by businesses, dear Facebook.

Facebook is just an example, of course, as nearly all social network sites are full of rules and advertising, with lots of people trying to use them to promote their business and, more often than not, creating 'havoc' with so many misleading posts they make (buy this, click here). There are also businesses who 'sell' followers and tips as how to get more people following your account, and they too are a product of a profit-focused world that enforces a negative loop effect on the public tools we use and how their rules operate (like Facebook, Twitter, Google - who do try to stop these 'spammers', but yet preserve plenty of room for other kinds of advertising that benefit them). This money-hungry world has nothing to do with the technology behind tools like facebook, twitter, the internet itself. It only controls how they are used/abused, and today, they are mainly used to extract profit from consumers, by both the ones who own the tools (like Facebook) and those who want to use them to promote their businesses. As a side note, you can read our article on online advertising to understand more about this 'practice'.

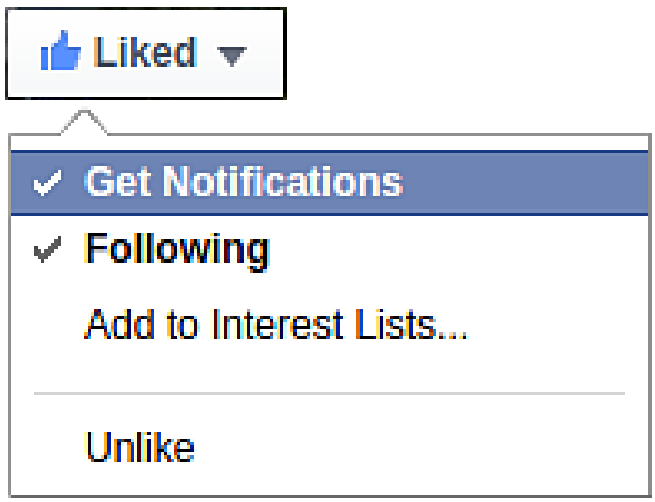
TVP is trying very hard to get important informational & educational messages and resources out there; not to sell something, make a profit, or to promote a business, while these escalating rules that Facebook and other companies employ are massively slowing us down in our 'mission'. TVP Magazine's readership has dropped by more than 60% over the last couple of months, as many fewer supporters now receive our posts on Facebook, the main social network we relied upon.

OF COURSE, MERELY COMPLAINING ABOUT ALL OF THIS WILL SOLVE NOTHING. SO LET'S SEE WHAT WE CAN DO TO IMPROVE THIS RIDICULOUS SITUATION.

First, let's try to 'fix' Facebook. This is not a proper 'fix', but I spent many days experimenting to try to uncover methods for getting all the updates from a page into my FB newsfeed. Here's what I learned:

1 NOTIFICATIONS

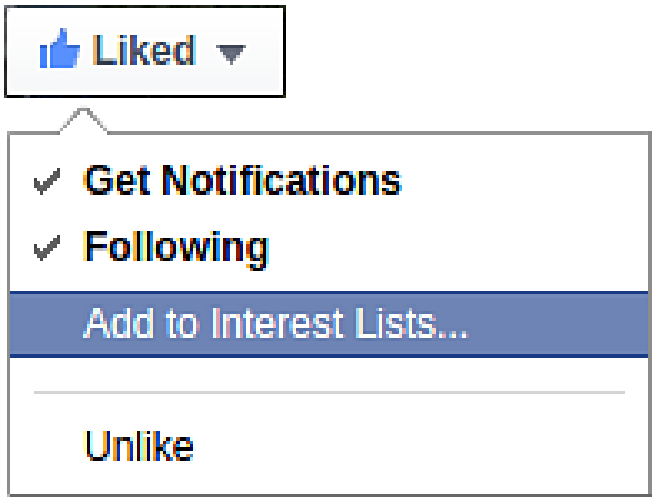
Go to the TVP Global Facebook page and check whether you have already Liked the page. Then, hover over the LIKED button and click "Get Notifications". This will show you notifications when we post on TVP Facebook page. To do this on a smartphone, use a browser like Chrome to visit Facebook, click the browser menu and then "Show Desktop Version". Once you are viewing the desktop version, you can go to the TVP Global Facebook page, click on the LIKE button and you will see "Get Notifications". If you cannot see the desktop version after selecting it, refresh your phone's view of the facebook website.



2 INTEREST LIST

Add the TVP Global Facebook page to an 'Interest List'. Again, hover over the Like button, and then on "Add To Interest Lists". You can then check your interest list to see more of the posts we make, perhaps all of them. This is also supposed to 'tell' FB's algorithm that you are interested in TVP, so it should, in theory, add some more TVP posts in your news feed.

You can also make an interest list with everything you are interested in and then "Favorite" that interest list. That Interest List will then become your news feed, allowing you should see nearly everything: posts from friends or pages that you add there. You can even create one lists for friends and another list for pages, if you prefer to keep them separate.



3 SOCIAL FIXER

Use SocialFixer to fine tune your Facebook to display more relevant content in your news feed and also to remove 'sponsored' posts and other advertising. It is very easy to install and set up, and could positively 'revolutionize' your Facebook experience.

4 3RD PARTY APP

Bypass Facebook's algorithm-limited 'newsfeed' altogether by using a 3rd-party app to get your notifications from the TVP Global Facebook page. The easiest way is to take advantage of the RSS url for the TVP Global page, which will pull every single post we make.

First, install a program/app(ios, android) or browser extension that supports RSS feeds (there are many of them), and then add TVP's RSS url to it: *http://facebook.com/feeds/page.php?format=rss20&id=152157788181214*

Those are some 'fixes' for Facebook, but we highly recommend alternatives to Facebook because we cannot rely on a company to connect us with you people.

5 TVP NEWSLETTER

The most reliable way to stay in touch with the most important TVP news is to subscribe to the TVP Newsletter. We send out newsletters only when there is something very important that all TVP supporters need to be aware of. Speaking of the main website, you should visit it regularly to see what's new about TVP.

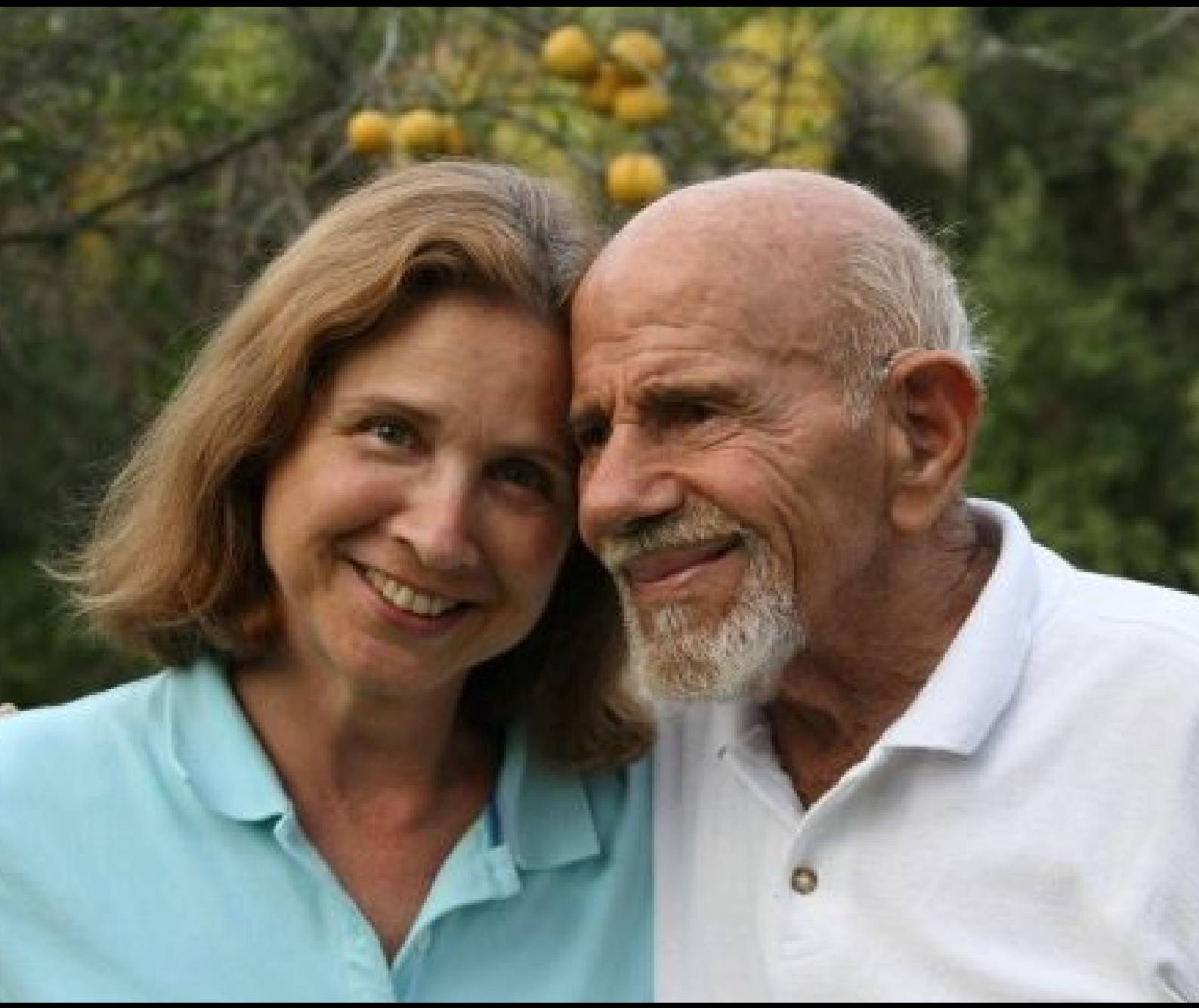
As a side note, people are working to improve the main site to make it more user-friendly on any device and expand its features.

6 TVPM NEWSLETTER

You can also subscribe to TVP Magazine's Newsletter below, to receive a notice whenever we release a new issue.

Another thing that you can do is to follow TVP on other social networks: Google Plus, Instagram, Twitter, Pinterest, Youtube Main Channel or Youtube Educational Channel.

And finally, I'm sorry to inform you, but I lied at the start of the article when I implied that Google does not filter their search results, because they do, alongside perhaps all major internet companies. This may not be such a bad idea, as some advantages can be found in this approach, but living in a world where profit is the main flavor all are salivating for, it should make us wonder if all intentions behind such filters are for the users' advantage, or a means through which such companies can promote more advertising to make a buck from it:



FAQ

with Jacque Fresco and Roxanne Meadows

How are Learning, Cooperation, and Gaining Health, Built into the System?

If we want children to achieve a positive constructive relationship with one another, and become contributing members of society, an effective way to accomplish this is by designing an environment that produces the desired behavior.

For example, when the children want to learn how to assemble a small motor vehicle, the design would require four children to lift the car while two others attach the wheels. The rest of the car would be assembled in a similar manner, needing the help and cooperation of all to complete the vehicle for use. This enlightened form of education would help students appreciate the advantages of cooperation.

Exercise in our schools would not be mandatory, monotonous, or involve competition, but would be incorporated directly into the classroom experience. For instance, a craft shop the children enjoy using might be located on a hilltop in the middle of a lake. To get there, the children would have to row a boat, and then climb the hilltop. This not only provides exercise, but also a sense of achievement, which improves mental health and incentive.

The Evolution of Purpose
and
The Purpose of Evolution

by tio

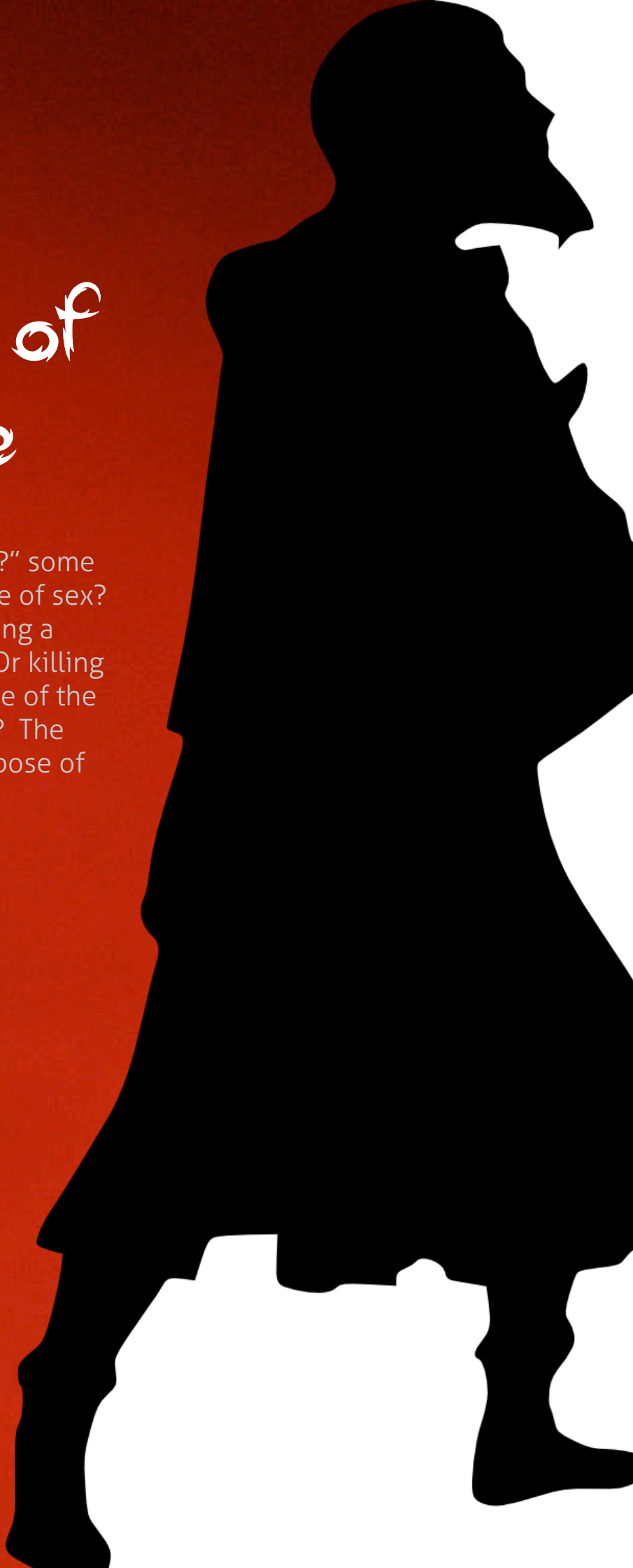
Did you know that baby koalas eat their mother's 'poop' to improve their gut bacteria so that, when they grow up, they will be able to digest food, while mother cats eat their kitten's poop to protect them from attracting predators? There are a wide variety of other creatures that eat their poop or other creatures' poop to improve their digestion, absorb vitamins, and so on. That's extraordinary! Until you realize that if people are found eating 'poop', and some do, they are deemed to be 'mentally ill'. That's what Wikipedia and many other sources project when it comes to 'purpose' and, especially, 'evolution'.

If there is one scientific theory that has been completely misunderstood by the general public, or at least severely twisted when explained by many, it would be the process of transmutation (what many call 'evolution'), and this process has been romanticized and mysticized so much that it may qualify as the most 'purpose'-infected scientific theory of all time. When I first came across TVP, one of the most interesting notions that resonated from it with me was the mechanistic and purposeless nature of 'evolution' that is explained by Jacque in many of his talks/interviews over the years. Jacque even performed experiments that I will present within this article, in order to showcase the mechanics of behavior in animals.

So, throughout this big article, we'll try to 'shed some light' on the science behind evolution, and cut through much of the BS (Bad Science) that is often projected on top of this very important scientific discovery. We'll provide you with many examples and analogies to make it easier for everyone to understand this process, and will then connect it with the idea of 'purpose' to see if it makes any sense at all.

The Evolution of Purpose

"What is the purpose of life?" some may ask. What is the purpose of sex? Of having children? Taking a shower? Killing someone? Or killing no one? What is the purpose of the heart? Fingernails? Hair? The Universe? What is the purpose of these questions?



People have asked these kinds of questions for many thousands of years, but they may have missed something important: they are the ones creating the questions, so the questions might be completely meaningless. Can we ask: "What is everywhere? What is the purpose of purpose? Why why?" We can play with words a lot, but they may not make sense at all if we have no physical reference to work with.

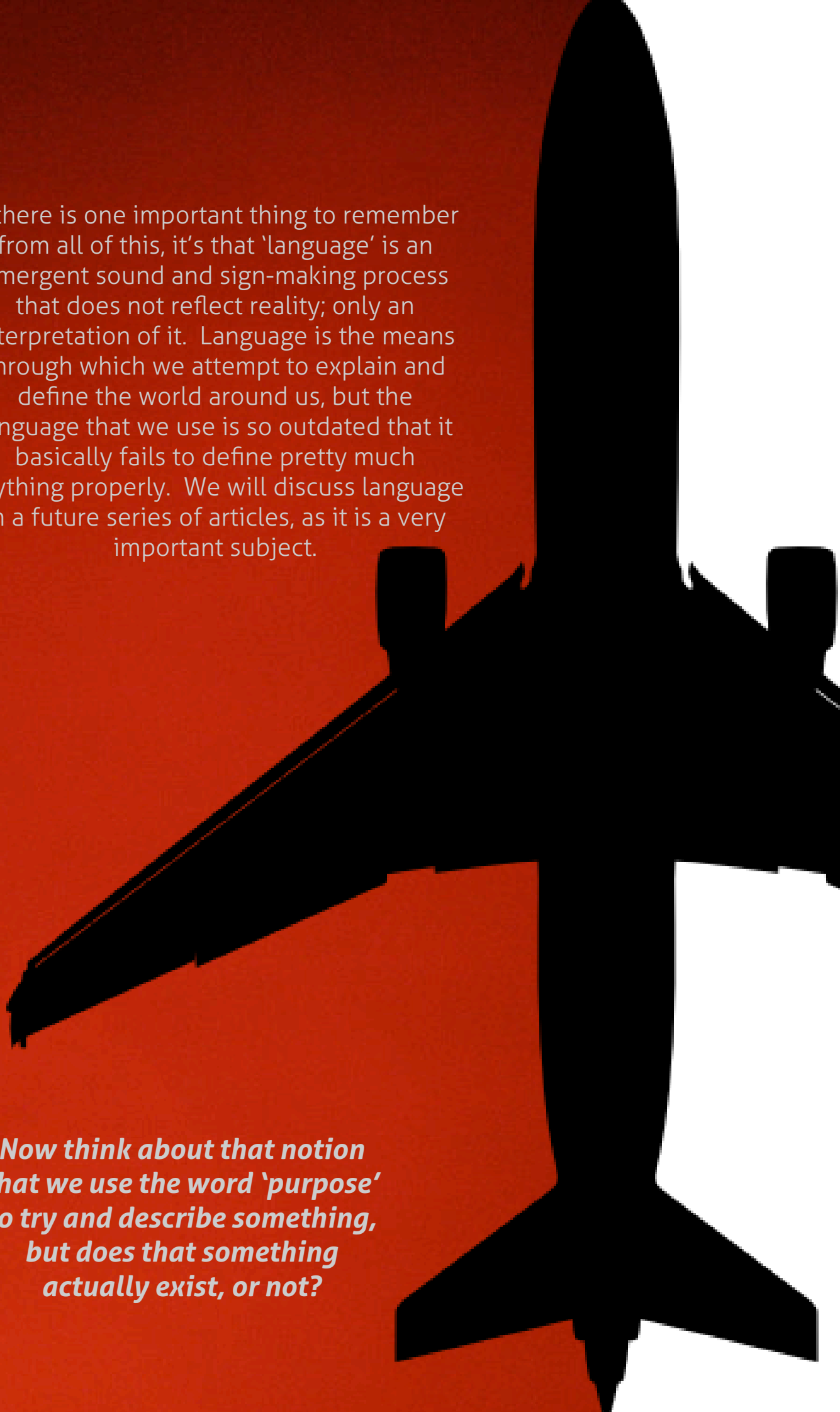
This kind of language use allows people to 'wonder' about the world, and to categorize and make connections between objects, events, feelings. If we try to imagine when people were using language 10 thousand years ago to understand natural phenomenon like lightning or snow, then we can see how they might have asked meaningless questions (from a scientific perspective) and sought for meaningless answers. " Why is it raining?" makes no sense at all today, as we now ask "How does it rain?". Imagine how weird it would be if we were still asking "Who is creating the rain?", but people thousands of years ago, having very little 'scientific' understanding about the world around them, looked at these as very valid questions.

Couple this with the fact that people back then were living very tough lives (they had to hunt for food, they were easily crippled by diseases, injuries, famine, and so on), so much so that many may have found the idea that they had a higher purpose in life as a pleasant thought, so it's little wonder how the idea of 'purpose' became so 'viral' (alongside similar notions).

So 'viral' had these kinds of notions become, that the careful study of celestial bodies 25,000 years ago (to track seasonal changes) eventually became subject to this kind of thinking, evolving over the years into something that we call 'astrology' today. People projected that the stars have influences on their lives. They used complex mathematical formulas to calculate the faith of individuals or entire regimes (kings and politics). If you start with a preconceived and unscientific notion, you can end up using science (like mathematics) to look for and justify your own meanings, arriving at conclusions you can interpret in any way you want to.

Religions are another example of how the notion of 'meaning' (purpose) was being promoted and empowered. Both astrology and religion have remained with us to this day. If you wonder why, then you should read our article on Reason

If there is one important thing to remember from all of this, it's that 'language' is an emergent sound and sign-making process that does not reflect reality; only an interpretation of it. Language is the means through which we attempt to explain and define the world around us, but the language that we use is so outdated that it basically fails to define pretty much anything properly. We will discuss language in a future series of articles, as it is a very important subject.

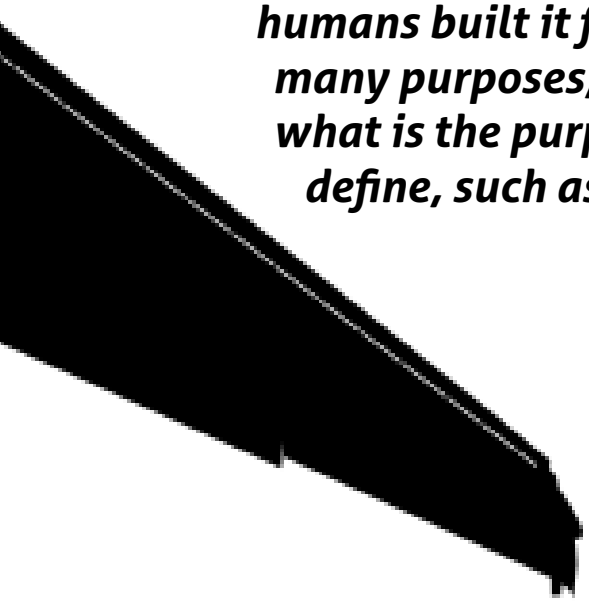


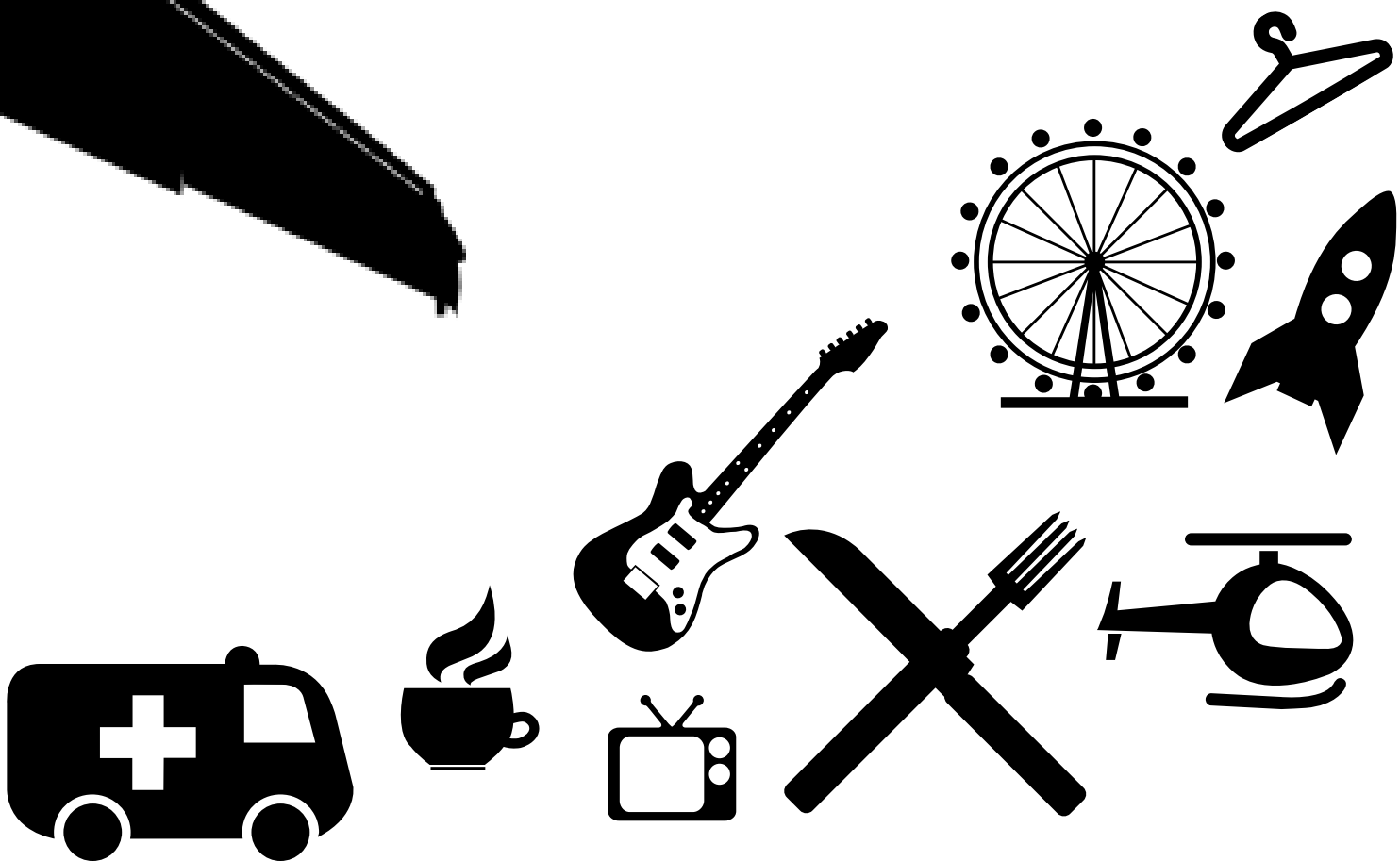
Now think about that notion that we use the word 'purpose' to try and describe something, but does that something actually exist, or not?

