# BESTGIFT SERVICE

# PRECISION WORD MEANINGS

Fourth Edition

# PREFACE

**This book is a report of ongoing research. This research has been directed to finding a method for selecting gifts automatically. The hope was that a machine could be constructed that would be able to perform selection. The machine would be able to perform selection many times faster than by purely manual methods. The goal is computerized methods of gift selection.**

**The material below is an exposition of the work of Bestgift Service to build a method of gift selection that is effective. The method under investigation is that of attempting to select gifts using the characteristics of language. The material is in large part an attempt to demonstrate the validity of the method.**

**Gift selection as performed by Bestgift Service's software program Compute-A-Gift in use at this time makes use of the matching of language representations of prospective gifts with language representations of problem situations. The result thus far has been a method of gift selection that efficiently yields a high percentage of gift selections likely to be appropriate to the gift need.**

**The material will be of interest to the consumer who wants to know the basis of our method of gift selection. It will be of interest to commercial organizations that want to know what Bestgift Service can do for them.**

**Bestgift Service will not be held liable for any damages caused or alleged to be caused directly or indirectly by this book.**

# LIST OF HEADINGS

# TEXT

**SUBJECT MATTER**

**The subject under discussion is one syllable words.**

**ACTIVITY OF SOCIETY MEMBERS**

**The activity of society members consists of the operation of devices on the environment. A member operates only one device at a time. The device performs a sequence of interactions with the environment which can be labeled by digit pairs. The digits are limited to the digits 1, 2, 3, 4, 5, 6. The digit pairs represent the mechanical feelings of the operator. All members of society possess the same capability for mechanical feelings. All mechanical feelings may be ascribed to six types of mechanical bodies such that the type of the operator body is represented by the first digit of the feeling, the type of the environment body is represented by the second digit of the feeling. The reports by the members of society of these feelings to one another constitutes the language of the society.**

**OPERATORS**

**An operator uses his hands to process and consume an environment. His hands operate on the environment only by the mechanical forces they exert during material contact with the environment. Operation means manipulation. Operation may also include the use of other parts of the person's body to exert mechanical force during material contact.**

**Operators constitute society.**

**BASIC TYPES OF BODIES, PERFECT TYPES**

**A body contains matter which does not spontaneously escape the bounds of the body. The basic types of bodies are:**

**6 Frictional bodies and non distorting bodies. Any body which transmits mechanical power efficiently from one part of its surface to another part of its surface. Can transfer power perpendicular and parallel to its surface without other energy involvement. Power transfer may be instantaneous or high frequency. Useful power transfers are time changing power transfer, directionally changed power transfer, area changes in power transfer.**

**5 Inertial bodies. These engage in kinetic energy conserving collisions with other inertial bodies. Elastic waves propagate in them without attenuation. Can contain vibrational energy as vibrations.**

**4 Elastic bodies. These efficiently store mechanical energy as a time independent single valued function of the mechanical force that is applied to them.**

**3 Fluid bodies. These obey the mechanical law of viscosity.**

**2 Liquid bodies. These obey the mechanical law of surface tension.**

**1 Crystal bodies. Perfect crystal bodies possess characteristic shapes with plane faces. They precisely maintain their shape and volume against a limited amount of static or changing mechanical force so that no energy is absorbed.**

**The final result of evolution is to produce perfect versions of these types of bodies. The final perfect types possess no properties in common. For example, the final perfect crystal body exhibits in its interactions no inertia property and no elasticity, nor properties of types 2, 3, and 6. That is, it does not engage in interactions where significant energy is associated with these properties. An imperfect body is controlled by means of the other types present in it. As a type specializes it reduces the amount of other types present in itself and in this way evades being controlled.**

**OVERVIEW OF PERFECT TYPES OF BODIES**

**The perfect types are not completely defined. In order to know how to define them it would be necessary to know how evolution resolves reality in the final limit of infinite time. It is not known how each type should be defined. Attempted definitions for each of the six types are listed below. These may be considered theoretical or artificial types to be used to construct artificial devices. These artificial devices are to be considered to be concepts to be used as convenient representations of real devices and objects found in technology and in the natural environment.**

*Theoretical Type 1***. This type is modeled on the natural crystal. Crystals are generally simple and perfect such as cubic, or complex such as snowflake. Some general ideas concerning the microstructure of the evolving crystal entity can be set forth.**

**A crystal is an aggregate formed wholly out of very elementary units. These units are much more elementary than the crystal material. This contrasts with other body types. These are constructed of units closely related to the body type.**

**Type 1 is structured from identical cells whose constituent rigid objects have a fixed positional relationship to each other. This occurs because of an interaction between the constituents. The relationship may be broken at some value of applied force. Adjoining cells also have a similar relationship to one another.**

**Type 1 is structured from bonds which have zero range but can withstand infinite strength force. It consists of rigid identical units completely in contact with one another and held together by contact energies. The shape of a particular type 1 body is determined by the shape of constituent units and the relative values of their contact forces arranged to achieve the condition of minimum energy of the body as a whole. This latter condition precludes stepped surfaces in favor of flat surfaces. A practical type 1 body can be constructed of identical wood or metal cubic blocks glued together. One block can be separated from another by applying sufficient energy to break the glue bond between them. The energy of the assembly is the total energy required to break the assembly into separate blocks. The question arises as to which arrangement of these blocks requires the most energy to disassemble. It can be seen that a cubic arrangement will require the most energy. As a general rule arrangements having plane faces and straight edges will require the most energy. These are the shapes of natural crystals. Identifying the units of type 1 with atoms and molecules enables correspondence to be made with real devices and objects, namely crystals. This model suggests a set of properties for theoretical type 1. The forces between units can be represented by springs. Energy is required to stretch a spring. Energy remains constant if stiffness is increased rapidly enough with decrease in breakage distance.**

**Such a model suggests that fluid flow does not occur for type 1, because the blocks are fixed. Surface tension is not relevant because the blocks are fixed so that energies of other shapes are not of interest. Elasticity also is excluded because of the fixed requirement. Nor is wave energy relevant because the blocks cannot move relative to one another. Power transfer is not relevant because the smoothness of the surfaces eliminates friction.**

**Ionic crystals are especially brittle because the electrons are tightly held, thus fixing the positions of the ions. Also the ions are arranged so that position changes of molecules result in rapid decrease in force, that is the force is short range. A perfect crystal has an energy of breakage and of vaporization but does not distort before breakdown and displays zero specific heat before vaporization.**

***Theoretical Type 2.*** **This type is modeled on the natural liquid. Natural liquids all take the spherical shape in zero gravity. Some general ideas concerning the microstructure of the evolving liquid entity can be set forth.**

**Type 2 is structured from identical cells whose single constituent object may be easily moved about. The object may be assumed to have a rounded or spherical shape. When moved too quickly relative to one another the objects or cells tend to string together perpendicular to the motion so that the motion is impeded, a condition called turbulent breakdown. Turbulent breakdown is identified by the nonlinear increase of impedance with speed.**

**Type 2 is structured from identical spherical units which have zero contact area and whose bonding energy does not result from contact. Attractive force between units decreases rapidly when the separation distance exceeds the radius of a unit. Type 2 assemblies are assumed to have smooth rather than jagged surfaces. The total energy of a type 2 assembly can be obtained by adding together the energies required for removing units one at a time from the outside surface until the units are all separated. It is evident that the difference in total separation energy of two assemblies of the same number of units is proportional to the difference of their surface areas. The actual difference in total separation energies is simply the difference of disassembly energies of the two surface shells, imagined to be first separated from the cores. The spherical assembly will have the least total separation energy. It is evident that it requires energy to flatten a spherical assembly or form it into any other shape. Shape changes of an assembly of type 2 units are much easier to produce than for type 1. This suggests the type 2 assembly as being a model for liquids. Identifying the units of type 2 with particular atoms and molecules enables correspondence to be made with real devices and objects, namely liquids. Water molecules are especially spherical in shape so that water is a very definite type 2 assembly. Liquids 2 are a combination of the characteristics of crystals and gases.**

**2 supplies an objective concept of force because liquids relate force to shape. Liquid compression "bottoms out" because of the surface tension energy. It requires a great deal of energy to produce a thin layer of liquid because of the large area of the surface. A thin layer of liquid is difficult to achieve.**

**Such a model suggests that viscous fluid flow does not occur for type 2, because the spherical units move so easily among one another. Type 2 assemblies exhibit zero viscosity. Elasticity also is excluded because of the free liquidity. Type 2 assemblies can possess wave energy. However, this wave energy cannot be transferred from one liquid body to another by the collision process because of lack of rigidity. Power transfer is not relevant because of the inability of liquids to exert friction.**

*Theoretical Type 3*. **This type is modeled on the natural fluid. Natural fluids flow under the influence of pressure differences and shear gradients. Fluids can take any shape by flowing. Under gravity they flow down to a thin layer on the supporting surface. Some general ideas concerning the microstructure of the evolving fluid entity can be set forth.**

**Type 3 is structured from a large number of small identical type 1 crystalline units dispersed in a type 2 liquid medium. A type 3 cell may be considered to consist of a crystal surrounded by a liquid. The liquid tends to eject the crystal in order to decrease the energy of the liquid. Also the cell tends to take a spherical shape. However in reshaping or in ejecting the crystal the liquid must flow around the crystal which has sharp edges that cause turbulence. This prevents reshaping or ejection so that the cell exhibits a fluid character. If the edges of the crystal are infinitely sharp turbulence will begin at zero**

**velocity.**

**Viscosity may also result from collisions between particles during shear motion of the type 3 assembly. The mechanism of viscosity may be demonstrated by the use of two counter-rotating cylinders, one inside the other, such that one revolves at a speed that is equal and opposite to that of the other. The space between them is filled with a type 3 structure. The cylinder surfaces are assumed to be rough. In the absence of particles the liquid slides over the surfaces without friction. Liquid is not speeded or slowed by the liquid and one cylinder does not experience force from the other cylinder. Particles in the liquid also will not experience friction from the liquid. But a particle that is hit by a projection of a cylinder wall will gain a component of velocity in the direction of motion of the wall. It also is likely to have a component of velocity away from the wall. It thus moves to and strikes the other wall. Its velocity component perpendicular to this wall will be reversed by the wall, assuming elastic collision. Its velocity component parallel to the wall will be reversed and added to it will twice the velocity of the wall. The collision produces an impulse tending to slow the wall. Each time the particle hits a wall it will slow the wall and also receive an additional velocity of twice the wall velocity. Therefore both walls will be subjected to a retarding force from the particles. Also the particles will have a continual increase in velocity so that eventually all the particles will achieve infinite velocity. To be in agreement with real fluids the model must include a mechanism whereby particle velocity is converted into heat. Also the mechanism must include a heat flow mechanism. The mechanism then will exhibit retarding forces on the two cylinders and continual heat flow from the cylinders to the environment. An additional mechanism may be included whereby sufficient temperature rise will result in breakdown of the fluid to liquid. This might happen for example if the particles melted or dissolved. At breakdown the fluid will become a liquid with complete loss of impedance experienced by the cylinders from the contents.**

**A vertical column of fluid may be bounded by two flat surfaces. The particles in the fluid may be assumed to be at rest. Assume the surfaces suddenly exert equal and opposite pressures. A perfect fluid may support these pressures and be in unstable equilibrium. For an imperfect fluid the surfaces impart vertical velocity to the particles. The particles make glancing collisions with one another and with the surfaces. This results in the particles moving outward horizontally so that the column increases in diameter, while the surfaces move closer together. Assuming the particles cannot escape from the liquid they will dissipate energy as heat. If the pressure is removed the particles will return to rest and the fluid flow will cease.**

**Such a model suggests that crystal form and behavior does not occur for type 3, because the particles and liquid move so easily. Free flow of the fluid excludes elastic, collision, and frictional behavior. Surface tension energy in the liquid may exist at the particles-liquid interfaces as well as at liquid surfaces at the surface of the fluid. Shape changes of the**

**fluid are not resisted by shape related forces. Energy is regulated faster by movement of the particles toward or away from the surface than by change in fluid shape so that shape influence by surface tension is negligible. That is, fluids do not exhibit surface tension.**

***Theoretical Type 4*. This type is modeled on natural elastic and flexible bodies. Elastic matter can undergo volume change. Some general ideas concerning the microstructure of the evolving elastic entity can be set forth.**

**Type 4 is structured from a large number of cells. Type 4 may be constructed from a combination of type 2 and type 3 structures. Type 3 furnishes shape to the cells, type 2 furnishes the force the elastic exerts if its shape is distorted. A simple example is a cubic cellular structure composed of 3 and with the cells bounded by a liquid layer or film 2. The cells are expanded against the surface tension of the liquid film and the fluid viscosity. The fluid forms the cell walls. When released the liquid contracts the elastic to its original volume. If expansion is slow no energy is lost to viscosity and energy is conserved. If tension is applied the cell walls become thinner. If the interior surface of the cells increases the surface tension energy of the liquid increases from its minimum value and a force arises that opposes the distortion. If the external force is removed the structure returns to its initial form. Elasticity conserves energy for slow change since in 3 no energy is dissipated if change is slow enough. The energy dissipated in reshaping cell walls 3 becomes zero. The force in the case of slow change arises only from 2, not 3.**

**Such a model suggests that maintenance of shape characteristic of type 1 does not occur for type 4, because of ability of cell walls to flow. Surface tension 2 does not occur for type 4 because surface tension operates only for cell contents. Fluid flow does not occur for type 4 because the structure opposes it with surface tension force. Elastic does not efficiently respond to rapid pressure change and thus does not transmit waves. Elastic does not have a surface friction mechanism and is not rigid against tangential force. Therefore it does not transfer power.**

***Theoretical Type 5*. This type is modeled on natural bodies which efficiently transmit waves and bodies which efficiently collide. Some general ideas concerning the microstructure of the evolving inertial entity can be set forth.**

**Type 5 is structured from a large number of material filled elastic cells. Type 5 may be constructed from a combination of type 3 and type 4 structures. The cells are formed from type 4 and are filled with type 3. Type 3 serves as masses and type 4 serves as elastic material between the masses. Waves are transmitted as compressions and expansions of the distance between the masses move along. Type 5 requires that there be no dissipation of wave flow, that is, no loss of energy of the waves. As a result of collision a pulse of compression enters the body and travels in the body at the wave speed of the body. If this pulse does not dissipate the body has undergone “elastic collision“. If it dissipates the body**

**has undergone “inelastic collision”. Type 5 bodies can collide elastically, possess vibrations, and transmit wave energy.**

**Type 5 bodies do not exclude wave motion, as do type 1 bodies. They do not transform from one shape to another as do type 2 bodies. They do not flow under force as do type 3 bodies. They do not absorb energy by volume change as do type 4 bodies since their mass filled cells limit volume change and ideally have zero volume of type 4 bodies. They do not flex under static force and can be considered rigid under static force. They do not have a friction mechanism and transmit power as do type 6 bodies.**

**As 5 evolves toward perfection waves in the solid do not dissipate and the solid no longer moves forward smoothly but in spurts as the wave or pulse in it bounces back and forth from one side to the other. Although the center of mass moves with uniform motion once the accelerating force is removed the vibrations about the center of mass continue. Efficient collisions occur only if wave motion does not dissipate so that they result in this spurting motion, not in smooth motion.**

**The pressure an operator can apply directly to a 5 body is probably much less than that which usually occurs in a collision. The latter however is of short duration. Applied pressure produces stress constant in time throughout the 5 body. Collision produces a pulse traveling about in the body. Since the purpose of 5 is collision one may not expect 5 to be able to withstand constant stress without breakdown. Capability for constant stress may be related to size of the colliding bodies. That is, large bodies may have collisions with longer pulse durations. Thus it is expected that with evolution longer stress durations could be tolerated. Therefore longer acceleration times could be used and consequently higher velocities would be available. Collisions of higher velocity objects would occur.**

***Theoretical Type 6*. This type is modeled on natural bodies which efficiently transfer power at a constant rate. Some general ideas concerning the microstructure of the evolving power transferring entity can be set forth.**

**Type 6 may be constructed from a combination of type 4 and type 5 structures. Type 6 consists of an elastic 4 surface to which are attached masses 5 which can transmit force to the elastic. This forms a friction mechanism.**

**A projection acts like a colliding sphere. 4 absorbs its energy. Thus a friction surface is reduced to multiple collisions. The 4 layer adjacent to the projections adds these collisions up to a constant force. This is a surface action characteristic of 6. The collisions enable the operator or driver to disengage. The 6 body must be able to freely engage and disengage from the driven object, as required by rolling contact. 6 does not involve wave propagation and is purely surface action. Power cannot be transmitted efficiently through the volume of a body. Only two dimensional bodies such as a belt, rope, chain, or gear are usable.**

**Thus a gear works by the ballistic collision of its teeth and the elastic attachment of the teeth to the body of the gear. Teeth plus elastic are basically two or one dimensional. Power cannot be applied efficiently to translational motion. The necessity of rotational motion requires ballistic interaction, which elastic cannot supply.**

**Type 6 bodies do not possess the volume shape or smooth surfaces of type 1 bodies. They do not seek a shape of least energy as to type 2 bodies. They do to flow under force as do type 3 bodies. They do not store energy efficiently as do type 4 bodies. They do not transmit wave energy as do type 5 bodies. Type 6 tends to stay in contact or rolling contact, as in gears. It normally starts in contact and continues in contact and does not have a chance for collision.**

**BODIES AS SPECIALIZATIONS**

**Every real body can be well represented as a combination of mainly one theoretical type with some of each of the other theoretical types. Real body behavior can be well represented by the theoretical types coordinating with one another.**

**For body types 1 to 4 no events take place in absence of operator force. In absence of operator force all the universe of types 1 to 4 would be static and forever existing. The operator in this environment is the mover of all. In a body type 5 universe changes take place without operator intervention. The character of 5 is efficient action and interaction only in the absence of operator force with limited time duration. In a body type 6 universe interaction of bodies is efficiently operator controlled and not limited in time duration.**

**1. A real crystal is mainly type 1 but has some of the characteristics of each of the other five body types.**
**1(2). Type 2 is characterized by spontaneous seeking of the spherical shape. The crystal is a flat faced shape. Having some type 2 means that such a crystal has some tendency toward spontaneous acquisition of a rounded spherical shape. The corners become somewhat rounded with time and the faces develop some curvature over a long period of time.**
**1(3). Type 3 is characterized by deformation without volume change under external force. Having some type 3 means the crystal slowly develops unlimited deformation under constant external force that persists for unlimited time.**
**1(4). Having some type 4 means the crystal develops some volume increase or decrease or shape change under external force in proportion to that force.**
**1(5). Type 5 is characterized by capability of being accelerated, possessing kinetic energy, and collision behavior. The requirement that a crystal be examined with zero force means that kinetic energy cannot be imparted to it. Having some 5 means the crystal can develop limited kinetic energy and collision behavior and consequently suffers a rounding of the corners through collision, as well as surface pitting.**

