

procedures, easily visualized when you look at a bit of rusted plumbing from the laundry tub, make very good sense.

But there's more to it than that. These "pipes" are part of thinking, knowing people. Angina pectoris, a grave and dangerous symptom of serious underlying pathology, is, it turns out, highly responsive not only to nitrates and beta blockers but also to inert treatment as well.¹⁶ This seems quite surprising as the theory of sclerotic arteries and blood clots – rusty plumbing – would seem to leave little place for such unlikely findings.

Here is one example of an unlikely finding. In a European double blind, randomized trial of two different drugs for treating angina lasting six months, 35 patients were treated only with placebos and nitroglycerine for the six-month period. At the beginning of the study, these patients had an average of 10.3 angina attacks per week, and, on average, they took 10.6 nitroglycerine tablets. After admission to the study, the patients' dose of placebo was adjusted for a period of eight weeks until it was satisfactory (as was done for all the patients in the trial). Then, this dosage was continued for another four months. Twenty-seven of the 35 placebo-treated patients (77% of them) showed substantial improvements over the period. Overall, the average number of angina attacks dropped from 10.3 to 2.4 per week; the number of nitroglycerine tablets used dropped from 10.6 to 2.1. Exercise time until an angina attack increased from 9.3 to 10.2 minutes (Boissel *et al.* 1986). Given the theory of rusty pipes, this is a very surprising result. It seems unlikely that these people would simply have gotten better had they stayed at home and had no treatment at all; "most of the patients had severely limited functional status... [and] most had been previously treated: 21 with long acting nitrates, 18 with beta-blocking agents, 9 with calcium-channel blockers. Only 1 received no treatment prior to entry into the study." These were people who were quite sick, and there was little reason to expect that they would get better without treatment. But, with inert treatment in a clinical trial, they did get better.

The logic of this theory of rusty pipes has had a long history. Several indirect revascularization techniques which involved rerouting various arteries were developed in the 1930s by Beck and in the 1940s by Vineburg (Meade 1961:480–515). Although Beck's procedure attained modest popularity, the first widely used surgical approach to angina was the bilateral internal mammary artery ligation (BIMAL). The internal mammary (or thoracic) arteries arise from the subclavian artery high in the chest

¹⁶ Bienenfeld's review of the placebo effect in cardiovascular disease in the *American Heart Journal* is particularly thorough and interesting (Bienenfeld, Frishman, and Glasser 1996).

presumably to people eating too much red meat. These lipid build-ups or atherosclerotic plaques cause lesions on the blood vessels. The heart attack is typically understood to be caused by *thrombosis*, that is, the blockage of the narrowed artery by a blood clot (a *thrombus*). The clots are said to form near sites of such fixed lesions; they are often not actually seen since, it is said, *spontaneous thrombolysis* (break down of the clots) occurs in two-thirds of cases. In any event, these clots block the artery; heart muscle, deprived of oxygenated blood, dies, creating an area in the muscle known as an *infarct* of the myocardial muscle (hence the technical name of a heart attack, a *myocardial infarction* or "MI"). The heart goes into fibrillation, and the patient dies.

In milder forms, coronary atherosclerosis is understood to lead to angina pectoris, a pressing pain beneath the sternum, which often radiates out to the left arm. The standard medical treatment for angina for the past century has been nitroglycerine tablets dissolved under the tongue. Now *there's* a powerful medicine for you! Most of us have seen the scene in the movie where someone clutches his chest, cries out "My nitro! I need my nitro!", and the bad guy tosses the pill bottle behind the couch. The poor guy dies right before our eyes, still clutching his chest. And we remember Yves Montand in the great film *Wages of Fear*, with his band of criminals, hauling truckloads of nitroglycerine over the Andes to put out an oil well fire. Our understanding of the power of medicine comes from all over. The curious thing about it is that it's not really clear why nitroglycerine stops the pain of angina attacks! It relaxes the muscles of the blood vessels, lowering blood pressure, presumably allowing more blood to get to the heart. None of this is nearly as clear as the fact that we all know how powerful nitroglycerine is!