We say that the purpose of airplanes is to transport us by air, the purpose of a knife is to cut bread or other foods, and the purpose of a hospital is to provide medical care for sick people. But those are objects and we might recognize what we mean by 'their purpose' mainly because we tend to agree that humans built those objects for a specific use.

I am sure that we can also agree that, even if many people project the same use, or 'purpose', for those objects, there are many who will not. An airplane can be seen as a weapon (missile), a knife's purpose might be to use it for a circus play, and a hospital can be seen as a place to make money from. Whatever you might project, might as well be accepted as correct, since we project these concepts of use and meaning into perhaps everything.

But if a plane can be seen by some as a means of transportation and by others as a weapon, and we are talking about an object that we can all see and we humans built it for a specific use, then if it can take on many purposes, how can we then expect that asking what is the purpose of something that we can't even define, such as life, is going to lead us anywhere?






What is the Qi of
the Universe?

To put it in perspective, Qi is a word that means... well, it is very hard to explain what it means because it means whatever people want it to mean, but it was a very important notion for people thousands of years ago, as it still is for some today. It tries to describe one's 'natural energy'. But what does this mean?

The concept is thousands of years older than the discovery of the scientific (real) understanding of energy, so the word 'energy' is of a different use for them compared to our use of the word today. Many thought of it as 'something' like a 'force' that makes you, you, which can be controlled with willpower and can sometimes be extended through the universe. They thought that this Qi exists not only in humans, but also within animals, wind, and other events.

To quote some people who lived more than 2,000 years ago, "Human beings are born [because of] the accumulation of Qi. When it accumulates, there is life. When it dissipates, there is death... There is one Qi that connects and pervades everything in the world." "Fire and water have Qi, but do not have Life. Grasses and trees have Life but do not have Perceptivity. Fowl and beasts have Perceptivity but do not have Yi (sense of right and wrong, duty, justice). Men have Qi, Life, Perceptivity, and Yi."

They even thought that this Qi flows through your body and when it's disrupted, it creates diseases. Some are still practicing this kind of pseudo-medicine today and if you want to know why, I recommend again that you read our article on Reason and Logic.

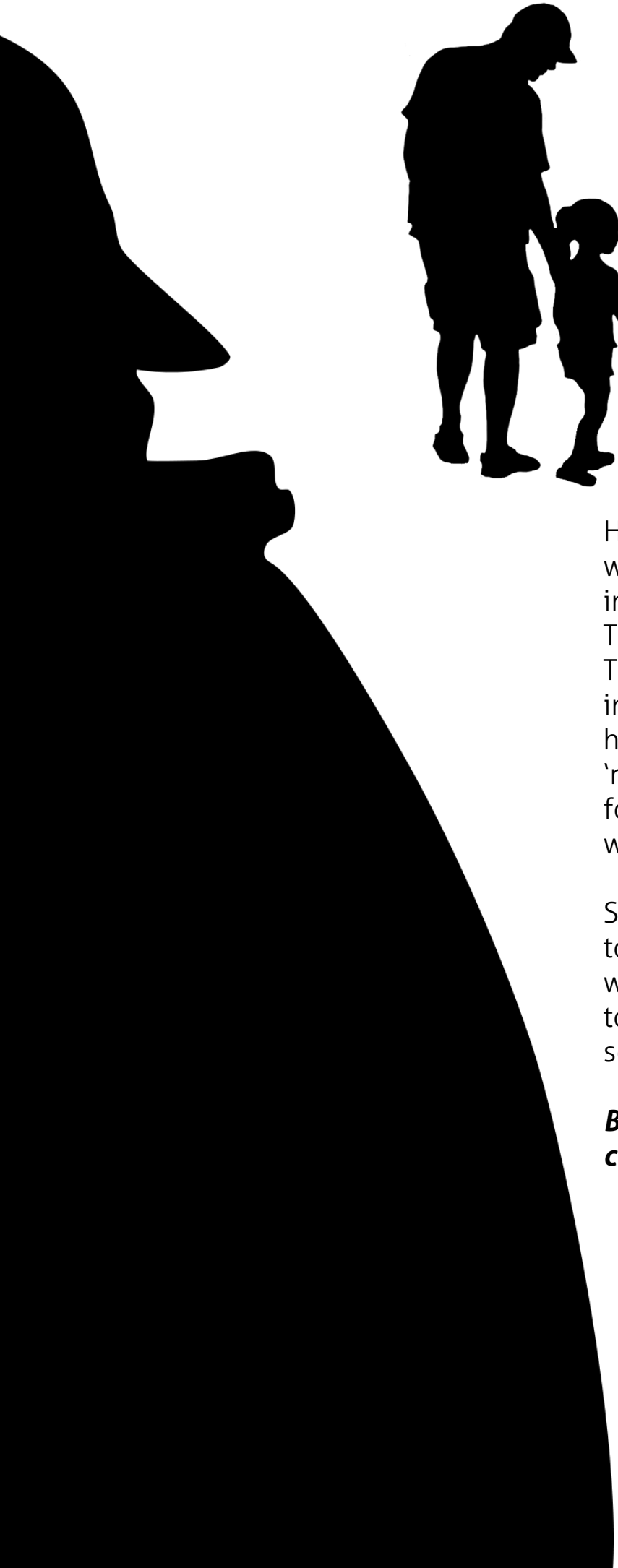
The idea is interesting and resonates with what we know today about 'energy', as in that sense we are all a flow of energy. But today, we don't ask "What is your Qi?" Or try to calculate the Qi significance of the Universe, because we now know what 'energy' means from a scientific perspective and it's not about any 'willpower' to increase or decrease it, nor does it have any 'real' meaning. Qi is not something we can measure and make sense of, so I think it's pointless to ask any questions about it.

In this sense, take the two questions and see if they make sense now:

What is the Qi of the Universe?
What is the purpose of the Universe?

The projection of purpose in events and emotions has lead to a complete confusion, as it does not adresses anything 'real'.

We should not be fooled into thinking that words describe the world, as the reality is quite different: we use words to try to describe our unique experience of what we observe. It's never reality - only a rought interpretation of it



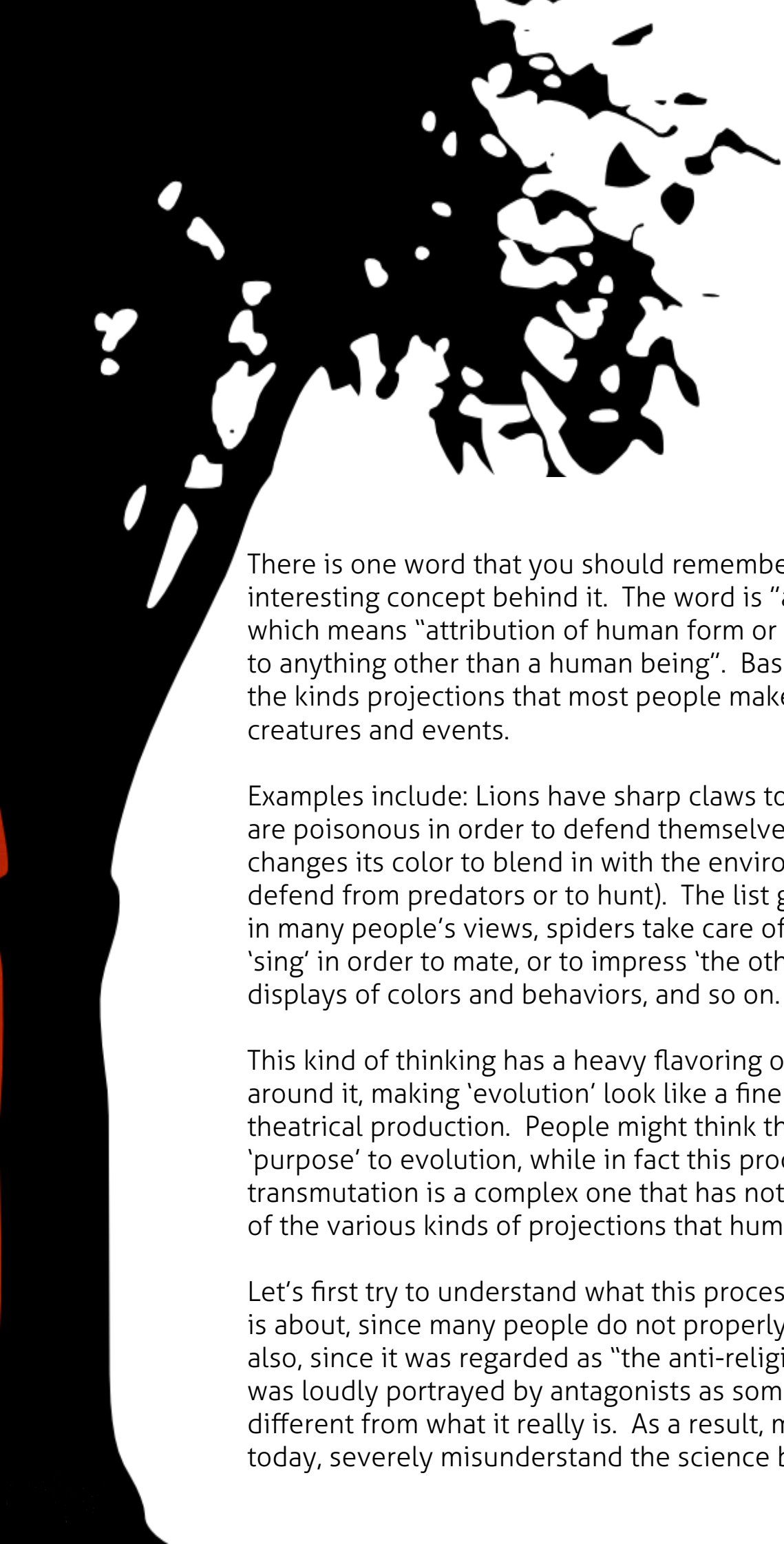
Humans are used to doing things with a 'reason' in mind. They go inside because it is cold outside. They eat because they are hungry. They have a child because, influenced by culture, they 'want' to have one. They buy stuff with a 'reason': to show off 'success' with it, for their perceived needs, or whatever else.

So, this notion of 'purpose' migrated to all kinds of behaviors and events where, perhaps, there is no 'purpose' to inject that notion, as it makes no sense at all.

But let's see how projections create confusion around 'evolution'.

The Purpose of Evolution

I have seen a great number of documentaries about 'nature', and in 99% of them, you can witness how humans often project their own values into animal behavior, creating a very misleading view of the world.



There is one word that you should remember, as there is a very interesting concept behind it. The word is "anthropomorphism", which means "attribution of human form or other characteristics to anything other than a human being". Basically, it describes the kinds projections that most people make for, in our case, creatures and events.

Examples include: Lions have sharp claws to hunt, some frogs are poisonous in order to defend themselves, and a cuttlefish changes its color to blend in with the environment (either to defend from predators or to hunt). The list goes on and on as, in many people's views, spiders take care of their young, birds 'sing' in order to mate, or to impress 'the other half' by their displays of colors and behaviors, and so on.

This kind of thinking has a heavy flavoring of 'purpose' all around it, making 'evolution' look like a finely choreographed theatrical production. People might think that there is a 'purpose' to evolution, while in fact this process of transmutation is a complex one that has nothing to do with any of the various kinds of projections that humans impart into it.

Let's first try to understand what this process of transmutation is about, since many people do not properly understand it, and also, since it was regarded as "the anti-religion argument", it was loudly portrayed by antagonists as something very different from what it really is. As a result, many people, even today, severely misunderstand the science behind it.

Hystory

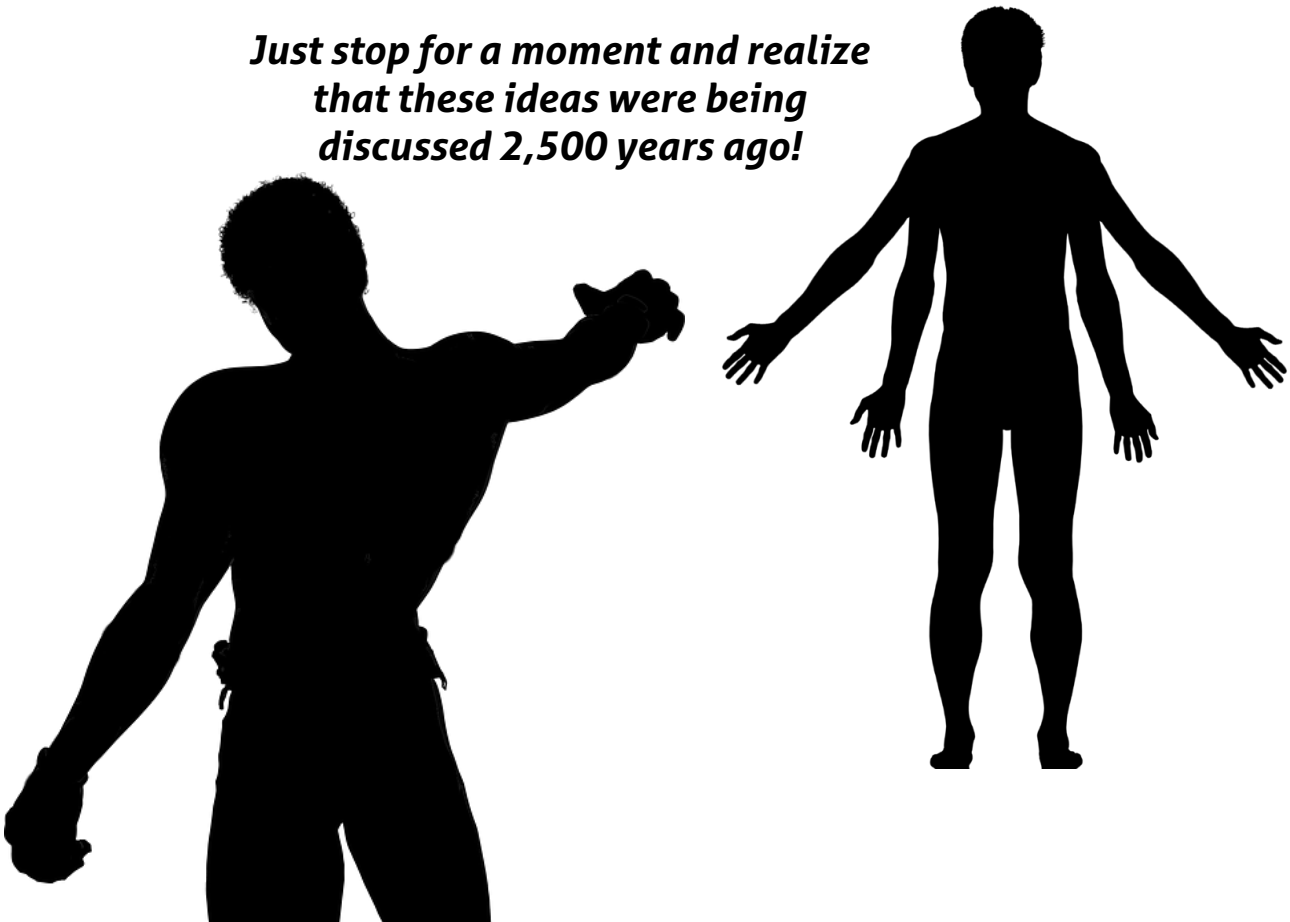
Let's see how the idea of 'evolution' started:

The evolution of species, or transmutation, did not start or end with Darwin, as many before him had noticed subtle changes in geology that they projected, over time, could lead to a different kind of environment. What once may have been a hill may, millions of years later, become a mountain.

2,500 years ago, some people proposed that one type of organism can 'descend' from another, and they 'deduced' that because of fossils they had uncovered at that time, the animals they knew about, and inspiration from other similar ideas.

They went even further by observing that some people are born with two heads, four arms, or any of many other 'defects', and realized that only those who were 'compatible' with 'normal' humans can make these 'forms' last. That 'inheritance' idea is an old one, as humans realized long, long ago that children resemble their mother and father's characteristics. In other words, if the mother had blue eyes and the father brown, then the child will either have brown or blue eyes, but not green.

Just stop for a moment and realize that these ideas were being discussed 2,500 years ago!



Much later (1,000 years ago), after many more ideas had been brought to light by different people, geology had become the main area where more and more scientists observed how small events in the Earth's geology appeared to have caused significant changes over time. Sedimentary uplift, soil erosion, deposition of silt, and marine fossils were a significant part of this growing hypothesis.

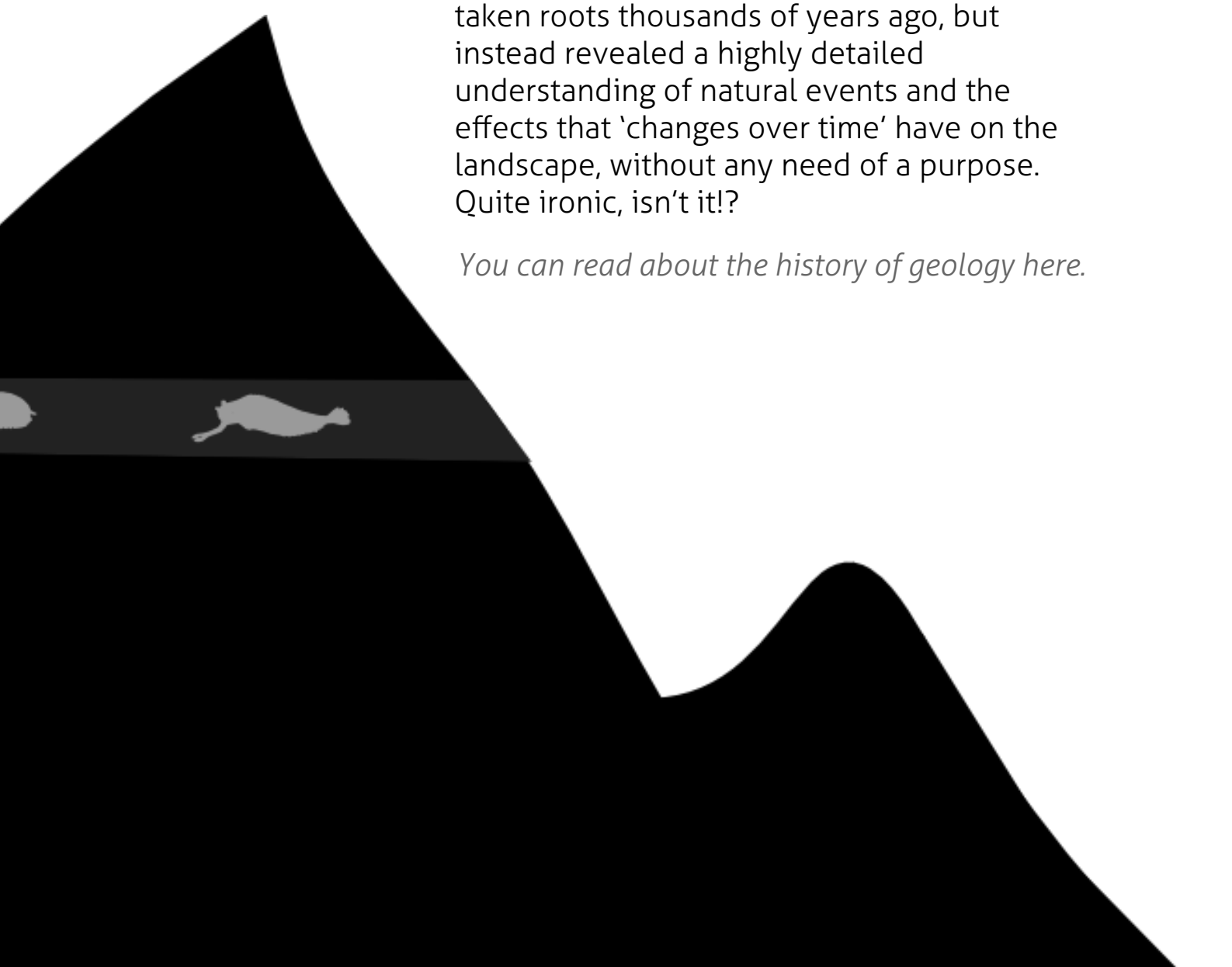
Let's think about this in simple terms: If you do a good survey of the earth's rock types and you understand that some types of rock can only form underwater, but you find these types of rocks at high points on mountains, then you may conclude that they formed beneath the water and that either they somehow moved there due to some unknown forces, or that at one point there was water so high that the mountains were covered by it for a long period of time, allowing these types of rocks to form there. But since you only find a layer of such types of rocks on a mountain, then you may deduce that it's not possible for the entire mountain to have been under water at some point as only one of its layers features that type of water-formed rock.(source)

Couple that with the discovery that mountains 'grow' and get taller (an observable fact) and we may understand (and even calculate) how and over what amount of time that layer of rocks ended up so high in that mountain. Fossils of various creatures were found inside these layers and, if you can calculate the age of the rocks, then you can discover the age of the fossils that you find inside that layer.

400 or so years ago, people started to understand how to properly calculate the age layers of rocks in order to form a more accurate timeline of the Earth's geology. Check out this video to see how a method called the "Law of Superposition" was used back then, and even today, to understand how Earth's crust formed.

As a side note: around the time of these scientific discoveries, many religious leaders (carrying out their 'purpose') interpreted such discoveries as evidence of water beds on top of mountains; proof that a big flood described by their old religious texts had occurred and, ironically, they pushed the incentive for more discoveries in geology. The result, of course, was not reinforcement of a 'purpose' that had taken roots thousands of years ago, but instead revealed a highly detailed understanding of natural events and the effects that 'changes over time' have on the landscape, without any need of a purpose. Quite ironic, isn't it!?

You can read about the history of geology here.

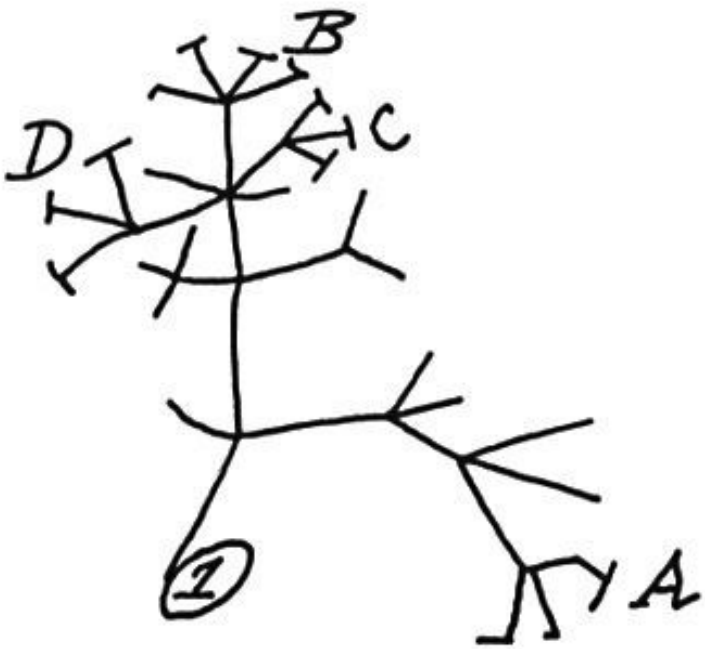


The ability to date fossils and the idea of an Earth that was very old (millions, or maybe billions of years, as they estimated), combined with ancient ideas of organisms deriving from other organisms, provided the basis of what was about to become the 'evolution of species'.

But before Darwin, there were other scientists that had worked on this theory, including his grandfather, and all proposed that new species emerge from combinations of existing organisms.

Characteristics that change over time can bring about new species when the characteristics are different enough.

Others recognized how some characteristics that are 'used' are passed to the new generation, while those that are not 'used' gradually disappear. While it's not this simplistic or true, as I will show you, the idea of 'what is better adapted to a particular environment has more chances to pass its characteristics on' was discussed before Darwin published his book.



Darwin's notebooks around July 1837 showing his first sketch of an evolutionary tree.

What Charles Darwin did was to better portray all of this knowledge and come up with better examples and 'proofs' of how organisms develop into new ones.

The core idea that he presented was 'natural selection'. He realized how, in any given species' population, some individuals survive and some do not, due to lack of resources or other factors. On this basis, those who survive have a chance to pass on their traits.