**1(6). Type 6 is characterized by ability to transfer power across itself. Having some 6 character means 1 has some of the special shape character of 6. It may have teeth like a gear or flexibility like a rope or belt. Fibrous or sheet-like crystals are examples. It means 1 has some ability to withstand force and to move with it by friction or by tension achieved by friction and coiling.**

**2(2). A liquid is mainly type 2 but has some of the characteristics of each of the other five body types.**
**2(1). Small parts of a liquid may have flat faces. The liquid is said to be slushy. Slushiness enables a liquid to be located by touch, that is, by very light pressure.**
**2(3). Having some type 3 means that liquids exhibit limited viscosity and can take on other than spherical shape in absence of force.**
**2(4). Having some type 4 means that liquids exhibit limited ability to undergo a volume change in proportion to applied force.**
**2(5). Having some type 5 means that liquids exhibit limited ability to undergo acceleration and to collide. 5 reduces coalescences of liquid drops enabling them to exist as rebounding drops, having a surface skin.**
**2(6). Having some 6 type means that liquids exhibit limited ability to transfer power across themselves, by friction or tension achieved by friction plus coiling. The liquid having 6 quality must be able to freely engage and disengage from the object it drives. A tube can support a column of liquid having some 6 type by exerting static friction on it. This is different from support purely by attraction between the liquid and tube at the meniscus. Tubes embedded in a pressurized liquid body may be fixated by static friction with it. 2 may begin to possess some interior static friction if exterior pressure on the liquid increases. If the pressure on the liquid decreases it again flows freely.**

**3(3). A fluid is mainly type 3 but has some of the characteristics of each of the other five body types.**
**3(1). 1 supplies locatability to a fluid.**
**3(2). 2 supplies force to a fluid. It enables objective knowledge of the amount of force acting on a fluid. Any spontaneous rounding of the fluid enables measurement of force on it. Distortion relates to the force. 2 prevents 3 from spreading into infinitely thin layers and thus gives "reality" to 3.**
**3(4). Imparts compression to fluid.**
**3(5). Harder viscous fluids exhibit some 5 collision behavior enabling them to be manipulated and placed into locations. They can serve to locate less hard viscous fluids. 5 reduces stickiness of fluids, especially of highly viscous fluids, giving them individuality as bodies.**
**3(6). Having some 6 type means that fluids exhibit limited ability to transfer power across themselves. The fluid that has 6 character must be able to freely engage and disengage from the object it drives.**

**4. An elastic is mainly type 4 but has some of the characteristics of each of the other five body types.**
**4(1). Brittle elastic. 1 supplies initial (zero compression) hardness to elastic, enabling location of the elastic without compressing it.**
**4(2). Elastic that spontaneously seeks a rounded shape. 2 supplies force to elastic. Any spontaneous rounding of the elastic enables determination of the force acting on it. The liquid effect in 4 originates from the finite thickness of the cell walls. As 4 compresses the material becomes solid and incompressible and can only bulge out in 2 fashion. 2 supplies "reality" or "materiality" to 4.**
**4(3). Elastic that flows under force. Tendency of springs to lose tension after a long time of tension. 3 supplies history to an elastic.**
**4(5). An elastic having some 5 property has ability to be moved in the environment at non zero velocity. 5 enables elastic pieces to be manipulated as a whole and placed into locations.**
**4(6). Elastic in the form of belts, ropes, gears, such as rubber bands. To have 6 quality the elastic must possess friction. Friction enables the elastic to shear, which is important in overcoming mismatches in size and shape of interacting elastic bodies. Force perpendicular to the surface of the elastic will transmit some of the power to the other side. However, power cannot be applied efficiently to translational motion. The necessity of rotational motion requires ballistic interaction, which elastic cannot supply.**

**5. A mass is mainly type 5 but has some of the characteristics of each of the other five body types.**
**5(1). The crystal quality supplies locatability to the mass. The crystal supplies some amount of flat faces to the mass. This however, interferes with the precision of the collision phenomenon.**
**5(2). 2 supplies force to mass. Any spontaneous rounding of the mass enables determination of the force acting on it. Distortion relates to the force. 2 gives a general rounded shape to 5 and prevents manufacture of thin layered objects of 5. These might break up and cause 5 dust. 2 also conglomerates any 5 dust, which tends to form as a result of collisions.**
**5(3). 3 supplies history to a mass. A mass having 3 character flows into a permanently altered shape upon acceleration or collision.**
**5(4). A mass body does not compress under static force. A thin mass body is not flexible because it does not flex under static force. However, it can support wave action.**
**5(6). To possess 6 quality the mass must have friction that acts on the body that is driven. The friction enables the 5 mass to receive rotational energy. This is useful in orienting 5.**

**6. A power transmitting body is mainly type 6 but has some of the characteristics of each of the other five body types.**
**6(1). The crystal quality supplies locatability to the power transmitting body.**
**6(2). 2 supplies force to a power transmitting body. Any spontaneous rounding of the**

**transmitter enables determination of the force acting on it. Distortion relates to the force.**
**6(3). 3 supplies history to a power transmitting body.**
**6(4). Ropes, belts that have limited elasticity. 4 helps gears fit together and work together.**
**6(5). 5 enables ropes and belts to be manipulated as bodies before they are put together.**

**SPECIALIZATION TO A HIGHER SET OF SIX**

**The natural mineral types have been hypothesized to be a set of six evolving entities evolving toward perfection. It is hypothesized that there is a higher set of six evolving entities arises having a certain relationship to the lower set. It is further hypothesized that for any given set of six there is usually a higher set of six and a lower set of six.**

**Further specialization results in the higher set of mechanical six. Type 6 in the lower set is the builder of the higher set of six. A higher six type consists of items which fit and function with one another better than items of a type of the lower six.**

**Characteristics are sought which are characteristics of the members of all sets of six. Characteristics are sought that are universal. The characteristics of the six basic mineral bodies are considered to be the best starting point for this.**

**1. Higher shapes of crystals may contain holes, concave angles. Higher types of crystals are more associative with one another and often fit together closely. In technology they occur as closely fitting parts such as architectural parts as in window fittings, in the stationary parts of engines and motors. They possess some 6 friction in order to maintain their relationship to one another. Close fitting together enables them to be more crystal-like than the crystals of the lower set of 6.**
**2. The higher liquid has less force influence from the environment. This means there is an absence of meniscus effect. Alcohol and gasoline function better in tubing. They are liquids of the higher six. They have more individuality than water.**
**3. The higher fluid has less friction with the environment. The fluid slides freely over environmental surfaces.**
**4. Shear elasticity. In the lower set of six this was important only in overcoming mismatches. In the higher set shear elasticity becomes the primary source of elastic energy. Shear elasticity is more specialized than compressive elasticity. Shear elasticity is less limited in its elasticity than is compression.**
**5. Spin. Angular momentum. In the lower set spin was useful only for the purpose of orientation. In the higher set it is the holder energy, replacing translational kinetic energy. Collisions of spinning spheres are more complex and involve both normal and tangential force. Complex shapes such as ellipsoids and bodies not possessing axial symmetry may collide. Rotational kinetic energy is less hampered in its motion than translational kinetic energy and is thus more mass-like.**
**6. Use of gears. Gears have in effect higher friction or “tangential” force than belts or**

**ropes. The holes required for the axles of gears enable gears to fit together precisely and cooperatively.**

## DEFINITION OF A SINGLE ISOLATED BODY

**A perfect body is isolated in the sense that it can only interact mechanically with other bodies. It may be operated so that it remains the same type of body.**

**A body is characterized roughly by a boundary which can move but across which matter does not flow.  A body remains intact for a range of mechanical stresses.**

## SPECIALIZATION IS ACHIEVED BY EVOLUTION

**A body type is achieved only after evolving for an infinite time. A higher body type begins evolving later than a lower type. Therefore a higher body is always less specialized than a lower body. An imperfectly specialized body behaves like a mixture of perfectly specialized bodies.**

**According to evolution the higher individual is built of a combination of pairs of the preceding two types of lower individuals. For example, the 5 individual is made up of pairs of 4 and 3 individuals. The lower individuals are modified so as to work together. The modification involves the addition of higher fundamental constituents. The individuals are built up rather than being degraded. The continuum of mathematics consists in actuality of combinations of individuals having no characteristics in common. Calculus is the mathematics of the alternating combination of two different types of individuals. For example, the continuum of the material of a billiard ball is made up in actuality of alternating pairs of elastic 4 and fluid 3 individuals (particles). Microscopic analysis of this material reveals this structure.**

**A particular body type makes essential use of the other body types. However, in the limit of evolution, while the other body types continue to be essential, the amount of matter contained in them becomes zero.**

## OPERATOR-CAUSED-INTERACTION OF TWO BODIES

**By operator-caused-interaction is meant interaction resulting from operation. The interaction of two bodies occurs only at the area of contact of the two bodies.**

**The hands and the two bodies may be immersed in a structure of bodies of types 1 to 6. The operator may operate this structure in any arbitrary way. Because the properties of all the bodies are known the operator knows the forces acting on the two particular bodies.**

**The operator wishes to be able to repeat his actions and thus tries to develop some regular manner of operating. He therefore does not operate randomly and arbitrarily. Certain simple rules of operation may be practiced.**

**If the operator ceases operation then operator-caused-interaction of the bodies continues until the original operator input energy no longer determines the interaction. This may possibly require infinite time. However, usually the dissipation of the original operator input energy allows the general environment to eventually gain control of the interaction.**

## BREAKDOWN OF PERFECT BODIES, DAMAGE

**Mechanical stresses may cause each of the four types of perfect bodies -- 1, 2, 3, 4, and 5 -- to break down to form an imperfect body. 6 bodies do not break down under any mechanical stress.**

**An imperfect body is the result of damage to a perfect body. An imperfect body exhibits some of the characteristics of a perfect body of the next lower type. The crystal type 1 body breaks down to non-cohesive matter.**

## DIGITAL REPRESENTATION OF PERFECT BODY INTERACTIONS, BREAKDOWN

**There are 36 possible combinations of the six types of bodies. These combinations may be represented by an ordered pair of the digits 1 to 6. The digits represent the types of the bodies.**

**Assume two perfect bodies are caused by an operator to interact with each other and only with each other. If one of the bodies is of lower type and is not damaged by the interaction, its digit is written first. If it is damaged, then its digit is written second. If the two bodies are of the same type neither will be damaged by the interaction. If one of the bodies is of higher type than the other it will not be damaged by the interaction.**

**The body that is operated directly is never broken down, with the exception of types 1 and 2. The operator has direct contact with the body and can monitor its condition closely so as to prevent breakdown. If the other body is a higher type then neither body is broken down. If the other body is a lower type then it is assumed that it is always broken down because the operator cannot guarantee it will not be broken down and cannot know whether it is broken down. If types 1 or 2 are operated against higher types the operator cannot guarantee that they will not break down. It is assumed that these bodies are too inferior to higher bodies to be operated without breakdown regardless of operator skill.**

**The interaction of two perfect bodies in which neither body is broken down is termed a cooperative interaction. If one body breaks the other body down, the body that breaks**

**down is called a resource and the interaction is termed a resource interaction.**

**These breakdown rules originate from the hierarchy of the types. A higher type of body consists of combinations of lower body types together with new types of ingredients. Higher types are more expensive than lower types. It is not efficient or beneficial to use a lower type of body to break down a higher type of body. A higher type of body may break down a lower type of body when the breakdown serves some special need of the higher type of body. Otherwise they relate in a non-breakdown way. Equal types of bodies do not break each other down because the special need is never sufficiently justified.**

## RULES OF OPERATION OF LETTERS

**A device is operated in an environment in a manner most beneficial to the operator. The operator finds it easiest to operate one body pair at a time. For this reason operation of a device is assumed to consist of a sequence of body pair operations. This is accomplished by operator action through non energy absorbing intermediate body of one of the interacting pair. In turn the other interacting body is operated against a non energy absorbing environment or a perfectly energy absorbing environment.**

**In a damaging type of interaction the higher body is always operated to act on the environment through the lower body.**

**Bodies of a letter are interacted in a simple manner so that repetitions of the operation can be carried out easily, inexpensively, and always in the exact same manner.**

**The operator prefers not to subject himself to uncontrolled behavior of the bodies of a letter.**

**The interaction of bodies consists of interactions involving various amounts of energy. These may be divided into a group of high energy interactions and a group of low energy interactions. The specification of interaction requires both. The low energy interactions help in the control and interpretation of high energy interactions. They are related to the senses. Detailed specification or description of interaction should include both. Symbolic representation of interaction specifies only the body types interacting and whether breakdown does or does not occur. Other information about interaction must be remembered without the help of symbolism.**

## DESCRIPTION OF NON-BREAKDOWN INTERACTIONS OF BODIES OF THE SAME TYPE

**The operator can interact two bodies of the same type.**

**1. Crystal-crystal non-breakdown behaviors. 1-1.**
**These behaviors are observed when a crystal interacts only with another crystal. A crystal is a rigid body with plane faces. Only a crystal has shape. Every crystal breaks down under sufficient force. It does not deform before breaking down. However, crystals cannot exert force on one another without causing breakage of perfect edges and corners. Crystals have a limited number of directions of cleavage. Therefore they have edges of angle less than 180 degrees so that breakage always produces breakable edges. Any force that can break an edge can eventually break the crystal down completely into separate molecules if applied repeatedly. Thus crystals are defined as entities having only form. Crystals do not adhere to one another. There is zero energy of attraction between molecules of a crystal. Because there is only one distance at which there is nonzero attractive force between molecules and this force is finite and central and conservative, crystals are extremely dependent on shape to adhere together. Crystals do not exert friction on one another. They cannot exhibit inertia because they do not undergo force. A crystal with inertia would break if moved. A crystal can be rotated without breaking down. The pieces of a broken crystal can not be rejoined by placing them in contact. This contrasts with liquids and fluids which can be broken into pieces, but these pieces rejoin if placed into contact.**

**2. Liquid-liquid nonbreakdown behaviors. 2-2.**
**These behaviors are observed when a liquid interacts only with another liquid. The excess energy of a liquid body 2 is proportional to the difference between its surface area and the surface area of a sphere containing the same liquid. For a thin liquid layer the energy is therefore inversely proportional to the thickness of the layer and the compressive force to the inverse square of the thickness. There is an energy of attraction of molecules of a liquid whereas there is no energy of attraction of a crystal. A liquid aggregates only into the spherical form. If a sphere of liquid is separated into two equal half-spheres a distance small compared to their size and released, it will immediately recover its original form because each hemisphere will take a spherical shape and in so doing will touch and therefore coalesce with the other hemisphere. But if a liquid is separated into widely separated parts the parts cannot spontaneously come together again. Two immiscible liquids will exert zero friction on each other. Gravity flattens liquids so only small drops are seen in their spherical form.**

**3. Fluid-fluid nonbreakdown behaviors. 3-3.**
**These behaviors are observed when a fluid interacts only with another fluid. Force may be exerted normal or tangential to a fluid surface. A fluid between two flat plates can be pressed into a thin layer. The force required for given plate speed, area, and separation is proportional to the viscosity. A fluid is composed of small particles immersed in a liquid. At the surface of a fluid the particles protrude enabling moderate nonstatic friction between two fluids. The level 3 experience is one of force that opposes any and every direction of motion and that has zero force in absence of motion and only in the absence of**

**motion. It is difficult to maintain a fixed power input to a fluid, easier to maintain fixed force or fixed velocity. The net power into a fluid body is dissipated as heat. In shearing a fluid, if the force is doubled and the time halved the shear displacement will be the same provided there is no breakdown of the fluid. A fluid cannot be cracked into two parts without damage to the fluid because it cannot spontaneously rejoin. A fluid has no shape because it is always flowing due to external forces, which cannot be made exactly zero. 3-3 may represent interaction by normal force. One fluid penetrates the other. Or by shearing force the two fluids spread each other out into thin layers.**

**4. Elastic-elastic nonbreakdown behaviors. 4-4.**

**These behaviors are observed when an elastic interacts only with another elastic. An elastic has no identifiable boundary and thus no shape. Force may be exerted normal or tangential to an elastic. Tangential force is associated with flexure. The force which an elastic object exerts on another elastic object is determined by the compression or extension of the object with respect to its equilibrium extension. Elastic objects exert force by volume change. The volume change may be the same throughout the body. This relates to simple compression and expansion. When the fractional volume change is not the same throughout the elastic body, flexing of the elastic body occurs. For example, in an elastic rod that is flexed there is compression (negative fractional change) on one side of the rod and expansion (positive fractional change) on the other side. Basically elastic materials achieve elasticity by means of holes (vacant spaces) throughout the material. At the surface these holes produce a roughness that enables a small static friction between two elastic bodies. Elastic bodies of high energy storage capability are low in average mass density taken over the volume of action.**

**5. Inertial-inertial nonbreakdown behaviors. 5-5.**

**The 5 body possesses kinetic energy proportional to the square of its velocity. A 5 body may transfer all or a part of its energy by means of a collision. The collision of two 5 bodies preserves their total kinetic energy 100%. A 5 body is rigid except during instantaneous collision with another 5 body. 5 bodies only transfer energy that they possess within themselves. Imperfect 5 bodies flatten slightly against each other during a collision because they are actually mixtures of perfect elastic 4 and perfect inertial bodies 5.**

**6. Rigid-rigid nonbreakdown behaviors. 6-6.**

**These behaviors are observed when the operator interacts a rigid body with another rigid body, using his left hand on one body and his right hand on the other. A body may be rigid in one (rope), two (belt), or three dimensions (shell). 6 bodies cannot have mass. They have negligible matter so that when they do break down their presence is not detectible. A 6 body cannot possess energy while not in contact with other bodies. These materials can exert infinite one-way force for infinite time without distortion of the material. They can exert tangential force. They can exert normal compressive force. The 6 body cannot be**

**manufactured to be smooth and therefore it can always exert unlimited tangential force. 6 can transfer unlimited power for infinite time. It can do this by rotary action. A rotary action cycle involves less than a full arm action. The operator can change the rate of power transfer. 6 bodies are dangerous because the environment may gain control of them. They do not absorb energy or break down and therefore offer no protective buffer against the environment as the bodies 1 to 5 do. To operate a 6 body the operator must know its environment.**

**DESCRIPTION OF NON-BREAKDOWN INTERACTIONS OF BODIES OF DIFFERENT TYPES.**

**In the following the interactions the operator is the stationary reference system.  The operator uses his two hands to control the two bodies.**

**3-4. A moving fluid body may compress or expand an elastic massless 4, if done gently enough so that shear stresses in the fluid are kept small and thus non damaging to the fluid. A flexible elastic bar may be flexed by a moving fluid  body if damage to the fluid is avoided. A fluid 3 may be pressed down on a part of the surface of an elastic body so that it spreads out on it and also causes shear elastic forces in the elastic body. 4 may or may not be initially energized. The bar flexure adjusts instantaneously to changes in the fluid motion because the mass of the bar is zero.**

**3-5. The 3 body is controlled by the operator directly. The 5 body may be in motion initially. The non damaging stopping action of 5 by stationary 3 requires infinite time and is determined by a time constant occurring in an exponential function. 3 can change the velocity of 5 from one constant value to another by a veering action of 3. A change in motion of a 5 body from one constant velocity to another requires only a transient action by a fluid body. There is no restriction on the motion of the 3 body as long as shear forces are kept small to avoid damage to 3.**