In the past twenty years a number of important new treatments have been developed for angina. Medical treatments include beta-blockers (like propranolol, known in the US as Inderal) and calcium channel blockers (like verapamil), which seem to reduce the frequency of angina attacks. Those that still occur are treated with nitroglycerine (or a similar nitrate). But the most interesting developments in the treatment of angina have been surgical. The two most common procedures are coronary artery bypass grafting (known as CABG) and angioplasty. In CABG, arteries which are blocked by fatty deposits on the walls of the coronary arteries are, in effect, bypassed by grafting in pieces of vein or artery borrowed from other places in the body, or, sometimes, by grafting in synthetic arteries made of Dacron or similar fibers. In angioplasty, a little balloon is threaded up to the coronary arteries and inflated. This expands the artery, allowing more blood flow to the heart. Given these theories of blocked "pipes" (that's what heart surgeons call arteries), these

and descend just inside the front wall of the chest, ultimately supplying blood throughout the chest and viscera. Following anatomical research by Fieschi, an Italian surgeon, which indicated connections between various ramifications of these arteries and the coronary circulation, several other Italian surgeons developed a procedure in which the arteries were ligated (tied off) below the point where these branches presumably diverged to the heart in order to enhance this flow and supplement the blood supply. The operation was first performed in the United States by Robert Glover and J. Roderick Kitchell in the late 1950s (Glover 1957; Kitchell, Glover and Kyle 1958). It was quite simple, and since the arteries were not deep in the body, could be performed under local anesthesia. The physicians reported symptomatic improvement (ranging from slight to total) in 68% of their first sample of fifty patients, in a two- to six-month follow-up. The operation quickly gained some popularity.

The problem is that no one else believed that there *was* any real connection between these arteries and the heart! So, shortly after these reports appeared, two different surgical teams at two American medical centers – one from Kansas City under the direction of E. Grey Dimond (Dimond, Kittle, and Crockett 1960) and the other in Seattle under Leonard Cobb (Cobb *et al.* 1959) – did double blind trials of the procedure. In each case, the surgeon learned only while in the operating room which patients were to have the complete operation and which were to receive "sham surgery." Those patients received the complete operation, but the arteries were not ligated. In both studies, the patients were followed for at least six months after the surgery by cardiologists who were unaware of which patients had received the ligations and which had not. In one of the studies (Seattle) the patients were told that the operation was experimental, but they were not informed that some of them would get the sham surgery. In the Kansas City study, it is not clear from the publication just what the patients were told; it does say that the patients did not know which procedure they had received (suggesting that they knew there were two possibilities). This seems not to have made any difference anyway. In both studies, most of the patients were much better after surgery regardless of whether they had the full operation or the sham surgery. Table 5.1 indicates the outcomes of the two studies and shows the combined outcome.

In both cases, patients experienced significant subjective improvement; that is, they reported that they had substantially less pain than before the surgery. This was true regardless of whether or not they had the full procedure (67% substantial improvement) or the sham procedure (82% substantial improvement). In the Seattle study, "need for nitroglycerine was uniformly decreased." In the Kansas city study, the average

Table 5.1. *Outcome of actual and sham surgery for angina pectoris; amount of subjective improvement*

Improvement	Actual surgery			Sham surgery		
	Seattle	K. C.	Total	Percent	Seattle	Total
Substantial	5	9	14	67%	5	10
Slight	3	4	7	33%	2	2
Total	8	13	21		7	12

number of nitroglycerine tablets taken per week dropped 34% in patients with the full operation and 42% in patients with the sham operation. In both studies, patients were, on average, able to exercise longer before an angina attack. In neither study were there substantial changes in electrocardiogram readings, although one Seattle patient with striking abnormalities before surgery had none afterwards. He received the sham surgery.

It is hard to know how to account for the substantial improvement in these patients. Whatever the truth may be about the alleged connection between the internal mammary arteries and the coronary arteries (it doesn't show up anywhere in my *Gray's Anatomy!*), it doesn't really matter; in these two studies, the patients with the sham procedure did as well (maybe even a bit better) than those with the complete procedure. But for people willing to trust their surgeons and doctors, this is a pretty compelling operation. The notion that your heart is starved for blood makes pretty good sense. And the notion that we can, by shutting off the flow of blood down one pipe, enhance the flow into another pipe – sort of like what happens in the bathroom sink when you turn off the shower – makes very good sense. One patient in the Kansas City study, when asked if he felt better, said, "Yes. Practically immediately I felt better. I felt I could take a deep breath... I figure I'm about 95 percent better. I was taking five nitros a day before surgery. In the first five weeks following, I have taken a total of twelve." This patient's arteries were not ligated (Dimond, Kittle, and Crockett 1960:484). But he did have two scars on his chest, and he had an explanation that made sense (unless he was an aficionado of *Gray's Anatomy*). He had all the elements of meaning which he needed.