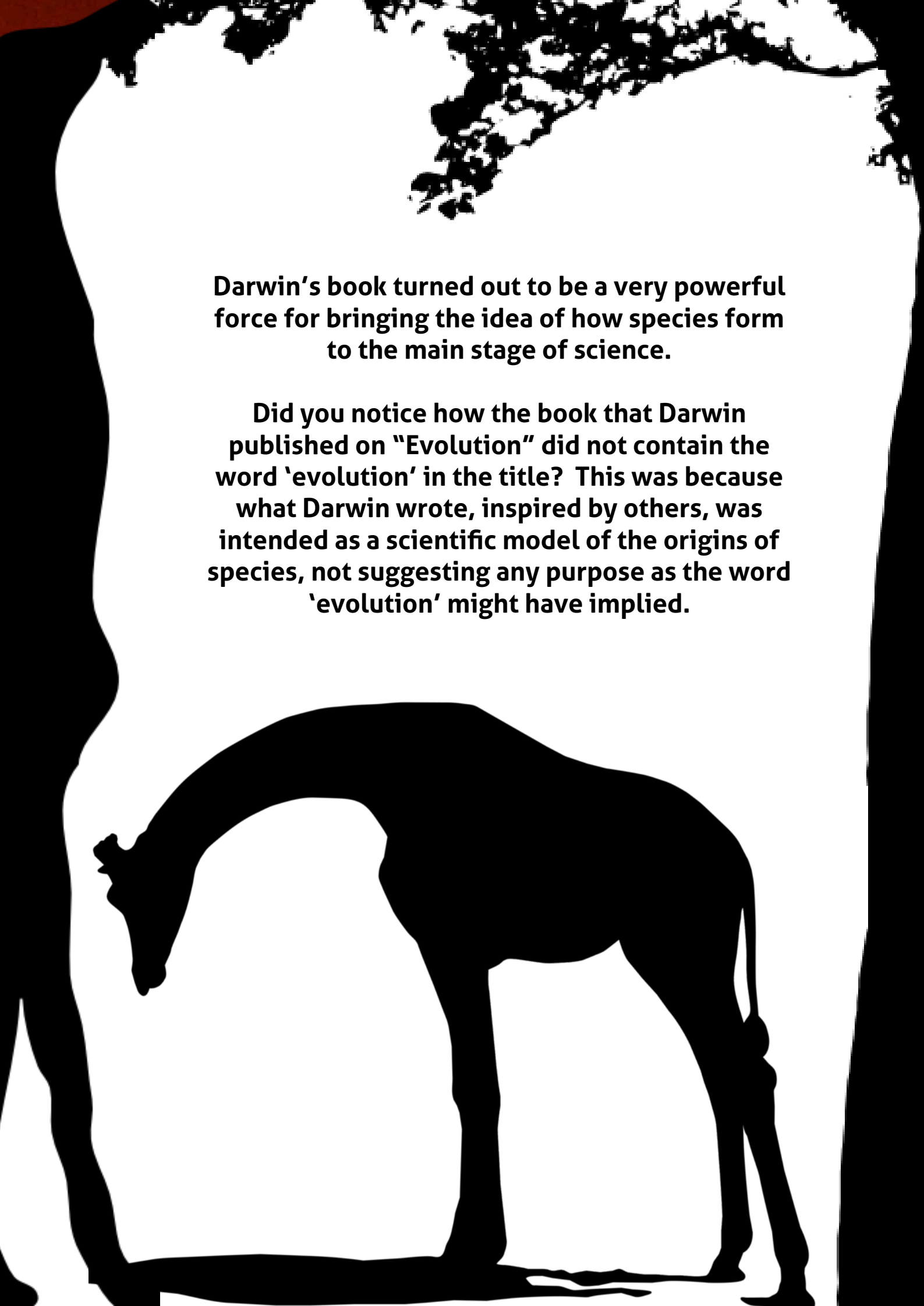
He demystified the 'use' or not 'use' of an organism's' characteristics to pass on their genes and said, basically, that it's all due to environmental pressures and how organisms or a population of organisms can cope with those pressures, survive and reproduce.

The following idea had been proposed before Darwin's clarification: if a giraffe struggles to reach taller branches in order to eat, this will force her neck to stretch and its offspring will be born with longer necks. Using the same example, Darwin showed that giraffes that are born with longer necks have more opportunities to eat from taller trees while those born with shorter necks have lesser opportunities to eat and are more prone to die earlier. Thus, giraffes born with longer necks survive due to environmental 'chance' and so experience greater opportunity to pass that characteristic to the next generation.

While writing his book "On the Origin of Species by Means of Natural Selection", he received a letter from another scientist who was studying many different animals and had observed the same thing Darwin observed: how characteristics are indeed passed down from generation to generation. As I mentioned earlier, this had been discussed over two thousand years earlier, but these newer discussions had now become scientific studies - not mere discussions, but serious work covering many species of animals, years long observations and careful descriptions.

Darwin's book turned out to be a very powerful force for bringing the idea of how species form to the main stage of science.

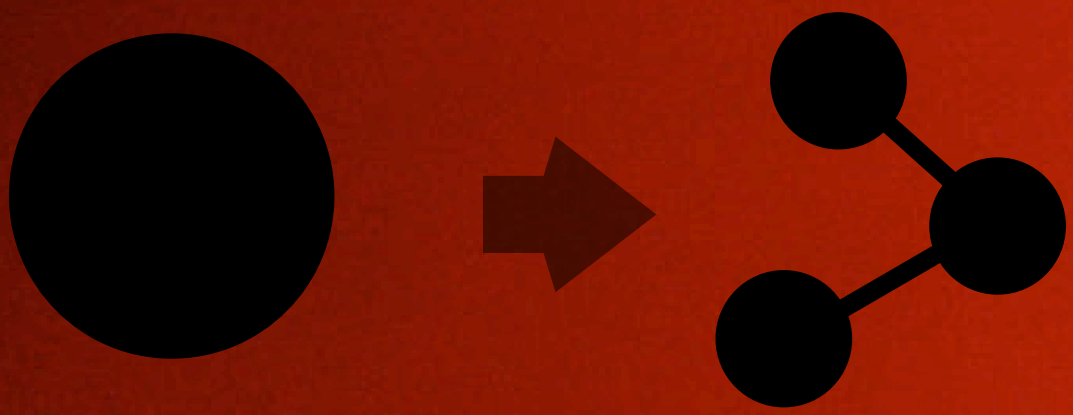
Did you notice how the book that Darwin published on "Evolution" did not contain the word 'evolution' in the title? This was because what Darwin wrote, inspired by others, was intended as a scientific model of the origins of species, not suggesting any purpose as the word 'evolution' might have implied.



HOW IT WORKS

Building blocks of life:

cell



atom

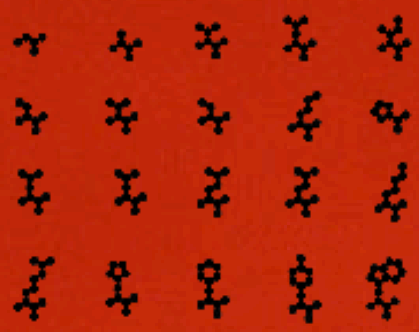
simple molecule

All of the creatures that we may call life, from plants, insects, humans, bacteria, etc., consist of one or more cells. But what makes these cells? Let's see:

In the Earth special edition, we highlighted a very important aspect of everything within the world we live in: its shape. We recommend that you read the entire edition, as you may be surprised by the 'amazingness' and complexity of the world we live in. You'll also learn why the shape of things is very important.

Atoms are one of the smallest building blocks of the world, and when atoms combine, they create molecules. A molecule is basically an organized bunch of atoms that has a particular shape. Twenty or so specific molecules, each with a different shape, make up the building blocks of life. We call them proteinogenic AMINO-ACIDS. Due to their unique shapes, these 20 lego-like pieces are able to combine together in many ways to form larger unique shapes that we call PROTEINS. In this way, these amino acids create proteins.

Through the many combinations of these 20 or so different amino acid shapes, proteins take on millions of unique shapes, and again, their resulting shape is what is most important about them. Beyond that initial combining, proteins combine with other chemicals to form cells. Cells combine to form tissue. Tissues combine into organs. Organs combine to form creatures.



amino-acid structures

proteine (one of millions)

So how do amino acids combine to form proteins, and then proteins to make up cells, cells to form tissue, and tissue to form organs?

The process is quite complex, and I will do my best to explain it in a future article, but what you should keep in mind is that DNA, which is also a molecule - a huge one, is responsible for transforming the amino acids found in cells (where the DNA also resides) into proteins, and these proteins to form new cells that make up everything our body is composed of (guts, fingernails, brains, etc.) .

DNA is like a code, a blueprint that, once 'followed', can result in the creation of all of the cells that makes up a human. Therefore, DNA instructs how amino-acids are combined and which proteins are to be created from them. What is passed down from generation to generation is basically this 'genetic' information.

Imagine DNA as a written guide (textbook) on how to build an airplane. This information will change with every generation that reads and edits the textbook. Over time the text will change even more. It does not pass the physical materials down to the next generation to build an airplane; only the guide as to how it should be built. The same goes for DNA.

You pass on only the information as to how a human can be built, for example, rather than the building blocks themselves (the amino acids).

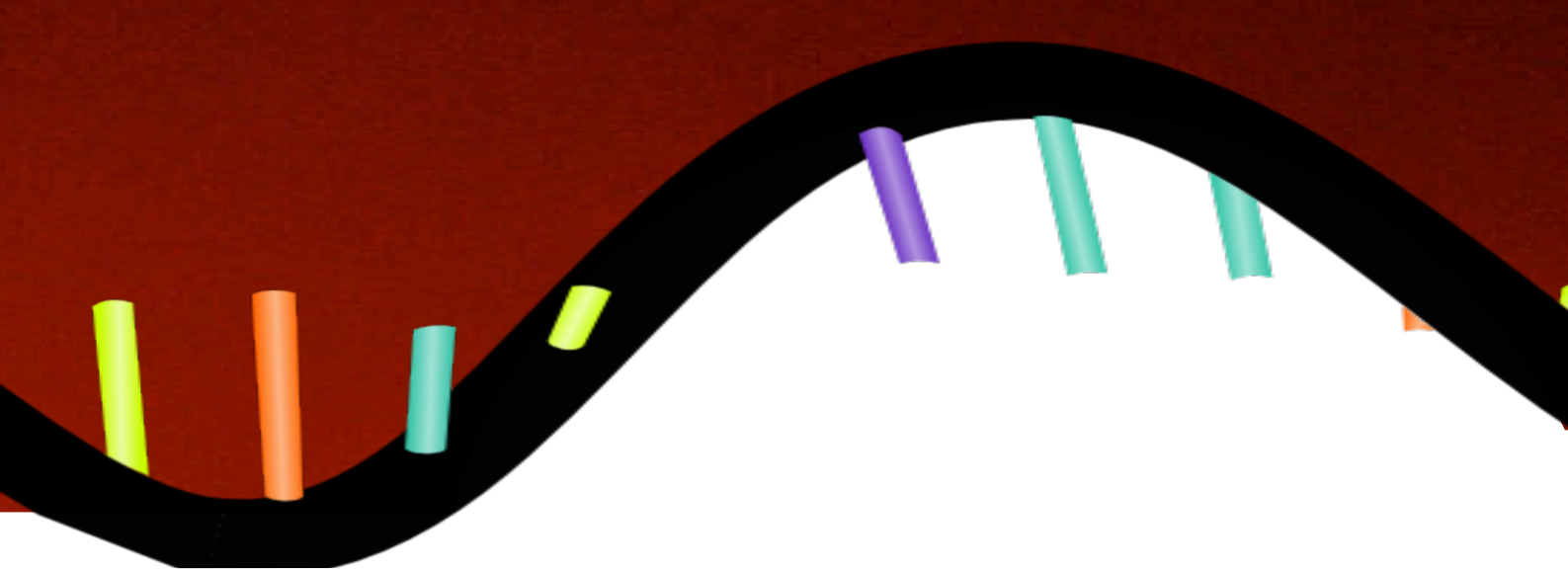
Watch this video to better understand how the DNA works

the DNA is only made up of FOUR main molecules

GENE

Genes are parts of DNA that may be recognized as coding for a specific part of the body, like the color of the eyes, the shape of a limb, etc. So a gene is a chunk of a DNA molecule that is responsible for coding a certain part of an organism.

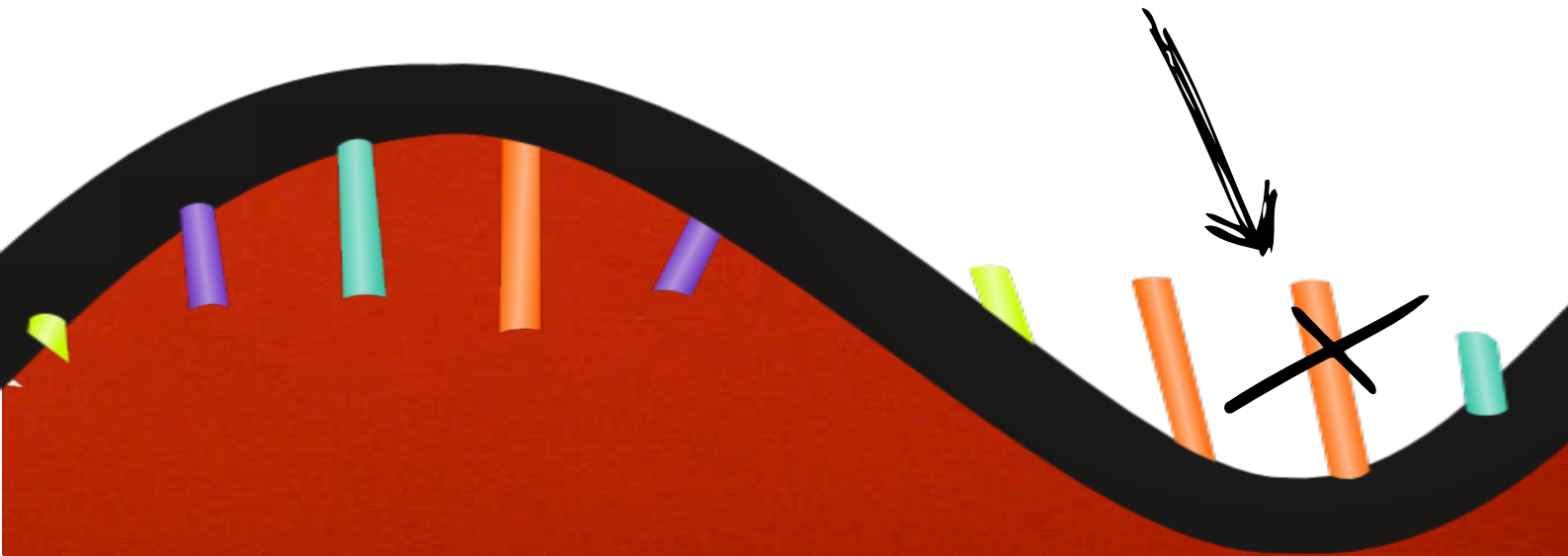
Although DNA was isolated (confirmed to exist) 10 years after Darwin published his book, Darwin had no clue about these details. Once his book came out, it still took another 50 years before it was proposed that DNA may encode for hereditary traits, and then another 20 years to confirm it.

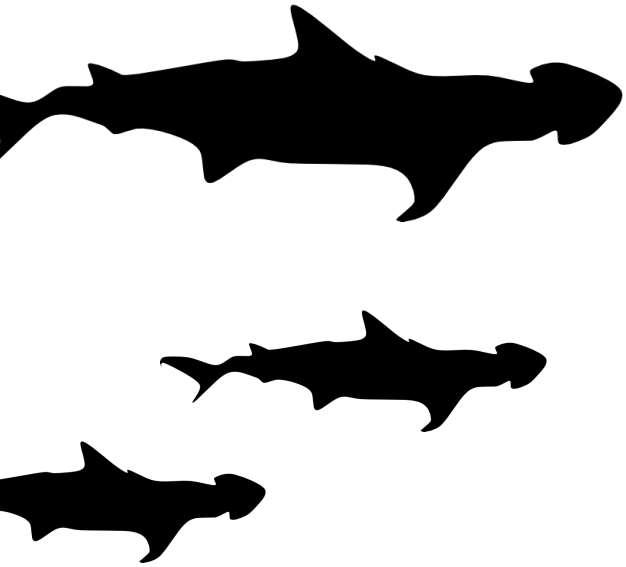


CREATING UNIQUE CREATURES:

When creatures engage in reproductive sex (or their reproductive cells combine), the resulting combination of their unique DNA (half from each 'parent') creates a new unique DNA - the blueprint for a new unique individual. This is why each new creature is unique. Then imagine this unique creature later combining its DNA with another unique creature, and we end up with a third unique creature. These combinations, over time, can create huge diversity. Let's call that process **COMBINATION**.

But errors in the DNA code (missing one or more of the 4 main molecules from the DNA) can happen during combination and this results in different outcomes than what's expected with merely combining 2 DNA sets. When DNA combines from 2 parents, and an error is introduced during the process, then that error becomes part of the offspring. Now, the unique creature is more than just the combination of its parents' DNA. It also carries something 'new', called a **MUTATION**, that can also be transmitted further on through COMBINATION to the next generation born from this creature.





Keep in mind that there are also creatures that 'self replicate'. They do not need a partner to combine their DNAs with in order to create a new individual. They more simply produce identical copies of themselves. Bonnethead sharks are one example of such creatures that can give birth to young without the need of a partner. Therefore, for instance, if mutations occur in these types of creatures, then they also create unique individuals.

So, creatures become unique and change over time through DNA recombination and mutations. Both work hand-in-hand and both happen. This is basically 'evolution'. So let's look at some real-life examples of how these combinations and errors give birth, literally, to new creatures.

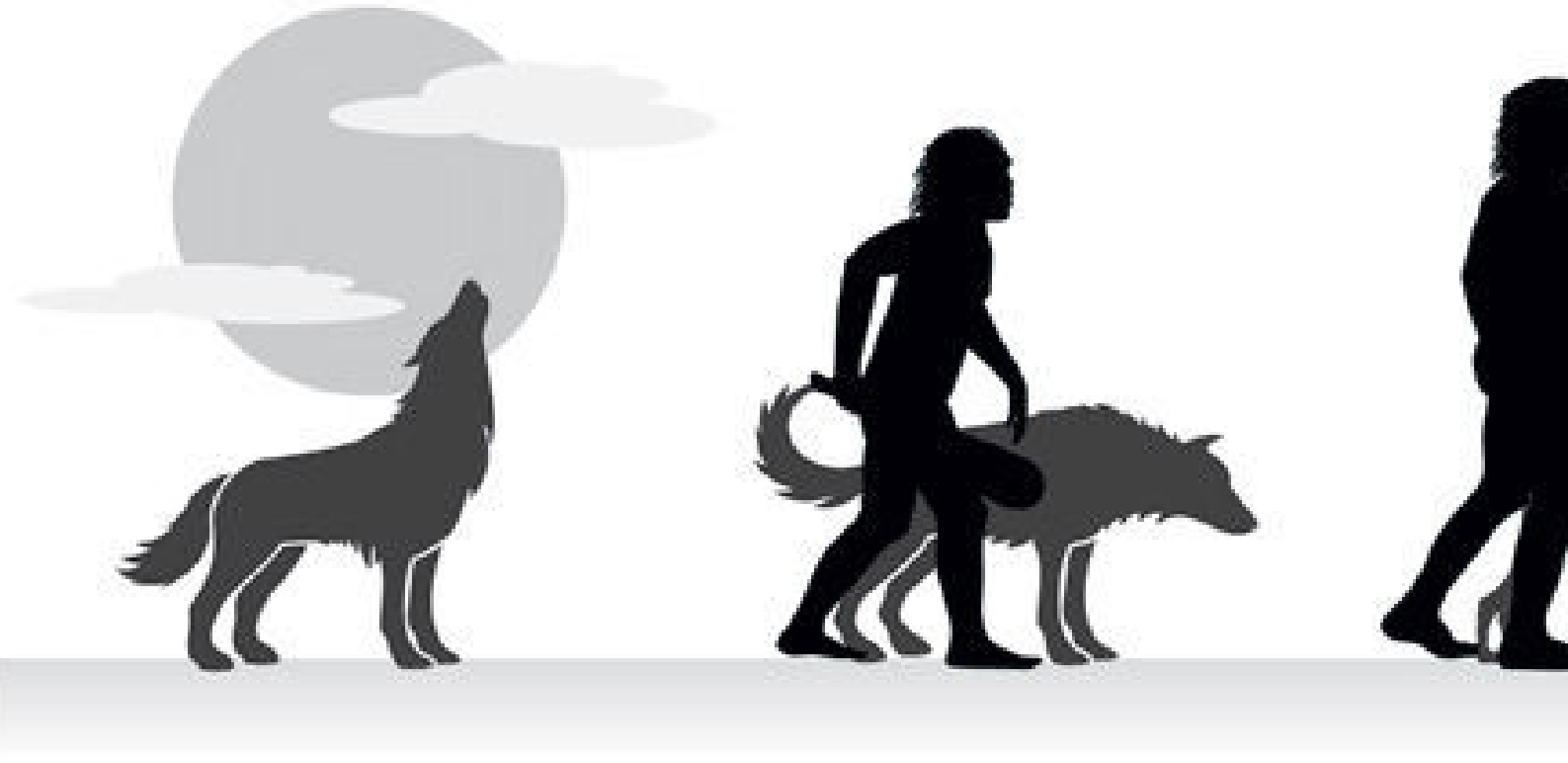
Domestication is something humans have experimented with for thousands of years. What this means is that they took certain creatures and raised them alongside human cultures for food, clothing or protection. One example is the 'modern' pig, which looked something like the wild boar before being raised and 'shaped' by humans over thousands of years. By 'shaped', I mean that people were selecting different traits from a population for breeding.

If they saw, for instance, some pigs that grew larger, then they selected those to breed with other big ones, so their offspring would produce more food. Because smaller pigs were not selected, that genetic trait did not get to reproduce and gradually disappeared from the pig's DNA. Over time, this changed the pig's appearance ('shape').

Wheat is a more documented example: Wild wheat falls to the ground to reseed itself when ripe, but domesticated (modern) wheat stays on the stem, allowing easier harvesting. There is evidence that this change was possible because of a random mutation that happened in the wild populations that existed at the beginning of wheat's cultivation. Wheat with this mutation was harvested more frequently and became the seed for the next crop. So, without realizing it, early farmers were selecting for this mutation, which may otherwise have died out.

They did the same for corn, which looked nothing like the corn we are familiar with. They selected seeds over thousands of years to bring it to the way it appears today. Not only does it look different, but it’s also different in how it reacts to certain chemicals, how it tastes, its nutritional value, etc..

Dogs are another example of 'evolution caused by humans'. Beginning as wolves, these creatures gradually became chihuahuas and many other types of dogs, all through the process of selective breeding.

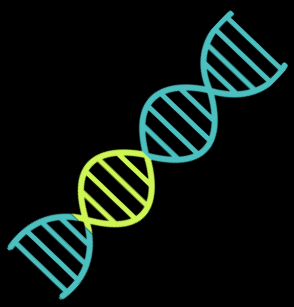


Many modern viruses are also man-made, in a way. As humans invent cures for viruses, they kill off viruses that conform to the specific structure (functionality) that they targeted. If the treated culture happened to include any mutant viruses that, as a result of their mutations, were resistant to that 'cure' treatment, they remain alive within the host and have more chances to survive and replicate than the ones that were killed off. In this way, humans are indeed 'creating' new types of viruses.

In the documentary "Defeating the Superbugs", an experiment was performed with a type of bacteria where, in a matter of 2 weeks, they could see how billions of bacteria 'evolved' (mutated and developed antibiotic resistance). I highly recommend that you watch the video here:

There are many examples that you can read about here, but man-made 'selective transmutation' has grown far more complex than this. Today, humans can directly modify the DNA of a creature to make it in a particular way for a specific purpose.

The first such human-designed 'mutant' was created in 1972, when they managed to create a bacteria that was resistant to a particular antibiotic by copying bits of a foreign DNA into its own bacterial DNA. In 1973, they did the same thing to a mouse by inserting bits from a virus DNA into a single cell of a mouse embryo and saw how the mouse survived and developed with the virus' genes among its own genes.



Today, there are a huge variety of organisms that have been genetically modified by humans by directly altering their DNA. Humans have mixed DNA from animals with DNA from plants, or bacteria, or viruses, and these methods use genes (parts of DNA that code for a specific part of an organism) to successfully transmit traits from one organism to another very different one. There are now cats and pigs that glow in the dark, plants that can absorb water pollutants through their roots, cabbages that can produce scorpion venom to kill harmful insects (they made it by adding DNA from scorpions, but removed key 'parts' of it so it would not be harmful to humans), and there is even a goat that produces a key protein for silk production, as its DNA was combined with one from a spider. As they say, the list goes on.

Sure, no one has been able to take half of the DNA from a rose and half from a human and turn it into a Human-Rose, but perhaps this way of thinking is completely unscientific and invalid. Dealing with human DNA is even more complicated because human DNA itself is very complex. But even so, 'gene therapy' refers to a process where the DNA of a human is 'edited' to correct genetic mutations, and the method works. In other words, human DNA has foreign DNA added to it. There are even scientists who are looking at 'editing' the DNA of a human embryo to, for instance, correct for mutations that would otherwise lead to diseases, thereby creating a human being that is more healthier.(source) We will talk more about this in a future article about the mechanics of the human body.

You may not see anything 'mutant', in the sense of it becoming extremely different from the 'original' organism, but these changes are quite significant, considering humans are only at the beginning of understanding how DNA works and how to manipulate it. Remember, 40 or so years ago, it wasn't even confirmed that DNA has the role that we are aware of today.