**4-5. The 4 body is controlled by the operator directly. The 5 body may be in motion initially. A 4 body having its end stationary expands so as to accelerate a 5 mass body, or compresses to decelerate a 5 mass to a stop. The operator may move the 4 body arbitrarily to interact with a 5 body under the condition that the 4 elastic body is not damaged by being too compressed or expanded.   4-5 gives 4 a time of unlikely 5 intervention.**

**3-6. The 3 body is controlled by the operator directly. The 6 body may be in motion initially. A 3 body acts on a 6 body by shear and pressure action so as to transfer power to 6. Shear gradients must be kept low to avoid damage to 3. 6 keeps 3 separate from the further environment. This enables 3 to transfer energy to it with precision and reliability and this leads to such concepts as “work”.  The operator must determine what force, location, velocity, and time values he can impose on 6 by means of his 3 body without**

**damage to the 3 body. He must determine which of these values can, and cannot, be sustained by the further environment. These further environment values may also be determined by the history of past power transfers. This is the way in which the 6 body interfaces the environment for the benefit of the 3 operator. In other words, what 3 can do to 6, 6 can in turn do to the further environment.**

**4-6. The 4 body is controlled by the operator directly. The 6 body may be in motion initially. A 4 body may exchange energy with a 6 body as long as 4 is not damaged by the interaction by being compressed, expanded, or flexed too much. 6 can insure that 4 transfers power fully with reliability and precision to another body. For example, a particular 4 body can transfer energy to the entirety of another 4 body of any size and shape by means of 6. This leads to concepts such as quantity. The 6 body interfaces the further environment for 4 in a way similar to that described in 3-6.**

**5-6. The 5 body is directly controlled by the operator. The 6 body may initially be in motion. A 5 body may interact with a 6 body with transfer of power and change of velocity of 5 with precision and reliability. 5 damage occurs if stress anywhere within 5 becomes too great. This is determined by the force on the surface of 5 body as a function of time. The result depends on the environment of 6. If 6 is backed by a 5 body then a collision occurs. If 6 is backed by a 4 body then 5 bounces from 6. If 6 is backed by a 3 body then 5 may slow to a halt. If 6 is known to be backed by a 6 body then the result is unpredictable unless more than this is known about the environment. This leads to concepts such as knowing, because the results of impact are known before impact. The 6 body interfaces the further environment for 5 in a way similar to that described in 3-6.**

**DESCRIPTION OF BREAKDOWN INTERACTIONS OF BODIES OF DIFFERENT TYPES.**

**2-1. The surface tension of a liquid 2 can be used to break a crystal. A liquid can exert greater force than the crystal can withstand.**

**3-1. Force from a fluid body 3 flowing on a crystal body 1 causes breakage and surface erosion. A larger force can be obtained from 3 by increasing its flow velocity until the force is sufficient to damage the crystal. Internal shear of 3 during this process also results in non-breakdown internal dissipation of energy in 3. Metals such as steel may exhibit fluid behavior by means of small or microscopic surface protuberances. During a rubbing action a protuberance striking a crystal undergoes fluid flow while exerting force on the crystal.**

**3-2. A 3 body distorts a liquid 2 drop by shearing it. The motion of 2 is sufficient to result in turbulence in 2. Turbulence in 2 results in increased resistance to flow of 2. Turbulence is a temporary effect. After the action causing the turbulence ceases the liquid quickly returns to its former pure liquid condition.**

**4-1. The compressive stress exerted by 4 can be increased until 1 breaks down. A leveling action may take place. A 1 crystal may be broken into pieces or the edges may be broken off by absorbing some energy from 4. The shape and location of the break is affected by the directional properties of the crystal. This is a milder breakdown of 1 than that produced by 5 or 6. An important aspect is that the breakdown is sudden and unpredictable as to exact time and location.**

**4-2. Flow may be caused in a liquid 2 body by pressure from an elastic 4 body. The result may be the occurrence of turbulence damage in certain volumes in the flowing liquid. Turbulence is a crystal-like rigidity in the liquid.**

**4-3. The force of compressed elastic 4 body acting on a 3 body causes shear flow and temperature rise in 3 sufficient to break down the 3 into a liquid-like 2 drop. 3 breaks down when its velocity gradient and temperature are high enough. The assumption is that breakdown is dependent on temperature only but requires time to occur, and may be speeded up by shear flow occurring at constant temperature.**

**5-1. A 5 body colliding with a crystal 1 body will shatter it and send the pieces of 1 in various directions with high velocity. 5 may also damage the shape of 1 by knocking off a piece of it. The shape and location of the breakage is affected by the directional properties of the crystal. Whether 1 breaks depends on the background of 1. If the background is 3 breakage may occur because collision produces a very rapid flow and consequently large forces. A 5 background tends to lead to breakage. A large area 6 background may lead to breakage even though the background of 6 is soft material because the 6 will total the impedance of the background. "g" assumes either that the kinetic energy is large or that the background is effectively hard.**

**5-2. A 5 body strikes a liquid 2 body causing high shear and resulting turbulence breakdown of 2 along the path of the 5 body. The turbulence is a crystal-like solidification of 2. Both turbulence and splash are a breakage of liquid into separate bodies. Turbulence and splash are breakdown into flat face bodies.**

**5-3. The operator causes a 5 body to collide with a 3 body with sufficient velocity to break it down. The breakdown results in formation of a liquid-like drop around the 5 body.**

**5-4. If the kinetic energy of a 5 body is sufficient 4 will be compressed sufficiently by collision with the 5 body to break 4 down into a material that behaves like 3 fluid. 3 dissipates the excess energy of 5. Compression of 4 reduces the volume of holes in 4 making it more similar to fluid 3.**

**6-1. 6 may break down crystals 1 by normal (perpendicular) pressure so that the breakage**

**is visible. 6 may be rough enough that rubbing of its surface on 1 visibly causes breakage. The pieces of a broken crystal are difficult to fit together. Thus breakage represents a gasification of the crystal. In 6-1 the many small crystals much increase surface area that is sheared and thus the force. Otherwise the shearing would be very small. It is understood that 1 must be continually broken for 6 to move through it. The 1s might tend to be gathered against 6. The force is indefinitely increasing and not reversible. It increases with displacement and not time. It increases with velocity also and is zero at zero velocity. But it is different from 3 force. 6-1 may involve lower types than 1. When 6 breaks down a 1 it essentially gasifies 1. 1 is always more specialized than 6 because it is lower.**

**6-2. A 6 rigid body moves through a liquid 2 body with sufficient speed to cause turbulence breakdown along the path of the 6 body. The rigid turbulence increases the effective area of the 6 body. The crystalline structure produced may be delicate and of low density resulting in a body of greatly increased dimensions. 6-2 involves forming a bridge from the rigid body to the edges of 2 so that 2 can be distorted. Because of zero viscosity the 6 body cannot otherwise experience force. A solid rigid divider is formed which allows 2 to be forcefully flattened against operator other hand or object. 6-2 can often be in wire form because turbulence tends to bridge the wires. 6-2 is a fast compress-relax action. It does not take place at low speed.**

**6-3. The 6 body breaks the 3 body down to form liquid-like drops. The force applied by 6 will be highly dissipated in the 3 body until the liquid is formed. Then the 6 body will move freely. 3 body breakdown is of the nature of cracks in 3. Cracks are ragged. A cracked up material tends to be free-flowing but to stick together by the jagged surfaces of the cracks. Thus a cracked up material is liquid-like. Dissipation means formation of heat. If a 6 body is constrained to move at constant speed in a fluid temperature may increase, determined by heat generation and flow and heat capacity, and may be sufficient to break down the fluid at some locations. Breakdown at given temperature may be time dependent and influenced also by flow shear velocity. The breakdown to liquid 2 results in reduced power input to 6 and consequently a lowering of the temperature. Recovery of the fluid ensues so that power input to 6 must be increased. Therefore a cycling of breakdown occurs. This cycling of impedance enables the operator to easily detect his own motion.**

**6-4. A 6 body applies sufficient pressure to break down a 4 elastic body. 6 can break down a large volume of 4. The sides of the holes in 4 are dented so as to reduce the hole volume. This makes the elastic more fluid-like. A volume of 4 next to the compressing surface will be converted to a fluid-like material. 4 is static and thus tends to be uniform compression throughout even if sphere. 4 is broken down in its function, that is, within itself.**

**6-5. 6 is said to etch 5 because the volume of breakdown may be very small. The reason for this is that 6 finds it difficult to break down 5 because it is only one level down. 6 does not have the resources to supply both high power and high energy. The etched volume is**

**broken down to elastic 4. Elastic is voluminous and low density. A voluminous extension of a mass 5 tends to keep it from moving and having kinetic energy. 6 may exert static friction on 5 that increases with pressure. Consider a perfect mass rod 5. A perfect 5 body is a body which collides with another perfect 5 body with conservation of energy. The wave velocity is independent of frequency and pulses do not spread as they travel. The speed of travel of a pulse is independent of the compression in the pulse. The displacement of the end of the rod to which force is applied is the pulse velocity times the time of application of force. The power put into the end of the rod is the force applied times the pulse velocity. If the pulse velocity is large the power must be large enough to keep the force (compression) large. If the power is supplied for a very short time the energy supplied can be kept small. 6 can always supply enough power to break 5 regardless of the wave speed of 5. If the energy is small the volume of 5 to which high compression is applied (and which therefore breaks down) is small. 6-5 requires a very sudden high velocity and strong force and a highly coordinated action of the two hands of the operator. But unlike other 6 actions 6-5 can also be performed with only one operator hand. 6-5 abrades rather than breaking as 6-1 does. 5 is broken down in its function, that is, in its interaction, which is surface. Thus surface of 5 is broken down. 6-5 interacts on surface if spherical but if it is a rod it interacts throughout and may have internal breakdown. 4 is static and thus tends to be uniform compression throughout even if sphere. But 5 is dynamic and thus all the compression takes place in a very small surface volume initially so this is where breakdown occurs. 3 and 5 have a somewhat similar breakdown. They both tend to etch. One might expect this. But 6-5 is more localized than 6-3 and there is no whole body shape change. 6-5 breaks down at zero velocity, 6-3 does not but requires high velocity.**

**FORCE VARIATIONS DURING INTERACTION OF BODY PAIRS**

**The following is an attempted description of the details of interactions of the bodies for letter devices, which will be essentially the same independent of the particular variations of the devices involved.**

**A=6-1. A rigid 6 body rubs over a crystal body 1. 6 is the only type of body that can be manufactured with microscopic precision because it is so strong and hard that even microscopic fibers in it cannot be broken. A crystal has a perfectly flat surface. The 6 surface is a manufactured surface and therefore is comparatively irregular. Therefore it can contact a crystal surface only at isolated points. 6 acts mostly on large weak spots in the body of the crystal. If there is sufficient pressure at one of these points a large chip is knocked from the crystal body or the body is broken into nearly equal parts. If the crystal consists of a group of component crystals cemented together then 6 may act to separate them. As the rigid 6 body continues to move it knocks out other chips. The crystal breaks unpredictably into unpredictable parts which exert unpredictable forces on the crystal environment. If the force on a crystal is less than a critical value the crystal can exert force**

**on its environment. This force is determined by the shape or form of the crystal. It is entirely determined by the applied force because the crystal cannot exert force having inertial, elastic, or other non-crystalline character. Crystals and broken pieces of crystal leave an effect on the environment that is dependent only on the applied force and the crystal shape. The graph of interaction impedance force-time starting from the beginning of interaction shows irregular fluctuating force. The amount and fineness of abrasion force graph depends on the manufacture of the 6.**

**B=6-2. A 6 body acts on a 2 spherical liquid body. In B the operator puts the 6 into the 2 body so there may be an increasing opposing force of surface tension prior to the power motion. 6 generally acts in situations of visible roughness or coarser. 6 damages the structure of the interior of the liquid over the entire area of 6. 6 damages the structure of a liquid by breaking it into parts by turbulence. This is interpreted as crystallization of the liquid because it is less aggregated, non spherical, not free flowing. Turbulence is associated with highly sheared flow. The turbulence starts immediately because the 6 body motion starts from a position already inside the liquid body. The interaction impedance force-time graph initially rises from zero as 6 enters the liquid and experiences possible surface tension pressure or buoyancy arising from any displacement volume of 6. As the velocity of 6 increases the force increases due to turbulence breakdown of 2 to 1. The force drops to zero as 6 exits the body.**

**C=6-3. A 6 body acts on a 3 fluid body, breaking it down to a 2 over a long period of time. Before breakdown the resistance force is proportional to velocity. As the breakdown velocity occurs the resistance at the points of highest shear gradient becomes zero as a result of the breakdown of fluid to liquid. The not-exactly-predictable breakdown at high operator velocity results in the inertia of the operator carrying him forward. A fluid breaks down as a consequence of high temperature. Heat is generated in 3 by non-breakdown dissipation. Heat may expand droplets in the fluid causing them to coalesce. The material then cracks as a result of large clumps suspended in the liquid 2. In 6-3 the liquid tends to evaporate eventually leaving only a varnish. But initially the material functions as a liquid 2 mechanically. The interaction impedance force-velocity graph shows that force increases linearly with velocity to breakdown velocity and drops to a lower value. However, as heat is released it increases the temperature according to the heat capacitance of the material. If the material is insulated against heat flow the heat stays in the material and the temperature rises as the heat accumulates in it. After a time the temperature becomes high enough to break down the fluid. Thus not only is breakdown proportional to the velocity but also to the time of interaction. Thin layers of fluid against a heat insulating backing break down faster than thicker layers or layers backed by metals.**

**D=6-4. A 6 body acts on a 4 elastic body. As the operator applies increasing force, starting from zero force, the distortion of 4 increases. The force is unrelated to the velocity or other**

**dynamic variable. The force is a function of distortion only. At some value of the distortion partial breakdown occurs, usually at a weak point, and force increases less rapidly. The material no longer recovers from increase in distortion. D action puts in only the amount of energy required to result in damage. The interaction impedance force-position profile is positive for force starting from zero and increasing linearly with position until breakdown of elastic 4 occurs. The interaction impedance force-velocity profile is independent of velocity before breakdown but relates to velocity after breakdown. After breakdown the material breaks apart at sufficient extension, the pieces flapping randomly because of the release of elastic energy.**

**E=6-5. 6 finds weak spots on the 5 surface and breaks them down. 5 is not rigid and brittle like 1. E material behaves in a more supple way. E might be shaken or worked loose using small force rather than depending only on major force. Vibration can loosen E but not A material. Perpendicular force may be more useful on an E situaion than on A in providing static friction. For E there is contact at velocity of 6 and constant amplitude breakdown dissipation and resonance in 5 until contact is broken by the moving 6. 5 abrades more smoothly than the other materials, producing an accurate smooth surface. The interaction impedance force-relative velocity graph is a constant independent of relative velocity. The impedance force-time graph is smooth rather than jagged. Very little of the power flows into the environment of the interacting bodies.**

**F=6-6. One 6 body acts on another 6 body in a rolling motion or in rigid attachment. There is no breakdown. 6 does not slide on 6. The interaction will have arbitrarily varying value of force between the bodies versus time. All power flows into the environment of the interacting bodies. Force on the environmental 6 is instantaneously the same as the operator force acting on the operator 6.**

**G=5-1. A moving mass body 5 is incident on a crystal body 1, either normally or at an angle. Breakdown occurs over a contact volume. Breakdown is determined more by the direction of motion of the incident body rather than by the anisotropic features of the crystal. The interaction force vs time is that of a series of jagged random narrow pulses showing individual breakages of crystals or crystal pieces. The total graph is the sum of the individual pulses. The short G sound corresponds to a collision of two bodies in rapid relative motion, the long G sound to a collision of very slowly moving very massive bodies.**

**H=5-2. A massive moving body 5 strikes a spherical body of liquid 2, backed by an immovable mass, at some angle to the surface. The moving body distorts the liquid surface and thereby encounters a surface tension buoyancy force directed generally along the radius of the sphere. After the mass travels for a distance, liquid flow speed will be sufficient to produce turbulence, assuming the initial speed of the moving body was great enough. Turbulence produces a force opposing and opposite to the motion of the mass. As the mass slows down turbulence decreases, so that only the buoyancy force and turbulence**

**resulting from it remains. The interaction force-time graph characteristically shows a sudden increase and a slow decrease of resistance force.**

**J=5-3. 5 breaks down a limited volume of 3. A moving mass body 5 is incident on a fluid body surface 3 and enters the fluid. Initial flow resistance to the mass body is determined by the requirement that the flow must accommodate the volume of the moving mass. Deeper within the fluid the flow pattern for a given velocity of the mass body will be somewhat different than the pattern when the body is nearer the surface. Near the surface the flow away from the mass has only a short path to the surface and thus requires less force. The resistive force is greater at greater depth. Flow shear gradient determines the breakdown. Breakdown to liquid 2 in regions of high flow gradient decreases the force opposing the motion of the mass. The interaction force vs time is that of small initial resistance to the mass and which increases rapidly as depth increases but leveling off as breakdown to liquid occurs and also as the velocity of the mass decreases. The graph is not much affected by heating because of the short time involved.**

**I=5-4. A moving mass body 5 is incident on an elastic body 4 backed by a large mass. The mass slows as it compresses the elastic. Breakdown occurs when the mass body reaches a certain position such that compression reaches a critical value. As the elastic breaks down the impedance changes to fluid resistance. Assuming no elastic force remains the mass is slowed to a permanent stop by the fluid resistance. The interaction impedance force-time graph shows a linearly increasing value with time corresponding to compression and then an exponential decrease with time due to fluid resistance. A moving mass may also cause separation or cutting off of a flexible body partially backed by a large mass. The graph shows an increase of force with time followed by a zeroing of force as cutting is completed.**

**TH=5-5. A moving mass strikes a stationary mass directly and velocity exchange occurs without breakdown. The interaction impedance force-time graph is that of an infinitely high pulse of zero duration at collision such that a finite amount of energy is transferred.**

**K=5-6. A moving mass body 5 is incident on a body 6 such as a tensioned belt. The body 5 may bounce from the belt with various possible changes in belt speed and body 5 velocity, depending on the frictional properties of the belt and the peculiarities of the environment of the belt 6. The force of interaction of 5 and 6 must be less than the breakdown value for 5. 6 evens out and smoothes the background making it possible for 5 to reliably avoid breakdown. Otherwise small local variations would often be present that would cause breakdown unpredictably. The operator of the mass 5 must be very timid, knowledgeable, and gentle in order to insure that breakdown does not occur. The interaction impedance force vs time graph is an initial non damaging force which remains below the damage threshold value during the interaction time.**

**L=4-1. One or more 1 crystals initially undergo pressure from a flexed elastic 4 body. With**

**given pressure the crystals are broken down a certain amount. If the 4 body contains a right angle the crystals tend to be cupped and confined and scattering is reduced. Edges of crystals are more likely to be broken than the main body of the crystal. The broken crystals are pressed against the background resulting in an even surface of broken crystals. The breakdown and scattering of crystal structures and groupings by pressure is usually a slow process. This accounts for the tendency of L is have considerable duration. The interaction impedance force-time graph is that of operator force rising from zero as the body is flexed against the crystals, and randomly increasing operator force as the crystals break, to a maximum value of operator force.**