It is also interesting to notice that the improvements here – 67% and 82% – are much the same as the improvements reported by Boissel – 77% – in the six-month placebo treatment of angina mentioned earlier, a good deal higher than that usually attributed to inert treatment.

There are other, similar, cases where one can make similar arguments, although not from double blind trials. As I have already noted, the surgical procedure known as coronary artery bypass grafting (CABG) is one of the most common surgical approaches to angina pectoris today. It is not clear how many such procedures may be done in a year, but various estimates suggest that it is about 600,000 per year in the United States. At roughly \$50,000 each, this is a \$30 billion dollar-a-year industry. The approach with CABG is different from the BIMAL. Here, the idea is to take another piece of blood vessel (sometimes the saphenous vein from the leg, and sometimes a piece of the same internal mammary artery which was ligated in the BIMAL) and to place shunts around the regions in the coronary arteries which seem to be blocked by the fatty atherosclerotic deposits. This should allow more blood to get to the heart and should stop the anginal pain caused by this ischemia. This procedure is far more invasive than the BIMAL. The patient is anaesthetized, and the surgeon performs a median sternotomy (that's formal surgery language; informally, surgeons say they "crack the chest"). The heart is stopped and the patient is attached to a heart-lung machine.¹⁷ An artery or vein is "harvested" and then used to make the shunts across the blocked portions of the coronary arteries; the occluded areas are "bypassed."

This is one of the most successful forms of surgery ever developed. The logic is perfectly clear, and 90 percent of patients find themselves pain free after it is over. But that was the case with the BIMAL patients, too, and with the patients taking the drugs subsequently shown not to be more effective than placebo. And, unsurprisingly, CABG has never been subjected to a double blind trial comparing it to sham surgery.¹⁸

There is every reason to believe that, today, CABG works more or less the way its defenders propose. Without doubt, the operation relieves pain in 80% or 90% of patients who have it. Moreover, their electrocardiogram readings become more normal and their exercise tolerance increases. This, however, was not always so. In the early days of the operation, during the 1970s, while many patients experienced the same pain relief of more recent times, many did not show the increase in exercise tolerance, and they didn't show the improvement in electrocardiogram readings. Analyzing the situation in the late 1970s, one group of researchers suggested that, after the operation, the ischemia (restricted blood flow) persisted, even though the pain was not present (Bulkley and

¹⁷ In recent years, some surgeons have developed techniques for applying the shunts on the beating heart, not stopping it, and not using the heart-lung machine (Murkin *et al.* 1999). This is, as yet, still relatively rare, but it is becoming more common.

¹⁸ Although a highly regarded thoracic surgeon once argued *vigorously* with me saying that there had been such a study. An exhaustive search of the medical literature reveals that there hasn't.

Ross 1978). These doctors suggested that this could have been due to several things: the heart could have been "denervated" – that is, the operation could have inadvertently destroyed nerve fibers to the heart, so that pain couldn't be felt any more; or the operation could have killed some previously living heart tissue which would, thereafter, be insensitive to pain. They also suggest that the pain reduction could have been due to the placebo effect.

Another team of investigators soon after reported something similar. It is often the case (probably more in the early days of the operation than now) that grafts around occluded regions of the heart muscle simply don't "take," or become "patent." Yet these patients with unsuccessful bypasses, in whom it is hard to imagine how the blood flow to the heart could be much improved, showed the same high levels of pain relief as did those with patent grafts (see, for example, Valdes *et al.* 1979).

These problems have largely been solved by now with significant improvements in surgical technique: grafts last for many years, and blood flow to the heart after CABG is clearly increased. But this doesn't change the fact that the pain relief occurred in those early patients with significantly less effective surgery.

Placebo pacemakers

There is additional evidence of meaningful responses to surgery. In a study in Sweden done in the late 1990s, 81 people with "hypertrophic cardiomyopathy" were operated on and given pacemakers. Hypertrophic cardiomyopathy is a condition in which the heart muscle thickens abnormally; it can be a fairly benign condition, but it can also be very serious, causing sudden death. It is treated with a range of options including beta-blockers or other medications, heart valve surgery, or by installing a pacemaker. In the Swedish study, half the pacemakers which were installed were, in effect, not turned on. While the patients with working pacemakers did better overall than those whose implants had not been turned on, the latter were doing much better after three months than they were when the study began. Unfortunately, this study did not have an untreated control group; but unfortunately, too, it is not a condition which simply goes away of its own accord very often. Patients with turned-off pacemakers experienced significantly less chest pain, shortness of breath, dizziness, and heart palpitations, and they experienced an improvement in cognitive functioning (thinking) after three months. The authors of the study concluded: "The placebo effect of pacemaker implantation appears to be substantial. Although it is hard to evaluate, it must be taken into account ..." (Linde *et al.* 1999). (As per my standard commentary:

there are no placebos here; this is not a placebo effect, but a meaning response.)