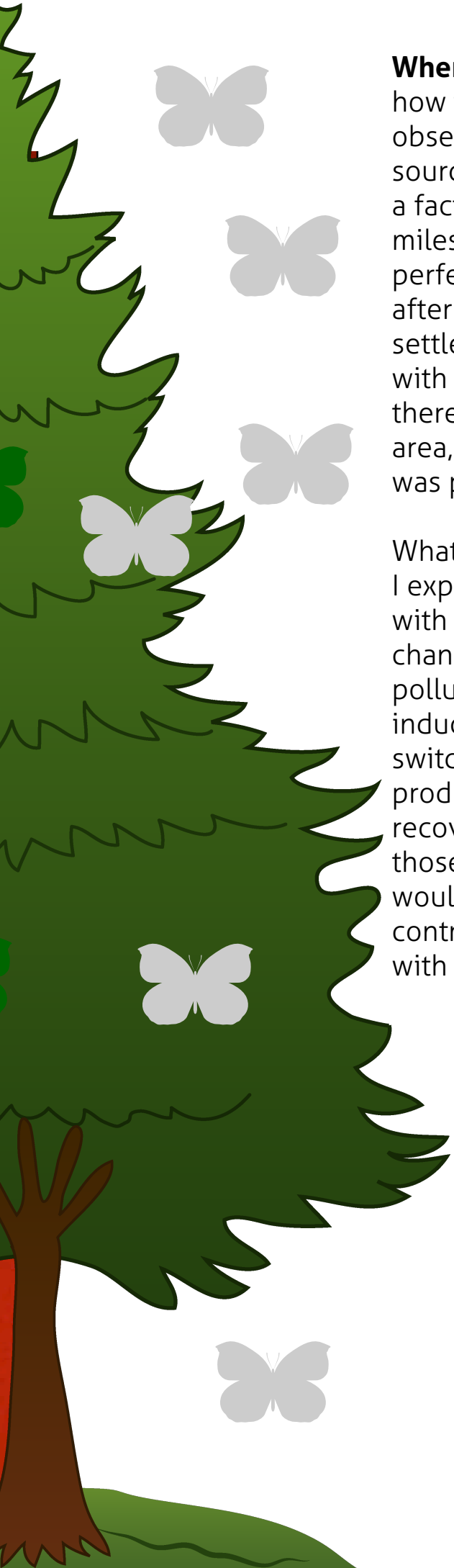
So, over thousands of years, humans have created many new kinds of organisms that are resistant to certain chemicals, contain different nutritional values, developed different shapes and sizes, and so on. But humans have managed this for only a very brief period of time compared with the time many of those organisms came into existence.

This is how 'nature' does it: Imagine a population of butterflies. They appear mostly blue, with an occasional green highlights tendency. But as they mate and have lots of baby butterflies, due to genetic mutations (the same effect that might cause a rare human to be born with 2 heads, or whatever else), one is born more green than blue. He then mates with other butterflies and, since babies inherit their parents' characteristics, a percentage of their babies (not all - keep that in mind), are also born more green than blue. They happen to live in a forest where the scenery is mostly green and brown. As a result, the green butterflies are harder to spot for some of their 'predators' and, over time, more blue butterflies are eaten while more green ones survive. Because the green ones end up with more opportunities to mate, this population of butterflies gradually 'evolves' to become more greenish than blueish.

It is as simple as that. But hold on, as there's one more key thing to consider: when autumn comes around and the forest loses its dominant green color, the green butterflies become more easily recognized by their 'predators' and get eaten just as easily as the blue ones. Also, if their 'predators' can see colors in ways that are different from how we imagine, or if they use other senses (like sensing heat) to 'hunt', then the green color of the butterflies may equate to nothing and the green butterflies will have gained no real advantage over the blue ones.

No butterfly could want to become green or, even understand what in the world it means to be green. It's just a multitude of event processes that may or may not prove to be advantageous for an organism, and any advantages gained may only be advantageous for a limited period of time.

Another thing to keep in mind: If that first green butterfly that was born out of a genetic mutation didn't mate with any other butterflies, then that characteristic would have 'died' with that butterfly.

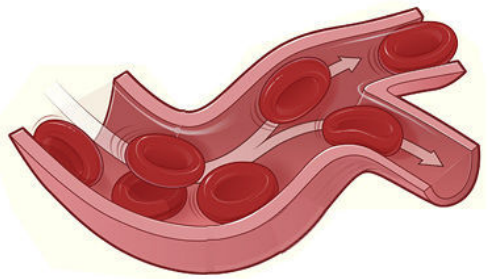


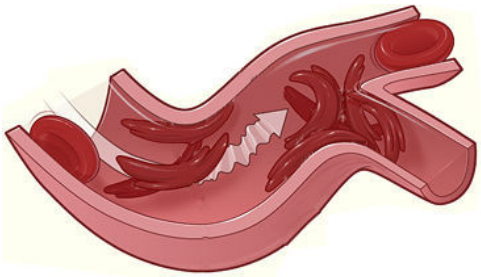
When butterflies became grey" is a story that shows how this happened in real life, and was directly observed by humans. Unfortunately I cannot find a source to link you to it, but here's the story: Close to a factory where its production spread a grey dust for miles around it, there was a forest. The forest was perfectly 'fine' until the factory was put in use, but after a few months in production, the grey dust settled on the forest, covering most if its green color with a grey hue. After many years, some noticed that there appeared to be a lot of grey butterflies in that area, but they were not observed before the forest was partially covered in the grey dust.

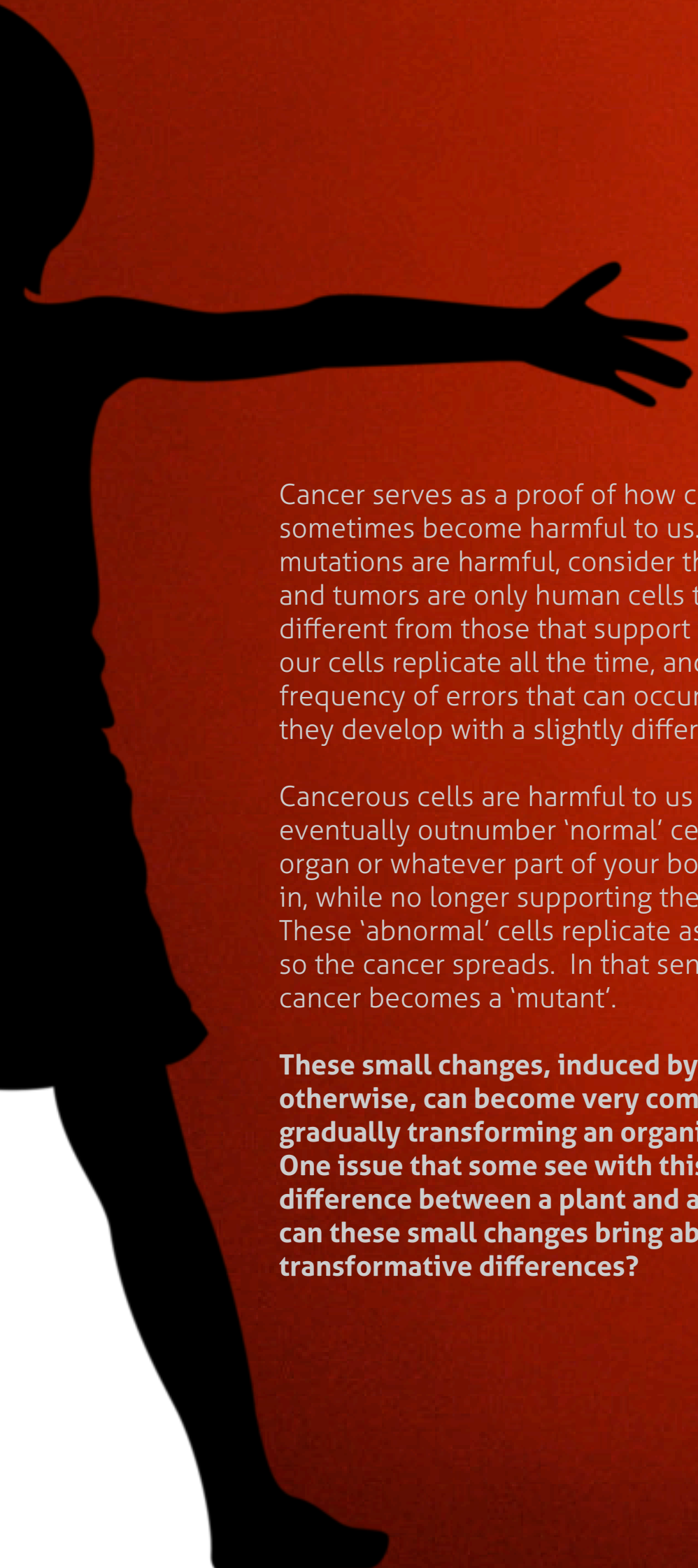
What happened, they deduced, is the exact thing that I explained earlier: some butterflies had been born with a 'mutant' grey pattern, and those had more chances to survive as they blended in with the polluted forest. This was, in a way, indirect human-induced 'evolution'. If that factory were to close or switch to a different production that no longer produces the grey dust, the forest would quickly recover back to its 'natural' state. And if most of those butterflies are grey now, then a green forest would, perhaps, become something of a death contract to them, as they could no longer blend in with the background of their environment.

You may have been convinced to think that mutations only results in humans with 2 heads, butterflies with a different color, or dogs with one eye, but mutations can also be much less obvious, if noticeable at all.

For instance, some people are predisposed to experiencing heart attacks or other problems, due to a mutation to their red blood cells. Their cells may have a more elongated shape than the oval ones that most of us have, and because of their shape, there is a higher risk of them clotting - stopping the blood flow to the heart, brain or other vital organs.(source)







Cancer serves as a proof of how cells mutate and sometimes become harmful to us. While not all mutations are harmful, consider the fact that cancers and tumors are only human cells that have become different from those that support your body. Because our cells replicate all the time, and due to the frequency of errors that can occur during replication, they develop with a slightly different 'mutated' DNA.

Cancerous cells are harmful to us because they can eventually outnumber 'normal' cells, dominating the organ or whatever part of your body's function they are in, while no longer supporting their 'normal' function. These 'abnormal' cells replicate as your normal ones do, so the cancer spreads. In that sense, a person with cancer becomes a 'mutant'.

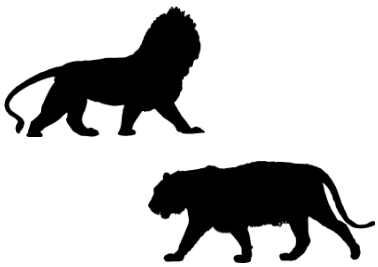
These small changes, induced by humans or otherwise, can become very complex over time, gradually transforming an organism into a new one. One issue that some see with this is the huge difference between a plant and a human being. How can these small changes bring about such a huge transformative differences?

CREATING NEW SPECIES:

There is scientific certainty that organisms change as we have exemplified here, but let's see if these changes are enough to create new species.

First of all, as we discussed in previous articles, a 'species' is not a properly defined entity. The term emerged as part of the notion of categorizing, at first flowers by how they appear, and was applied a bit later to animals. You might consider lions and tigers to be two different species, but they look similar and can even mate to have offspring.

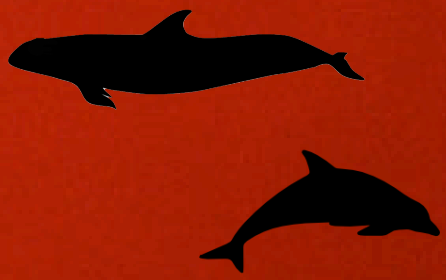
THIS IS A REAL **LIGER**, A LION-TIGER 'CREATURE' THAT IS FULLY CAPABLE OF REPRODUCING



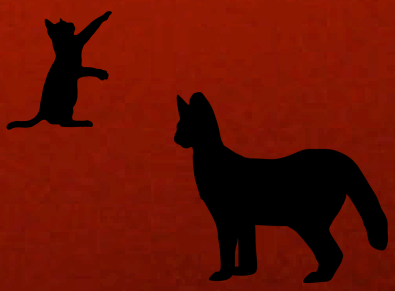
A **ZEBROID** IS HALF ZEBRA-HALF DONKEY

KILLER BEES ARE A RESULT OF TWO DIFFERENT SPECIES OF BEES THAT SPRUNG INTO EXISTENCE IN 1957 DUE TO A 'HUMAN MISTAKE'

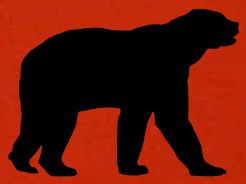
A **WHOLPHIN** IS HALF DOLPHIN-HALF FALSE KILLER WHALE



A **SAVANNAH CAT** IS A COMBINATION OF A DOMESTIC CAT AND A WILD CAT (SERVAL)

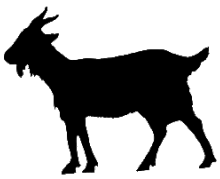


GRIZZLY-POLAR BEARS
ALSO EXIST

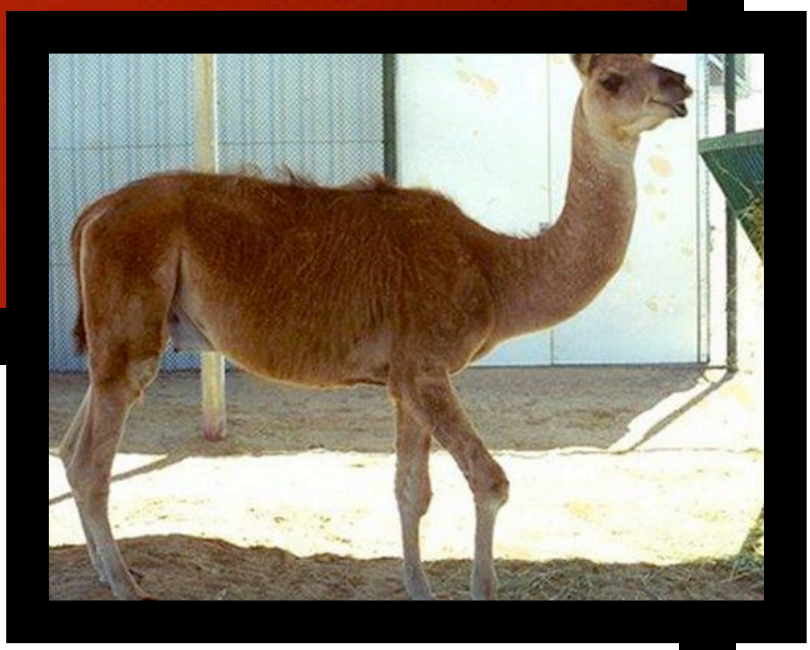


A **BEEFALO** IS A COMBINATION OF AMERICAN BISON AND DOMESTIC CATTLE

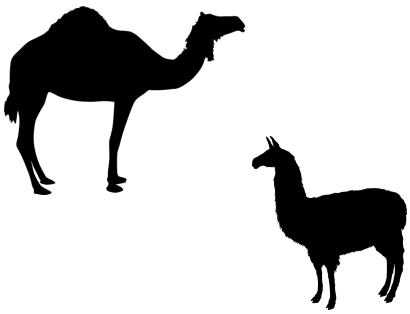
SHEEP–GOAT
SHOULD BE OBVIOUS



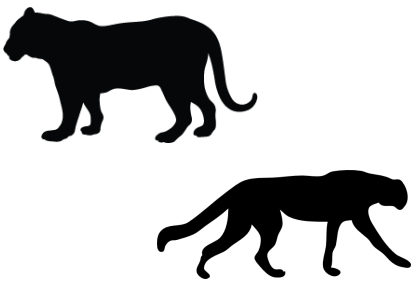
BLOOD PARROT CICHLID
IS A HYBRID OF TWO
SPECIES OF FISH



CAMA - A DROMEDARY
CAMEL AND A LAMA



A **LEOPON** IS THE CROSS
BETWEEN A LION AND
LEOPARD

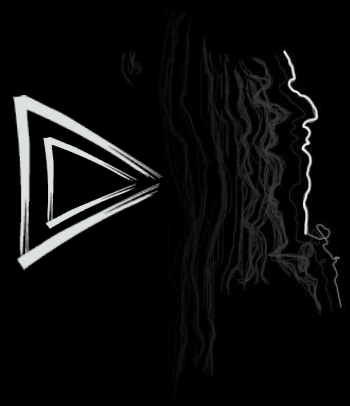


There are many other cross-breeding species of plants and other organisms which you can read more about on Wikipedia.

If we do not know exactly what a species is, then we should ask what is the criteria for defining these mutations and combinations of DNAs as different enough to be considered as 'something new'. Isn't a bacteria that mutates to become resistant to an antibiotic, a new kind of bacteria? Isn't a chihuahua a different organism from a wolf? Aren't all of the 'hybrid' species we've shown 'new kinds' of organisms? Or how about the millions of new organisms genetically created by humans?

These examples are a proof of how organisms change over thousands of years. But what about millions or billions of years? Imagine that!

Or let me help you put it in perspective: Let's play the "Tracing Game". The first human draws a vertical line. A second person tries to trace over that line. A third then tries to trace over the second line, and so on. After 50 such attempts, the 50th line looks nothing like the first one. This is how small changes drive huge changes. Watch this video to see how this was experimented.



Another thing to consider though: The differences in appearance and functionality in the many organisms that we find on Earth is huge -- but who is to say that? If there is no proper way to define a species, then why do we see so much difference between a chimpanzee and a human? Maybe since we are the observers, we think that such differences are enormous, when in fact they may not be.

Consider the difference between a plant and a human. We may see it as a big difference, but relative to what? Who knows what 'creatures' or 'intelligent things' that we cannot imagine exist within this humongous universe, rendering the differences that we see between Earth organisms almost irrelevant!?

So, this is how 'evolution' works: DNA codes for organisms and this DNA changes over time by combining with other DNA and creating slightly unique ones. This, plus occasional mutations that occur within this code, all give rise to different creatures that, over billions of years, result in tremendous complexity.

To observe this complex transmutation in creating such widely different organisms is like watching a galaxy form. You can only see snapshots of how various younger galaxies look, along with some of the common processes that you theorise are essential for their formation. But you can never actually witness a galaxy forming, as it's something that occurs over billions of years. However if you can cross-check enough data from many scientific domains (chemistry, biology, astronomy, etc.), then you can create a good hypothesis that holds true until something new is discovered. To this end, there is no way we can find out anything about the world around us other than through science.

The same types of snapshots and the same kinds of investigations take place for transmutation, as fossils, rock types, DNA decryption, experiments, and more are creating the most educated guess of an event that can never be fully observed, only understood.

This video explains extremely well how the investigation of millions or billions of years of transmutation is understood through science:

As you can see, the idea of change over time resulting in tremendous complexity and variety dates thousands of years into the past, and over the last 100 years or so, many people have studied many different scientific fields, all of which powerfully point in the same direction toward what we understand as 'evolution'. You may not have been there to witness a crime being committed, but analyzing the scenery and adding up the evidence discovered through careful scientific investigation, you arrive at the best tools for providing an explanation for what happened. The transmutation process over billions of years results in the same kind of scenery, which can only be analyzed through what it has left behind.

And just in case you're wondering how all of these organisms started, as the evidence shows that they all have a single ancestor (bacteria, horses, roses, humans, polar bears, whales -- all have one ancestor), then the answer is: no one knows! OF course, that makes life even more interesting for us humans, since it offers us fantastic opportunities for new discoveries. Still, it's not like there isn't any research done toward learning how these organisms started. There are plenty, with some of them highlighted very well in this video:

An experiment performed by NASA and published in March 2015 was described by one of the researchers: "Our experiments suggest that once the Earth formed, many of the building blocks of life were likely present from the beginning. Since we are simulating universal astrophysical conditions, the same is likely wherever planets

As an extraordinary example of how life can be made, resulting in new species, researchers can now decrypt DNA structures to better understand how they work. Knowing that, combined with the fact that DNA is basically a structure composed of only 4 key molecules, they can take these key molecules from nature, and assemble them into a new kind of DNA.

You see, even though DNA is only made up of 4 main distinct molecules (unique shapes), it contains millions or billions of such pairs, and the way these pairs are aligned can be read like a code. Once the code is understood, it can then be modified to have pairings of these 4 key molecules assemble in any way we can imagine, thus forming (perhaps) any kind of creature out of them, if we have the proper technology and means to do that.

Whether we're talking about a flower, a bee, a bear, or a human DNA, all of them are made up of pairings of only 4 main molecules. The only difference is in the way they are assembled and in what order.

Understanding how to code DNA has led to the first synthetic DNA (other examples soon followed). A few years ago, the first synthetic cell was made by extracting the DNA from a bacterium and inserting a new DNA into it, made entirely from scratch from those 4 molecules that all DNA is made of. We will look more into this in a future article, as it is such an important subject that it needs to be addressed in more detail than we can manage in this article, but you can read more about it here.

So, it seems that 'life' (DNA based organisms) is not that hard to decrypt and understand how they function and relate to one another, how they have 'evolved' into such a variety, and how we can even make new ones.

Let's see what we have found so far when it comes to 'evolution':

1. The idea of complexity emerging from change is quite old, and can be found in both geology and biology, for both landscapes and organisms

2. Change in organisms is confirmed and properly understood (we are all here because we are each a unique combination of tiny DNA changes), even to the point of manipulations (synthetic DNA, genetically modified organisms).

3. Again, it's all about shapes: as atoms form molecules, molecules form DNA, DNA helps form amino-acids, amino-acids then form proteins, which form into cells, cells cluster into organs, and organs into creatures.

4. Change over the longer periods of time that have given rise to the complexity we see today seem to have happened solely due to DNA recombinations and mutations, and a massive number of studies across multiple scientific fields all confirm this.

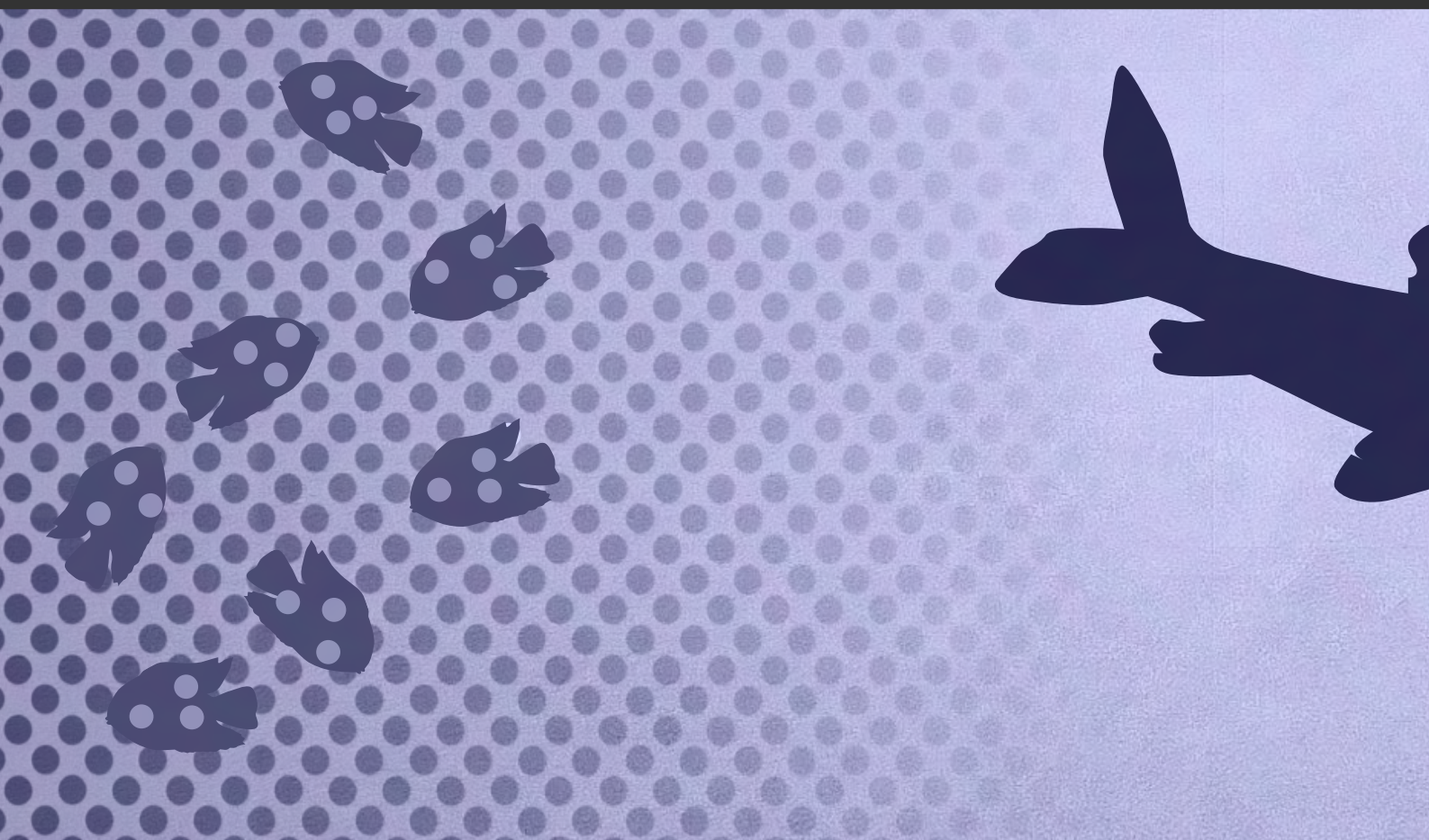
5. Just as humans drive the 'evolution' of dogs and other 'domesticated' organisms, nature (the environment) continuously drives the 'evolution' of all creatures, as a process of chances, random mutations, varied events and huge periods of time.

Are you ready now to connect 'evolution' with 'purpose'?

Transmutation is something that happens all the time, and over the course of billions of years, extraordinary changes can indeed happen. Now let's look at what 'purpose' does to this extraordinary process that is amazing in its mechanics.

THE MECHANICS OF ORGANISMS' BEHAVIOR:

Here are two experiments that Jacque Fresco performed to study the mechanistics of animal behavior.



The Fish Experiment:

"I wanted to know whether fish were born with automatic coloration change abilities, or if they learned it. I built an experimental tank about 35' by 40' and about one foot deep. I painted fish with various colors and patterns and they moved about throughout the tank. I then put predators in the tank and observed that the fish were continuously bothered by the predators and continued to move about.