**M=4-2. A compressed elastic body 4 is released to act on a spherical liquid body 2. The 4 body expands against turbulent flow resistance in the 2 body until surface tension in 2 balances the elastic force. M maximizes the use of 4 to produce turbulence. The mixture of stiff and flexible sections in M causes M to move so that patterns of flow are broken up, eddies are broken up into finer disturbances. M may stay in 2 with little motion as a whole, whipping back and forth causing continuous turbulence. This accounts for the hum sound of the letter. The impedance-time interaction profile arising from 2 shows a force decreasing rapidly to a constant value.**

**N=4-3. 4 can break down a thin layer of 3 by heat buildup. If the layer is backed by a heat insulating material the breakdown is facilitated. Pressure from an elastic 4 body is suddenly applied to a fluid 3 body at time zero. The pressure is balanced by resistance from an initial fluid flow velocity pattern throughout the fluid as the fluid yields to the pressure. As the elastic expands, exerting less pressure, the flow velocity decreases in proportion everywhere. But heat buildup in the fluid results in breakdown to 2 liquid in the hottest regions. This transfers the stresses elsewhere so that there is further breakdown. A result is that the elastic may push out and separate a portion of the fluid. A flexed 4 body may straighten slowly against the fluid 3 and then suddenly flip forward as breakdown occurs. The overall interaction impedance force-time graph would be approximately a step down function of time, the force zeroing upon exiting of 4 from 3.**

**O=4-4. The operator compresses the two 4 bodies against each other and then releases them. The compression must not be great enough that the elastic of either body breaks down. The interaction force-time graph is plateau shaped.**

**P=4-5. Initial contact of a compressed elastic body against a mass body may be achieved in two ways. A precompressed elastic body may be brought into contact with the stationary or moving mass body and then suddenly released. Or an uncompressed elastic body may be compressed quickly against the stationary or moving mass body. In this case no momentum will be imparted to the mass body during the compression. The mass is accelerated by the elastic until the elastic reaches its own equilibrium length. All the energy of the elastic is converted into kinetic energy of the mass. There is no breakdown of**

**the elastic. Therefore for a particular elastic the compression must be less than breakdown value. Care must be taken that initial motion of the mass does not result in elastic breakdown. This could especially happen if the elastic got into the way of a rapidly moving mass body. For an initially stationary mass body the interaction impedance force-position graph shows an initial value that decreases linearly to zero with distance from the fixed end of the elastic body. The time graph is a portion of a sine wave.**

**Q=4-6. The operator interacts 4 and 6 in such a way that 4 does not break down. This requires that the maximum allowable compression of 4 is not exceeded. The operator gently and briefly compresses 4 against a tensed belt 6. The belt 6 may be embedded in a powerful environment whose eruptions are difficult to predict. The belt however tends to smooth out random unpredictable forces in the environment enabling 4 to more reliably to interact with that environment without being damaged. The interaction impedance force time graph shows limited and safe amount of force during the interaction.**

**R=3-1. A fluid body 3 is dragged over a crystal body 1. The small bodies contained in the moving fluid 3 can find small imperfect spots in the crystal and break them down by striking them. These spots may be only a few atoms in size corresponding to a roughness that is not optically visible. Such spots are too small to be interactive with 6. The corners of the crystal are more exposed to the environment and therefore more likely to have a weak spot. There are more weak spots at higher temperatures. At sufficient flow rate the fluid breaks off the corner or an edge of the crystal. There is a decrease of force because the fluid flows more easily over the crystal. The interaction impedance graph of force vs time shows a constant positive value suddenly decreasing to a lower value. The fluid layer may be thick or thin. Where there is a thick fluid layer on a layer of many crystals fixed in a background there may be a constant rate of breakage of the crystals and a steadily decreasing resistive shear force per unit area.**

**S=3-2. Two fluid bodies move equally fast in opposite directions against opposite sides of a liquid sphere. Below breakdown velocity the shear flow will push and drag the liquid so as to cause distortion of the liquid sphere, which produces opposing surface tension force. At breakdown the dragging of the liquid in curved paths causes turbulence in the liquid, the turbulence being of a crystal 1 quality. The turbulence causes a resistance of the liquid to flow and therefore a shear force arises at the fluid-liquid interface. The forces will draw out the sides a distance in opposite directions. Surface tension will oppose these forces and draw the two arms backward. Instability of the arms and random turbulence will cause rapid small variation in the forces. Before breakdown if the operator stops shearing the fluids the liquid gradually recovers its spherical form. After breakdown if the operator stops shearing there will be no recovery to the original sphere. Before breakdown the interaction impedance force-velocity graph is approximately proportional to velocity. After breakdown the graph climbs more steeply upward.**

**T=3-3. Two non mixing fluid slabs are in contact. A force applied normally over a small area of one slab causes flow penetration into the other slab. Breakdown must be avoided. Breakdown can be avoided by decreasing the force. This is a zero-threshold letter because the force can be made as close to zero as desired. The interaction impedance force-time graph is a transient arbitrarily shaped positive valued pulse of limited height and whose duration is limited by the thickness of the slab. Duration of perceptible action can be increased by force parallel to the slab surface.**

**U=3-4. There is no breakdown for this vowel. When a moving volume body 3 contacts unflexed 4 there is an immediate flow pattern and motion of 4 with 3. As 4 reaches equilibrium flexure exponentially the relative velocity of 3 and 4 reaches its maximum. Sliding on a thin film or layer of 3 on a flexible bar 4 will also flex the bar. There is non breakdown dissipation in 3 and this reduces dissipation in the environment. The interaction position-time graph shows the flexure increases exponentially to a final constant flexure. Relaxation of flexure is also exponential.**

**V=3-5. There is no breakdown so that the law of viscosity holds throughout. The moving 3 body contacts 5 and 5 is accelerated to the speed of the fluid. Action is slow and gentle to insure against breakdown. 3 is very capable of sticking onto 5 so as to be able to move its surface tangentially. The force-time graph shows the force slowly decreasing to zero exponentially. 5 approaches operator speed exponentially.**

**W=3-6. The fluid body 3 may move in a wrapping progressive contact motion about the 6 body in order to prevent sliding on the surface of the 6 body. Or the 3 body may be pressed on the 6 body sufficiently slowly and cautiously that breakdown of 3 does not occur as it spreads out. Sliding may be performed if care is taken. The interaction force-time graph may show a constant or varying force during the interaction depending on the situation.**

**X=2-1. A liquid drop body is pressed on a crystal body. The buoyancy force is sufficient to cause breaking off of an immersed edge of the crystal. The edge is thrown out of the liquid by the liquid buoyancy force. The interaction force-time graph shows a step down to a lower value of static force.**

**Y=2-2. A drop of liquid 2 is pressed against another drop of immiscible liquid 2. There is a compression occurring on contact. Gentleness and care are taken in order to avoid breakdown. Or one drop may slip off the other. Extreme care is taken to avoid overly fast slippage, which would cause turbulence breakdown. The former corresponds to the vowel Y. The latter corresponds to the consonant Y. There is no damage to either drop. For the vowel the interaction force-time graph is that of zero static force initially and with increasing static force as the drops are pressed together. For the consonant there is a step down to zero force.**

**Z=1-1. Two flat crystal faces are brought into contact. The force between them is less than the breakdown force of either crystal. There is no breakdown. For Z the dissipation is entirely in the environment. The interaction force-time graph is a single nonzero static value during interaction. The sliding force is zero.**

## DEFINITION OF SIMPLE MECHANICAL DEVICE

**A device is an object that is operated by a member of society. It is operated on the environment of the society. A "simple" mechanical device is an object that is operated by mechanical forces arising from contact of the device with its environment. It is manufactured by combining parts immovably to one another. Simple mechanical devices are referred to briefly as "devices".**

## DIRECTIONS OF EVOLUTION OF DEVICES

**A device subjected to its environment may evolve in the direction of the environment.**

**A device that is processed by a society member evolves in the direction of society.**

**A device that has evolved in the direction of the environment may be processed by the method of maintenance or repair so as to evolve it toward society.**

## EVOLUTION AND PERFECTION

**Our society is a society of perfection, not of evolution. Thus the hypothesis is that the silent letters are normally strongly enunciated in order to achieve evolution but at present the opposite is practiced. In an evolutionary society the silent letters in words are strongly enunciated in order to facilitate evolution. This is a costly process because it involves imperfection. In our society it is negated in the interest of perfection. Evolution does not tolerate perfection, but if there is no evolution then perfection is the goal. If words are to represent perfections then the concept of purpose becomes useful. Every word represents a perfection which is termed the purpose of the device the word represents.**

## RULES FOR OPERATION OF DEVICES

**The operation of a device begins at a definite time and ends at a definite time. Such times may be mathematically infinite and are definite in the sense of half life.**

**A device can only be operated by a single simple continuous operator motion. The first letter indicates the general operator approach since the operator does a single reflex and cannot deviate from his initial approach. The other letters modify the reflex somewhat.**

**A device is operated to interact with its environment in the form of an environmental device. After the interaction with the environmental device the operator device must not be in contact with the environmental device and the operator device must be at rest.**

## RESOLUTION OF THE INTERACTION OF A DEVICE AND ITS ENVIRONMENT INTO BODY PAIR INTERACTIONS

**The interaction of a device and its environment occurs as a sequence of energetic interactions of pairs of bodies attributed to the device and its environment.**

**A body that the environment presents to a device during interaction may be created during interaction. If it does not exist before interaction it cannot be identified in the environment before interaction.**

**The sequence of interacting bodies for a device may depend on the environment with which it interacts. It may also be dependent on the manner in which it is operated.**

**The interaction of device body pairs must be distinguished from the interaction of isolated body pairs. The interaction of device body pairs is much more limited than the operation of isolated body pairs.**

**A device material may be a mixture or structure of absolute pure types of bodies. At a particular time one type of body may be operating with the most energy and may be a member of a letter body pair. Which body is selected out of a mixture or structure depends on the manner of the interaction. For example, if a structure consisting of a membrane covering a liquid 2 is subjected to a local beating process the interactive body may be essentially a liquid because the membrane has no effect on this kind of interaction. If the interaction is that of rubbing the interactive body may be 6 instead of 2.**

## TYPES OF DEVICE INTERACTIONS

**Device interactions are limited in variety by the requirement that a device consist of parts immovably fixed to one another. Device interactions can be grouped into two main groups.**

**The simplest are those interactions in which the device contacts only the exterior surface of the environment. This includes cases where the device contains a cavity which envelopes a portion of the environment.**

**The second group is interactions in which the device penetrates into the material of the environment of the device.**

**DEFINITION OF DAMAGE TO DEVICES**

**A device is said to be damaged by an interaction if any of its bodies is damaged.**

**ENVIRONMENT VERSUS DEVICE**

**If a device interacts without damage to its environment then the device and its environment are equal.**

**A device is never damaged by interaction with its environment.**

**The environment is always larger and more massive than the device. Increasing the amount of material of a body increases its ability for self repair of damage to itself and makes less significant any damage to it.**

**The environment is generally more valuable than the device. Property is built up by minor alterations of the environment. The operator's immediate concern is the device. Much data and analysis is required to assess the environment and it is not sensitive to small changes. But the device is small and is sensitive. It is the difference in handling the small and the large. The environment is standard. The device is manipulated to bring bodies into contact.**

**INTERACTION OF DEVICE CONTACT AREAS**

**Device interaction occurs only through an area of contact of the device with its environment. Each letter interaction involves area contact between the device and its environment. Contact area for a letter interaction may change with time. Because of various types of material are involved such as crystals, liquids, fluids, and rigid bodies, contact area may be complex.**

**The boundary surface of a device at any instant of time may be specified relative to a set of three coordinate axes. At any instant of time during a letter interaction parts of a contact area of a device can be identified as original area or newly created area. During the letter interaction the area of contact may change from the original area for either or both bodies. For the device newly created area is always reversible. For the environment newly created area may be reversible or irreversible.**

**During a letter interaction contact area can also be destroyed. Consequently the total area contacted during the interaction may be much larger than any instantaneous contact area. Instantaneous contact area may be approximately zero, such as when the contact is basically a line or a point.**

**Different contact areas of a device can be accessed by translation and/or rotation of the device as a whole. As a device moves during a letter interaction it moves various areas and these may come into contact so as to result in transition to another letter interaction.**

**Device interaction consists of the letter interactions according to the ordered left to right sequence of the letters of the word. This means the first most significant interaction that occurs is described by the first letter of the word, the second most significant interaction by the second letter of the word, and so forth.**

**A letter interaction is represented by a single body pair. During a letter interaction several body pairs may interact at the same time. Only one body pair interaction will be most important. It is this body pair interaction that is represented by the letter.**

**During a transition to the next letter two different letter areas of a device may be temporarily operating at the same time. The letters involve areas that may be separated in space from each other for both device and environment. If not then contiguous areas will be operating as different bodies. Or an area may undergo a continuous transition in body type. For the environment contiguous total areas consisting of the same type of body may be distinguished merely because device bodies of different types interact with them.**

## MORE DETAILS OF DEVICE INTERACTION

**The two bodies of a letter are embedded in the interacting device and environment. During interaction of a pair of bodies of a letter, energy may be dissipated in the two bodies and also transmitted into the remainder of both device and environment. Some of this energy may be transmitted into the air, which may be a part of the environment.**

**The letters of the interacting device and environment form one or more groups. The body pairs of the letters of a word interact in the sequence they occur in the word. Typically the letter interactions of device and environment can be divided into initial interaction, intermediate interaction, and final interaction groups.**

## REPRESENTATION OF DEVICE INTERACTION

**A picture of the device and its environment before and after interaction furnishes a good idea of how they interacted. The picture should show the environment soon after interaction because healing or recovery often takes place quickly. The device and environment can be shown separated or out of contact. Contacting areas can be labeled by a sequential number and a body type number separated by a comma.**

## ORDER OF PRESENTATION OF TYPES IN DEVICE INTERACTION

**For a word often there may be general ideas of what the devices are but details of their structure are not known. Also operation of the devices may not be fully known. The problem is to obtain more details of the structures and to learn what the sequence of operation is. Often one needs to justify the assignment of a body type to a structure. This may sometimes be done by a consideration of the physical constitution of the material and the effect of the manufacturing process on it.**

**How the operator operates the device may affect presentation order. There may be five or six factors affecting order of presentation. These all need to be considered in determining this. Order of presentation affects what letters represent the process and their order in the word. It is merely a scheme for representing physical processes and it is asserted that it is the foundation of the alphabet scheme. Structures that are gone through need to be recognized. In the device the operator controls structure accessed. In the environment the general structure determines this.**

**What the word specifies on this can be checked out to see if it is reasonable. First the structure of the environment needs to be considered. The first material contacted in the environment needs to be identified. The type of this body has to be determined. This will depend on the part of the device body it contacts and the statics and dynamics involved.**

**Hypotheses concerning mode of operation need to be made. This will be relevant to bodies and types. If the word is given then a mode is sought which seems most nearly to agree with the letters and their sequence. The second materials which come into interaction are determined. The mechanical process by which they come into interaction is determined. Breakdown changes and materials are considered and what mechanical processes take place are considered. Breakdown must be consistent with the known structure of the devices. Basic aims and purposes of the device operation are relevant to helping decide what interactions take place and what sequence of interaction takes place. How is the device tool operated with respect to the environment? The letters can be referred to in order to help clue this. This can be researched by use of dictionaries, encyclopedias, technical books and perhaps actual operation.**

## TYPES OF BODY TRANSITION DURING DEVICE INTERACTION

**Going through a body.**
**Speed control.**
**Change of position.**
**Change in direction of motion.**
**Change in direction of force on an object.**
**Comparison of device transitions versus environment transitions.**
**Transmission of force through a non energy absorbing body to an energy absorbing body.**

**Transitions resulting from selection of a body type from an object or material that consists of a mixture of body types.**

## VOWEL-CONSONANT TRANSITIONS DURING DEVICE INTERACTION

**A consonant can control a vowel. It can initiate the vowel by opening gradually so that the vowel can be performed more and more strongly. A consonant can also close down a vowel gradually so that the vowel is forced to be performed less and less strongly. How a device is operated and the body types which function during operation are related. The device passes through a series of modes of operation with a gradual transition between any two modes. Not only is there a transition in geometry but also a transition in power. As one body type decreases the next body type increases in power and vice versa. This is true even if the power levels of the two bodies are different. Consonants are weak in power, vowels are strong in power. As the low power of a consonant decreases to zero the power of a following vowel increases from zero to a high value. The case of a consonant following a vowel is similar.**

## BENEFICIAL DEVICE INTERACTIONS

**A device interaction is beneficial to an operator if it includes satisfaction of operator needs including bodily needs and/or otherwise contributing to his survival according to the estimate of the operator. The benefit to the operator is sufficient if he perceives that the result of the single motion he performs for the word is worth the effort.**

**A mechanical device is operated by a person on the environment so as to benefit society members.**

## BENEFIT OF DAMAGING AN ENVIRONMENT

**Damage to the environment protects the device against damage.**
**Damage to the environment protects the operator against injury.**
**Damage to the environment is the most easily repaired or is self-repairable.**
**Damage to the device is not allowed. It is more costly than damage to the environment.**
**Injury to the operator is not allowed. It is the most costly.**

**Breakdown occurs only to the environment on which the device is operated.**
**Breakdown is beneficial to the operator. It destroys undesirable environmental evolution or evolves environmental material in a manner beneficial to the operator.**
**Breakdown of primary environmental evolution in a volume prevents evolution of higher more dangerous and destructive environmental forms in the volume.**

## IDENTIFICATION OF INTERACTING BODY PAIRS

**During operation of a device it is desired to identify the sequence of body pair interactions that take place. Identification of interacting body types during device operation may depend on the following:**
**Identification of the parts of the device and environment interacting.**
**Identification of the previous parts of the device and environment that were in interaction.**
**Relative orientation of device and environment before interaction.**
**Speed and direction of motion of device and environment prior to interaction.**
**Variables of the parts of device and environment prior to interaction including composition and fabrication.**
**Variables of the operation of the parts throughout the directly controlled interaction or throughout the predicted interaction including forces, speeds and their directions, areas of contact, orientations.**
**Consideration of what is known about the interaction of the parts in other circumstances.**
**Prediction of the interaction from scientific data concerning structure of the parts.**
**Past history of interaction of the parts of the device and environment.**
**Identity of materials, such as natural wood, stone, metal.**
**Treatment of the materials interacting such as kiln drying.**
**Method of manufacture of the materials interacting.**

