THE OCTAD



It is typical to group the twelve basic systems into three groups of four. The first set – monad to tetrad – are called the 'elementary systems' because they appear everywhere and in everything. The second set – pentad to octad – can be called 'systems of autonomy' because they seem to address how complex wholes arise and assume special identities. The pentad introduces us to uniqueness while the octad expresses completion or totality. The third set can be called 'transcendental' since these address the creation of frameworks within which the lower systems can operate. To some extent, the three sets correspond to Bennett's treatment of the domain of fact in Volume I of *The Dramatic Universe*, which he divides into three realms – the hyponomic (or under law), the autonomic (under its own laws) and the hypernomic (makers of law).

The octad as a group of eight or a symbol is widely known but rarely analysed. The illustration shown above conveys a sense of an intricate interlocking of elements that is easier to feel than to think about. When Bennett was alerted to the significance of the octad in Sufi tradition, he set himself to explicate its construction and implications in a way that would provide an important tool for understanding complete totalities. In doing so, he developed insights that are not to be found in traditional literature. We are going to follow through these insights in such a way that we draw on what is available in the literature and show how they can all be brought into a coherent picture and some measure of agreement. We will make extensive use of available visual representations and adduce some of our own to fill in the gaps.

Numerically, 8 has two obvious partitions: 8 = 7 + 1 and 8 = 4 + 4. We will be concentrating on the latter partition.

THE ENCLOSURE

There are seven notes in the diatonic scale and the eighth makes the completion of one octave and the beginning of another. In this sense, the eight *encompasses* the seven and can be seen as both closure and *enclosure*. It may remind us of early walled gardens: our word 'paradise' comes from the Persian *pairi* (around) and *daeza* or *diz* (wall, brick, or shape).

The classic Paradise Garden is divided into four parts by canals. It is known as a *chahar bagh* or quadripartite garden and has four square parts separated by water channels. The Greeks added the idea of four elements: earth, water, fire and air. The Koran (xxv.15) describes paradise as a garden of eternity (Arabic *jannat al-khuld*) with four rivers: of water, milk, wine and honey. Strict rectilinear gardens with squares and rectangles demarcated by water channels were made by the Persians (from the sixth century BC) by the Arabs (from the eighth century AD) and by the Mongols (from the sixteenth century until the eighteenth century). The underlying geometry had an amazing consistency for some 2,500 years.



Another reference for octagonal enclosure may be found



in some of the great Chapter Houses attached to cathedrals, such as at York Minster and Westminster Abbey. The Chapter Houses were places for meetings and had remarkable acoustic properties such that a mere whisper could carry round the whole enclosure. Many Sufi *tekkes* or meeting houses had an octagonal

shape and the place

where today tourists come to see the whirling dervishes in Istanbul is one of them. The octagonal shape is one of many appearing in all forms of Islamic art but is one of the most prominent. It is found not only in buildings but also in carpets, the design of which has its own ancient and complex history.

The Sufi order the Nagshbandiyya



takes its name from naqsh = "impression, print"; band = "to bind, to fasten", and the term *naqsh* is also sometimes translated as the 'seal' meaning what is imprinted on the human heart to bind us to Allah. Idries Shah took another tack in saying that *naqsh*



took another tack in saying that *naqsh* meant 'design' and the Naqshbandiyya were the 'designers'.

Thus there is a current of associations and images to do with enclosure, a special place, the heart, a seal and in general *design* in the sense of a higher order brought down into earth. It is also expressed in Asian religious architecture as in the great *Stupas* or temples of Buddhism.

However, there is a relatively little available about the meaning of the octagonal construction, particularly in its form as a double square.



STRUCTURE OF ASPIRATION AND CONSTRAINT

The double square is a rendering of the octad as in the partition $8 = 4 \times 2$. As a doubling of the tetrad, it suggests that the two squares have complementary functions, or that one of them operates on the other. The diamond shape evokes feelings of activeness while the square shape evokes feelings of stability or conservation. The points of the diamond 'reach out' while the points of the square 'constrain' or 'hold'. In place of the steps of transition we had in the heptad, the octad is composed of limits.

Bennett had ascribed the character of limits to his pentad but we found that it was more meaningful to think of them in terms of the system attribute he gave to the pentad, namely that of *significance* as 'type of significance'. In using the word 'limit' to designate the terms of the octad we have a way of speaking about its character of containment and totality.