I then painted various designs and configurations throughout the tank that matched the painted fish, put the fish in the tank and they moved about freely. I then put the predator fish back in the tank. In a few days, I noticed that fish of a particular pattern or color would spend most of the time in the areas that best matched their own patterns. The fish were not born with a mechanism that changed their colors to best match their surrounding or enabled them to adapt to their surroundings, but the colors they had gave them more protection when they remained in an area that best matched their own colors. They were bothered less by predators when they blended into their surroundings."

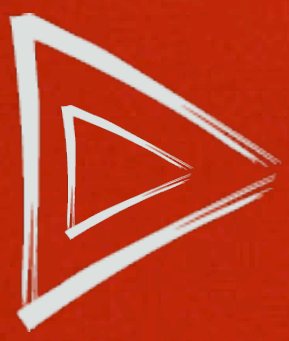
The BIrds Experiment:

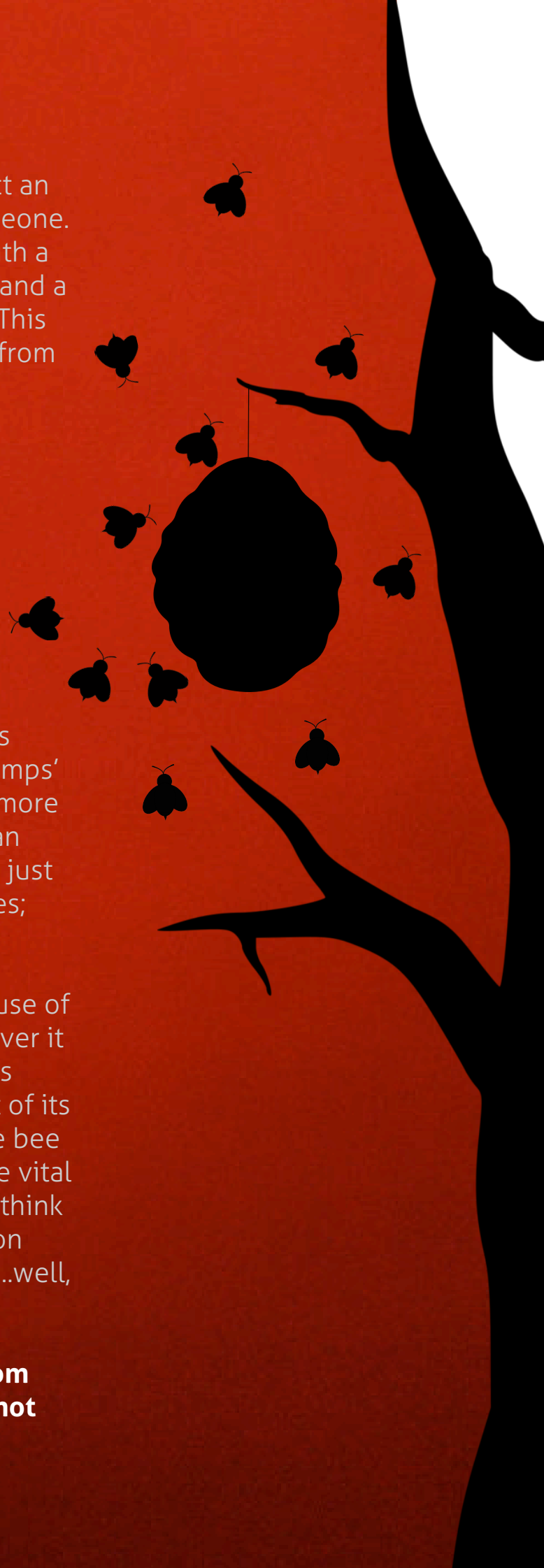
"Inside my lab, I took a bird's nest and put it in a cage. I noticed that the mother bird fed the most animated baby bird more frequently. I made a plastic bird that was extremely accurate to the real ones, as I was an accomplished model builder, but it moved more vigorously than the real birds, and when it opened it's mouth, it was wider. The mother put more food in the mouth of the artificial bird than its own living birds. I concluded that the mother bird did not know it was feeding it's young, but was only responding the movement."

Some of the materials that inspired Jacque Fresco in this area were the research and books produced by Jacque Loeb. They also influenced Jacque Fresco to do further research and experimentation in this field where he came to similar conclusions.

Jacque Fresco states that "animals are born every which way and those characteristics that are supported by their environment will enable that configuration to survive."

Take bees for example. When a bee stings someone, many people project an intention of the bee to hurt that someone. They even see the bees equipped with a defensive weapon, a barbed needle and a sack of venom to fight off invaders. This is a video of a bee stinger detached from a bee.





As you can see, the bee stinger works without the bee. It contracts and 'pumps' the venom, even though there is no more bee to 'direct' this activity. As you can see, it is not attacking a 'predator'. It just lays there, contracting its tiny muscles; reacting without a 'purpose'.

When a bee stings, the stinger, because of its shape, remains attached to whatever it stings. It also ruptures from the bee's body, leaving the body without most of its digestive system and nerves, and the bee will quickly die from the loss of these vital components. Does it make sense to think that the bee is on a 'kamikaze' mission and thinks like us, giving her life for....well, whatever reason?

If the bee knew that it would die from stinging someone, maybe it would not sting anymore :).

When one approaches a honeybee nest, you might be tempted to think that the honeybees will sting him to defend their beehive. But your conclusion would only be based on a projection. If you were born in another culture, you may conclude that the bees come to salute the guy and they sting him as their greeting.

There are many insects that, because they happen to release certain chemicals, can go into the nests of other insects without those insects detecting their presence, and the 'impostor' insect lays its eggs inside the nest. No other insect looks at it and says "Gosh, this one is not one of ours. Let's kill it!" because insects react to various stimuli (chemicals) and if there is no such chemical detected, those insects won't react.

For instance you can use smoke to calm bees down and the way this is understood to work showcases the 'purposeless' of bees to 'defend' their beehive. If you hurt some bees, they release a certain chemical, not as 'alarming' the other ones, but that's just how their bodies work. This chemical has an impact on the other bees, making them change their 'mood' and become more 'active', or 'aggressive'.

They have a reaction to that certain chemical, rather than to the intruder. Interestingly, smoke masks this chemical, and also causes the bees to eat more honey. When they do that, they become more physically unable to make the necessary flexes to sting. This illustrates a bunch of reactions based on how chemicals and other stimuli change the functional behavior of an organism.

I once saw in a documentary that when they added certain ant pheromones to a small photo of the Queen of England, the ants began carrying food to the picture. They said that the ants thought it was their queen. Of course, the correct response would have said: this is how ants react to this kind of pheromone influence.

Ants don't really have queens and workers, soldiers and whatever. They just react to various chemicals and some ants react in different ways than others, and we observe that in their behavior. If you see ants carrying food to their nest, you might say that they do that to feed their young, but when you see them going into an electricity unit and dying by the hundreds, you don't call them depressive or suicidal, right? Instead, you do some science and realize that ants are very active in all directions.

If some of them get too close to an electric unit and get electrocuted, their bodies release certain chemicals that cause other ants go to the same place and they get electrocuted too, releasing even more of that chemical and attracting even more ants to their 'death'.(source)

Why not apply the same investigative approach to learn and understand what makes ants carry food from one place to another? Or for any kind of behavior that they or other creature exhibit?

PROJECTING HUMAN VALUES:

To show you how unrealistic it is to project such human values into other creatures, imagine that you are a wasp and you want to lay your eggs somewhere 'safe'. Where would you lay them? Think... ...

Ok... Did you think of laying them inside other creatures, and also adding a bit of 'venom' to make the host not reject them? It's logical, right? After all, inside those hosts, your eggs can feed on and grow within the hosts' own body. Quite brilliant, right? I bet that no human would have thought up such a plan for them. Now, do you think a wasp could have come up with such a plan? Of course not, but there are wasps that do just that and, unfortunately, many humans describe their behavior with 'logical' human values injected into it.

Speaking of venom. Do you know what the difference is between venom and poison? Humans! Humans invented those notions and categorized them as such. Venom and poison are substances that are harmful for humans. They call it 'venom' when the host (the animal or insect) 'delivers' it (stings or bites you), and 'poison' when you see something (poisonous frog, for example) that can't deliver the venom to you, and you decide to lick or eat it, and then die because that substance got inside you :) I once saw a funny video where someone talking about poisonous frogs was saying that some of them have enough poison to kill 1,000 people if they lick it, and another guy asked him "Why would you lick it?". I think that's very relevant here, as that frog's poison had no purpose. It just so happens that the frog produces a chemical inside its body that just so happens to be harmful to some creatures, including humans.

HIV is a structure that we call a 'virus', and it can 'stick' to different molecules within the body, making your body less and less able to cope with infections. Millions of people have died because of this virus. If a guy has it and he rapes someone, we can call him venomous, as he will infect his 'victim'. If you lick the guy's wounds (where there is blood present), then we can call him poisonous. That illustrates the value of 'poison' and 'venom': any substance that is harmful mainly to us humans. And the term 'substance' is not a proper definition of anything in this case, as it is all, again, about structures/shapes. As a virus is harmful because of its complex structure, snake 'venom', for example, is also harmful because of its structures

To put the projection of human values vs what really happens into better perspective, let's look at a specific situation: A venomous snake feels threatened and attacks a man, biting him on the leg. The man struggles to breath while his muscles are contracting, and he dies after a half hour of suffering.

What happened?

The man was walking in the woods and, without noticing, he got too close to a snake that reacted by biting the man. To more deeply understand why the snake may have reacted this way, read our article on "What is behavior?". Basically, a snake (or other creature) can exhibit such reactions under many different circumstances. As one example, on a TV show that aired 20 or more years ago, the host was explaining why the snake he had around his neck won't bite him, saying that the snake 'doesn't feel threaten by him, nor is he venomous to try and attack him' (as if the snake could be aware of whether he was venomous or not). 30 seconds later, the snake bit his neck. Here's the video.

You see, snakes produce saliva, as we do, but some snakes also produce a 'special ' kind of saliva, stored in tiny sacks below their eyes, that contains molecules that are harmful to us and many other creatures. When the snake from our story bites, due to his anatomy, his 'special' saliva ends up in the body of the man.

When you have a wound, signals are transmitted to certain molecules in your body that stick to the broken tissue and that stops the flow of blood out of your veins and closes the wound. Along with other compounds that affect its victim in various ways, the 'special' saliva from this snake includes a molecule that dissolves the 'patching' molecules in your blood, so your blood lacks their ability to 'fix' the broken vein, and the blood from your veins continues to freely escape your normally closed-looped circulatory system.

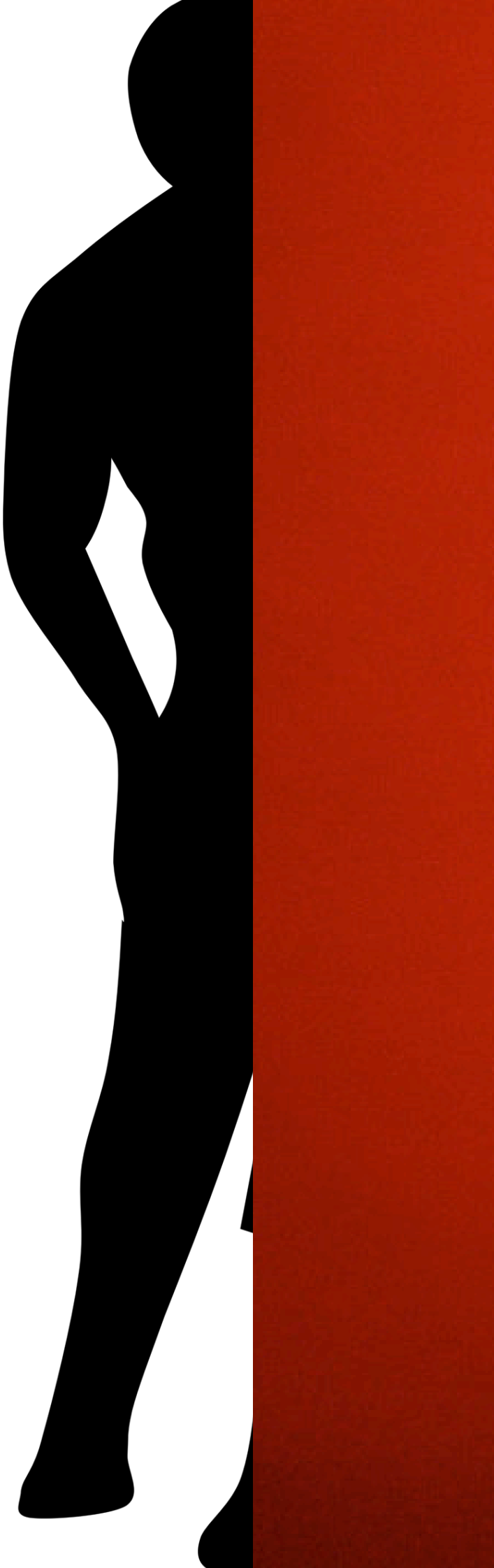
Without enough blood flowing through them, your muscles are unable to function and the oxygen levels throughout your body begin to decline. If the man receives no medical help to 'fix' his body-machine, then his body eventually fails and he dies. The man died because his mechanical body leaked too much of an essential substance (blood), made possible because of the snake's 'special' saliva.(source)

Snake venom includes a variety of 'toxins', harmful molecules that, once injected, disrupt numerous functions throughout our bodies. This is similar to how large objects clog up a toilet's functionality, or how too much cholesterol does the same to our circulatory system. The large objects and cholesterol could be labeled as viruses, or poison, or venom, or toxins to those systems :).

When a virus enters your body, it has no plan and no purpose. It just enters and it just so happens that its own molecular shape and complexity allows it to 'merge' and 'stick' with molecular parts from your own body causing those parts of your body to malfunction. I recommend this documentary to help you understand more about the mechanics of the human body, and to also see how, like so many others, this documentary erroneously presents these events through human values ('purpose').

I saw a documentary where a baby zebra was born almost completely black, and the mother zebra did not 'protect' it and ran away from the newborn. Zebras, like all living things, react to various stimuli (in this case, visual cues). There are animals that seem to 'take care' of other animals, whatever that means. Some project similar behaviors towards non-living objects.

Bacteria does not 'want' to protect or harm you; genes do not 'want' to survive; bees do not 'attack' you or 'protect' their hive; birds do not 'sing' - all of these things are merely human projections that have no place in reality.



When I was little, there was a guy that 'drove' around in an invisible taxi. He was homeless. All the people laughed at him, saying that he was crazy. He could not stop without 'parking' his invisible taxi. But he looked to me like a very nice guy, and I was sure that he viewed us, the other kids, as 'the privileged ones'. So, I thought that he must be extremely sad that he has no family, home, and nothing good to eat. I was very sad for him. Very!

So one day, I took all of the good food from my home's fridge (tomatoes, cake, steak, and so on) and went out to find him to give him the food, despite the fact that this would get my parents angry at me for taking food from our house. We were not at all rich, so taking the food that we all depend upon and giving it to a stranger was not such a good idea to them. But I was really happy about my decision and, with a smile on my face, I found this guy and I said, "Here, I brought you the best food we have in our house. Enjoy it!". The first thing I noticed is that he did not thank me! But that was ok, as I figured that maybe he just forgot, or he was simply too hungry. He opened the bag, took the tomatoes, looked at them, and threw them to a nearby dog, saying, "I don't eat tomatoes!" I was shocked... He took a bite of the steak and, although I suspected that he liked it, he mumbled that it was not well-cooked. I was observing his behavior in shock. When he took a bite from the cake, he asked, "Who made it?" I replied, "My mom!" So he said, "I recommend you buy it from the store next time. It tastes better from the store."... Wow! I was completely speechless.

I thought that I knew this guy, and that he would understand my 'help', but apparently, my projection was completely wrong, along with all my friends who projected the same about him, even though we knew him for many years. **From that moment on, I stopped projecting my own values into other people and understood that if I can be so wrong where it comes to human behavior, then I would be completely wrong in projecting about any other creatures' behavior.**

Remember the creatures that 'eat poop' at the beginning of the article? Do you still think that koala babies eat their mother's poop to improve their own gut bacteria? Of course not. They just happen to eat it, for whatever reasons baby koalas have for that (smell, temperature, etc.), and that happens to have some advantages for their own digestive system, alongside other effects or non-effects.

If you see a lion 'defending' its cubs, then stop and recognize that you are being that guy at the dance club, projecting his own values onto others. Lions do not have the understanding of 'social order' like we humans have. We cannot allow ourselves to think that we can understand what it is like to be a lion, when human men can barely understand what it's like to be a human 'woman' in any particular culture. Many times, I don't understand how girls think, and that's a matter of only slight cultural difference; just as I find myself unable to understand how 'normal' people from today's culture think.

If we can't understand how organisms like our own (humans) behave, influenced by significantly similar environments as us, then we need to be very careful about what we project about other organisms.

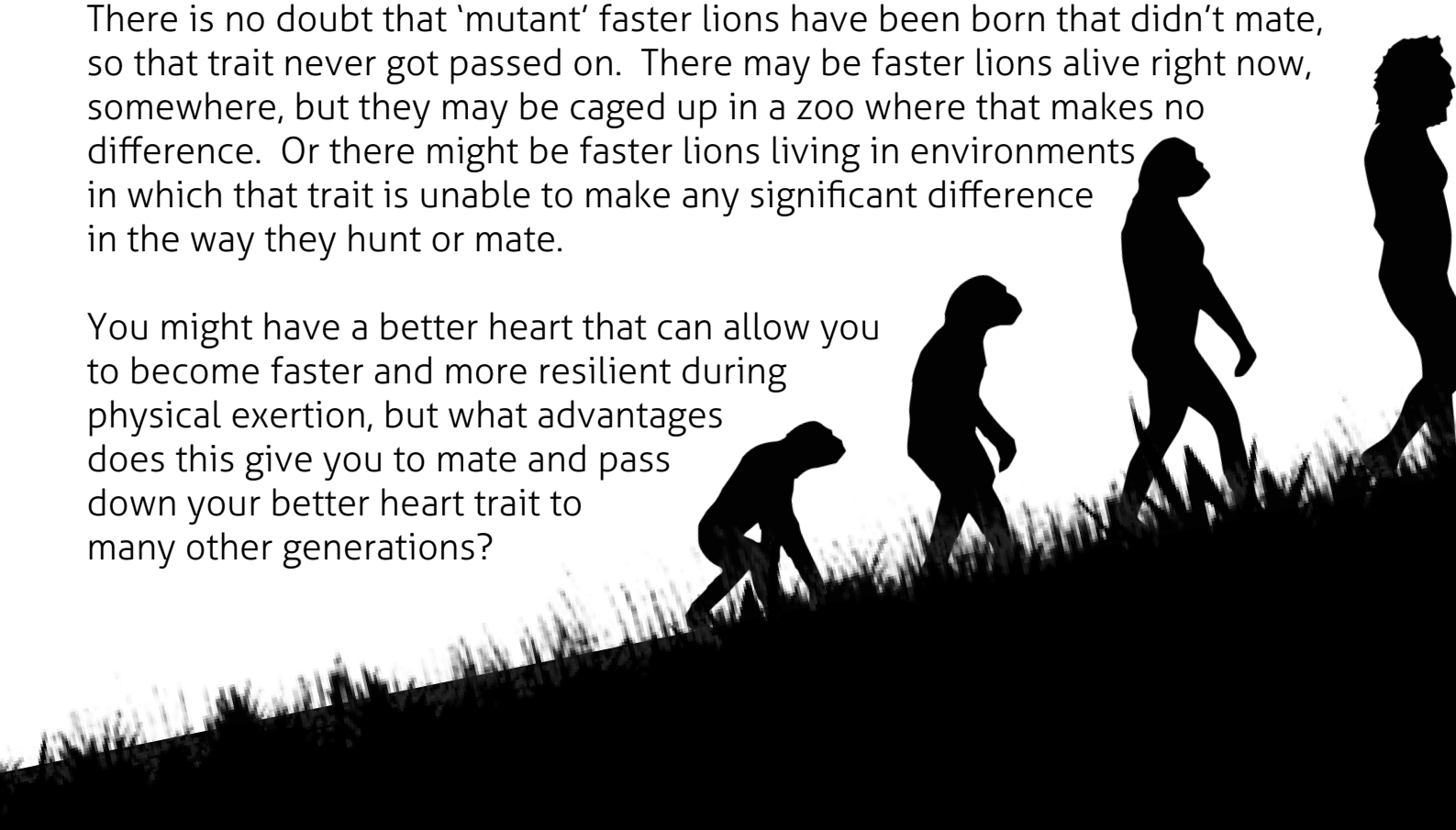
NOTHING ACTUALLY EVOLVES:

Organisms do not become smarter, stronger, or faster over generations, as these terms are merely human projections of 'progress or regress', and while they may become larger in size or more resistant to certain diseases over generations, organisms can only transform via DNA mutation or recombination. If one trait proves to be advantageous for a particular environment, and if those organisms replicate and transmit that trait to new generations, then that trait MIGHT eventually become the norm for that species. That's all there is to this, but there is no 'purpose' to it.

If a snake with 1,000 times more powerful saliva toxins is born tomorrow, then it may not mate with other snakes and that trait would never pass on. Even if it does mate, it makes no difference whatsoever to the snake population unless this new trait eventually becomes the norm, in which case we can later look at what 'forces' made this possible. In that situation, we may learn that because they are able to kill bigger prey, gaining more nutrition without hunting as often (something that may have threatened their existence), that they simply have gained opportunity to mate more often. Or it may turn out that, along with this more toxic saliva, they are slightly less 'smelly', and so a bit less detectable by other creatures that are able to eat them. Or it could be that their new trait also releases certain chemicals that make their potential partners more aroused when around them. Whatever the reasons, they are very complex and interrelated, connected with their total environment and many related circumstances that we can hardly imagine.

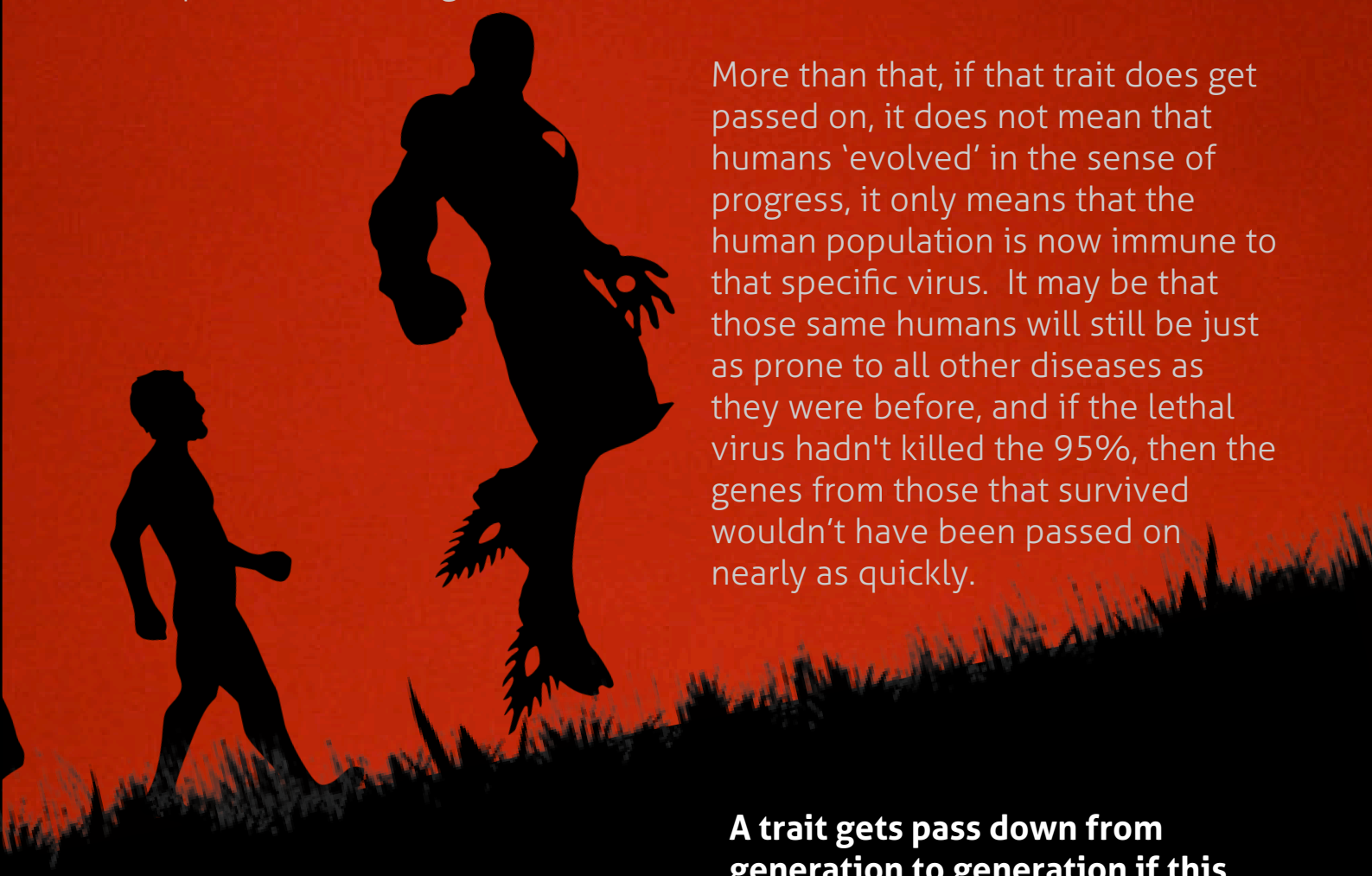
There is no doubt that 'mutant' faster lions have been born that didn't mate, so that trait never got passed on. There may be faster lions alive right now, somewhere, but they may be caged up in a zoo where that makes no difference. Or there might be faster lions living in environments in which that trait is unable to make any significant difference in the way they hunt or mate.