## ENERGY INVOLVEMENTS DURING MACHINE INTERACTION

**Technological activity consists of an operator who operates a machine to interact with a part of the environment, both machine and the operator also interacting with the more general environment. This activity can be resolved into a sequence of four energy involvements: the energy input from the operator, the energy involvement of a pure type body of the operated machine, the energy involvement of a pure type body of the part of the environment interacting with the operated machine, and the energy involvement of the pure type body of the environment with the more general environment if the device is type 6. The energy involvements of the interacting body pairs of the machine and environment are represented by the letters of the alphabet. The only letters that involve the more general environment are "f"=6-6, "k"=5-6, "q"=4-6, and "w"=3-6. Only for these letters does the more general environment have a significant energy involvement.**

## PROPERTIES OF WOOD

**Wood is a natural composite material that in a particular pair interaction may exhibit any one of the properties 1 to 6. Microscopic and chemical examination of wood shows it to consist of three substances. These are fibers 1, water 2, and lignin 3. The fibers are lined up parallel to one another separated by water and lignin. These materials are arranged in higher structures to enable wood to exhibit the properties 4, 5 and 6 also. Pair interactions may occur involving wood and wood, wood and metal, wood and soil, wood and ceramics,**

**and other combinations. The properties of wood are dependent on direction, variety of wood, and its preparation and treatment. The properties exhibited depend on its manner of operation, the devices it is interacted with.**

## MACROSCOPIC VERSUS MICROSCOPIC BODIES

**The macroscopic mechanism is a constructed version of the natural microscopic mechanism. The parts of the macroscopic mechanism can be individually hand manipulated. Every letter represents all combinations of macroscopic and microscopic interactions. The combinations are *F-L, F-F, L-F, L-L* where *F*= fine scale or microscopic, *L*=large scale or macroscopic. A particular case may not always be represented on a letter. For example, for the letter F the cursive point on the end of the top prong functions as a large scale mechanism acting on a fine scale 6 body, case *L-F*. However, the representation does not show that it is sharp enough for this purpose. Case *L-F* is thus only partially represented. Case *L-L* is represented well by the flexible top prong tipped by a large mass. Cases *F-F* and *F-L* are represented by the frictional side of the cursive on the top prong.**

## SPOKEN LETTERS VERSUS MECHANICAL DEVICE LETTERS

**The mouth can perform any individual letter action. A mechanical device can perform a group of letters in only one sequence. The mouth is not a material structure. It has an internal structure which generates types of bodies in various locations. It generates both bodies of any letter pair and operates one on the other. It can also sequence letter actions. For example, the tongue can generate a 6 body by muscle tension. By different muscle tension patterns 6 bodies different from one another may be formed for use in different letters that make use of different varieties of 6 body. One tension pattern may make a 6 body for operation on a 4 body , another tension pattern a 6 body for operating on a 5 body. The muscles make tools which work like and look like those in mechanical devices. For example, the 3 body made by the mouth for the 3-2 interaction has the shape S and is a tool that appears in mechanical devices in the same shape and with the same behavior and function.**

## HOW TO PRONOUNCE THE LETTER SOUNDS

**To enunciate a letter sound several factors must be known. The shape of the uppercase letter must be known. The digital pair equivalent of the letter must be known. Whether the first digit is higher than the second must be considered. The types of bodies and their characteristics must be known for both digits of the letter. The part of the mouth to be used in making the letter sound must be known.**

**The breakdown letters are those where the first digit is greater than the second digit. The**

**operator controls the body of the first digit. In general it is possible for the speaker to control his mouth parts to have the same motions regardless of breakdown. There may be occasion to communicate a non breakdown interaction where the first digit is greater. Therefore in the description of pronunciation of letters both breakdown motion and non breakdown motion should be described for those letters which can have both.**

**Device-environment configuration is communicated by the air stream as well as the action. This means that a pair such as 4-3 is communicated as being different from a pair 3-4 even if the 4-3 action does not involve breakdown.**

**When an individual interacts with an environment it becomes a possession or tool. It can be reused in a deliberate way. When he goes into another individual's territory he has the disadvantage of being unfamiliar with what use can be made of it. Language represents territory knowledge and relates to a territory.**

**Voicing does not occur during consonant action. Consonant action establishes moods for the starting and ending of the voice action.**

**The operator is not allowed to travel. Therefore the letter P cannot have infinite duration. The operator can only manipulate from a fixed position.**

**Letters such as G and P which block the air stream are enunciated with a suction motion after the end of the actual letter action. This suction signals the speech mechanism to start airflow. At the end of a word these letters naturally stop airflow and no suction action is required. For example, at the start G is enunciated with an upward jaw motion and also at the end. But at the start a downward jaw motion is added after G in order to start air flow. G ends with blockage and the extraneous motion is needed to communicate G at the start of a word. At the end no downward jaw motion occurs in association with G. Letters such as S do not block the air stream and the air stream can be started during their action. Extra action is not needed to communicate S. T blocks the air stream during its action and its communication at the start of a word is accomplished by breaking the blockage with air pressure. This is a passive extraneous action as far as the mouth and jaw are concerned. For syllables the momentum of the air stream generally is sufficient to continue flow and a letter such as G is performed with the same actions at the start and end of the syllable. The G may be bounced unless there is a syllable after. In this case calculation for G may be done so as to fit the next syllable. This saves chest energy because the chest should not heave between syllables. The chest must continue its course with only tension pulses and no relaxation.**

**The vowels put power into the environment. They can be extended in time so that the energy put into the environment is the power times the duration of action. The vowels are located at syllables.**

**In a word such as “this” the voice starts immediately after the collision of the tip of the tongue. Waves and configurations in the mouth immediately after the collision modify the voice in a way that is recognized as “th”. The actual information that the tongue tip approached the palate is not communicated by the voice.**

**Loud speaking or shouting employs more jaw motion. However, jaw motion is most appropriate to letters G to K. G to K can be enunciated getting the inertia from the tongue only. Adding jaw motion helps this and adds clarity. The mouth passage tends to be partially open during all the letters. For “M” extra strength or emphasis may be had by closing the jaw.**

**For the below letter enunciations best agreement with the descriptions is obtained by comparison with loud speaking as is done by the orator.**

**A=6-1. A pictures the tongue rising from the root to make a sharp bend that touches the palate with tip of the tongue on the lower front teeth. A section below the palate is especially tensed.**

**Long A is spoken with tongue palate contact sliding with friction on the palate.**

**Long A is spoken with tensely held tongue 6 and operated by tongue muscles further back. A moves forward strongly (wide line) and sharply forward with a definite point on roof. The sharp top maximizes force on a crystal and obviates having to match the direction of the plane face. Jaw action is not involved. The A action is one of constant lip shape. The forward motion tends to carry the tongue into the “E” position so that the A sound tends to change to an “E” sound. Long A and short A are similar but short A uses the tongue farther back to make the top of the A shape. There are six levels or strengths of A. These occur in the words WAVE, WART, WANT, WASH, WARE, WAFT listed in order of decreasing long A. These are real levels and are based on real levels in a 1. The sound vibrations in the air stream are filtered by the varying shape of the passageway resulting in the characteristic sound of the A = 6-1 vowel.**

**B=6-2. The B loops picture the lower lip and flesh below the lower lip that bulges below the gums on the chin. The stem is the inside tissue.**

**For 6-2 the lower lip functions as a tensioned 6 belt, the upper lip functions as 2 liquid. The lower lip 6 rises and flattens stiffly and presses up into upper lip 2 against surface tension and then flips out and rubs against the upper lip so as to produce ripples in it corresponding to 2 breakdown. The curved top enables easy contact with surface curvature while the double loop provides stiffness against surface tension. The sound**

**vibrations in the air stream are filtered by the varying shape of the passageway resulting in the characteristic sound of the B = 6-2 consonant.**

**C= 6-3. C pictures the tongue curling from the root to the tip on the roof of the mouth behind the upper front teeth.**

**The shape enables easy contact with the fluid surface while preventing entering too deep and getting fluid inside the letter. The cursive increases local gradient and thus breakdown. For long C=6-3 the sides of the tongue 6 rub against the gums and palate 3. The short C is made by the tongue further back in the mouth and from a portion closer to the root. For short C more pressure is obtained by a rubbing action flat on the 3 palate. Short C action lasts a shorter time because of greater pressure from a stronger portion of the tongue and because of the thinner fluid layer and better heat insulation at its location. The thinner fluid layer results in faster heat buildup and consequent faster 3 breakdown. At breakdown both long and short C release the tongue into free motion, as a consequence of the conversion of 3 into 2 having zero viscosity. This release is an important part of the C sound. Long C shows a slow opening of the lower lip at constant speed followed by a sudden jerk open with some turning out of the lip. The sound vibrations in the air stream are filtered by the varying shape of the passageway resulting in the characteristic sound of the C = 6-3 consonant.**

**D=6-4. D pictures the tongue rising vertically from the root to the palate and pressing along it and bending down to the floor of the mouth.**

**The flat or nearly flat top enables maximum area on 4 surface and the slightly flexible shape enables the slight adjustment to get matching and to maintain matching during application of force. The tongue moves slowly forward against the elastic surface 4 of the palate and draws it along and suddenly is released and jerks forward as 4 breaks down to 3 fluid. The D motion before breakdown tends to slow down because the increasing force requires an increase in power at constant velocity. The operator is forced to slow down in order to be able to supply the power. The sound vibrations in the air stream are filtered by the varying shape of the passageway resulting in the characteristic sound of the D = 6-4 consonant.**

**E=6-5. E pictures the tongue rising from the root to lie on the roof of the mouth and descending to the floor.**

**The flat top enables constant translational unidirectional abrasion on a curved rigid 5 surface. The long E involves making a very sharp right angle bend in the tongue at the roof of the mouth or to the convex sides of the inner gums. This bend is achieved by**

**strongly tensing the muscles in the portion of the tongue against the roof of the mouth. The strongly tensed tongue section 6 slides a centimeter or two forward along the upper gums 5 so as to break them down. The right angle is maintained during sliding. The short E involves the same configuration but with less tension, force and speed. The sound vibrations in the air stream are filtered by the varying shape of the passageway resulting in the characteristic sounds of the E = 6-5 vowel.**

**F=6-6. F pictures the flesh of the lower lip against the gum and the lip projecting forward slightly with the corners tucked behind the upper lip.**

**F begins with closed lips and a beginning rotation outward of the lower lip. This rotation may begin in the center of the lip and then spread outward. The lips roll outward together. The entire upper lip structure rolls. F requires a definite non zero amount of rotation of the upper lip before the lower lip lets go. Breakdown does not occur. However, considerable energy is spent because the unknown environment must be subdued with it. The sound vibrations in the air stream are filtered by the fixed shape of the passageway resulting in the characteristic sound of the F = 6-6 consonant.**

**G=5-1. G pictures the tongue projecting from the root and then curling upward along the roof of the mouth.**

**The curved top enables contact with a flat surface. The cursive keeps material out of the inside of the letter by blocking it. The essential idea of G is that it is a jaw letter. The lower jaw 5 moves upward to make the tongue 5 collide with the palate 1. When saying G think of the action as that of the jaw mass rather than of the tongue. For the long G action the tip of the tongue is raised so it can contact the palate. Long G is a slow speed with no minimum value, large mass action. The short G action takes place further back in the throat. For this the middle of the tongue contacts the roof of the throat. Short G is a fast velocity, low mass action. The sound vibrations in the air stream are filtered by the varying shape of the passageway resulting in the characteristic sounds of the G = 5-1 consonant.**

**H=5-2. H pictures the tongue forming double edges that touch the roof of the mouth with the tongue tip touching the floor of the mouth.**

**The rigid tongue and lower jaw are thrown upward ballistically so that the top edges of the tongue 5 gently strike the soft throat 2 squarely, breaking it down to 1. 5 is required to have a minimum impact speed. Surface tension of 2 slowly ejects H after it has lost its momentum. The sound vibrations in the air stream are filtered by the varying shape of the passageway resulting in the characteristic sound of the H = 5-2 consonant.**

**J=5-3. J pictures the tongue rising from the root to touch the palate with the tip curling up from the floor of the mouth.**

**The tongue is fixed to the lower jaw mass which moves upward causing the tongue to strike the roof of the mouth ballistically. 5 must have a minimum impact velocity sufficient to result in breakdown of 3. The top of the J impacts and slides on the palate 3, progressively slowing down. At some point the 3 breaks down to 2 allowing momentum to carry the tongue forward freely. There is no appreciable ejection. The overall action is that of a jerk. The sound vibrations in the air stream are filtered by the varying shape of the passageway resulting in the characteristic sound of the J = 5-3 consonant.**

**I = 5-4. I pictures the tongue rising directly from the root and contacting the roof of the mouth and dropping directly to the floor.**

**The tongue is fixed to the lower jaw mass which moves upward causing the tongue to strike the roof of the mouth ballistically. 5 must have a minimum impact velocity sufficient to result in breakdown of elastic 4. Long I 5 impacts the soft palate at the edge of the hard palate and has a separating effect. This means that the long I sound can last only a short time, that required to produce a separation. Short I 5 impacts the soft palate nearer the mouth opening where it is well backed by the hard palate and has an imprinting effect. Short I is the result of an infinite mass moving infinitely slowly but having a finite amount of kinetic energy. It compresses a limited depth of 4 with a finite pressure over an infinite amount of time. This means that the short I sound can last an infinitely long time. Structural and chemical changes may take place in the impacted elastic over the long length of time under pressure. The sound vibrations in the air stream are filtered by the varying shape of the passageway resulting in the characteristic sound of the I = 5-4 vowel.**

**Θ=5-5. Θ pictures open lips and teeth with the tip of the tongue nearly touching the upper front teeth.**

**The tongue 5 impacts the upper gum 5 in a controlled manner so as not to break down the structure of either. The jaw does not move. The sound vibrations in the air stream are filtered by the varying shape of the passageway resulting in the characteristic sound of the Θ = 5-5 consonant.**

**K=5-6. K pictures the tongue bending so as to be able to hit the back of the throat, and then descending to the root.**

**For K the top of K hits the back of the throat 6 and roughness causes it to rotate about 45 degrees so that its energy is transferred slowly to the 6. This avoids it being rebounded from the 6. The K is assumed to be incident on a path that is at an angle to the back of the throat such as 45 degrees. But K is oriented with top parallel to the 6. Thus the action of K is a rotation to a stop with some translation due to 6 motion.**

**The arm of the K assures that kinetic energy goes into power transfer rather than rotating the 5. The flexibility of the arm helps prolong the contact so that appreciable power can be transferred from kinetic energy. The inertia of the K slows down the rotation allowed by the flexible arm. It lengthens the action of the letter and makes the bounce less violent and gentler and more controlled thus reducing breakdown possibility. This is essential to the correct sound of the letter. It is essential that the letter always be enunciated with care. The jaw is flipped gently upward so that back of the tongue 5 rigidly fixed to it collides with the palate 6. At this location the palate has the structure of a tensioned belt. Care is taken that breakdown does not occur to the tongue 5. The larynx sound vibrations in the air stream are filtered by the varying shape of the passageway resulting in the characteristic voiced sound of the K = 5-6 consonant.**

**L=4-1. L pictures the tongue rising from the root to the palate and down to the floor of the mouth with the tip along the floor toward the lower front teeth.**

**The tongue moves forward flexing to a straight shape against the front teeth. Crystalline matter behind the front teeth and gums is broken, smoothed and made level against the teeth. The crystal edges are rounded so that leveling can take place. The tongue acts like a flexible right angle bar which flexes to straighten out. The tensing of the right angle of the tongue can be felt. The sensation of interest is the variation of this tension. The larynx sound vibrations in the air stream are filtered by the varying shape of the passageway resulting in the characteristic voiced sound of the L = 4-1 consonant.**

**M=4-2. M pictures the inturned flattened lower lip. The thick right stem of the M represents the thick outer flesh, thin stem the inner flesh.**

**The lower lip is 4, the upper lip is 2. The vertical cross section of the lower lip has the construction M. The upper lip is loosely held. The hard outer section of the lower lip presses the upper lip against the hard backing tissue below the nose. M maximizes the use of 4 to produce turbulence. The mixture of stiff and flexible sections in M causes M to move so that patterns of flow are broken up, eddies are broken up into finer disturbances. M may stay in 2 with little motion as a whole, whipping back and forth causing continuous turbulence. This accounts for the hum sound of the letter. 2 bulges under pressure from 4 because the volume of a liquid cannot change. There is turbulence and swirling action in**

**the upper lip. The lower lip can be withdrawn to end the enunciation. M is enunciated without jaw motion. The sound vibrations in the air stream are filtered by the characteristically varying volume of the chamber resulting in the characteristic sound of the M = 4-2 consonant.**

**N=4-3. N pictures the tongue ascending from the root to roof, descending to the floor to form the crossbar, ascending upward to touch its tip on the roof of the mouth.**

**For N the force is a function of pressure and velocity. The flattening of N serves as an indicator of physical processes which are the content of communication. N measures the viscosity of 3. The tongue end is pressed against the floor of the mouth with the tongue cupped against the roof. The lower jaw is moved up causing the tongue to slide forward on the roof 3. The impedance 3 then zeroes due to breakdown of 3 to 2 and the speed increases with a sudden jerk of the tongue forward and jaw upward. This motion ends due to elastic tension increase. The sound vibrations in the air stream are filtered by the characteristically varying volume of the chamber resulting in the characteristic sound of the N = 4-3 consonant.**

**N is a period of constant speed and force. Other action is not related to N. N requires a travel distance and speed sufficient to build up heat for breakdown. The occurrence of breakdown defines N. It differs from J in that deceleration may not occur and free travel is not relevant. Opposing force must become springy as speed is increased because 3 becomes 2.**

**O = 4-4. O pictures the lower lip cross section with the vertical halves of the letter flattening against each other.**

**For the long O the elastic material of the lower lip is compressed and pushed up against the upper lip so as to compress it also. For the short O the lower lip is stretched wide by the muscles of the cheeks so that the lower lip in turn stretches the upper lip wider.**

**O has several other sounds, which are however, sounds relating to silent letters. These include O as in ROOM, BOOK, COST, OTHER. These are not basic types of O sound.**

**P = 4-5. P pictures the lower lip and chin with the lower lip slanting and puffing out.**

**The lower lip moves upward quickly and strikes and compresses against the upper lip and stops and moves the upper lip upward by expanding. For P the lower lip departs as soon as the upper lip moves. P is minimum compression that starts motion of upper lip. The speaker should be well aware of feeling of displacement of upper lip. This may require**

**considerable displacement of upper lip. Only the red part of the upper lip should move and not the flesh higher up. P should be fast enough that upper lip moves considerably and not engage 4 force of the flesh above the upper lip, which should occur only after the lower lip departs. This is best achieved by not moving lower jaw since the mass of the lower jaw slows down the motion. Thus the lower teeth should not move for the P letter. Jaw motion is more easily avoided if the lower lip moves outward some. Thus for P outward motion of the upper lip must be allowed. By flipping upper lip outward 4 can interact with 5 as a whole. The upper lip 5 acts as a rigid mass body. It does not change shape during enunciation. The lower lip lingers in the vicinity of the upper lip before contacting it as a caution. P is basically characterized by the no minimum velocity requirement. Because there is no breakdown there will be no discomfort. Because 4 is less than 5 the compression must be done sufficiently gently that there is no breakdown of the lip elasticity. Therefore the action will be light and quick. The sound vibrations in the air stream are filtered by the varying shape of the passageway resulting in the characteristic sound of the P = 4-5 consonant.**