In respect of the diamond, we can imagine the four points as reaching limits of extension from the centre. The upper point is then the 'highest' and the lower one the 'lowest'. This already suggests that the top region is that of 'heaven' while the bottom is that of 'hell', taken of course in metaphorical terms. The challenge is then to conceive of an appropriate pair of terms for the left and right hand. Bennett himself came up with

the idea that these represent the 'least' and the 'greatest', or the atom and the totality. The horizontal axes then is not concerned with *level* as the vertical one is (albeit by convention) but with *scale*. We called the terms 'limits' and it is possible to see them in this sense. There is a sense of an urge to reach out as far as is possible. They are limits because they are never quite reached and this is shown by the square 'cutting off' access to them. They are 'aspirational' in nature.





The square terms should in turn form a complement to the four diamond ones. In Bennett's cosmology, they will correspond with what he called 'framework conditions'. Though he speaks of six dimensions as underlying all existence, it is possible to reduce these to four, three of temporal character and one of space, which is in contrast with the standard view of three of spatial character and one of time. The arrangement shown here enables us to associate the scheme with other ideas such as Bohm's *implicate order* (the top line) and *explicate order* (the bottom line) and we also note the use of the *lines* of the square as significant. The four terms link to the ideas of being (eternity), will (hyparxis), function (time) and form (space).

The inner space made by the two tetrads is called the *arena* because it is the region where action can take place. This might remind us of the idea in Zoroastrianism of the *creation* being a realm where the evil principle *Ahriman* could be enticed to do battle with the good principle *Ahura Mazda* and thereby be trapped and defeated. It also returns us to the theme of architecture, because early playhouses such as the Globe Theatre (where Shakespeare's plays were launched in the 16th century) were sometimes octagonal; the arena was where the ordinary people stood



Arena theater



while the richer were in boxes on the sides (which we can picture in the triangular areas in the diagram). The highest part of the stage was called 'heaven'. There is of course 'theatre in the round' where the stage is set in the centre with four aisles for access. Lloyd Llewellyn-Jones writes: "On entering a theatre of any kind, a spectator walks into a specific space, one that is designed to produce a certain reaction or series of responses. The reception of that space becomes part of the total theatrical experience." A crucial ideal of theatre is that audience and players are conjoined in producing the total effect. The players come in from some unknown world of secret preparations, while

the spectators enter from the world of everyday affairs.

As we can see from the illustration of what is thought to be the Globe Theatre above there are three parts for the spectacle: the higher structure or 'heaven'; the front where backdrops and tableaux can be made and the projecting stage for the action. If the spectator space is then pentagonal, the eightfold scheme reveals itself. In actual buildings, the basic patterns are not confined to plan views but can be extended in three dimensions.



THE WHEEL



One of the most important eight-fold symbols is that of the Buddhist Dharma Wheel (Dharmachakra, Wheel of Law) which is connected to the doctrine of the Noble Eightfold Path. It is of Hindu origin, resembling a wagon wheel with eight spokes, each representing one of the eight tenets of Buddhist belief. Instead of representing Samsara, or endless rebirth, it symbolizes overcoming obstacles. The circle symbolizes the completeness of the Dharma, the spokes represent the eightfold path leading to enlightenment: Right faith, right intention, right speech, right action, right livelihood, right endeavor, right mindfullness, and right meditation. The hub represents discipline and the eight spokes the forms of spiritual practice, while the outer rim symbolises samadhi which might be translated in this context as 'good mind' to link with Zoroastrianism. The emphasis in this representation is on balance and control and there is an association with the wheel used on a ship to steer it. Sometimes the spokes extend into points symbolising the 'cutting' power of spiritual discipline.

We can – though somewhat artificially – group faith, intention, mindfulness and meditation into one set and speech, action, livelihood and endeavour into another to distinguish the more inward form the more outward. The more inward could then be linked to the aspirational diamond and the more outward to the constraining square of our previous discussion. The wheel and the double-tetrad versions are complementary.