You might have a better heart that can allow you to become faster and more resilient during physical exertion, but what advantages does this give you to mate and pass down your better heart trait to many other generations?



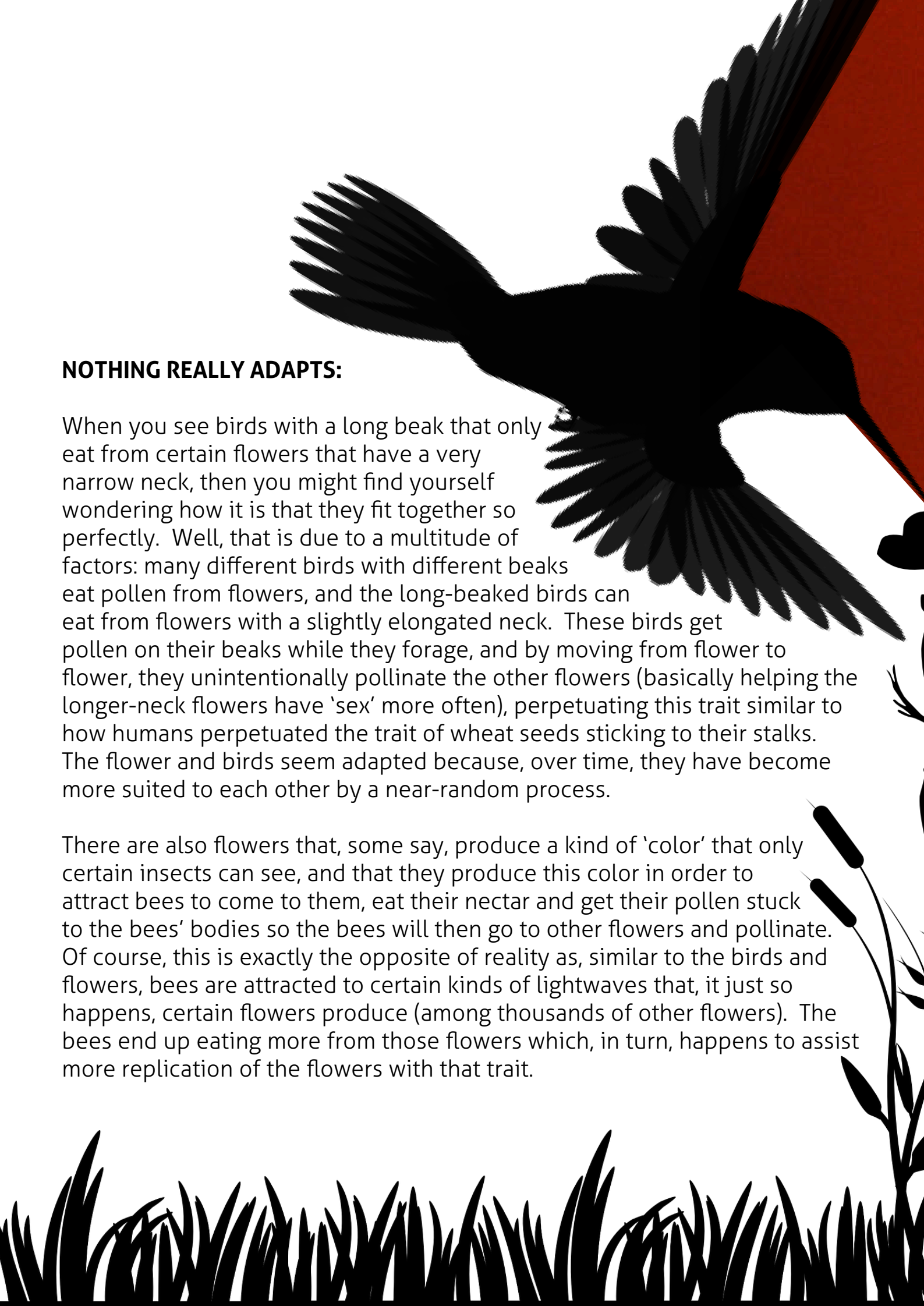
There are people today that are born with six fingers per hand. That can prove to be a significant advantage in an era of advanced technology, right? Perhaps they type faster, better, can use tools more efficiently? Even if that is the case, this does not mean that people will choose to mate with them for their six fingers, or that they will have any real advantage in the cultures we live in today, or that this trait will become well-spread over time, just because it may prove to be a bit more advantageous.

There may be people who are immune to certain lethal viruses, but are you now more interested in mating with those people just to perpetuate their genes? Of course not. They don't really have much more advantage over others in the world we live in. Let's say that a particular virus kills 95% of the world population and only those with a certain mutated DNA (immunity) survive that plague. If the survivors never find anyone with whom to mate, or if no one wants to mate with them, or if they starve to death first, then that trait equated for nothing.



More than that, if that trait does get passed on, it does not mean that humans 'evolved' in the sense of progress, it only means that the human population is now immune to that specific virus. It may be that those same humans will still be just as prone to all other diseases as they were before, and if the lethal virus hadn't killed the 95%, then the genes from those that survived wouldn't have been passed on nearly as quickly.

A trait gets pass down from generation to generation if this trait gets replicated (sex, cell division) and this process can be influenced by many environmental factors.



NOTHING REALLY ADAPTS:

When you see birds with a long beak that only eat from certain flowers that have a very narrow neck, then you might find yourself wondering how it is that they fit together so perfectly. Well, that is due to a multitude of factors: many different birds with different beaks eat pollen from flowers, and the long-beaked birds can eat from flowers with a slightly elongated neck. These birds get pollen on their beaks while they forage, and by moving from flower to flower, they unintentionally pollinate the other flowers (basically helping the longer-neck flowers have 'sex' more often), perpetuating this trait similar to how humans perpetuated the trait of wheat seeds sticking to their stalks. The flower and birds seem adapted because, over time, they have become more suited to each other by a near-random process.

There are also flowers that, some say, produce a kind of 'color' that only certain insects can see, and that they produce this color in order to attract bees to come to them, eat their nectar and get their pollen stuck to the bees' bodies so the bees will then go to other flowers and pollinate. Of course, this is exactly the opposite of reality as, similar to the birds and flowers, bees are attracted to certain kinds of lightwaves that, it just so happens, certain flowers produce (among thousands of other flowers). The bees end up eating more from those flowers which, in turn, happens to assist more replication of the flowers with that trait.

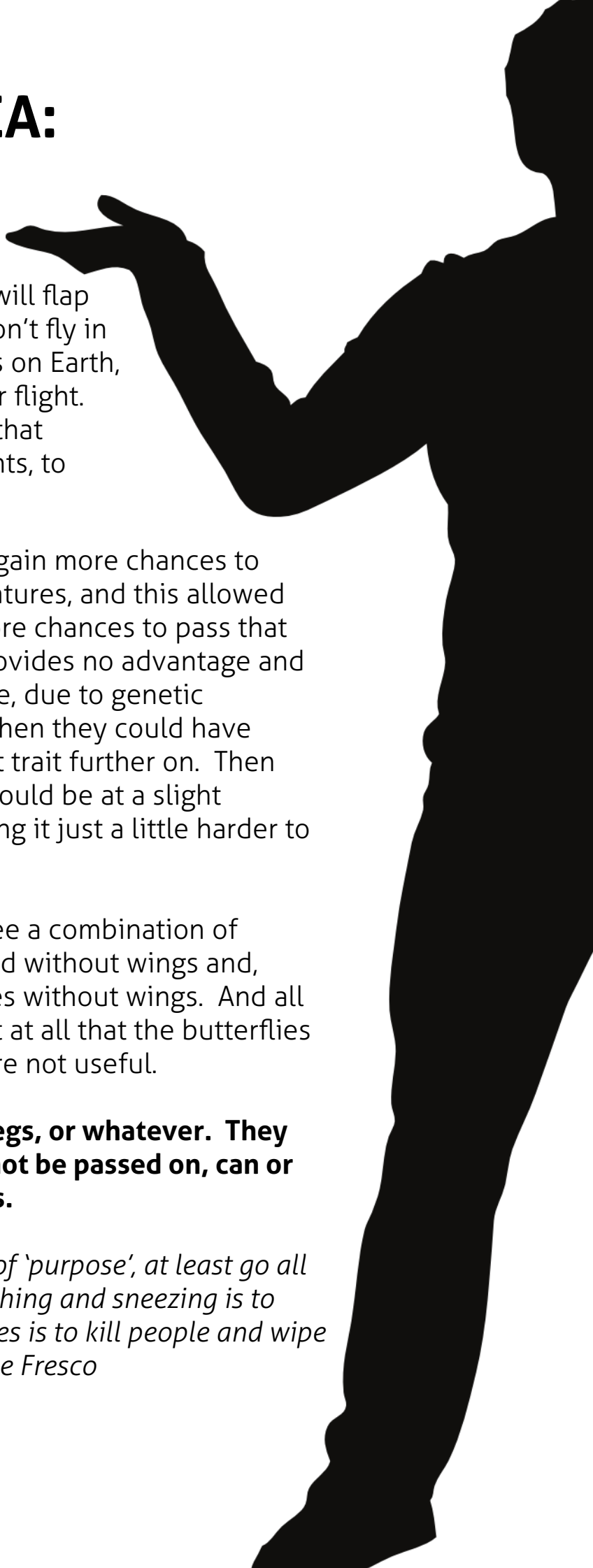
Imagine projecting the same way of thinking onto planets.

What if we say that, early in the formation of the Solar System, planet Earth moved closer to the Sun in order to produce humans? Or that Jupiter grew bigger in order to protect Earth from asteroids? Or that the Moon formed in order to create the tides? Of course those projections make no sense, as we instead look for the mechanics of such events. This is what we should do for everything we observe, and stop projecting our limited human values onto them.

Some people ask, "How do you explain that Earth is at a perfect position relative to the Sun? Isn't that too perfect? Wouldn't that explain a creator?" Well, the analysis is, again, backwards, because we are here specifically because those conditions made it possible for us to be here. It's like a pond saying: "Isn't it extraordinary that the temperature and the soil are so perfect that I can exist? Wouldn't that imply a creator?" Well, if the Sun and the soil were not the way they are, no pond could be there to ponder its existence (if only it could, of course).

99% of all species that ever existed are extinct! To call this process "adaptation" is really misleading and does not show an understanding of the process. What is happening is random circumstances and reproduction, and if the total environment does not support the configuration of the animal, it will not survive.

THE GENERAL IDEA:



If you put butterflies in space, they will flap their wings (move them) but they won't fly in microgravity. If they flap their wings on Earth, they fly. So clearly, wings are not for flight. Wings are some parts of a butterfly that enables them, in certain environments, to move in certain ways.

On Earth, creatures with wings may gain more chances to escape being eaten by crawling creatures, and this allowed the creatures with wings to have more chances to pass that trait to others. In space, this trait provides no advantage and so, if some of the butterflies in space, due to genetic mutations, are born without wings, then they could have equal chances to mate and pass that trait further on. Then again, maybe the ones with wings would be at a slight disadvantage, with their wings making it just a little harder to mate in space.

After many generations, we might see a combination of different kinds of butterflies with and without wings and, maybe at some point, only butterflies without wings. And all because of random chances. It's not at all that the butterflies will lose their wings because they are not useful.

There is no purpose to ears, guts, legs, or whatever. They just are. And such traits can or cannot be passed on, can or cannot be useful. That's all there is.

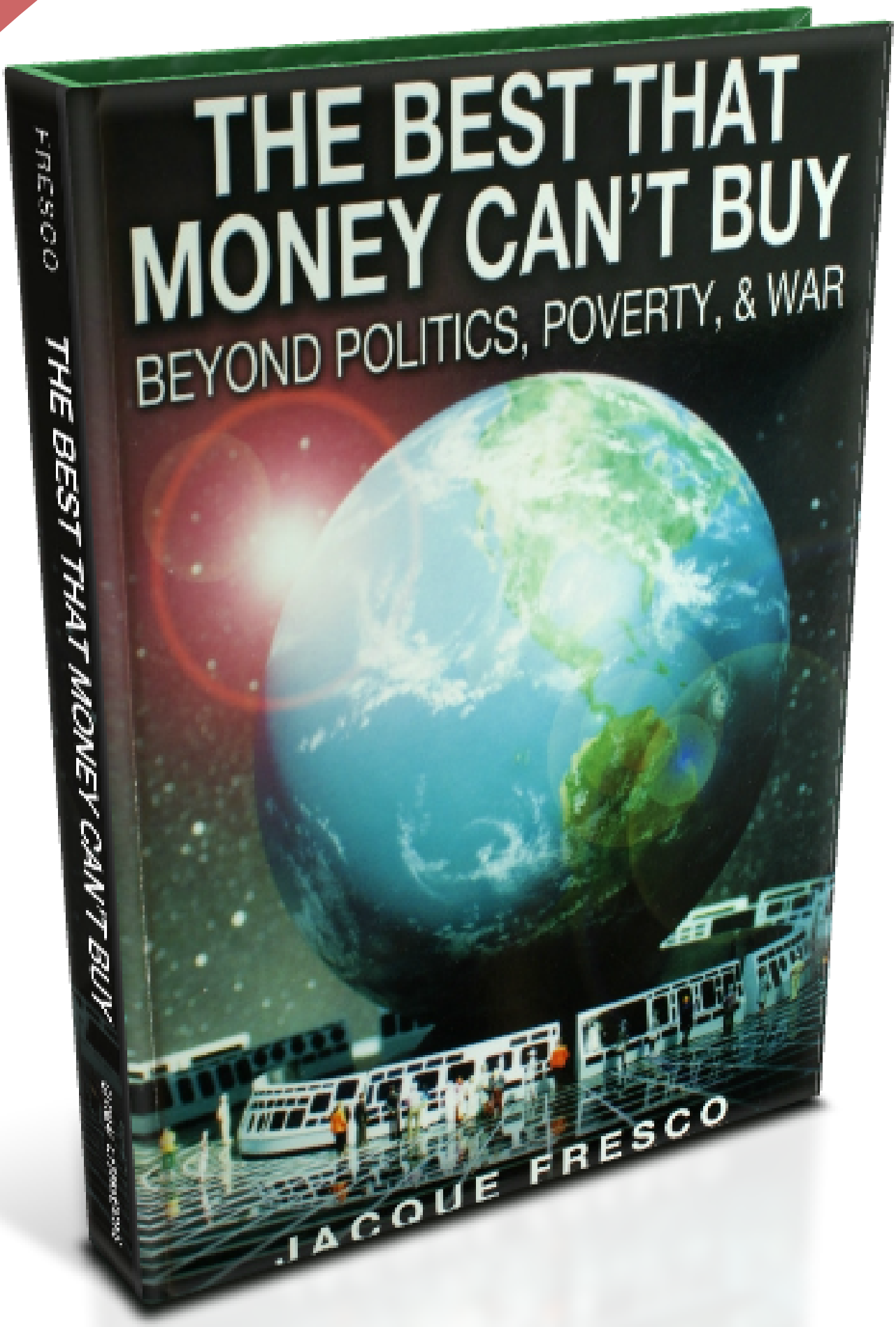
"And if you want to inject the notion of 'purpose', at least go all the way: say that the purpose of coughing and sneezing is to infect others, the purpose of hurricanes is to kill people and wipe out entire villages, and so on"....Jacque Fresco

When it comes to evolution, the big confusion is what we highlighted at the beginning of the article: people tend to ask irrelevant questions. Instead of asking "Why do bees sting?", you should ask "HOW do bees sting?" Rather than "Why did the snake attack?", ask "How did the snake behave the way it did?" The difference that single rule makes, is huge.

To sum up the entire article, the 'purpose' of transmutation (evolution) is best described by the following example: There is a tubular aquatic creature that has no brain, but if you touch it, its muscles contract, creating a left-right movement. Since it's in water, it appears to be swimming 'away' from you, as if it has an 'intention' of running away from predators. This is what happens to all creatures: They react to a multitude of stimuli and humans project their own cultural values onto these behaviors, significantly missing out on all of the science behind these events.

Transmutation happens every day and continuously creates slightly new kinds of organisms, and complexity/diversity is all about replication and time.

Once you understand the evolution of purpose, you will understand the 'purpose' of evolution.


THE BEST THAT MONEY CAN'T BUY
BEYOND POLITICS, POVERTY, & WAR
JACQUE FRESCO
FRESCO
THE BEST THAT MONEY CAN'T BUY

The Venus Project does not regard environmental conditions as fixed or static. We must allow for adaptation and change as a continuous process. This avoids the tendency to perpetuate temporary arrangements beyond their period of usefulness. The construction of a circular 'research' city would initiate a transitional phase that could help humanity evolve from a semi-cooperative money-oriented society into a fully collaborative resource-based economy. This could be the prototype for a series of cities to be constructed in various places throughout the world. The rate of progress will depend upon the availability of funds raised during the early stages and the people who identify with, participate in and support the aims and direction of The Venus Project. As these new communities develop and become more widely accepted, they may very well form the basis of a new civilization, preferably through the process of evolution rather than revolution.

Excerpt from The Best that Money Can't Buy, by Jacque Fresco

PART HUMAN PART MACHINE

ENHANCEMENTS

BY TIO

In the first installment of this series, we discussed what mechanical replacements exist for the human body. Here, we will look beyond the idea of 'fixing' humans with technology, by looking at extending their capabilities.

Cell phones, clothes, the internet, air conditioning, cars, buildings, shoes, knifes, refrigerators, telescopes, microscopes, various uses of nanotechnology, biotechnology, and all other fields of science provide enhancements for us humans, as we become better able to see farther and deeper, to analyze the world's structures and forces that we are not able to detect or measure with our senses, to protect ourselves from harmful external and internal factors, and more.

VISIBLE LIGHT 4 to $7x10^{-5}$ meter

HEARING 10 to 20,000 Hz

CHEMOSENSE 10^{3} odors

TOUCH 3000 nm

HEAT SENSING 200 to 400 ^{0} K

HEAT TOLERANCE 270 to 370 K

MEMORY SPAN 70 years

LOCOMOTION 50 km/h

OEAN DEPTH 75 meters

ALTITUDE $8x10^{3}$ meters

VOICE 300 to 3,500 Hz

PAST

PRESENT

VISIBLE LIGHT 10^{-12} to 10^{6} meter

HEARING 10^{-9} to 10^{12} Hz

CHEMOSENSE millions of compounds

TOUCH 0.1 nm

HEAT SENSING 3 to 10^{5} ^{0} K

HEAT TOLERANCE 3 to 10^{3} ^{0} K

MEMORY SPAN 5000 years

LOCOMOTION 26,720 km/h

OEAN DEPTH 10,912 meters

ALTITUDE $3x10^{9}$ meters

VOICE 10 to 20,00 Hz

source

We highlighted many technologies in our AA WORLD series, showing how we could make far better use of them than we do today, but now we will focus on technologies that allow us to improve our biological abilities, exceeding what our DNA coded for us. This article's focus is specifically on 'machines' that enhance our existing biology, while the next issue's installment will focus extensively on physically 'manipulating' our biology.

Of course it's hard to define exactly what I mean by 'enhancing biology', as pretty much all of the technologies that we have presented so far manage this in one way or another. So let's look at two major technologies/ideas that will enhance human beings' biology: nanobots and new senses. These approaches are not only about allowing us to be healthier and to sense the world in new ways but, as you will see, also how they may significantly change the way we communicate and understand the world.

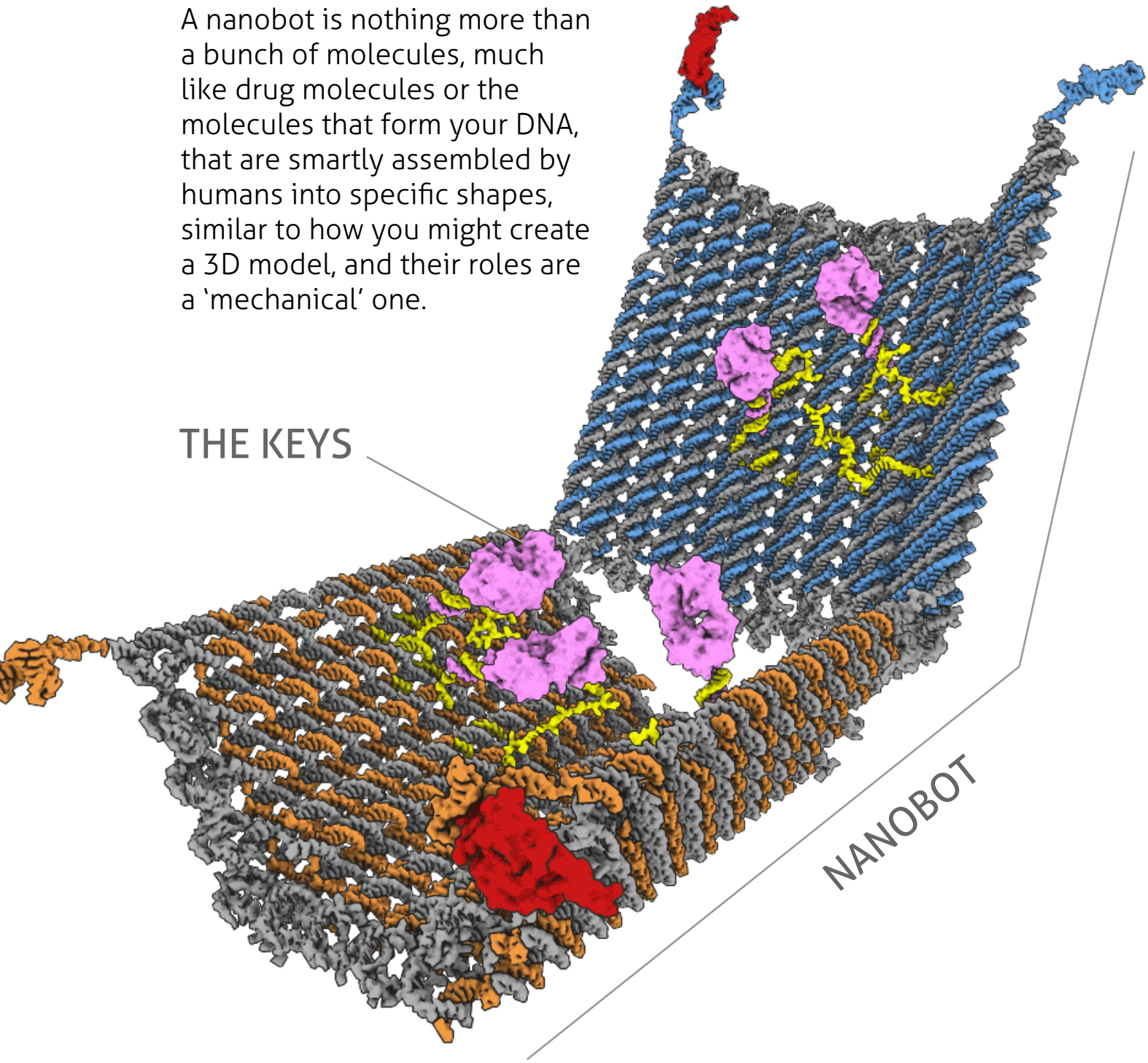
♦ NANOBOTS

You have probably heard of 'nanobots', but what are they and do they really exist?

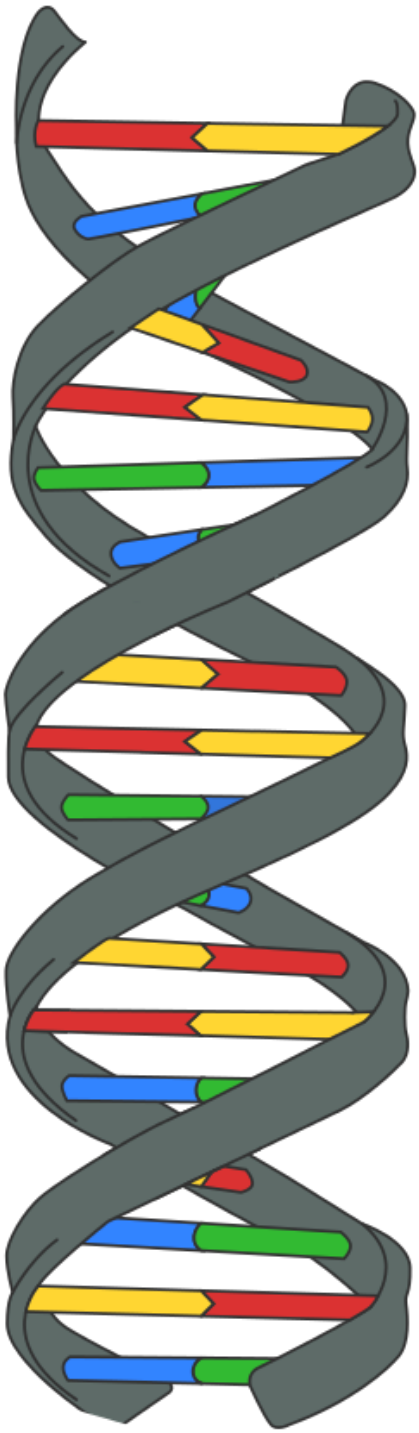
The idea of tiny 'robots' may project a serious misunderstanding of what these 'things' are, so I'll try to clarify it here. The human body, as we have discussed in recent articles, is made up of tiny structures that we call molecules and relies heavily on combinations of these 'shapes' (molecules) to perform different kinds of functions. As described in our Earth special edition, drugs are nothing more than specifically shaped molecules that have been found to be able to bind with specific molecules within our body to 'fix' it. They are like keys that unlock specific 'doors'.