**Q=4-6. Q pictures the tongue curled upward sharply from the root, brought down to the floor and tailed forward.**

**The back end of the tongue 4 is flexed lightly on the palate 6 and quickly withdrawn. The lower jaw may be moved slightly to help control. The tail also helps control. The intent is to avoid breakdown of the tongue. Elastic 4 has a special capability of making light or zero force contact. This enables it to avoid damage from powerful and unpredictable 6 action generated by the environment of 6 (such as a cough). The sound vibrations in the air stream are filtered by the varying shape of the passageway resulting in the characteristic sound of the Q = 4-6 consonant.**

**R=3-1. R pictures the tongue rising from the root to form the stem and looping forward and with the tip dropping to the floor of the mouth.**

**The main thing in doing R is to get the back of the tongue vertical to the roof and touching. R does not give way completely as the operator moves 3 but some. For R the tongue moves straight through the mouth channel. The tip of the tongue corresponding to the end of the prong can help the speaker determine that it is doing this. It is a detector of motion, not a part of 3-1 action. 1 breakdown produces a random effect on resistance to tongue motion. The tip detects this random breakdown and produces an effect on voice sound since as the speaker tries to maintain contact the attempts are heard since the tip itself affects the sound stream. The tip 3 of the tongue is pushed forward by the root section to rake the floor 1 of the mouth. Simply sliding 3 results in breakdown which has a characteristic effect on tongue motion and on motion of the fluid on the tongue. Faster speed and more pressure may produce more audible effect. Variation of force and speed**

**communicates R.  R requires a minimum speed. It is the speed required for breakdown. Breakdown is observable as a sudden decrease in impedance when this speed occurs. The sound vibrations in the air stream are filtered by the varying shape of the passageway resulting in the characteristic sound of the R = 3-1 consonant.**

**S=3-2. S pictures the tongue lying forward from the root, rising up and turning backwards and then pressing forwards on the palate behind the upper teeth.**

**The edges of the upper side of the tongue 3 slide quickly on the palate 2 at the back of the teeth. The surface of the tongue is grainy so that it can function as a fluid. The tongue 3 slips forward quickly on the palate liquid 2 so as to cause it to break down to 1. Breakdown greatly increases the sliding resistance so that sliding slows and stops. Therefore the S sound is a terminated hiss. The sound vibrations in the air stream are filtered by the varying shape of the passageway resulting in the characteristic sound of the S = 3-2 consonant.**

**T=3-3. T pictures the tongue rising from its root to lie flat and pressing backwards and forwards on the palate behind the upper teeth.**

**The tip of the tongue 3 is slid lightly and slowly in a controlled deliberate manner on the palate 3 of the mouth. Breakdown is not allowed to occur. The purpose of control is to avoid inadvertent motions that might exceed breakdown limits. The tongue has a balanced contact with the roof. This improves control. Symmetry improves uniformity of shear flow so as to avoid inadvertent extremes of flow. The T action does not include the breaking of contact between 3 and 3. This is transition action, involves slight breakdown of 3 and is not heard in the voice. Thus the plosive is not part of T sound but is transition sound. The sound vibrations in the air stream are filtered by the varying shape of the passageway resulting in the characteristic sound of the T = 3-3 consonant.**

**U = 3-4.  U pictures the tongue doubled backward into the throat from its root. The U is formed from the half of the tongue nearest the root.**

**The U shape, consisting of viscous matter 3, collapses on right side but not on left because the right side is thin. As the U moves forward oriented vertically it encounters increasing elastic 4 force from the roof of the mouth. This causes it to start moving at an angle to the vertical. It thus begins to dig into the 4 elastic surface. The tongue changes its angle to the roof 4 of the mouth as it moves forward. This explains the E-OO sound. The E sound occurs when the tongue is parallel (U vertical) to the roof before the U side collapses. The OO sound occurs when the U makes an angle. As the U collapses the distance from 4 decreases and there is greater force at less velocity available to press on 4. This gives**

**stability and gripping power to 3 on 4. The collapsing enables U to maintain constant force on its thin side. The short U has a smaller amount of this effect. U is done carefully to avoid breakdown. The sound vibrations in the air stream are filtered by the varying shape of the passageway resulting in the characteristic sounds of the U = 3-4 vowel.**

**V=3-5. V pictures the lower lip as it acts on the upper lip.**

**The lower lip inside acts on the upper lip. The lower lip 3 touches and pushes the upper lip 5 outwards with increasing speed. The upper lip does not change shape but merely moves outward. The lower lip shears to change shape in an outward direction. 3 may stop the mass instead of veering it and may also start the mass. A basic requirement of V is that rolling does not occur. V is done carefully to avoid breakdown. The larynx sound vibrations in the air stream are filtered by the varying shape of the passageway resulting in the characteristic sound of the V = 3-5 consonant.**

**W=3-6. W pictures the surface of the center of the lower lip and corners after enunciation.**

**The lips are open. The lower lip engages in a wrapping motion on the upper lip at the corners so that only a center part of the lips is open. The lower lip engages in a shape change, the upper does not. The shape change is a thickening of the lower lip in the middle which is a kind of accumulation in the middle. The muscles of the lower lip cause the lower lip to shear over the increasing portion in contact. This is similar to pursing but actually different. The power action of the upper lip is that of being moved outward without shape change. The lower lip thus behaves as flowing fluid to move the upper lip outward. It is like a bar of fluid below and across a tensioned belt. Both ends of the bar are flowed up progressively in a balanced way and forward so as to drive the belt forward.**

**Be careful not to purse W. The upper lip is dragged out with the lower lip starting near center and going out. The lower lip stays essentially flat and moves outward. W does not put the lips together although it may if they are moist in the center. The inner part of the center may also be moist but parts of the lip exposed to air are not useable. The center of the lip is too massive. The best W does the center and requires precision action. W also has right side moving first out of mouth. The forward side of W is weakest but moves out first and has more pulling power because it is nearest the center of the lips. The correct W pulls the upper lip out a definite distance. W shows V on left and V on right superimposed. It is like a V but has two V's. V starts in the middle of the lip and pulls out at the middle down at 45 degrees. W has two Vs because it is a belt. W uses teeth on each side as one side of each V. The sound vibrations in the air stream are filtered by the varying shape of the passageway resulting in the characteristic sound of the W = 3-6 consonant.**

**X=2-1. X pictures the tongue rising from its root to the palate where it makes contact at two points and then curled down to the bottom of the mouth behind the lower front teeth. The tip and root form the bottom points of the X.**

**The tongue leans backward from the root contacting the roof and breakdown at the rear contact point of the tongue with the roof causes a shift to support by the front contact point of the tongue with the roof. Crystal builds up at the back of the throat. The tongue reaches furthest back for X than any other letter, essentially an unknown part of the throat. The tongue acts like the sloshing of a liquid sphere. The sloshing breaks down crystal edges. X requires a minimum force for breakdown. As this force is achieved there is a sudden decrease in opposing force. The sound vibrations in the air stream are filtered by the varying shape of the passageway resulting in the characteristic sound of the X = 2-1 consonant.**

**Y = 2-2. Y pictures the tongue rising from the root to the palate near the front teeth with its tip touching the back of the front teeth and with a second contact further back. Initially the tongue is spherical.**

**For the long vowel Y the tongue is initially spherical but becomes Y shaped during contact. It flattens first. The operator tends to go toward the lips so that most of the 2 tends to remain in the backward branch. Care is taken that turbulent breakdown does not occur. During enunciation, or in position for it, the tongue can be equally moved to neighboring positions in all directions. This demonstrates the buoyancy effect of surface tension. The sound vibrations in the air stream are filtered by the varying shape of the passageway resulting in the characteristic sounds of the long Y = 2-2 vowel.**

**The vowel short Y is performed by careful balancing of the tongue on the palate. There is a constant balancing motion required and this makes up the sound of the Y. This corresponds to keeping one liquid sphere pressed on another without flattening. If breakdown were to occur the film would be penetrated. If there is no breakdown the contact is frictionless so that any non perpendicular force will cause inertial acceleration forward. The velocity and pressure must be kept low enough that breakdown does not occur. This demonstrates the zero viscosity of 2 when the surface energy is constant. The sound vibrations in the air stream are filtered by the varying shape of the passageway resulting in the characteristic sounds of the short Y = 2-2 vowel.**

**For the consonant Y the tongue is drawn back in the throat and the tongue is thrust up very slowly and carefully with increasing force from its root perpendicular to the surface of the throat opposite. The tongue can revolve at the root so the tongue contact can shift forward. This demonstrates the "yaw" effect whereby one liquid 2 sphere pressed on**

**another 2 sphere shifts to one side. The sound is that of the sphere slipping to the side but in such a careful manner that breakdown does not occur. The sound vibrations in the air stream are filtered by the varying shape of the passageway resulting in the characteristic sound of the Y = 2-2 consonant.**

**Z=1-1. Z pictures the tongue lying backward from the root on the floor of the mouth, then ascending forward so the tip is at the roof of the mouth, then with the tongue behind the tip projecting rearward along the palate.**

**The tongue top section 1 is formed into a rigid perfectly flat shape and slides without resistance on the palate 1. The action is performed with care and gentleness so that there is no breakdown. It is a natural straightening action of the tongue. The action is pure motion since no forces are present. The sound vibrations in the air stream are filtered by the varying shape of the passageway resulting in the characteristic sound of the Z = 1-1 consonant.**

**HOW TO OPERATE AND SOUND THE LOWER AND UPPER CASE LETTERS (speculative)**

**If the letters are printed with a rough surface and rubbed left to right they will make their corresponding sounds.**

**The mouth part of the sounds of the letters is made by sliding a narrow vertical bar from left to right over the letter. The bar and letter surfaces are slightly abrasive so as to make a sound. The length of contact of the bar with a line width slanting at any angle is proportional to the strength of the sound. The duration of the sound will be proportional to the horizontal projection of the slanted line width. The pitch of the sound rises with height of the contact point of bar and slanted line width. Two or more contact points or areas therefore results in an impure sound.**

**An uppercase letter pictures an isolated perfect body tool. The working end of the tool is represented by the upper end of the letter. The handle of the tool is represented by the lower end of the letter. Isolated bodies tend to be symmetrical. Uppercase letters picture isolated bodies. Therefore uppercase letters tend to be symmetrical in shape.**

**The letters are mineral equivalents of the complex mouth muscular structure. The mineral tool equivalent is somewhat similar to the mouth configuration for the letter. The mineral tools are shaped for operator use for the particular action. What shape the operator needs is not very obvious. But by comparing mouth configurations with uppercase letters it is possible to guess what the corresponding tools are and their use.**

**For device interaction bodies are embedded in the device and environment and their interaction is controlled by operator handling of the entireties rather than the bodies directly.**

**The shape of the letters is very important in determining proper manipulation. The shape also determines alternative manipulations. A letter pictures a tool which can be manipulated in any arbitrary way, depending on the operator's need. A letter shape is designed for operation of a body of the first type of that letter on another body of the second type of that letter.**

**The letters represent the set of actions of the letter tools. They can communicate these actions. Therefore they provide an exact method of gift selection.**

**Letter interactions are rather arbitrary and argumentative. Consequently the letter forms are also argumentative. This explains the reason for the many fonts.**

**The discussion below presents only a few of the many aspects of the letter actions.**

**A = 6-1. A long duration weak pure sound followed by an equal duration stronger pure sound.**

**The A tool is gripped at the base with its apex applied to a crystal 1 as for the "awl". The apex may be considered to be rounded with a surface acting as a tensioned belt 6. It cleaves or splits crystals such as cubic or fiber crystals. It may function like an ax whose edge abrades or breaks through any wood fibers which are misaligned with the straight line direction of motion of the heavy tool. The sides of A are flat so that they are useful for abrading the flat faces of a crystal. The apex lacks a cursive which would interfere with abrading. The heavy side is best for abrading. The thin side vibrates which helps align the heavy side with the crystal face.**
**Micro-Micro= frictional right leg abrades natural crystal**
**Micro-Macro=frictional right leg abrades cell entities that have a fixed positional relationship.**
**Macro-Macro=flexible end weighted prong strikes cell entities that have a fixed positional relationship**
**Macro-Micro=flexible end weighted prong strikes a natural crystal.**

**B = 6-2. The two ending somewhat chord-like sounds indicate an E sound formed by two strong sounds closer together in pitch than the trailing sounds of E. E also has slight plosive ending that B does not have.**

**The B tool is gripped on the lower loop. The tool may be rotated about the base so that the top of the upper loop serving as a tensioned belt 6 is abraded against a liquid sphere 2 so as to break it down into turbulence 1. B only presses into a liquid rather than undesirably penetrating and scattering a liquid as the E shape would do. The action is that of a "bat" or "beater". The bottom serves as a handle which prevents twisting during the beat action. The B does not trap liquid in a cavity which would result in result in reduction in frictional surface acting on the liquid. The cursive at the top provides a cavitation effect.**
**Micro-Micro=frictional upper loop rubs natural liquid**
**Micro-Macro=frictional side of rug beater rubs weft**
**Macro-Macro=flexible rug beater rod or end weighted prong 6 strikes and flexes against weft 2 in rug**
**Macro-Micro=flexible end weighted prong strikes a natural liquid.**

**C = 6-3. A rapidly increasing strong sound shortly decreases quickly to a weak high and low pitch pure sound.**

**C outer surface can serve as a tensioned belt 6 abrading a large area of fluid 3. C is not required to penetrate the fluid body because the surface of a fluid body has the same force characteristics as the inner volume. The surface of a fluid offers the same force as its interior. Therefore C has no ability to penetrate. C has a curved shape rather than linear in order to fit surfaces of various curvatures. In zero gravity it is useful as a cup because its smooth contour does not impede fluid flow. A sharp angle impedes the flow. The entirety of the letter is devoted to containing a volume. The cursive separates the fluid from the outside of the cup at the surface, making it easier to remove the cup from the fluid.**
**Micro-Micro=frictional side rubs against natural fluid.**
**Micro-Macro=frictional side rubs against a suspension of a single crystal in a drop of water or liquid.**
**Macro-Macro=a flexible prong acts on a suspension of a single crystal in a drop of water or liquid.**
**Macro-Micro= an end weighted flexible prong acts on a natural fluid.**

**D = 6-4. A strong sound starts suddenly and ends suddenly, is continued by two very weak sounds which then quickly increase to a strong sound which then gradually decreases and cuts off. Differs from B by a stronger purer ending sound.**

**The D shape is a rigid lightweight shape which can perform 4 breakdown. It may be assumed to be bounded by a tensioned belt 6. An elastic 4 offers no surface force and therefore the top of D must press into it. The D functions as a large handle which the**

**operator can easily control for simple coarse actions. It has a wide surface useful for acting on a broad object. The stem affords a good grip for applying strong pressure and friction. The force is applied on a singly convex surface so that a broader deeper effect is obtained. The curvature enables a high maximum pressure decreasing with increase in contact length.**
**Micro-Micro=top frictional edge presses elastic 4 and stretches it**
**Micro-Macro=frictional body abrades a cell containing fluid and liquid film.**
**Macro-Macro=flexible prong strikes a cell containing fluid and liquid film.**
**Macro-Micro=flexible prong strikes a natural elastic body.**

**E = 6-5. Ends in a weak pure widely separated chord.**

**E is the structure for 5. It can apply strong force because it is balanced. The E cursives function with zero penetration. The letter represents two possible structures. The ends of the E flexible prongs may be masses. This is a useful tool for edging action on soft material such as cake icing. The flexible prongs do not catch on objects yet offer large collision force. The E prongs can also be interpreted as enabling a strong pressure and tense belt or friction to be used on hard masses 5. The prongs can get into small depressions and will vibrate to clean out the frictional surface. The letter is lightweight so as to obviate the problem of controlling inertia.**
**Micro-Micro=frictional edges of top and bottom prongs etch natural inertial material**
**Micro-Macro=frictional belt abrades cell elastic and fluid material**
**Macro-Macro=flexible prong strikes cell elastic containing fluid**
**Macro-Micro=flexible prong nicks natural inertial material.**

**F = 6-6. A suddenly increasing and decreasing strong sound followed by shortly by two successive weak plosives.**

**F is handled only from bottom and leverage is limited. F maximizes the power transmitted from 6 to 6. The hooks on the F enable it to engage the other 6 body so as to pull and push it in all directions without power loss. The tool is meant to apply force at the upper end with the handle at the bottom. The hooks enclose a cavity free of the hand into which an object can be jammed. They are of the correct separation and the cavity is of the correct size in relation to the hand. Such an object may be round with a tensioned frictional skin. The small diameter of the handle allows control with the fingers. The handle is free of sharp points. The action is that of a fork.**
**Micro-Micro=frictional edge of top prong cursive grips natural frictional 6**
**Micro-Macro=frictional edge of top prong cursive belt grips flexible prong**
**Macro-Macro=flexible top prong cursive body collides with and flexes against same**
**Macro-Micro=very sharp end of top prong cursive penetrates and snags natural frictional surface.**

**G = 5-1. G is similar to C except G has a medium sound lower sound. This is gotten from a lowered back of the tongue, which must be raised to begin the E sound. The voicing of E must wait for the ending breathy G sound.**

**G pictures an open cavity in a mass with an anvil in the cavity for the operator to press on. The top of the G presses on 1 in a grinding action. The top cursive keeps the powder out of the G cavity, keeping the mass of the G from increasing. For G there is a holding of the crystal in a kind of gaffing action.**
**Micro-Micro=top of G impacts natural crystal 1**
**Micro-Macro=top of G impacts cell entities that have a fixed positional relationship.**
**Macro-Macro=fluid filled elastic cell impacts cell entities that have a fixed positional relationship.**
**Macro-Micro=fluid filled elastic cell impacts natural crystal 1.**

**H = 5-2. A loud sound is suddenly started and stopped. A faint pure sound continues for an equal duration followed by a sudden starting and stopping of a loud sound.**

**A mass in the shape of H impacts a liquid sphere in a "hit" collision action because of the symmetry of the H about its vertical center line which gives a balanced impact. Penetration is limited because of the broadness of the letter and the presence of the crossbar.**
**Micro-Micro=top of H 5 impacts natural liquid 2**
**Micro-Macro=top of H 5 impacts weft fiber**
**Macro-Macro=fluid filled elastic cell impacts weft fiber**
**Macro-Micro=fluid filled elastic cell impacts natural liquid 2**

**J = 5-3. Begins with a weak plosive, made with the tip of the tongue, and trailing sound and then a sudden strong sound which ends suddenly. C has a very weak ending sound, G a medium ending sound, and J a strong ending sound.**

**The curved section serves as the handle. The tool is wielded so that the top strikes an object in an easily deflected uncontrolled manner in a jabbing action. The sharp cursive provides some penetration but also limits it.**
**Micro-Micro=top of H 5 impacts natural fluid 3**
**Micro-Macro=top of H 5 impacts a suspension of uncooked rice in water.**
**Macro-Macro=fluid filled elastic cell impacts a suspension of uncooked rice in water.**
**Macro-Micro=fluid filled elastic cell impacts natural fluid 3**