Wheels are also found in the Amerindian tradition. Like chapter houses and tekkes only some have eight components, but the eight-fold design is strongly based in the 4 x 2 directions of space. There are now many modern interpretations of the directions and the following is an example (Lynette Hopkins):

The Medicine Wheel is a powerful metaphor for the totality of life. All aspects of creation and consciousness, inclusive of the mineral, plant, animal, human and spirit realms, are contained within the center and eight directions of the medicine wheel. They overlap and interweave to form the whole. It is in the center of the medicine wheel that we find the void, black hole, sacred zero, the chaos at the source of creation, containing all possibilities. Each of the elements – air, fire, water, and earth – is guided and molded by the sacred life force energy contained within the void. It is the source of chi, which is the driving force of all sacred sexuality. Through sacred sexuality, all forms of all things within the mineral, plant, animal and human kingdoms, have been and continue to be created. Life could not exist without the sexual life-force energy of the void, which is the catalyst for all the powers that are found within the 360 degrees of the medicine wheel.

In the cardinal directions are: East – Fire, spirit, human kingdom; West – Earth, body, mineral kingdom; South – water, emotions, plant kingdom; North - air & wind, mind, animal kingdom. In the non-cardinal directions are: Southeast – self-concept, ancestors; Southwest – dream, symbols; Northwest – cycles, patterns, rules and laws; Northeast – choreography and design of energy.

The Amerindian tradition is linked to Asia and belongs to the same Great Spirit culture, one of the primordial four that Bennett proposed:

- 1. Creator God originating in Africa, now exemplified in Islam
- 2. Great Spirit originating in Asia, now exemplified in Buddhism
- Saviour God originating in the Arctic Circle (or extreme North of Europe), now exemplified in Christianity
- 4. Great Mother the proto culture associated with the birth of agriculture and now being rediscovered.

The tendency in the Great Spirit culture is towards 'being on a level' since God is everywhere and naturally symbolised by the wind or air. It is not in essence hierarchical, in contrast with the Creator God culture. This may explain in part why we have two quite different types of representation of the octad. In particular, we should note that in the Amerindian tradition, East is the supreme direction while in the Indo-European, it is North. This may reflect distant memories of the origins of these cultures. It entails, for our purposes, that what is taken as the 'top' term will be different in the two realms.

Another explanation of the eight points of the Amerindian Medicine Wheel is:

East: Enlightenment and Illumination Southeast: Self-Concepts and Esteem South: Trust and Innocence Southwest: Symbols of the Dream West: Introspection and Intuition Northwest: Laws and Regulations North: Wisdom and Logic Northeast: Movement of Energy

As with the Dharmachakra, we can divide the eight into two sets. The main cardinal directions are ideals while the intervening ones are operational. It is easy to see a correspondence with the previous explanation of the Medicine Wheel, but this may be simply explained as the result of more than a hundred years of bringing Amerindian ideas into western culture. The interweaving of the two sets can be visualised by means of the diagram here. If one looks for a while, the four arrows give way to a picture of four small squares within a diamond shape. Once the two versions are set



small squares within a diamond shape. Once the two versions are seen, they can oscillate or 'pulsate' with energy making the symbol seem alive.

The four operational terms can be summarised abstractly as: concepts, symbols, laws and movement. In Bennett's description, he uses the terms: ideals, states, functions and necessities. All such general abstract terms mean little without reference to concrete occasions, when they can be substantiated by the work done in a community. This is how Bennett applied the octad, in the context of education.

THE EDUCATIONAL EXAMPLE



Fig. 37.24. The Structure of Education

Bennett's interpretation of education is given below (from The Dramatic Universe Vol. III). The arena - in this case of the educational world - is outlined in bold lines. The horizontal line gives the axis of scale and it is from this that the left and right hand sides of the square are interpreted. The ideals and necessities are those of the given society. It requires an effective work force and generates visions of an ideal development of its members. The powers and abilities are those of the children. By 'powers' Bennett meant the basic human capacities which he believed were capable of becoming

manifest in new ways, while the word 'abilities' described those things that were measurable. The understanding here is that children may be born with new powers that may not be addressed by the educational system because they are so new.

The four terms prescribe inherent limits to what can be done. The top level of the square is obviously creative while the bottom level is mechanical. The two other sides

can be seen as representing types of *transformation*, such that dealing with necessities can become ideal, and the new powers being born can be realized in abilities. It is easy to see that any of the four terms of the square can be taken as the starting point but are independent. The seemingly simple description Bennett gives highlights the key issues of education. Given the octadic symbol and elementary guidelines anyone can investigate its implications for



themselves. The questions are: How are these factors connected? And how do they *meet*?