"Bloodlines" and lasers

"Bloodlines are paths that allow oxygen-rich blood to saturate oxygen-starved heart tissue. One laser can create bloodlines: the CO₂ Heart Laser™." Well, that's what it says on the website of the company that makes the laser, PLC Medical Systems, Inc.¹⁹

"Transmyocardial laser revascularization" (TMR) is the latest whistle in the surgical approach to angina. A company spokesperson told me that they estimated they were approaching a total of 6,000 procedures worldwide (in spring 2000), explaining that, after the procedure was covered by Medicare, it quickly gained widespread acceptance as a treatment for angina by the medical world (Floody 2000).

What kind of operation is this? In TMR, an incision is made in the side of the chest between two ribs. The outer layer of the heart (the pericardium) is removed, and the heart muscle (the myocardium) is exposed. A laser (several different types are used) is touched to the surface of the heart, and a laser beam is fired into the heart, presumably to make a channel through the heart. Usually thirty to fifty such channels are made. The idea is that this will make a sort of substitute artery, a "bloodline" in the terms of one company, through which blood will flow providing oxygen-rich blood directly to the heart muscle. The pericardium is replaced, and the incision in the chest is closed.

Interestingly enough, the origins of this operation lie in some experiments done in the 1960s where a doctor, making an analogy with the way reptile hearts work (reptile hearts don't get blood delivered via arteries, but the blood simply suffuses from the ventricles into the heart muscle itself through cavities called "sinusoids"), decided simply to make such channels using acupuncture needles! Subsequently some other researchers decided to try using lasers to do the same thing (for a clear history of the procedure, see Kantor *et al.* 1999). By the mid-1990s, a number of fairly large trials had been carried out. The procedure was reserved for people who were not healthy enough to be treated by the standard techniques (CABG, angiography), and who had very serious, unstable end-stage angina – that is, for very sick people. The results were quite remarkable: success rates were in the range of 75% to 90%.

¹⁹ Fall, 2001: <http://www.plcmed.com/intro.htm>; remember that websites change frequently. This is a very snazzy site with dramatic graphics, worth looking at as an example of how private companies can create medical meaning. The website also refers to bloodlines with the less dramatic term "channels."

"Success" was defined as very significant improvement in pain and functioning. Angina is characterized in several ways; one uses the Canadian Cardiovascular Society system which sorts angina into four classes.²⁰ Successful improvement in these studies required a two-stage improvement; that's a lot for such very sick people.

The problem is that no one really knows how or why this operation "works." The "bloodlines" close up in a matter of hours, and there is no evidence that the myocardial blood flow actually increases by the best type of evidence, perfusion imaging (Landolfo *et al.* 1999). The analogy with the reptile heart simply doesn't work; mammalian hearts just don't have the reptilian sinusoids. So what *does* happen? Some say that the laser beams disrupt the nerves of the heart and denervate the affected areas (Al-Sheikh *et al.* 1999), but others seem to show pretty conclusively that this is not the case (Hirsch *et al.* 1999). There is some reason to believe that the scarring process may lead to the creation of some new blood vessels ("angiogenesis"), but there is no clear evidence that this has any effect on angina.

So, what's left? A number of people who have looked at the situation suggest that, by analogy with the bilateral internal mammary artery ligation, this may be due to the placebo effect (for example, Kantor *et al.* 1999; Lange and Hillis 1999). There are minimal improvements in the objective measures of heart disease; but for patients, the most important thing is not objective measures of anything, but whether or not they can climb stairs, lift their grandchildren, or mow the lawn.

More recently, Dr. Martin Leon and a group of colleagues from across the US enrolled 300 patients in a placebo-controlled trial of a related procedure similar in form to angioplasty. A laser catheter was inserted in the femoral artery and threaded up into the left ventricle; the laser pulses were administered from inside out; this requires much less invasive surgery. These patients were very sick:

- all were rated as Class III or IV on the four-stage Canadian scale;
- 90% had previously had bypass surgery;
- 65% had previously had heart attacks;
- all had had angioplasty within the previous four months;
- yet they were relatively young people, averaging about 62 years in age.