**I = 5-4. A strong sound starts and ends suddenly.**

**The stem serves as the handle. The cursives are crossbars. They serve as imprinters when the tool is struck against an elastic surface. The I imprints deeply because it is massive and narrow. The imprint application refers to the short vowel. This is the impure version of the letter because the 3 and 4 body types become mixed during breakdown. The motion of the tool is more complex than elastic compression would involve. As breakdown occurs further motion occurs without increase in force. Displacement is no longer displacement related. A mixture of elastic force and viscosity force begins to occur. The mass 5 begins to slow down differently. There may be either an increase or decrease in the rate of slowing down. If the tool has indentations on its face these may take in the flow of fluid, the elastic being unable to fill them in previously. It is symmetric to assure a uniform imprint. The single imprint surface assures uniformity. The simple structure guarantees freedom from vibration during the impact. Both the top and bottom can imprint. This assures that the tool remains in balance after long use. The tool must be sufficiently long for this. The tool is narrow so that angular momentum will not be a problem in the hand controlling the angle of the tool during its intended short distance of travel. It is a desk tool rather than a missile.**
**Micro-Micro=top of I 5 impacts natural elastic 4**
**Micro-Macro=top of I 5 impacts a cell fluid containing liquid film.**
**Macro-Macro=fluid filled elastic cell impacts a cell fluid containing liquid film.**
**Macro-Micro=fluid filled elastic cell impacts a cell fluid containing liquid film.**

**Θ(THETA)** = 5-5**. Theta differs from T in not having a strong middle sound. Theta has a uniform sound that never gets very strong.**

**The vertical ticks delimit the tool. It is a kind of locator. The outer circle actually does not exist but is an indicator of empty space. The size is such as being held by the fingers. The tool is simply a tapper. It taps the environment by making gentle collisions that do not damage the tapper or environment. It may serve as a locator or attention director. It is shown as a tool which fits easily into the palm of the hand. This suggests that it is not to do interaction while being in the hand. Interpreted as having cursives it may be thrown with spin. The spin prevents deflection from a straight line path. The object is shown without surface irregularities. This insures minimum air resistance and maximum path stability.**
**Micro-Micro=a natural mass object impacts a natural mass object.**
**Micro-Macro=a natural mass object impacts a fluid filled elastic cell.**
**Macro-Macro=fluid filled elastic cell impacts a fluid filled elastic cell.**
**Macro-Micro=fluid filled elastic cell impacts a natural mass object.**

**K = 5-6. A strong initial sound followed by a longer duration medium sound coincident with a weak sound. The ending A sound is a purer sound. Both A and K end with a sound lowering in pitch gotten by opening of the mouth.**

**A mass 5 interacts with a power transferring body 6 without breakdown. Therefore it is a letter representing action of great carefulness and skill. The letter pictures the incident 5 body on the left as the stem, the prongs of the K serving as the handle of the 5 body, as for a knocker. The lower case has the 5 body off center to minimize interaction. The interaction is increased by centering for the uppercase letter.**
**Micro-Micro=a natural mass object impacts a frictional belt**
**Micro-Macro=a natural mass object impacts a flexible end weighted prong**
**Macro-Macro=a fluid filled elastic cell impacts a flexible end weighted prong**
**Macro-Micro=a fluid filled elastic cell impacts a frictional belt**

**L =4-1. A suddenly starting and stopping strong sound followed by a trailing long duration weak low pitch sound gotten by lowering of the tongue.**

**The base of the L is in a flexed (as for a lash) or unflexed position (as for a lid with handle) in relation to the stem. The stem serves as a handle. A crystal 1 is subjected to pressure from an elastic body 4. As soon as the minimum stress for breakage is reached by the compressing of the elastic, breakage occurs. For L the flexible lower bar whips about after breakage of 1, imparting energy to the crystal pieces and thus maximizing energy input into the crystal.**
**Micro-Micro=a natural elastic 4 presses on a natural crystal 1.**
**Micro-Macro=a natural elastic 4 presses on cell constituents that have a fixed positional relationship.**
**Macro-Macro=a cell fluid containing liquid film presses on cell entities that have a fixed positional relationship.**
**Macro-Micro=a cell fluid containing liquid film presses on a natural crystal 1.**

**M = 4-2. Has a very short duration strong sound and then a long duration medium sound lowering in pitch produced through the nose, a weak sound rising in pitch, and a strong suddenly starting and ending sound. The latter is gotten by opening the mouth.**

**M involves a middle section that can elastically flip up or down. M is symmetric allowing it to bracket objects. Allowed to flip out against a liquid it can serve as a mixer. Maximization of energy input is achieved by matching of force constants. The M structure, containing two thin flexible bars, maximizes the elastic energy which can be inputted into a liquid. Forcing the M into a liquid flexes the bars which are designed to match the force constants of the liquid body.**
**Micro-Micro=the cursors trap liquid 2 against a surface and the operator manipulates the elastic right stem to squeeze it about so as to make turbulence.**
**Micro-Macro=a natural elastic presses on weft fiber**
**Macro-Macro=a cell fluid containing liquid film presses on weft fiber**
**Macro-Micro=a cell fluid containing liquid film presses on natural liquid.**

**N = 4-3. Starts with a very short duration strong sound followed by a medium strong sound lowering in pitch and then a strong very short duration sound made as a plosive by the tip of the tongue. This contrasts with the longer duration plosive M made by the lips.**

**N is asymmetric giving it one side action. The multiply flexed N serves as a nail or needle when released. As a nail it contains its own hammer.**
**Micro-Micro=if pressed between two surfaces the thick middle bar slides to the left on a surface on fluid 3 with an increasing length of contact.**
**Micro-Macro=natural elastic 4 presses on a suspension of uncooked rice in water.**
**Macro-Macro=a cell fluid containing liquid film presses on a suspension of uncooked rice in water.**
**Macro-Micro=a cell fluid containing liquid film presses on natural fluid.**

**O = 4-4. A gradually increasing strong sound ending suddenly, a weak transition by two sounds to a sudden strong sound which ends gradually.**

**O serves as an elastic body which can act on another elastic body. O can serve as an opener because something that is closed uses elastic force to stay closed. The opener is pressed on the closed object to perform the opening action. The action is reversible.**
**Micro-Micro=one O of natural elastic compresses another inside it.**
**Micro-Macro=one O of natural elastic compresses a cell fluid containing liquid film**
**Macro-Macro=a cell fluid containing liquid film compresses a cell fluid containing liquid film.**
**Macro-Micro=a cell fluid containing liquid film compresses natural elastic 4.**

**P = 4-5. A sudden strong sound followed by two equal duration very weak chord sound followed by an equal duration medium strong sound ending somewhat gradually.**

**An elastic body 4, the loop on the right, is initially compressed against an inertial body 5. The stem serves as the handle and may flex also. The elastic body expands transferring its energy into kinetic energy of the inertial body. There is no damage to the elastic body. Avoidance of damage is indicated by the off-center location of the elastic, which reduces the interaction capability of the operator.**
**Micro-Micro= a natural elastic body 4 is flexed against a natural mass body 5.**
**Micro-Macro=a natural elastic body 4 is flexed against a cell fluid containing liquid film.**
**Macro-Macro=a cell fluid containing liquid film compresses against a fluid filled elastic cell**
**Macro-Micro=a cell fluid containing a liquid film presses against a natural mass body 5.**

**Q = 4-6. A sudden medium strength sound changing to two weaker sounds followed by an equal length very strong sound.**

**Q represents an elastic body held by the bottom and tail. The tail helps increase control. The body is cautiously touched to a belt 6 which has some environment. For example, Q may be used to hit and impel the side of a horizontal bag of candy which in turn impels pieces of candy out of the bag in a quaffing action. The upper case Q relates to a higher energy interaction of 4 and 6.**
**Micro-Micro=a natural elastic body 4 is flexed against a natural frictional body.**
**Micro-Macro=a natural elastic body 4 is flexed against an endweighted elastic prong.**
**Macro-Macro=a cell fluid containing liquid film presses on an endweighted elastic prong**
**Macro-Micro=a cell fluid containing liquid film presses on a natural frictional body.**

**R =3-1. A sudden strong sound changing to an equal duration weak sound followed by an equal duration stronger sound lowering in pitch.**

**The presence of 3 within the device enables the operator to adjust his position within the device. It also enables easy adjustment of the operator with respect to his position in the environment. "position of device" is not well defined if 3 is present in the device. R is especially designed to enable an operator to easily perform the 3-1 action. R represents a fluid body held by the bottom section of the stem. The stem is moved to rub the end of the prong on crystal 1 bodies. The uniform width of the prong improves control. The thickness of the cursive on the prong cues the operator to a limited distance of rubbing because it quickly wears through. The force must be small because of the large distance through which the operator force is transmitted. Pressure perpendicular to the surface must be avoided. Alignment with the bottom of the handle facilitates this control. The loop adds moment of inertia so as to stabilize against rotation. The entire bottom of the R may be grasped and the top rubbed on the crystal. The angled prong discourages wrist action in favor of arm motion, enabling a more even rubbing action.**
**Micro-Micro=the natural fluid prong 3 is rubbed on a natural crystal body 1.**
**Micro-Macro=the natural fluid prong 3 is rubbed on cell constituents that have a fixed positional relationship.**
**Macro-Macro=a suspension of uncooked rice in water is pressed on cell constituents that have a fixed positional relationship.**
**Macro-Micro=a suspension of uncooked rice in water is pressed on a natural crystal body.**

**S =3-2. Sudden starting of three approximately equal sounds which stop suddenly.**

**The 3 body is represented by the letter figure. The lower part of the S serves as the handle**

**of the body. The upper part of the body stirs a liquid body 2 by being moved forward in it and rotating so as to create swirling and turbulence.**
**Micro-Micro=the upper part of S fluid body 3 is swirled in a natural liquid body 2.**
**Micro-Macro=the upper part of S fluid body 3 is swirled on weft fiber**
**Macro-Macro=a suspension of uncooked rice in water is sheared on weft fiber**
**Macro-Micro=a suspension of uncooked rice in water is sheared on a natural liquid body 2.**

**T =3-3. A starting weak high pitched sound and then a suddenly starting and stopping strong sound and a second weak high pitched sound. Does not have the breathy ending that D has.**

**T represents a fluid body held by the stem. T is operated carefully so there is no breakdown. It may be operated as a "tacker" by applying a fluid with the top bar. The top bar gives it positioning capability. T cannot be slid on the surface of a 3 body without breakdown. Therefore T is only touched to it. The upper cursives prevent peaks and bumps on the 3 body from getting on the underside of T.**
**Micro-Micro=a natural fluid body rubs on a natural fluid body**
**Micro-Macro=a natural fluid body shears a suspension of uncooked rice in water**
**Macro-Macro=a suspension of a single crystal in water shears a suspension of a single crystal in water**
**Macro-Micro=a suspension of a single crystal in water shears a natural fluid body**

**U =3-4. A sudden strong sound followed by an equal duration weak sound and then a sudden increasing and suddenly ceasing strong sound.**

**U represents a fluid body which can be pressed and slid on its side. It is applied to a 4 body slowly so as to avoid breakdown of the fluid. Its operation is a "use" action. A "use" action always involves operation of the U body on an elastic body 4. It is an operation that always wastes energy and which always distorts the other body but only in a temporary way. It is an operation that must be carefully done so as to remain in control. The controlling body is never broken down.**
**Micro-Micro=a natural fluid body shears a natural elastic body**
**Micro-Macro=a natural fluid body shears a cell fluid containing a liquid film**
**Macro-Macro=a suspension of uncooked rice in water shears a cell fluid containing a liquid film**
**Macro-Micro=a suspension of uncooked rice in water shears a natural elastic body**

**V = 3-5. A gradually increasing strong sound and a trailing weak sound.**

**V represents a fluid body. The left side is held by the operator and the right side is used deviate the motion of a mass body 5 in a "veer" action. No damage occurs. The interaction is transient, depending on the amount of deviation desired. A 3 body exerts too weak a force to control the magnitude of velocity. It can only change zero components of velocity. The cursives on V enable the prevention of sliding too far in one direction since they will wear thin.**
**Micro-Micro=a natural fluid body shears a natural inertial body**
**Micro-Macro=a natural fluid body shears a fluid filled elastic cell**
**Macro-Macro=a suspension of uncooked rice in water shears a fluid filled elastic cell**
**Macro-Micro=a suspension of uncooked rice in water shears a natural inertial body**

**W = 3-6. A gradually increasing strong sound is followed by a short weak sound and then another identical strong sound and then a trailing weak sound.**

**The bottom of the W is gripped and the top contacts the 6 object. The sharp bottom of W discourages pressing. The cursives on W require equal back and forth action to prevent wearing thin. The action is gentle and cautious in order to prevent damage to the W tool. Since the environment in back of the 6 layer is subjected to constant action from W it wears out. Since W is fluid any action by W permanently alters its shape. The action of W is a "wash" or "wipe" operation.**
**Micro-Micro=a natural fluid body shears a natural frictional body**
**Micro-Macro=a natural fluid body shears a flexible end weighted elastic prong**
**Macro-Macro=a suspension of uncooked rice in water shears a flexible end weighted elastic prong**
**Macro-Micro=a suspension of uncooked rice in water shears a natural frictional body**

**X = 2-1. A medium strength sound lowering in pitch combined with a weak sound rising in pitch. The medium sound is same as ending A sound. The lowering pitch is produced by a lowering of the back of the tongue. The simultaneous weak sound is made by a raising of the tip of the tongue.**

**A macro liquid unit consists of two crossed crystal fibers. One is thick, the other thin. The thick fiber tends to move out of the way when encountered. A crystal 1 is subjected briefly to pressure by operation of a drop of liquid. The bottom of the liquid drop is gripped and the top contacts and spreads about the 1 object. The action can be only momentary because exact balance of force cannot be achieved. The crystal breaks unpredictably and destroys the momentary balance of force. The action is that of playing a xylophone, where momentary balance is destroyed by the unpredictable deflection of the plate.**
**Micro-Micro=a natural liquid body presses on a natural crystal**
**Micro-Macro=a natural liquid body presses on cell constituents that have a fixed positional relationship.**

**Macro-Macro=weft fiber presses on cell constituents that have a fixed positional relationship.**
**Macro-Micro=weft fiber presses on a natural crystal**

**Y = 2-2. A medium pure sound that suddenly increases in volume and then smoothly decreases to the original volume followed by a constant weak pure sound.**

**If pressed directly together two drops of immiscible liquid will store operator energy. The stored energy may be returned to the operator. One drop may be slid over the other in a "yaw" action. In both cases gentleness and care are practiced to avoid breakdown. The operator grips the base of the Y and applies the Y body directly to a drop of liquid so that it does not slip to one side. Very accurate positioning must be done to achieve this, rather than relying on skill or reflexes. The Y tool may be constructed of non-liquid material provided it contains an adhering surface film of liquid.**
**Micro-Micro=a natural liquid body presses on a natural liquid body**
**Micro-Macro=a natural liquid body presses on weft fiber**
**Macro-Macro=weft fiber presses on weft fiber**
**Macro-Micro=weft fiber presses on a natural liquid body**

**Z = 1-1. Has a medium strong sound that rises in pitch combined with a weak widely spaced chord sound. The rise in pitch is gotten by raising the tongue gradually toward the palate.**

**The operator grips the bottom of the Z crystal and presses the top on the face of another crystal. Sliding can be performed if the force between faces is maintained exactly perpendicular and centered. Action must be performed with gentleness and care to avoid breakdown. Exact balance of force can be precalculated from the crystal forms. The action is that of the starting action of a zipper.**
**Micro-Micro=a natural crystal presses on a natural crystal**
**Micro-Macro=a natural crystal presses on cell constituents that have a fixed positional relationship.**
**Macro-Macro=cell constituents that have a fixed positional relationship press on cell constituents that have a fixed positional relationship.**
**Macro-Micro=cell constituents that have a fixed positional relationship press on a natural crystal body.**

**DEFINITION OF VOWELS AND CONSONANTS**

**Vowels are letters that involve large energies and have long duration. They do not control the actions of other letters. Consonants or vowels acting as consonants have small energy**

**and exhibit transient behavior. They control the actions of vowels, either by initiating the action or making it workable, or by terminating the action. The terminating action of a word either stops the action if the device is not to be removed, or facilitates removal of the device.**

**A consonant is a higher type of letter than a vowel. As such it may be preferable to give it a higher weighting in word matching for gift selection.**

**A vowel represents an action which involves at least ten times the energy of a consonant. The vowel action may have a longer time duration than a consonant or may involve a force which is more than ten times that of a consonant while acting through at least the same distance.**

**Vowels are actions that persist after the operation of the device. These actions take in energy directly from the environment to be absorbed by the device. Consonants do not do this. In this way a mechanical device acts exactly like a living individual which consumes energy from the environment.**

**Vowels are good absorbers of energy. A body is a good absorber of energy if it has a high energy absorption per unit distance. For a 6 body the best energy absorbers are crystals 1 and mass 5, corresponding to vowels A and E. For a 5 body the best energy absorber is elastic 4, corresponding to the vowel I. For a 4 body the best energy absorber is elastic 4, corresponding to the vowel O. For a 3 body the best energy absorber is 4, corresponding to the vowel U. For a 2 body the best energy absorber is 2, corresponding to the vowel Y.**

**Breakdown is the important feature of all vowels. All the letters are aimed at breakdown though weaker letters are more subtle at it. The environmental 4 in 4-4 is more likely to be broken down than the environmental 4 in 3-4. This is to be expected because 3 is weaker than 4. In 3-4 a likely breakdown is that of 1 occurring outside of 4 by means of a 6 component contained in 3. In 4-4 a 6 component contained in the operator 4 may break down a small amount of the environmental 4, resulting for example in shape change of the 4 as by cutting.**

**Under constant lung air pressure the larynx is capable of much faster sound utterances than the vowels formed by the mouth. The powerful vowel actions are slow and difficult to start and stop. Speech made up only of vowels would be very slow. Consonants carry information. They do not slow down vowel starting and stopping. For this reason syllables usually start and stop with a consonant.**

**Any consonant can be stretched out in duration so it has a vowel sound and any vowel can be made consonant-like by a short duration.**

**COMPARISON OF HAND AND MOUTH CONFIGURATIONS**

**The hand and mouth configurations for manipulating and speaking are similar. The thumb is the controlling part of the hand on the tool. The fingers are the supporting part of the hand on the tool. The fingers correspond to the lower part of the tongue and the thumb corresponds to the interacting end of the tongue, or they correspond to the upper and lower lips.**