The Bennett diagram has all the points all connected to each other. Thus, on the *outside ring* the terms are most separate, while at the centre they are congruent. At the many points of intersection inside the figure there are varying degrees of congruence. If we go along a line such as 8 to 4, first on the outside we have a point connected to two others, then a point connected to four others, and then one connected to six others. This makes it possible to ascribe a distinct meaning to everyone of the intersections (more than fifty). At the centre we find an inner octagonal figure and notice that it has *the form of the dharma wheel.* This gives us a way of reconciling the ancient spiritual symbol with a more modern and structural model of the octad.

In the case of education the inner octad would that of a school or college, or some educational establishment, in which all the elements are incarnated; the 'Medicine Wheels' of education. The relativity of meaning of the points of intersection entails that the terms we ascribe *at different scales* will differ somewhat. In the Medicine Wheel at the centre we can place such words as we came across in some of the contemporary descriptions. It can also be seen as an equivalent of the *stage* in theatre in the round.

There is another correspondence to be elicited, this time to do with the more outer octad that Bennett called the arena. Our suggestion is that this eight-fold structure can be taken to designate the 'gods' in the other ancient scheme of the *Ogdoad*.



THE OGDOAD



Robert Mills writes:

The Ogdoad were the primeval forces of chaos in Egyptian mythology, represented as eight deities which existed before the creation of the sun god. The eight were considered as four couples, each embodying a different aspect of the primal world: Nun and Naunet, the god and goddess of the primordial waters; Kek and Keket, the deities of darkness; Amon and Amaunet representing invisible power; and Heh and Hehet representing infinity. Occasionally, other couples were included in the Ogdoad, but eight was always the total number of deities involved.

Between and from themselves, the Ogdoad created a mound that rose from the primeval waters and on this

an egg from which the young sun god emerged. Thus they were sometimes depicted as baboons heralding the first sunrise, as in this papyrus (*left*) from around 1350 BC, showing seven of the Ogdoad and Horus, the falcon form of the sun god Ra-Harakhty. Often, though, they were conceptualized as suitably primitive creatures such as snakes and frogs. The site of the 'Island of Flame' that saw the birth of the sun god was a place called Khemenu ('Eight Town') by the Egyptians and Hermopolis by the Greeks, and this was where the Ogdoad were principally worshipped. A piece of the shell of the cosmic egg from which the sun was born was said to be buried in a temple here.

Valentinius was a prominent second century Gnostic, and he used the term Ogdoad to describe eight emanations - grouped in pairs of male/female, active/passive principles - by which Creation was effected. Initially there was the masculine principle of Bythos (the Abyss or Depth which was boundless and unqualified), from which came the feminine Silence, Grace or Thought. The uniting of these two produced Mind (masculine) and Truth (feminine). These four principles are the root of everything, bringing forth further powers called Aeons, again grouped in masculine/feminine pairs. The union of Mind and Truth brought forth Word (masculine) and Life (feminine), which together created Man (masculine) and the Church (feminine). Together, this group of eight principles formed the Ogdoad, which in turn produced further Aeons. The thirtieth of these was Sophia, the desire for wisdom, and it was the error of Sophia in not comprehending her limits that caused the Fall that made our Universe, according to Valentinian myth.



The eight spoked cross shown here is very old symbol is found in ancient Egypt, where it is a symbol of the Ogdoad, the eight emanations of the manifested creation. Gnostics borrowed the symbol to represent the eight Aeons, and resurrection. In Catholicism it is called the *baptismal cross*, and represents both the age of baptism in the church (eight years), and the eight day interval between Christ's entry into Jerusalem and his resurrection. It is also the shape of the

eight sided baptismal font and the arena of Bennett's octad.

In the scheme of the Ogdoad, the eight gods come together to form a mound out of the primordial waters and this is the central region we discussed before. In architecture it is the central pinnacle of the stupa or the top of the ziggurat, with the other regions ringing it at lower levels. The associated idea is that form arises from the middle of the totality as emergence from chaos.

The Ogdoad are not always eight in number, sometimes nine and sometimes less. However, as in British legend for example, when members of the Ogdoad 'go away' the land suffers and things go wrong.