But the way that medicine is currently used is more like trying to unlock a real door by throwing millions or billions of keys at your apartment, hoping that one will hit the door's lock and open it. It works, to a degree, only because of the massive number of keys you throw at the issue, but these keys can also damage other 'things'. As an example, if you have a specific key that can unlock the self-destruction mechanism in a cancerous cell, then it is very risky to dump billions of those keys into a human body, as they may very well kill many of the healthy ones as well.

Now, here comes the nanobot. A nanobot is nothing more than a bunch of molecules, much like drug molecules or the molecules that form your DNA, that are smartly assembled by humans into specific shapes, similar to how you might create a 3D model, and their roles are a 'mechanical' one.



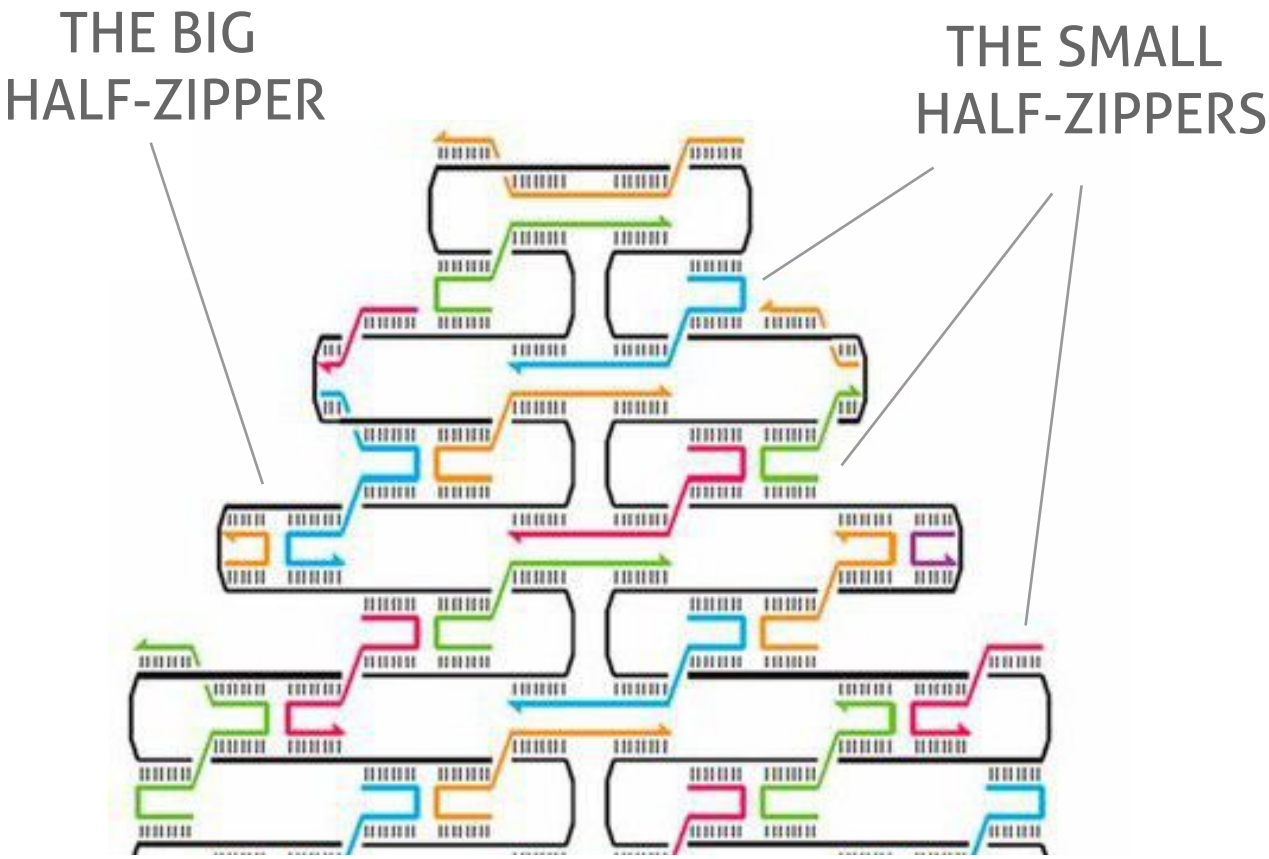
HERE ARE THE BASICS OF HOW ONE IS BUILT

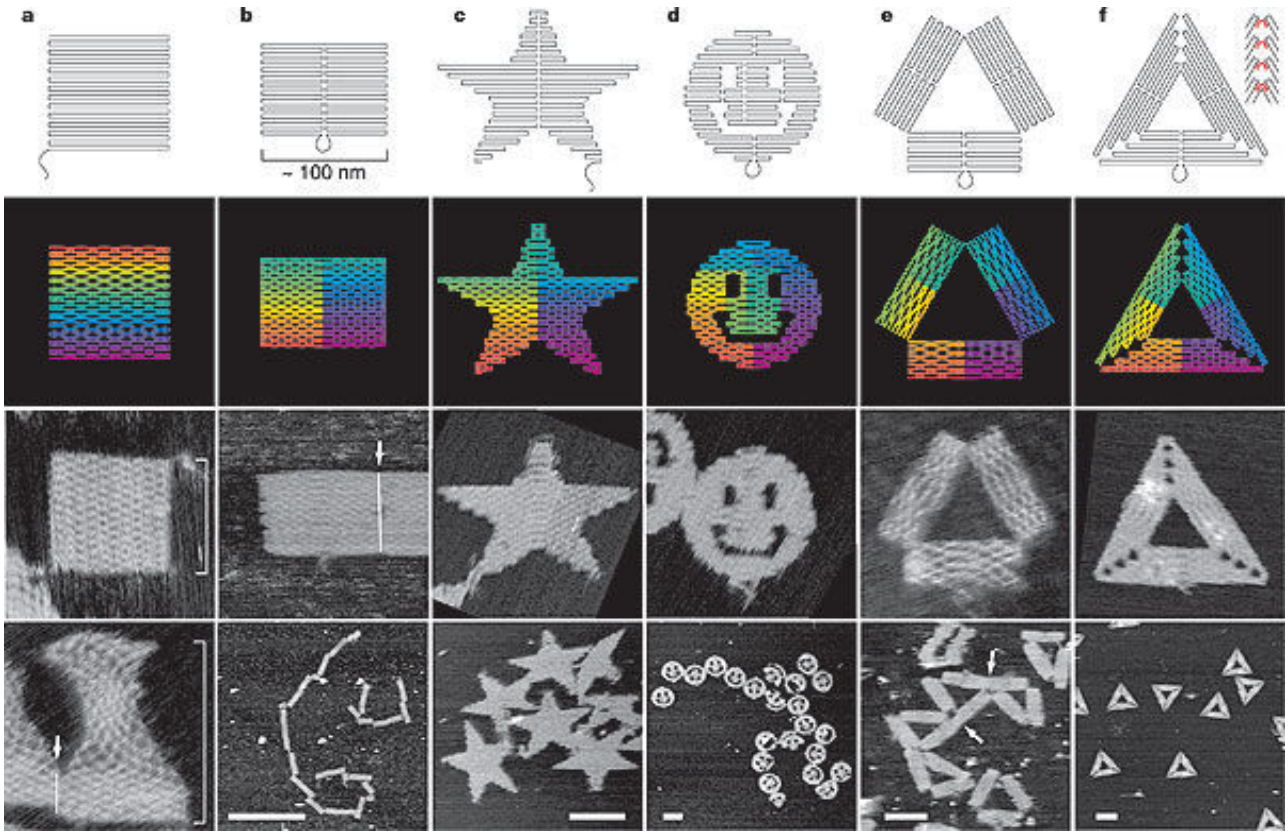


Typical DNA is composed of two strands bound to each other within a special shape (double helix), where the connectors on one side (strand) match with those of the other side, somewhat similar to a zipper.

If you start with just one side of a zipper, and then create and add smaller parts of other half-zippers that only match some positions/ parts of the first half-zipper, you can make the entire first long piece of half DNA change it's shape any way you want to.

Here's an animation with the process:

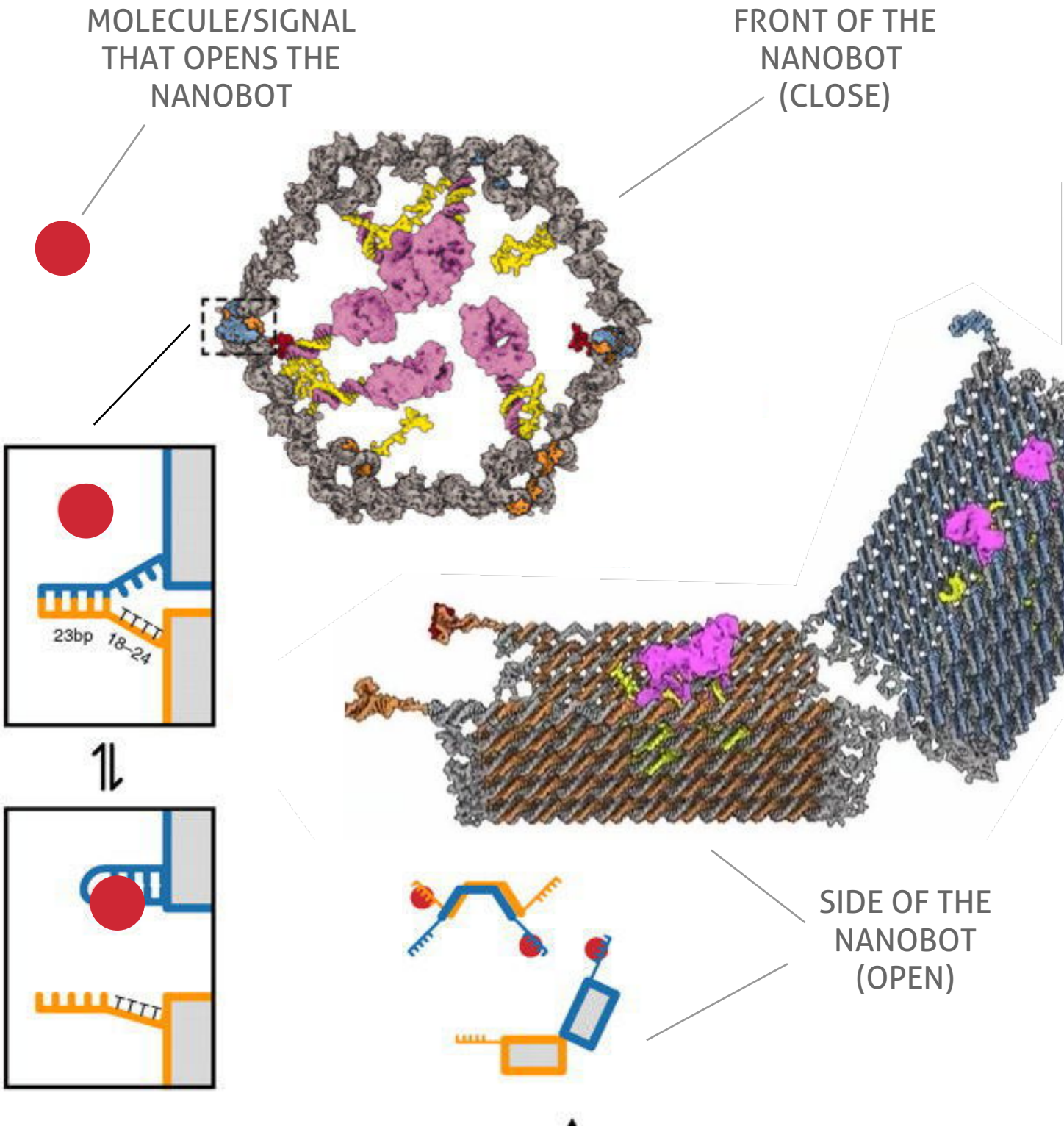


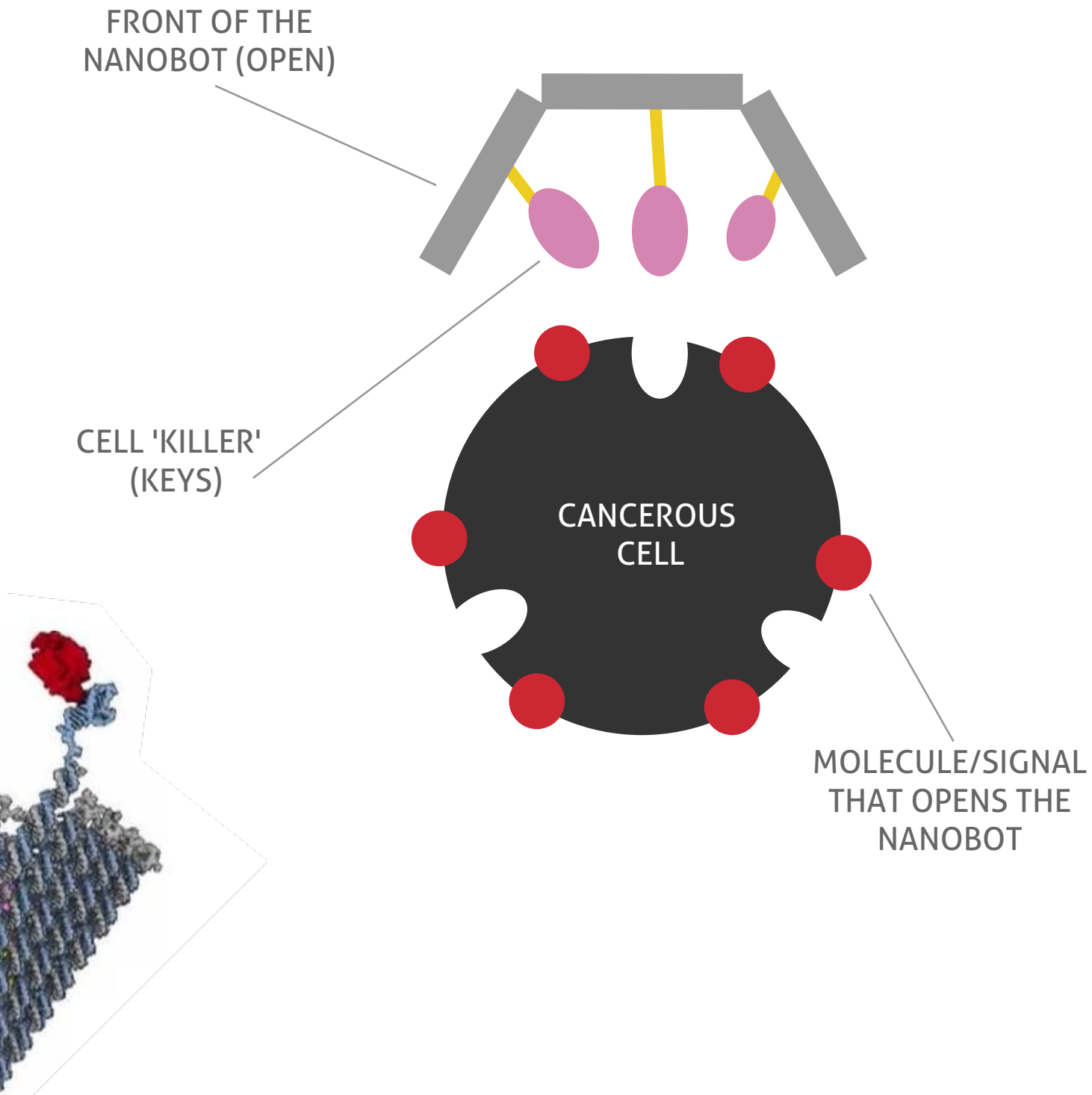


These are real images of real structures made entirely out of DNA and using the method I just described above.

We also recommend that you watch this TEDtalk video to better understand how this works, as it is a very interesting process.

Today, they are able to make many different tiny molecular shapes that, because of their form, can perform many functions. To keep to the same example with the cancerous cells, if you are able to place "cell killer" keys inside of a 'cage', and then design this 'cage' to open only when it comes in direct contact with a cancerous cell, then you can deliver the cargo (the drug/key) only to cancerous cells throughout a body, without causing any harm to healthy cells. That cage is a nanobot.

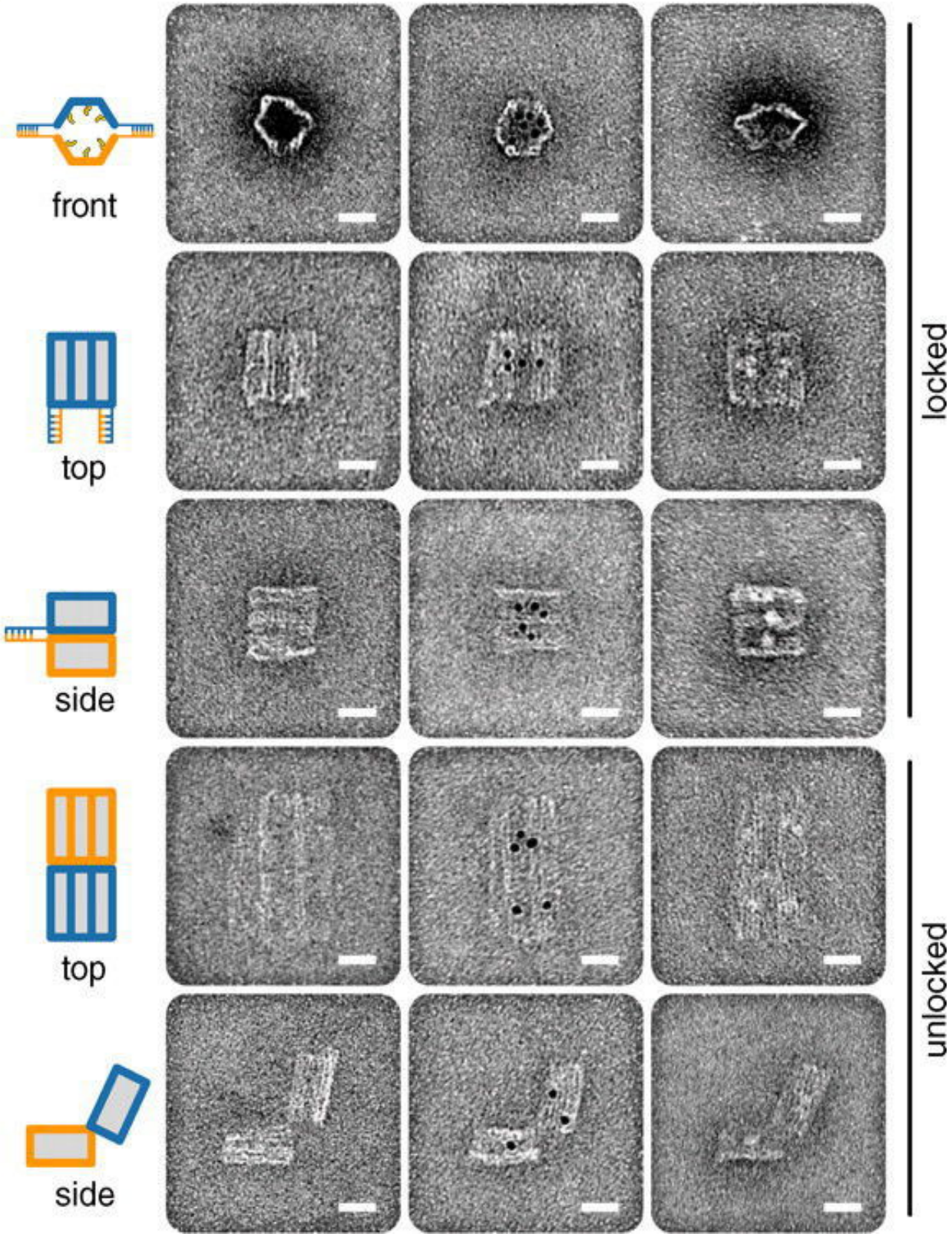




So, instead of throwing billions of keys at an apartment to get one to unlock the door while the others cause damage the apartment, imagine all of those keys wrapped inside soft tiny boxes that cannot damage the apartment, and these boxes only open and release the key when they make direct contact with the door lock. This way, you will not damage the apartment while benefitting from a much more exact delivery system.

This is not a theory. This is now happening 'in the lab' with animal testing, where they are already able to 'build bridges' for tissue growth (for example, for spinal cord injuries), detect various types of viruses/bacterium, delivering many kinds of drugs, or actually target cancerous cells with success (they can identify 12 types of tumors).

Real 'photos' of these nanobots:



They can even be made to 'cooperate' with each other to behave more like a swarm. It's made possible by their lego-like behavior, so that when one combines with another, then one or both of them may 'open up' or otherwise change their combined shape toward a specific outcome. It can also be compared to a computer program, as they can be built to load an ensemble of related drugs inside many of these boxes for programmed release, all based on specific situations that may be found in the body.

So, if they find a particular situation/disease that requires 5 different drugs to be administered in a specific order and over specific time intervals, then, by the way the containers assemble after being triggered by the encountered situation, they can open their 'cages' in a particular way to release the 5 required drugs, as needed, rather than all at once.

WATCH THIS VIDEO TO BETTER UNDERSTAND THIS

If the human body can be mapped by the unique molecules that are found in each individual area of the human body, then these nanobots can use that map to better target specific zones. It is also now possible to activate or deactivate these nanobots using remote control, which significantly adds to their capabilities. Watch this TED talk for additional information about all of this.

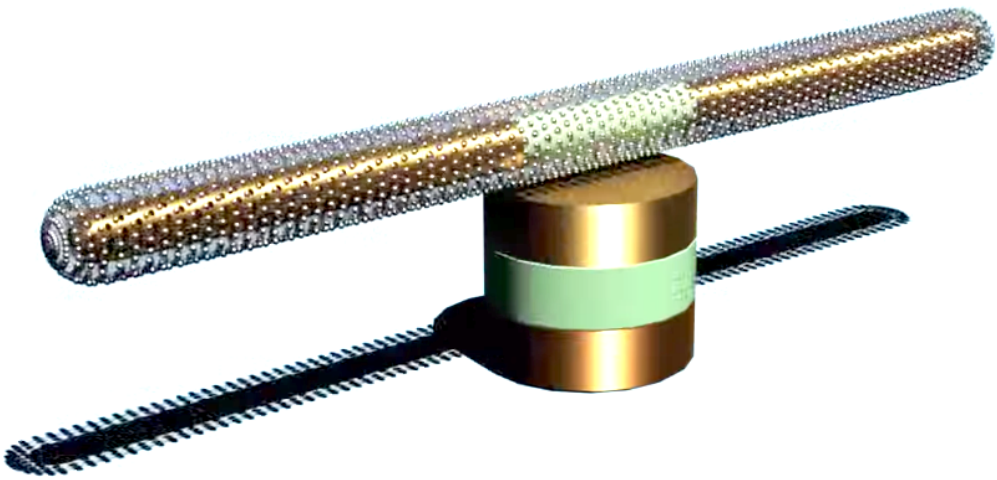
The same researchers recently announced that a human trial is due to begin very soon for treating leukemia (a form of blood cell cancer).(source)

While these 'nanorobots' are essentially various molecular shapes that bind and lock-unlock when in contact with certain targeted molecules inside the human body, and their reactions are continuously being made made more sophisticated, they still represent a 'shoot in all directions' solution, as they must be injected into the body, perhaps by the billions. They are 'able' to bind where they are intended to bind, in large part due to the presence of their large numbers moving through the body and increasing their chances of locating all of the existing targets that require their 'treatment'.

The research and promises of these tiny structures is fantastic, but there is still much more to 'nanobots'. Another approach is to develop nanobots that are more than simple molecular shapes; more complex and better controlled from 'outside' so they can perform more like the 'real', full size robots that we are used to. There are already a few examples, but keep in mind that, although they may seem simple while still performing relatively primitive tasks, this research is much more about continually expanding the future capabilities of these nanorobots and how humans can already manipulate and control such extraordinarily tiny devices.

THIS TINY ROCKET-SHAPED 'THING' IS 60 TIMES LARGER THAN THE MOLECULAR BOTS ABOVE, BUT THIS IS ACTUALLY A MOTOR-BASED NANOBOT - PERHAPS THE TINIEST MOTOR IN THE WORLD.

It can spin extremely fast while being controlled by soundwaves and magnetism for rotational speed and overall movement.