Patients were randomly assigned to one of three groups: a high-dose group (twenty to twenty-five laser punctures); a low-dose group (ten to fifteen laser punctures); or a mock procedure with only simulated laser treatment. All three groups displayed similar impressive improvement six

²⁰ In Class I, ordinary activity (walking, climbing stairs) does not cause angina, but rapid, strenuous and prolonged exertion may. In Class IV, people are unable to carry out any activity without discomfort; anginal pain can occur at rest, while sitting in a chair.

months after surgery on all objective and subjective measures which were observed. Exercise tolerance was increased in all three groups. The percentage of patients who improved two or more classes on the Canadian scale ranged from 25% (high dose) to 33% (placebo) to 39% (low dose). Frequency of angina declined, and physical functioning and disease perception scores increased, in all three groups. None of the modest differences between the three groups were statistically significant (Leon *et al.* 2000).

Recall that these were very sick people, many of them in their fifties or younger. They all showed remarkable improvement regardless of whether there were any channels placed in the heart muscles.

In the early 1990s, before the FDA had approved this laser treatment, Dr. Alan G. Johnson wrote an article titled "Surgery as a placebo" in *The Lancet* (a leading British medical journal), and he noted that "electrical machines have great appeal to patients, and recently anything with the word 'laser' attached to it has caught the imagination" (Johnson 1994). It may be worth suggesting that doctors, as well as patients, find their imaginations fired by lasers (surely more than by acupuncture needles)!

Lumbar disk herniation

These kinds of effects can be seen in areas other than cardiology and thoracic surgery. As I noted at the beginning, there aren't many cases where we can actually demonstrate the effects of placebo surgery since randomized controlled trials of such procedures are quite rare. But there are some similar situations which, carefully interpreted, can yield similar conclusions. In 1972, researcher Erik Spangfort did a very comprehensive analysis of all the surgical operations carried out for suspected lumbar disc herniation between 1959 and 1965 in Sweden, a total of 2,503 operations. The main symptoms of "slipped disc" was some form of sciatica (pain running down the leg along the sciatic nerve) often accompanied by persistent back pain. The diagnosis is based largely on analysis of x-rays of the back, plus a series of additional neurological tests. The surgery involves exposing the disc and "removing all loose fragments of disc tissue, . . . and to excise degenerated tissue from the interior of the intervertebral space without attempting to remove the total disc" (Spangfort 1972:7). In the course of his review, Spangfort noted that 346 patients with all the appropriate symptoms and signs turned out not to have degenerated discs after all. He called these, variously, "negative explorations" or "negative operations." In these cases of what turned out to be "exploratory surgery," nothing was done to the discs, and the patients' wounds were simply closed. With these patients one would imagine that, since the healthy

disc was not, apparently, the cause of their pain, and since nothing was done to them except sufficient surgery to observe the disc, there would be no particular outcome to the procedure. But Spangfort reports that, six months after surgery, 37% of these patients had complete relief of their sciatic pain; another 133 (38.4%) had partial relief of their sciatica. Three quarters of these "sham surgery" patients were improved. Only 85 patients (25%) were the same or worse as they were before surgery. He also looked at the effect on "persistent low back pain," but this time one year after surgery; 43% of patients with "negative operations" had no back pain a year later.

One researcher has commented on Spangfort's findings by saying "There is no known therapeutic effect of surgical exploration of the lumbar spine" (Turner *et al.* 1994:610). Unfortunately, we have no way of knowing what the surgeons told their patients after this "unsuccessful" surgery. We might guess that they were told that their discs were (now?) in fine shape and they would just have to wait and see. And up to three quarters of them were substantially better.