THE EIGHT SEASONS

Looking to the outermost circle of eight, we note that in many traditional societies, the vear was divided into eight seasons. Jill Hammer writes:

The cycle of the Jewish year, like many calendrical cycles, takes note of and weaves itself into the natural seasons: Passover falling in the spring, the new year of Rosh haShanah in the autumn, Chanukah in the winter, and so forth. One



of the most important ways of tying the earth to the spirit is to fully celebrate the holidays as they pertain to the seasons and cycles of the earth. If one looks at both the major and minor festivals of the Jewish year, one will see that for the most part, major holidays fall at the equinoxes and solstices, while four minor but powerful "transitional" holidays fall exactly in between the equinoxes and solstices. Like the eight branches of the Chanukah menorah, each of these eight points on the calendar sheds its own light on our existence.

These eight points on the Jewish calendar are not meant to represent the

most important Jewish holidays in a traditional sense (though all major Jewish holidays are covered somewhere in these essays). They are evenly-spaced moments, whether major or minor according to the tradition, that resonate with the transition of the seasons and the cycles of time.

These eight points closely parallel the festivals of ancient and modern European and Near Eastern calendars, and are deeply rooted in the movement of the



seasons. I discovered the eight points on the Jewish calendar while looking for similarities and differences between Jewish holidays and the calendar of modern Goddess religion, which also has eight pivotal points based on seasonal change. While there are many unique qualities of the Jewish year, particularly the sense of repeated yet historical time (such as the story of the Exodus at the Passover

seder or of the destruction of the Temple on Tisha B'Av) and the sense of evolving covenant (that one experiences during the counting of the omer, for example), it is instructive to note the similar ways in which peoples and faiths experience time through the changing seasons.

"The work of the Weaver, its pillars are four and its sockets are four." —Exodus 27:16 Perhaps this is a hint of the eightfold structure of the calendar.

The Celtic calendar has a similar structure, starting in Winter: Samhain, Yule (Winter Solstice), Imbolc, Oestre (Spring Equinox), Beltane, Coamhain (Summer Solstice), Lughnasadh, Mabon (Autumn Equinox). In the Celtic tradition, the octad can be discerned in the combination of circle and cross, which again emphasises the interlocking of two tetrads but also, of course, stating the union of circle (heaven) and square (earth)



PHENOMENOLOGY

The interplay of two squares leads us to consider further the possible contrast between them. In one reading of the standard visual form of the octad one of the squares is rotated into other dimensions off the page. We can visualise ourselves standing in a space which stretches to the four quarters. Our standing posture evokes in us a sensation of above and below – the sky above us and the earth beneath us – with their innumerable associations. There is also another kind of direction, signifying what we refer to in the words 'inside and outside', or the 'within' and the 'without'. This other direction need not be taken as spatial at all; instead it can be seen in a temporal sense as 'inner time' and 'outer time', or the time of our will (hyparxis) and the time of our world (time). In this visualisation, first we have the two dimensions of the surface we walk upon, then another dimension of verticality, which is of a different quality. The inner and outer dimension would then be a 'fourth dimension' and this axis is different in quality again.

The aspects of above and below and within and without are linked to the diamond shape of the octad, in contrast with the square. We would suspect that they are strongly associated with *time*, but we have to allow for Bennett's *three* kinds of time and also give a role to space. The following equivalences then present themselves:



Above = Eternity, Below = Space, Without = Time, Within = Hyparxis.

What is implied by these concepts, especially taken together, is a sphere of experience. We show the diamond shape coming out of the flat plane as representing an *awareness* that is *selfaware*. It might be described by the words, 'I am here, aware', where 'here' refers to the *position* in the plane and 'aware' to the *experience* of being here. It is then possible to infer that the terms of the one square will have counterparts of the other one. Incidentally, which is taken as 'square' or 'diamond' is a matter of convention since it depends on how we are looking at the figure.

Earlier on, we ascribed the dimensional terms to the square and not to the diamond but here we are doing the converse.