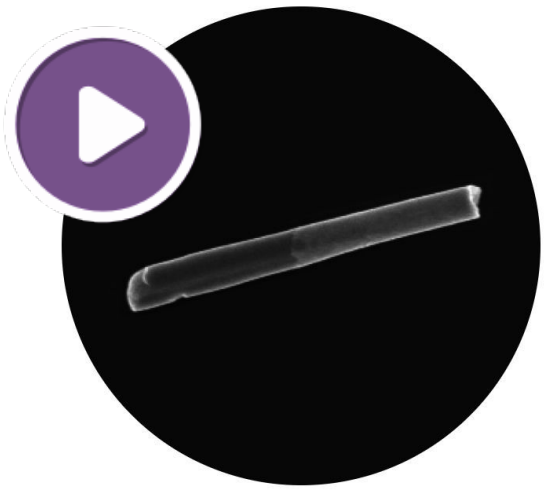


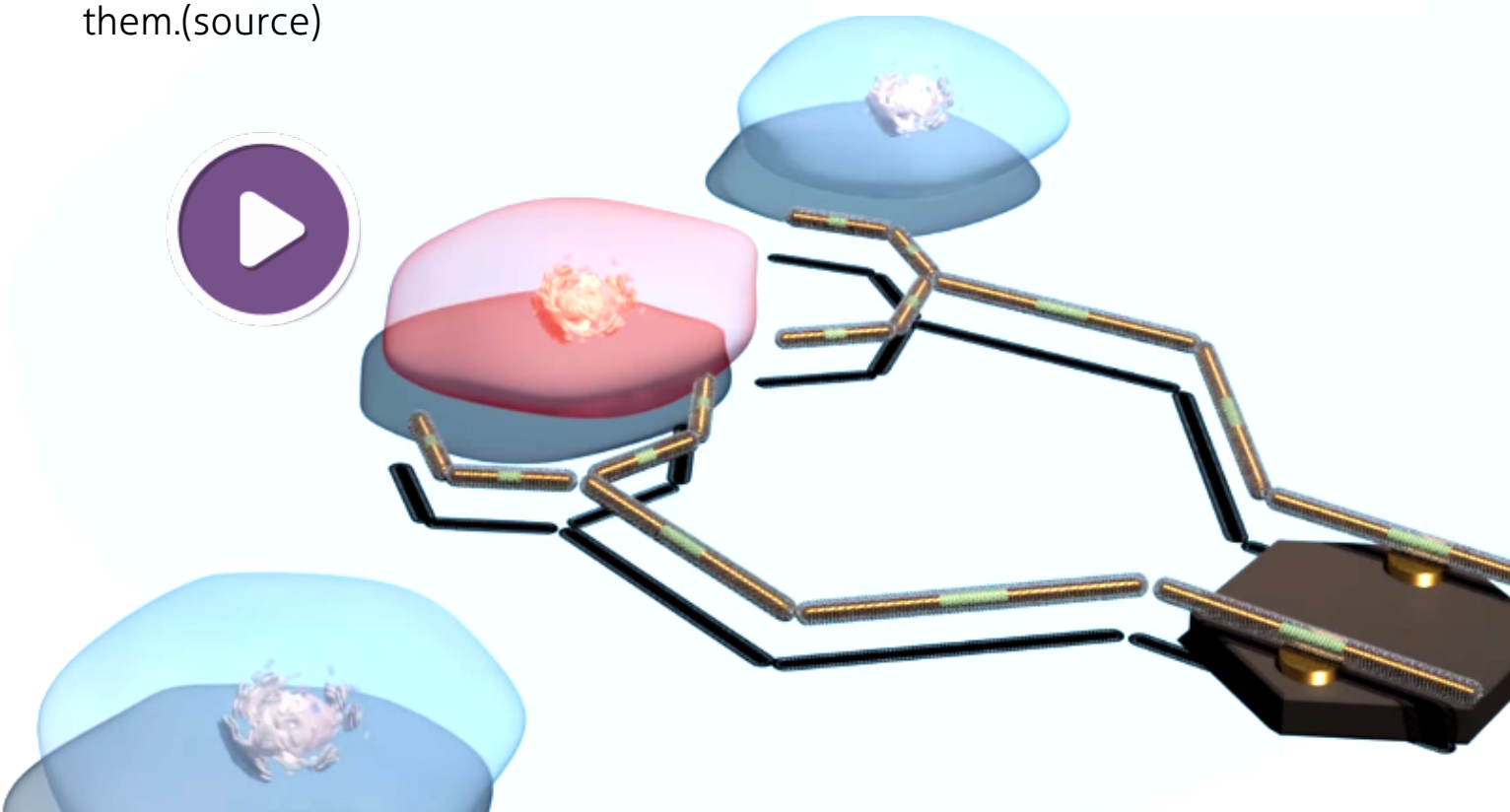
It can also be coated with certain biochemicals that are then delivered according to the motor's rotational speed, thus these bots can be controlled for how much medicine they 'deliver', and through magnetism they can control where these tiny nanobots go to deliver it. They can also be made to target, for instance, cancerous cells, and then puncture/ destroy them from outside, or also from inside the cell, where these nanobots can insert themselves and, by spinning at very high speed, they can literally 'shred' the cell's interior.

These nanobots can also move autonomously and, perhaps in the near future, be able to find and automatically cure all kinds of cell-related diseases. Even more interestingly, they plan to focus on making these tiny rocket-shaped robots assemble themselves into bigger structures for performing more complex tasks.(source)

Other mobile nanobots currently exist, but these are only being tested for their movement within the human body, but without any specific application for them.(source)

HERE ARE SOME REAL FOOTAGE WITH THESE NANOBOTS IN ACTION





Some fascinating research is also going toward decrypting the 'natural' healing properties of the human body and now some of these functions are known to be connected with the nervous system. By introducing tiny nanorobots in key locations, they can now tweak some parts of the nervous system to 'cure' some diseases.

So, instead of relying on ingested drugs that, due to their huge number spreading throughout the body, eventually find themselves at the right spot, and instead of nanobots that can deliver drugs to more targeted spots, this new approach tweaks the body to create and deliver the proper 'drugs' (molecules) itself to proper locations.

This is a very new approach, but it has already been tested in several patients and seems to already be working for a handful of symptoms/diseases.(source)

EXPLANATION VIDEO

A hundred or so years ago, human beings started building up a better understanding of cancer, deciding that the best way to remove cancer would be through surgery. What they quickly realized is that, in almost all cases, the cancer reappeared after the surgery. As a result, they concluded that they would have to cut out even more bits of the 'infected' human parts to better ensure removal of all of the cancer. With breast cancer, for example, they often ended up removing huge chunks of the pectoral and arm muscles, leaving the women with parts of their bodies completely non-functional. The procedure was gruesome and inefficient.(source)

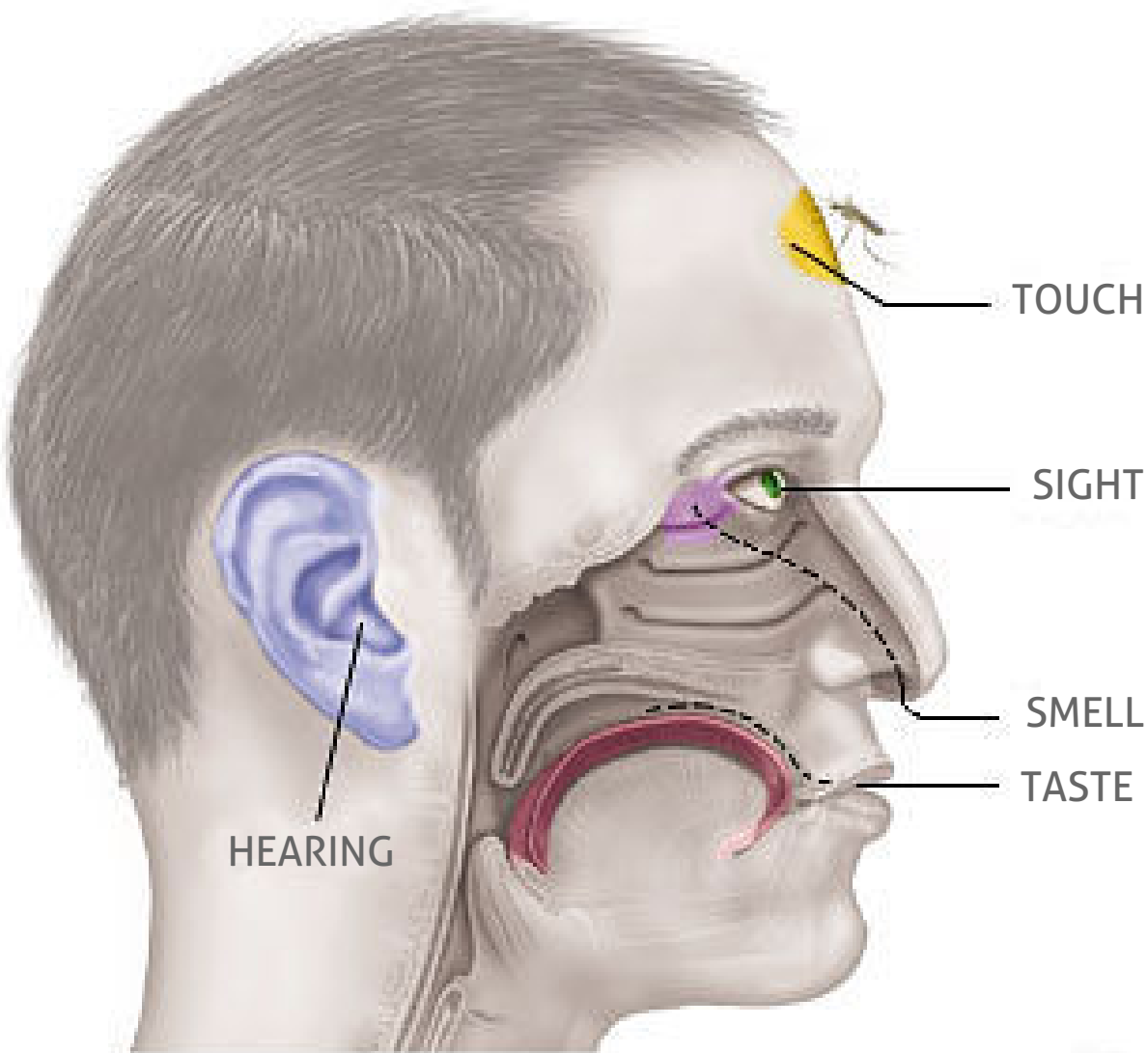
Today, we use similar methods for dealing with cancer, except that the scalpel is more and more replaced with 'toxins' (chemotherapy) or 'radiation'. Chemotherapy is a method of injecting substances that kill cancerous cells into the body, but the problem is that it cannot always differentiate between them and normal cells and, therefore, destroys healthy cells as well.(video explanation) Radiation treatments shoot atoms or particles that are smaller than atoms at the cancer cells from an external device. While it boasts much higher precision than chemo, it cannot target cancerous cells that are widely spread throughout the body (metastasis).(video explanation) These approaches are merely more precise versions of 'old-fashioned surgery', since they also affect other organs or are still quite imprecise at removing all cancerous cells.

But nanobots change all of this, as they are the perfect 'surgeons'; targeting only what you want them to target, and managing that goal throughout the entire body. Imagine having these small robots inside you, responding to and curing the earliest stages of various diseases without you even aware of it. This 'continual state of near-optimum health' highlights the power of these tiny bots: it will enhance our biology, making us more resistant to diseases (and perhaps immune to most).

♦ NEW SENSES

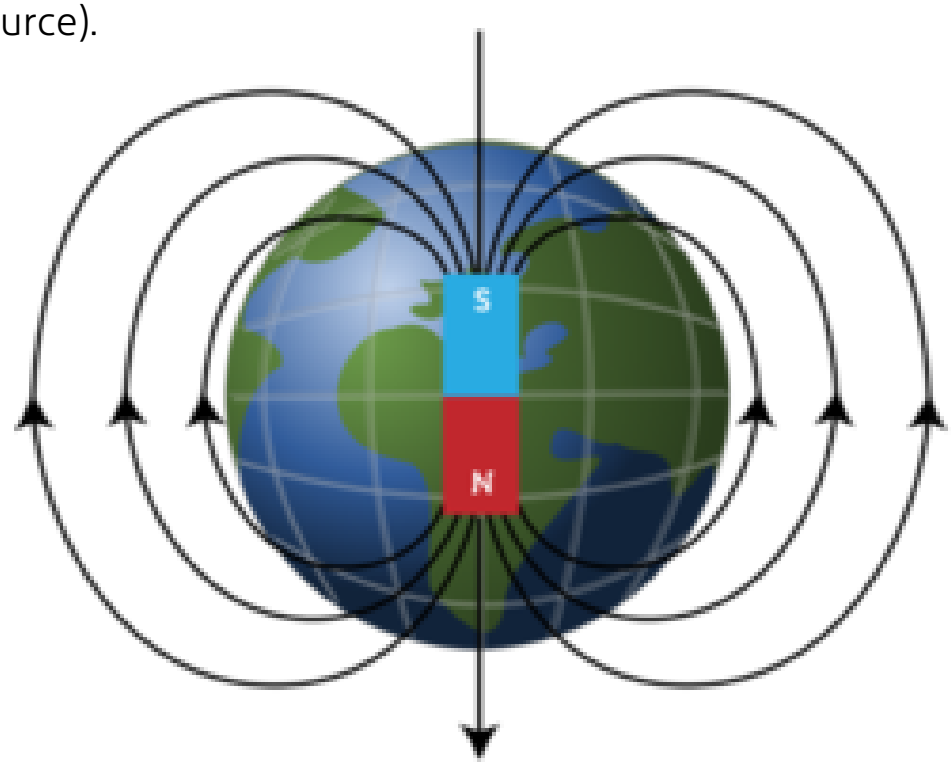
Humans have 5 senses, right? Well, no. Humans can sense the world in many different ways, through many various inputs. Skin, tongue and nose, ears, hair follicles, eyes, pain receptors, pulmonary stretch receptors, stretch receptors in the gastrointestinal tract and many other receptors allow us to 'feel' different 'things': temperature, balance, lightwaves, soundwaves, certain chemical reactions, vibrations, the need to pee, eat, sneeze; we can feel dizzy because of certain chemicals or visual/auditory cues, sick, cold, hot, and so on.

There's no proper way of defining and categorizing a 'sense', since sometimes many of them function together as one, or one cannot be fully isolated and/or understood.



When I first tried seafood and a friend asked me what it tasted like, I said "chicken". How else could I describe the taste? If I had used chemistry and biology to describe the taste to him, it would have been extremely complicated (perhaps completely unrealistic), but since we both have the same kind of taste receptors and we had both tasted chicken before, we could relate it to that experience. The way we 'sense' the world, while certainly subjective, seems to be the most powerful communication device and the best tool for us humans to understand the world in and around us.

I can use a compass to guide myself around on the planet, or I can study the physics of the magnetic field of the Earth, but it would become far easier for me to have a belt around my waist that allows me to basically 'sense' Earth's magnetic field through tiny electrical impulses or vibrations to my skin that indicate, for example, the direction and distance to the North Pole. That would help me make sense of it far more completely than with the aid of a simple compass and/or strong academic understanding of the physics behind it. I watched a documentary many years ago showing how they had tested such a belt, and it proved to be very efficient in allowing a person to better understand his/her position in space, while the subjects' overall orientation improved significantly. Similarly, tiny electronics are now being developed that can act as a sensor of magnetic fields (source).



As we've shown earlier in this series, the brain is the 'task' organ while the rest: ears, eyes, skin, etc., are the 'sensing' organs. Therefore, adding a new sense, or a set of senses, should not be a difficult task for the brain to adopt. If you think about it, so many creatures have similar brains with ours and many of them have very different kinds of senses. Some are very sensitive to heat, some are able to see in low light, sense smell thousands of times better than us, detect lightwaves well outside of our natural range, sense the magnetic field of the Earth, enjoy 360 degree vision, and so on. All of these tasks, although sensed by different kinds of organs, are managed by their 'neurons' (brain).

So, can we add new 'senses' to our own neurons? Sure we can. We've already highlighted some expansions of our existing senses in the previous issue (hearing light, seeing sound, etc.). Those were intended to replace some biological errors (blindness, for instance), so let's take a closer look at some that can enhance our ability to sense.

Here is a girl who can sense earthquakes and, with precision, the speed of moving objects around her. A sensor was implanted within her elbow that is connected to a network that monitors earthquakes around the world. Whenever an earthquake occurs, she feels a vibration in her elbow, where the vibrational intensity relates to the quake's intensity. After some time, she was able to acclimate the new sense, 'feeling' the Earth's quakes and their intensities as 'naturally' as we understand how chicken tastes. That same girl also has sensors that have been added to the back of her head (and also in her earrings) that detect the speed of objects and, again, transfer that to her via vibrational patterns, allowing her to 'feel' the speed of objects.

For instance, instead of saying that a car is moving at 100 km/h (62 miles/hour) and a human at 5 km/h (3 miles/hour), this girl can 'feel' these speeds and understand the difference between them. Of course, this is not suggesting that she can tell us exact measurements of speed, but it does provide a new way of understanding the world around us.

See, we mainly rely on just 2 senses: vision and sound. We can look at the Moon and we might be aware that it is 384,400 km (238.60653782 miles) away, but we really have no idea how far away that distance really is. We often try to relate incomprehensible things with other things that we are much more familiar with, such as: it would take 20 weeks to arrive at the Moon if you could drive there at an average highway speed. We can relate to this because we drive cars on highways and we 'experience' days. This comparative approach relies on a kind of 'relational soup' between experience (senses) and knowledge.

So, imagine if we were able to just look at the Moon and 'feel' how far away it is. Wouldn't that provide a more accurate understanding for us, humans? Imagine the same principle when we are traveling, feeling how close we are to the destination, not relying on written numbers and sounds that we may or may not be able to understand.

Such senses that can 'feel' distances and speeds would allow us to much better understand parts of the world we live in, without knowing the physics of them. I know how it 'feels' to balance in a swing, but I would find it impossible to properly describe that to another human in 'scientific' terms, or for him to understand my attempts at describing it without both of us being able to feel that sensation.

Our entire life experience relies on our senses to function: we associate colors with different situations (hot or cold water, traffic lights, warnings & notifications, and so on). We still rely mainly on bodily symptoms for detecting something wrong with it (nausea, fever, etc.); if we were all to live in a world without sound (as most deaf people do), we would find it much more difficult to function (no 'music', no auditory warnings for approaching cars, impending explosions, etc., no voice recognition or vocal inflections to help you determine the other person's state of mind or excitement level during communications with them, and much, much more).

I went to eat something earlier today because I 'felt' hungry. I took some pasta from the fridge and put it in a pot with cold water (I knew it was cold, as I could check it - I felt it). I then put the pot on the stove to bring the water to a boil. I 'heard' my phone ring, so I answered it. I talked for 10 minutes with the person who called. I closed the phone. I went to the bathroom (I felt the need to pee :)). I left the bathroom and felt steam (heat), which reminded me about the pasta. I went to the kitchen and turned off the stove, since the water was boiling. Once it cooled down, I ate the pasta.

I open doors in the house based on how I am used to opening doors, and not based on principles of physics (to apply a certain force); I eat because I feel the need to, not because of a formula that calculates my nutrients and recommends that I eat at specific times or in specific quantities; I close my eyes when there is too much sun, rather than because of any biological understanding of pupils, sun rays, etc., since that's simply how my body reacts to what it feels; and I don't go to pee because some smartphone app alerts me that my bladder is full and needs to be emptied so it can take on more 'liquid'.

The way we dress, what we eat and when, what we pay attention to, the way we interpret the world, and many other aspects of life are all extremely connected to how we 'sense' all of it (cold, hungry, etc.).

EXPANDING OUR SENSING ABILITIES CAN DRAMATICALLY IMPROVE OUR UNDERSTANDING OF THE WORLD AND MAKE IT EASIER FOR US TO, BASICALLY, LIVE.

However, adding various kinds of devices to detect movement, earthquakes, magnetic fields, temperature, and so on is not the entire story. There now exists a more complex type of sensor apparatus, in the form of a vest, that works on the same principle of vibrations to the skin, but this time, the vest is designed to produce complex vibration sets in a way that its wearer can recognize spoken language and can 'communicate'.

Because the vest has multiple vibration modules, it can create a huge variety of distinct patterns of vibrations, allowing a deaf person to associate these vibrations with distinct spoken words and, basically, understand 'language'. This is a huge advancement, because if a deaf guy can learn how to understand words (vibrations in the air) through this vest, as showcased in the video below, then a huge variety of more advanced scenarios can be imagined.

EXTERNAL SOUND

SOUND-TO-TOUCH MAPPING

REAL-TIME COMPRESSION

TED - DAVID EAGLEMAN: CAN WE CREATE NEW SENSES FOR HUMANS?

VIBRATION OUTPUT

The variety of inputs that our brains can interpret and make sense of can be greatly improved and extended beyond our existing biological senses, and once you do that, you can connect them with other sensors and big data.

Imagine 'feeling' when a virus outbreak is near you, so you can take appropriate measures; to be able to detect when toxic chemicals, undetectable by your biological sensors, are around you; to feel when you have entered a dangerous area -- for instance, a construction area where, instead of a visual sign that many may miss or are unable to translate from another language, you more simply 'feel' the need for heightened awareness; or imagine 'feeling' big data, such as the overall health status of a population, instead of having to gain such awareness through statistics; we can even imagine ways of feeling other's pain, discomfort and level of happiness by decrypting and wirelessly transmitting their state through similar sensors, which may also provide a new way of explaining to a doctor or to a loved one how you 'feel'.

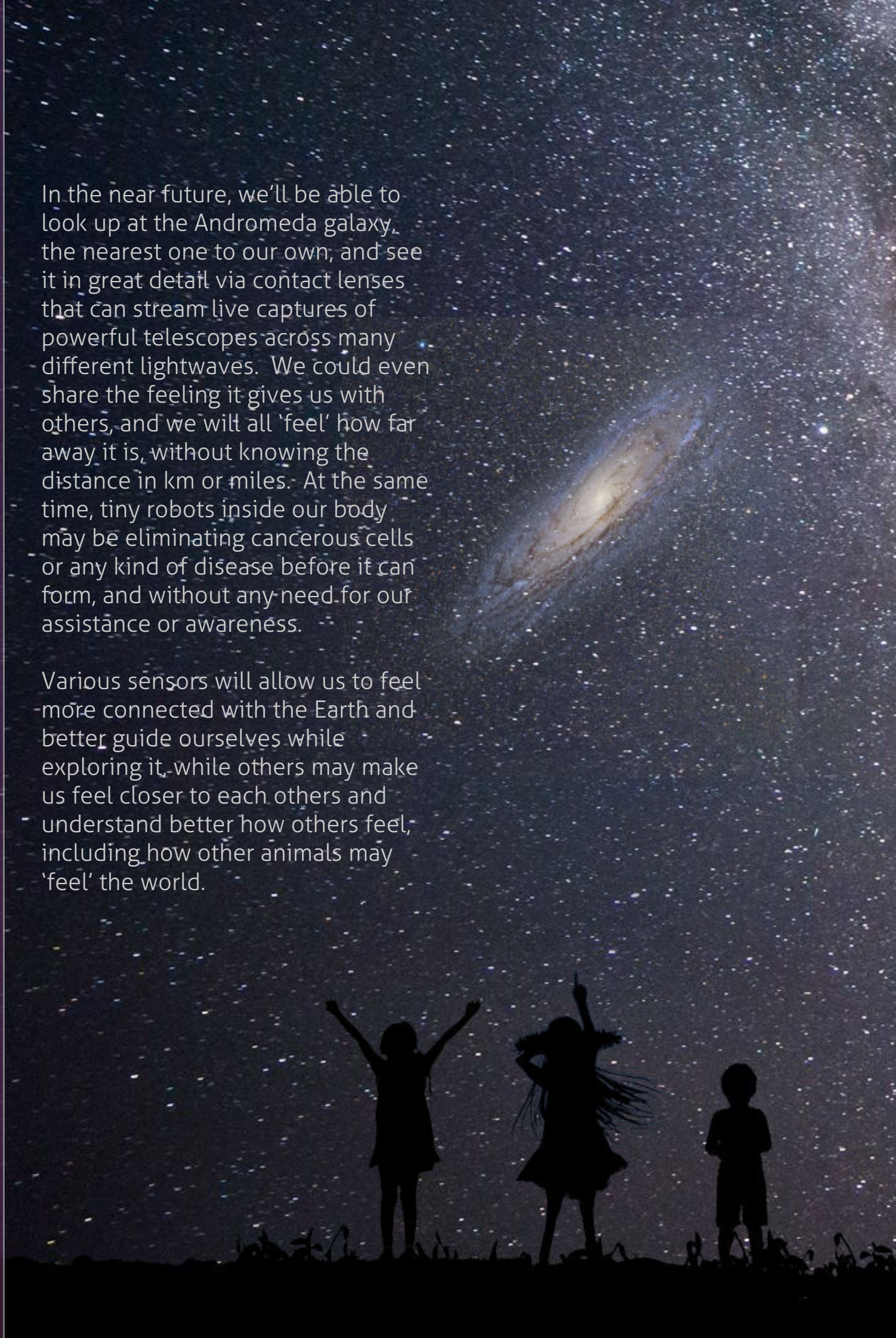
The list is endless and, from navigation to sensing various 'events'/forces/waves, to compressing complicated big data or more accurately recognizing distances, heights, etc. into easier to understand patterns of 'senses', we can become far superior than we are today at understanding the world we live in, and ourselves.

We already use lots of devices (smartphones, supercomputers, light detectors, the internet, and so on) to extend what we are, but perhaps these tools are extremely primitive, as they represent a limited conversion of the complex world of which we can only experience a tiny fraction, and designed for just a handful of limited senses that we use to interpret it (sight, hearing, smell, and a few others).

Coupling these new senses with nanobots may very well allow us to become vastly different from what we are today: diseases and other difficult problems may auto-'fix' inside our bodies without us even realizing it, and we will be able to experience the world in completely new ways.

In the near future, we'll be able to look up at the Andromeda galaxy, the nearest one to our own, and see it in great detail via contact lenses that can stream live captures of powerful telescopes across many different lightwaves. We could even share the feeling it gives us with others, and we will all 'feel' how far away it is, without knowing the distance in km or miles. At the same time, tiny robots inside our body may be eliminating cancerous cells or any kind of disease before it can form, and without any need for our assistance or awareness.

Various sensors will allow us to feel more connected with the Earth and better guide ourselves while exploring it, while others may make us feel closer to each others and understand better how others feel, including how other animals may 'feel' the world.



We must not forget that no matter what new senses can be successfully added to our biological bodies, they are just as subjective in their details as the biological ones. Just as it is today, we may sense the same 'expanded' lightwaves in the future, but still interpret them differently. We may have similar tasting sensors, but the foods we eat will taste differently due to cultural influences.

So, yes, these new senses will still be subjective, but more alike and easier to understand and relate to than mere words can manage today. Also, consider that while we may be able to feel things like heat and pressure in many different ways today (damn useful in our day-to-day lives, but we need science to describe them), however acute and complex our senses become, our brains simply do not have the capacity for making total sense of all of the available information in an 'objective' and categorized way as clearly as we can through science. But with advancements in 'big data connectivity', for example, maybe that won't matter.

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