Ménière's disease

Ménière's disease is a very unpleasant and potentially debilitating condition affecting the inner ear. On unpredictable occasions, someone with this condition can experience severe dizziness, tinnitus or loud roaring in the ears, hearing loss, and pain or pressure in the ear. The part of the ear known as the "labyrinth" is filled with liquid; as you move your head, the liquid stimulates nerve endings which send signals to the brain to indicate the nature of your movements, so you can maintain your balance. Should this fluid ("endolymph") increase in quantity, causing pressure on the labyrinth, it stops working properly, causing the dizziness and other symptoms. The cause of the increase in the fluid is unknown. There are many treatments for the condition, none of them foolproof. In the 1970s several surgical approaches were developed for Ménière's disease (which is named after a French doctor who first described it in the mid-nineteenth century; it is now also called "endolymphatic hydrops"). A common procedure was to insert a small tube into the affected region so the excessive fluid could be drained away. In 1981, several Danish physicians published the results of a controlled clinical trial of this surgical procedure. They treated thirty people with Ménière's disease; in fifteen, they installed the drainage tubes while in the remaining fifteen they did a mastoidectomy, a fairly common procedure for ear diseases, but not in any way considered to be a treatment for Ménière's disease (Thomsen *et al.* 1981). They reported that, a year later, there were no differences

between the two groups, and 70% of the patients in both groups were much improved. This improvement in both groups, which they attributed to the placebo effect, was still evident nine years later (Bretlau *et al.* 1989).²¹ People can respond to inert treatment, including surgical treatments, for a long time.

Conclusions

What can we conclude from this review of formal factors in the meaning response? Large pills work better than middle-sized pills. Blue pills make better sleeping pills than pills of other colors (except for Italian soccer fans). Four inert pills work better than two. Pills work fine, but shots work better. Surgery works better yet, even if it sometimes doesn't actually do anything to the person being operated on. High-powered machines with snappy names, especially ones that remind us of video games, may be at the top of the heap. The *form* of medical treatment, not just its *content*, can have a dramatic effect on human wellbeing.

And notice something else. In the previous chapter, I presented a range of evidence to show that doctors were more important than patients in generating meaning responses. This view is generally quite the reverse of the standard view which most people have, where people (or at least medical professionals) still believe – against all the evidence – that patients are the source of these responses. In that case, the general wisdom, the common sense, is opposite to what the evidence shows. In this chapter, I have looked at the form of medicine, its shapes and colors: I have shown that pink pills work differently than blue ones, that two inert pills work better than one, that capsules work better than tablets, and that shots work better than pills (even if both are inert); and I have shown that inert surgery works nearly as well as real surgery. This is not in any obvious way the "opposite" of common sense; it simply defies common sense. In either case, we learn to be wary of our common sense when we think about medicine.

²¹ More recently, other researchers have re-evaluated the data reported by the original authors at the one-year follow-up using newer statistical techniques, finding the drainage tube operation to be more effective than the mastoidectomy (Welling and Nagaraja 2000); regardless, over 70% of the patients with the sham treatment still felt the operation had produced good results nine years later.

6 Knowledge and culture; illness and healing

The biomedical model of disease is so pervasive that we often fail to see it as such but view it as reality. Questioning this model is like asking whether a goldfish knows it is in water.

O'Boyle, 1993

These sorts of things – from blue pills to lasers – are all things which we "know," even though, like the goldfish, we may not realize that we know them. Much of our knowledge of the world is not an elicitation of what "is," but rather it is a construction laid atop the world of experience. This is a very difficult concept for many people to grasp. The world that we see and experience seems so palpable and true, and our conceptualizations are so deeply entwined among themselves, that it just seems fantasy to say that the reality I perceive is largely metaphor and construction and is largely projected onto (rather than observed in) the world.²² These things are generally true, and they are true for many matters of health and medicine. This chapter may not convince a skeptic. But it may encourage the enquiring, and its goal is to make the strangeness of the placebo effect and the meaning response somewhat less strange. The price to be paid is that everything else gets rather more strange. *C'est la vie.*

Proper meals, clothing, pills

In the United States, we "know" that one eats (or, ought to eat) three meals a day²³; if you don't, your mother gets mad at you. Those meals come in an ordered set which can be characterized as "breakfast, lunch, and DINNER" – two subordinate elements and a dominant one which

²² Two sources which can help you understand this perspective better are *The Social Construction of Reality* (Berger and Luckmann 1967) and *Metaphors We Live By* (Lakoff and Johnson 1980).

²³ My discussion of food habits is inspired by Mary Douglas' and Marshall Sahlins' various writings about the subject (Douglas 1966; Sahlins 1978). The size and complexity of the problem is hinted at by the scope of Claude Lévi-Strauss' four-volume *Mythologiques* which deals essentially with the origins of cooking, table-manners, and so on (*The Raw and the Cooked*, *The Origin of Table Manners*, and *From Honey to Ashes*, for example).