We can extend the representation of the octad fully into three dimensions as a cube of cubes, as in the figure shown. The phenomenological experience of 'I am here, aware' is then centred on the middle point and there are eight regions into which it extends. Such a figure will not be found in traditional material, which eschews three-dimensional models (it seems that perspective was a relatively late development in the graphic arts) with the exception of sculptures that are nearly always representational of humanoid figures. In this representation of eightfoldness, there is a power relationship $8 = 2^3$. The three axes may correlate with 'higher & lower', 'inner & outer' and





'smaller and greater' or similar terms. But we can make a new link to

tradition by thinking of the *eight trigrams* of the system of the *I Ching* which derive from having three lines, each of which can be either *yin* or *yang.* The opposite trigrams in the classical picture (the one shown is in the sequence of Later Heaven) correspond to diagonally opposed cubes in the schematic. To get from one to a neighbouring one, there is a change in one of the three lines. The two primary trigrams are widely known as Heaven (father)



and the six remaining ones are the sons and daughters of the primordial father and

and Earth (mother)

mother. The eight trigrams are also linked with parts of the body as shown below - mainly to remind us of the theme of a standing figure who is selfaware. The hand, foot, thigh and belly are to do with action in the world while mouth, ear, eye and head represent perception and awareness. Thus there are two obvious groups of four, but it is next to impossible to make any obvious correlations between the Chinese terms and the ones we have entertained from the work of Bennett. It is notorious that Chinese systems are so culturally embedded that they cannot be made susceptible to western analytical schemes.

Reference to the parts of the body leads us to another general type of representation, which we can first sketch in terms of a sequence of experience, rather as a mythical form: as we stand in the world, our awareness of the world reflects into itself and then unfolds into 'our presence' as a body, making a 'world' of our own. The world is one plane and our body another, but this is



the body as expression of our own presence and not the body the doctor might examine. Different traditions treat of different limbs or organs as points of reference and some speak of 'subtle centres' rather than of actual parts such as the liver or brain, but all are seeking to express the 'felt body' which has its own kind of space. It is the



divergence or skewness between inner and outer space that gives the sense of 'l'. Thus the simple symbol of the two overlapping squares represents optimal independence between inner and outer and suggests that where the lines cross indicate eight kinds of experience.

In the more elaborate version shown below, we can read the phenomenological statement 'I am-here aware': I is in the unmarked space, am-here is in the white square and aware is in the black square. It is the union of existence and awareness of existence.



THE OCTAVES WITHIN

The Affirmation of the Druida: "The world is as we behold it. Thus says the rede. Before there were eyes to see the world, and minds to comprehend, there was no world to speak of. Much took place in the time of the fae about which we can have no certain knowledge.

"Therefore we who seek to chronicle the world say: first came the Ice. And when the power of the Sun waxed stronger and the Ice withdrew, it was seen that the Drowned Lands had become ocean, and the land of Albion was made an island. Then came the Age of Trees"

The partition 8 = 7 + 1 which we briefly mentioned at the beginning, was used by Bennett in the simple sense that the octad must 'contain' octaves. We can see a form of sevenfoldness in the previous diagram if we trace, for example, the line from the top of the black square to the





bottom. Along this line there are four crossings and counting these there are seven points. This form of the heptad is shown in the 'hour glass symbol' and it is easy to see that by turning this symbol inside out we have that of our octad.

Bennett actually used the sevens formed along the cross connections. The line from top to bottom is thus sevenfold and forms a

spectrum, in this case from the highest to lowest, or matter to spirit, base to summit, etc. In the same way, the horizontal line is also sevenfold, in this case extending form the smallest to the largest, or from the atom to the totality. There are in fact four main spectra of this type, but also eight more, taking the sides of the arena. The main four spectra have most significance since they are linking



opposites or contrasting terms. In traditional mythological perspectives, the place of mingling of opposites is *chaos*, but in more modern perspectives it can also be seen, as we have mentioned before, as *emergence from chaos* or *self-organisation*. The treatment of the octad in terms of spectra gives it internal structure. We can now appreciate in a special way the Egyptian story of the Ogdoad forming the primordial mountain in the middle. The hill was *Atum*, or *Ptah*, the Creator (or the Creator came from the hill or sat on the hill). The central point is central in all four main heptads; it has to resolve four dualities simultaneously for chaos to be overcome. This leads us back to *design*.

THE DESIGNING PATTERN

The ancient mythical cosmologies have their equivalent in the modern world as design and technology. What might appear as 'gods' in mythologies now appear in other guises as motives or drivers and forms or patterns. The twentieth century saw the rise of research into discovery, invention and design which always had the virtue that what was made should *work* and not just be *believed*. Theory of invention brought in something that had been largely ignored in science, which was concerned with what was possible in nature rather than with either *how* discovery worked or what could be *made* that did not exist before.

In ancient mythologies we find a common thread of gods and goddesses or male and female aspects of some principle. We can link the male gods to 'drivers' and their female counterparts to 'forms'. Edward Matchett spoke of good design as 'appropriate form' that corresponds to 'the sum of the true needs of a particular set of circumstances'. We adduce here two scales, one to do with *needs* and the other to do with degrees of *appropriate form*. The scale of needs derives from the work of Abraham Maslow:

Self-actualization

Esteem

Social

Safety

Physiological (survival)

Most people are familiar with this scheme and it has the virtue of being straightforward and immediately intelligible. However, in the simple treatment, it is asserted that higher needs can only be addressed once the lower ones have been met; but this is not always the case and the needs have their independent drives. The other scale is not articulated in such simple steps. Our example comes from the Russian method of invention known as TRIZ, in which the direction of improvement (technological evolution) is towards *Ideality*. Ideality is defined as:

Ideality = Benefits/ (Cost + Harm)

The concept has been called 'Zen-like' since the ideal is to produce the desired result at no cost, with no harm, with no mass and no energy. To make a link with our previous mention of Bennett's determining conditions, we can equate Ideality with *eternity*. The realization of self-actualization is then *hyparxis* which is much its meaning in Proclus and other Greek philosophers. Survival can then be matched with *space* in the sense of dealing with outward forces and actuality (the present state of affairs) with *time*.



It is fairly easy to see that these are exemplified in Bennett's octad of education; but we have made the four terms more active. We have taken the cross diagonals because these correspond to those of the diamond shape (from lowest to highest and smallest to greatest). How many steps we consider depends on what aspect of the figure we choose. In the version shown here there are five points along each line (including the ends) so that we can use the Maslow scheme as a reference. In all cases, the central



point appears critical. In the case of the line from present actuality to Ideality, this point represents the design that can be envisioned as possible starting from present technology. It is the same point for the scale of needs but appears in the guise of fulfilling social needs; which is important since any effective technology requires a market (a recent example is that of the mobile phone which has become a versatile multiuse device that is a feature of social interactions). It would not be meaningless to consider the top line of the square as 'spiritual technology' and the bottom one as 'material

technology'. A further consideration is that the upper levels of technology bring us more and more into the realm of self-correcting, self-mending and otherwise autonomous devices, leading so it seems towards artificial intelligence. In this sense, Ray Kurzweil's notion of 'spiritual machines' has a place, even though the very phrase appears to be an oxymoron.

The arena is now the arena of practical work. The extremes – the outer eight points - are like attractors or givens and set limits to what is possible. The range of smallest to greatest is actually reflected in TRIZ methodology in considerations of sub-system, system and super-system. The vertical range is reflected in the consideration of past, present and future; but we have to remember that this kind of temporal thinking is allied to *purpose* and add that in Bennett's scheme, the top line of the square is linked to his concept of the *hyparchic future*, which is the region of creative higher intelligence. This line is therefore 'demiurgic', whereas the bottom one is 'animal' – if we use his idea of essence classes. The top point of the diamond is then the cosmic individuality or Christ principle and the bottom one that of the germinal essence.

In Francis Bacon's *New Atlantis* he envisions a modern myth of groups working together to regain 'paradise lost' and build heaven on earth. Such groups would be situated at the centre and their work would extend into the arena.



LEMINISCATE

In Hinduism, infinity is called *ananta* and symbolises the Supreme Brahman. The well known symbol for infinity, the leminiscate (the word introduced by Bernoulli), was invented by John Wallis in 1655 and is the figure 8 on its side; though originally he used a version of the Roman symbol for 1000. If we take

the line as a strip (*lemiscus* means ribbon) we have a moebius shape, amplifying the sense of



moebius shape, amplifying the sense of something endless that is still only finite. In ancient symbolism it is related to the *ouroboros* or 'infinity snake' that swallows its own tail. It is a curiosity that the figure of 8 was used in this way, but there are two points of interest. First,



the intertwining of the two circles reminds us of our discussion of the interlacing of the two squares. Second, the infinite connotation of the figure reminds us of our guiding concept of the outer points being unreachable limits. The outer points are primordial, but inspire the workings within the arena.