**"A"=6-1. For AWL the thumb is pressed firmly without tension, similarly to the tongue in the mouth.**
**"B"=6-2. For BAG the hand is rotated as is the lower lip.**
**"C"=6-3. For CARVE the surface of the tongue is on roof of mouth just as the thumb is pressed.**
**"D"=6-4. In DRAG the tip of the thumb is used like the tongue in the mouth.**
**"E"=6-5. For EDGE the thumb presses upward against the edger just like the tongue tenses and presses upward for the 6-5 in the mouth.**
**"F"=6-6. In FIRM the thumb is essentially inactive as in the mouth.**
**"G"=5-1. In GRAB the thumb impacts like the tongue.**
**"H"=5-2. In HOLD the edges of the cupped thumb impact.**
**"J"=5-3. In JERK the front section of the thumb is pressed hard.**
**"I"=5-4. In ITCH, or IRON the thumb and fingers are aligned and impacted. This agrees with the mouth.**
**"TH"=5-5. In THROW the curled thumb and tongue are lightly impacted.**
**"K"=5-6. In KEEP the back of the tongue and thumb are lightly impacted.**
**"L"=4-1. In LOB the flexible front section of the thumb and tongue are used.**
**"M"=4-2. In MIX the thumb and lip are compressed against an easily moving part.**
**"N"=4-3. In NAB the cupped tongue and thumb are compressed.**
**"O"=4-4. OAR uses a rounded grip that is shaped like the rounded shape of the lips for 4-4.**
**"P"=4-5. In PUSH the thumb gently flexes and releases similar to configuration of the lips for 4-5.**
**"Q"=4-6. In QUASH the thumb cautiously flexes similar to the mouth conformation of 4-6.**
**"R"=3-1. In RUB the middle of the curled thumb slides, similarly for tongue.**
**"S"=3-2. In SAW the tip section of the curled thumb slides, similarly for the mouth.**
**"T"=3-3. In TAKE the end section of the thumb gently presses and slides, similarly to the mouth.**
**"U"=3-4. In USE edges of the cupped thumb gently slide is in a way similar to the configuration of the mouth for 3-4.**
**"V"=3-5. In VISE the cupped thumb gently impacts, as does the lip for 3-5.**
**"W"=3-6. In WIPE the cupped thumb gently and cautiously slides and spreads, as does the lower lip in the mouth.**

**"X"=2-1. For XYLOPHONE the cupped thumb is pressed to slide. The tongue is similarly situated for 2-1.**
**"Y"=2-2. For YAW the thumb slides gently to one side just as for the mouth.**
**"Z"=1-1. In ZIP the rigidly end section of the thumb gently slides. In the mouth the tip section of the tongue slides.**

**PREDICTING LETTER COMBINATIONS**

**It is possible to calculate the statistics of letter combinations from a knowledge of the six types. Words begin and end with consonant combinations. There may be 0, 1, 2 or more consonants in sequence before and after the vowel. Combinations of consonants vary in frequency of occurrence in words.**

**The vowel sound in a word builds up gradually to a constant value. It then terminates by gradually dying out.**

**The enunciation of a letter modifies the enunciation of the next letter. It also modifies the enunciation of all following letters but to a lesser extent. Consonants preceding a vowel modify the enunciation of the vowel. The result is a "variety" of that vowel. The variety is defined by the preceding consonants. The enunciation of the "variety" alone communicates the preceding consonants as well as the vowel. The variety is also defined by the anticipation of the succeeding consonants. Thus enunciation of the vowel variety also communicates the succeeding consonants.**

**Letters may represent mechanical interactions of body types in the environment of the operator. Instead of air stream the motion of the first digit bodies is involved. The results for vowel modifications and consonant frequencies are the same in this case also.**

**Allowed combinations of two or more consonants at the start of a one syllable word are those which transmit the first letter well. Thus transmission is measured well by power of the consonant. The most powerful consonants are b, c, d, f. They cannot be preceded by a non silent consonant because they overpower the preceding consonant. The result is that the preceding consonant cannot affect the succeeding vowel. They derive their power from the fact that their first digit is 6. Consonants having a first digit equal to 5 are also powerful. In only a few cases do they transmit a preceding consonant. "h" is weaker because it works against liquid 2. "k" is weakened because it must work against a powerful 6. Both h and k can be preceded by "s" and "h" also by "c" and "p" and "w". The consonants r to q can exist in many combinations.**

**The combining of consonants after a vowel is much less restricted. These consonants must cause the vowel sound to die out quickly. The terminating combination must be reliably weak. As a second consonant R is not suitable because 1 is unpredictable. L has some of**

**the problem of R and is infrequent as a second consonant. The remaining consonants are frequent second consonants. S is most predictive and variable in strength and can always terminate as a second or third consonant. t is also a good second consonant.**

**T, v, w are already weakest and can be followed only by s, which can be as weak as desired. P, k, f are also weak because of the relation of their digits and are infrequent as a first consonant.**

**WORDS CODIFY THE MATERIALS AND THEIR PROPERTIES**

**It is not possible to know what materials can exist. Words are derived empirically. They can be studied to see what materials have been discovered and what the mechanical properties of these materials are.**

**STRUCTURE OF ONE SYLLABLE WORDS**

**Words are combinations of units which are letters. All one syllable words have the form of a middle enunciated vowel bounded by consonants which begin and end the vowel. Words have more energy than letters. Every multiunit entity contains an energy unit. Vowels are the energy units of the six groups of letters. A word must have energy so words are ordered on the six vowels. There are six categories of words.**

**As an example: beg, bag, rib, rod, rut, by. These have decreasing energies. In this group “beg” is the most important or valuable word, “by” the least important or valuable. Another such group with decreasing energies is: beat, awl, light, tow, rut, dye.**

**In a one syllable word one vowel contains the main action and energy of the word. A series of letters of increasing energy access the main vowel and a series of letters of decreasing energy terminate the main vowel.**

**An isolated letter represents the action of an operator body on an environment body. The environment body may be damaged by the interaction. The operator body is never damaged by the interaction. The damage a letter produces is always the same proportion to its energy. However, one letter may produce much less damage than another letter for the same interaction energy. The damage a letter produces for given energy is approximately in proportion to 6 + (op dig -env dig). Here “op dig” stands for “operator body digit” and “env dig” stands for “environment body digit”. According to this formula the A damage is 11, G and B damage is 10, O, F, and T damage is 6, W damage is 3.**

**A word stands for a device. In a word the damage the operator body of a letter produces may not be to the environment body of the same letter. It may be damage to the environment body of another letter, and more likely so if the latter digit is less than the**

**digit of the operator body. The damage may be indirect. The operator body may also have a cooperative effect of reducing damage to other operator bodies in the device. In this case its damage relates to the total damage of the device on the environment.**

**The same letter in different positions of a word may have different energies. For example, in SWEEP the second E has less energy than the first E. In CREASE the second E has less energy than the first E. The A has less energy than the first E, the S less than the A. The C has less energy than the R.**

**The damage produced by a letter in a word is of special interest. For the word RUB the isolated letters could produce damage proportional to 8, 5, 10 respectively. If U has 10 times the energy of R and 10 times the energy of B then the damage U does is 50, the damage R does is 8, and the damage B does is 10. R may damage 1. U may damage 4. B may damage 2. However, in the device U may tend damage 1 instead of 4. U finds it easier to continue the damage that R started than to damage 4. A damaged 1 is considered more vulnerable than an undamaged 1. U takes the easiest path to inflict damage. U produces a less intense damage to 1 in the device than R but over a larger area. B functions in a cooperative manner to help the overall operator device to escape with not damage to any of its parts. Thus B effect is shifted from direct damage to the environment to a cooperative effort to prevent damage to other operator bodies in the operator device. In this way it contributes to the total damage produced by the operator device.**

**Vowels tend to make syllables. If a word has two vowels the word may have more two syllable character. For example PAINT has more two syllable character than PANT. One syllable words having two vowels will represent a somewhat higher technology.**

## LANGUAGE EXPLICATED

**There is the often argued question as to whether language is not arbitrary coding of practical meanings, equivalent to assigning numbers randomly to meanings. Communication is never economically done by coding. Pictorial methods are always used in order to economize on use of human mentality. Representation can be done by direct pictorial method as in hieroglyphics. Or it can be done by pictorial representation of abstract characteristics or general types of materials and objects as is done in spoken and written phonic language.**

**Is language simply a coding of the properties of body parts? Words relate to sequential interactions of types of bodies. But there are certain conventions not included in the symbolism. These concern reflex type, interaction energies, method of interaction as contacts, what damage is to occur, how the operator is to make decisions and perform.**

**An operator has hands which can manipulate if there is a stimulus-response mechanism to**

**actuate them. The mechanism may be simple unconditioned reflex. A more capable mechanism is that of conditioned reflex. The mind is a third more advanced mechanism for actuation of manipulation. The mind is a linguistic mechanism. Device components in the situation are automatically inputted to it. The mind calculates manipulative device operation by use of the mind's linguistic mechanism. The output of the mind is associated to instincts for automatic selection of appropriate action.**

**The mind can calculate operation of devices not previously encountered. It can calculate new ways to operate known devices. The mind does not contain the data of all possible calculations as memory. While this would enable the same mental output it is not a natural structure for the physical body of the operator. Thus the mind is basically a calculator rather than a memory device.**

## THE GENERAL MEANING OF A WORD

**Words imply a time sequence of action, the sequence being that of the letters of the word. Initial actions are generally thought of as "general" meanings of words. The general meaning tries to encompass all the cases of use of the word. Sometimes actions tend to get broken off. If a word is a sequence of actions then sometimes this sequence gets broken off. Yet there is a tendency to attribute the word to this broken off sequence. Thus the first letter in this way gives the general meaning of a word. However, the general meaning also includes reference to use of a device which is capable of doing all the letters of the word. Thus the general meaning refers to simple visual observation of what actually occurs but also includes the fact that the capable device was used in performing the action. The word includes reference to the unknown environment so that the complete event is itself essentially unknown. Only the device and outer appearances are definitely known. The specific meaning of a verb refers to the results of further investigation to determine whether actions and effects implied by the second and other letters of the word took place.**

**A word however contains more than information about the actions that take place. The general meaning of a word also includes the purpose of the device the word represents. This information is contained in the silent letters of the word.**

## THE COMPLETE MEANING OF A WORD

**The meaning of a word includes all aspects of the behavior and manipulation of the device of the word. Both operator action and sensation are included. The meaning of a body is the body itself. However, aspects of the body correspond to aspects of the meaning of the body. The behavior of a device pair is resolved into a time sequence of body pair interactions whose behavior is the most energetic at the moment. But more than energy is involved in meaning. Low energy aspects of behavior are also important to meaning. Aspects unrelated to energy are involved in meaning. The first step in mastering meaning**

**is to understand the science and mathematics of each of the six types of bodies. The conventional approach to determination of meaning is that used by the scientific layman. Using dictionaries and comparing experience the layman may eventually determine the meaning of a particular word. He may arrive at the science of that particular device pair but is little better prepared to determine the meaning of another word. He does not realize the relation of the particular to the meaning. The determination of meaning by the use of science of letters short circuits the layman's approach to meaning. It pays to do the science in the first place because it is the foundation. Such concepts as infinite time behavior, surface tension, force-velocity relationships should be taught at the start because they will be encountered in any search for meaning anyway. These concepts are the foundation of the mechanical manipulation of the environment which the hands and body are capable of performing. The higher sciences involve merely a more complex series of the same mechanical manipulations and thus merely a complexing of the same mechanical language. Rote methods of learning spelling and learning to quote dictionary meanings are inefficient and superficial.**

**Words are to refer to theoretical models. The thought process is to consist of a processing of theoretical models, a visualization of theoretical bodies, not a visualization of real things. Real things tend to be reflexed rather than thought. Words as theoretical models support and amplify thought.**

## LETTERS SUPPLY ONLY A PARTIAL DEFINITION

**The letters of a word give a skeleton to hang the meaning or definition on. The first letter gives the direction of the meaning or definition. The structure must be filled in with particular facts. Each of the six bodies can occur in many different varieties. Each body has many different aspects. Each body in a device-environment pair is a particular type and appears in a particular aspect. This makes it difficult to derive words strictly out of the general letters. Often it is desired to formulate a definition of a familiar word. While a word may be familiar there will usually be many unfamiliar aspects of the word that can be derived during the attempt to formulate its definition using the method of this book. It is helpful in discovering and remembering the types of each general body if one knows something about the general physical microscopic structure of each of the bodies. A word refers to a beneficial device-environment pair. As each letter is considered the problem is to discover or guess what particular types of the bodies of the letter contribute to the beneficiality of the word. In so doing one also often discovers what the benefits of the word are. These benefits are very important to the definition of the word. A word device-environment pair is of no value if one or more of the bodies is of the wrong type.**

## HOW DEVICES ACT ON THE ENVIRONMENT

**Bodies have the shape of letters and fit together and blend into each other to form a**

**mechanical device or tool. The environment also contains mechanical objects made up of sequences of bodies. The environmental object is often much larger than the device. The tool group is a more closely associated group than environmental group. The tool is a more circular group so that all tool bodies are close to each other, but all environment bodies are at maximum distance from one another. Thus the tool is a more cooperative group than the environment group.**

**Device bodies are internal or external. Types 3 and 6 bodies are external, types 4 and 5 bodies are internal. Internal bodies are accessed from outside the device. Sequencing of bodies in a device may be achieved by passing around a loop from external to internal to external or from internal to external to internal.**

**The operator needs to rotate or reverse the operating points of the device in order to achieve a useful result. In zero gravity the operator must remain in one location. Everything must return to him. During operation in order to interact the device he may use his arm to move the device into the environment and rotate it and bring it around and back to himself.**

## THE ORIGIN OF PRECISION IN MEANING

**The meaning of even a short word such as BE is very specific. It might be thought very unlikely that two letters alone would suggest a very specific meaning. The answer to this mystery lies in the requirement of efficiency. Each letter of BE represents a limitation on operation. The sequence of the two letters is a further limitation. These limitations are however very broad. A myriad devices, environments, and operators might be represented by BE. It is the requirement of efficiency that sharpens the meaning. The requirement of efficiency or benefit to the particular operator narrows the range of devices and environments, and background environments allowable for the action of the word. The limitations and abilities of the particular operator narrow the meaning and make the meaning specific to the operator. It is evident that "standardization" of the operator is necessary if the word is have the "same" meaning for different persons.**

**Examples:**

**"me" and "be". Any difference in meaning must originate from the consonants. The difference in the consonants is in 4-2 versus 6-2. 4 represents a weak and gradual force access to the E interaction. 6 represents a strong force access to the same interaction. This difference is the difference in meaning of ME and BE.**

**"rake" and "bake". In this case any difference in meaning derives only from the difference in "r" and "b" in the context. There is a different approach to starting the same procedure. For BAKE a 2 guards the environment, for RAKE a 1 guards it. The difference**

**in meaning is that of a powerful approach through 2 and a weak approach through 1.**

## SELF COMBATIVE WORDS AND ENVIRONMENT COMBATIVE WORDS

**The first letter of a one syllable word may indicate the general meaning of the word.**

**There are two types of these words. If the first letter is a breakdown type letter then the word refers to a device operation whereby the device damages the environment.**

**If the first letter is an equal or cooperative type of letter then the word refers to a device operation whereby only the environment of the device-environment pair is damaged.**

**For example, two such words are BE and WE. The first word is self serving, the second is cooperative.**

## GRAVITY AND WORDS

**One syllable words represent device interactions only in a zero gravity environment. The technology of higher mechanics is a correction to this contact area language. It treats gravity as its fundamental defining phenomenon. However, higher mechanics is only a small correction to material contact. Basically language is incapable of treating gravity as a first order phenomenon. Language is not efficient in a gravitational environment. This must be kept in mind when considering beneficiality. One syllable words must be interpreted as device interactions under the condition of zero gravity.**

**Language refers strictly only to what has evolved in the absence of gravity. Available objects or appurtenances are generally too gravitationally related to be handled correctly by language. Such include the ground, trees, lakes. All available objects have evolved in the presence of gravity and their behavior is characterized by it. This behavior is therefore incompatible with the behavioral requirements of word device interactions. The problem is how to derive devices which do behave approximately according to language requirements.**

**The operator supplies the force to make the device and the environment interact. In a zero gravity environment the operator may attach to both the device and environment by physical contact in order to bring the device and environment together. Or the operator may rely on inertia of himself and device or device and environment to help perform the interaction. In that case kinetic energy transferred to the bodies must be recovered by the operator.**

**All devices must be operated under the force of gravity. Words represent only fictional devices. However, correspondences can be established between zero gravity and gravity**

**devices. Obvious modifications of gravity devices and their operation can be made so as to identify words which can be used to represent them.**

**Types 2 and/or 3 materials and devices are especially important in the zero gravity environment. Devices with type 2 and/or 3 features can be constructed much more easily for the inertial environment. Their type 2 and/or 3 character is much more evident.**

## OPERATOR SAFETY AND PRODUCT PROTECTION

**Many commonly occurring letter combinations have the function of improving operator safety or protection of commercial products.**

**A basic type of benefit is protection of operator from his own inertia. Breakdown is often sudden and unpredictable and operator is not prepared for it. Breakdown of any of 1 to 5 may pose a danger to operator. Operator inertia causes problems in starting and stopping of operator action. It takes time to break something down. A certain amount of energy must be inputted to do it, for example, for "n". For "n" the operator has time to apply and latch 4 before breakdown begins. Breakdown may re-form or be recovered from before the start of the next letter.**

**Letters acting on the same body may sequence. Thus "nc" represents elastic 4 acting on a fluid body 3 followed by 6 acting on it. Sm, sh, mb, and rl, rg, ra, la, lg, and id are similar. Only some of a body is broken down. For sh the "s" creates some 1 so that 5 does not slide freely. Thus by adding a lower type to do preliminary breakdown safety is enhanced. The lower type body breaks down the environment body less violently sparing the operator the more violent breakdown experience. This is an important principle for device design.**

**Another type of danger is the injury which the device can inflict on the operator if misdirected. A tack is very sharp and the "t"=3-3 operation starts its placement carefully. Lower types of bodies are gentler than the higher types such as 5 and 6, and enable the operator to detect mishandling before severe injury to himself occurs.**

**Other combinations prevent damage to the device and/or the environment where that is desired. For example, the starting use of "s" in "sack" enables proper placement of the sack over the environment by gentle action. Beginning the "a" action with the sack improperly placed could damage the sack or the merchandise.**

## A METHOD OF FINDING THE EXACT MEANING OF A WORD

**The meaning of a word is that of the series of interactions of the letters of the word. But the interaction of any letter is the starting action of any word containing that letter as its first letter. The starting action involves the interaction of two bodies. Thus a more exact**

**meaning of a word can be obtained from the approximate meanings of a set of words. This is a very useful method of determining word meanings. The purpose of the device can also be determined by treating the silent letters in this manner also.**

**This method must be used with care. It is often easy to mistake the starting action of a particular word. Greater certainty may be obtained by considering the starting action of one or more other words.**

**For example, the meaning of “bag” is: Do a “beat” action of swinging the bag at the laundry pile, then do an “awl” action to force laundry further into the bag, and then do a “grind” action to pack it in. the meaning of “rake” is to do a “rake” action to access the lawn, an “awl” action to gather the leaves, a “keep” action to withdraw the rake. The purpose is an “etch” or “eat” action to remove an area of the leaves entirely from the lawn.**

**“a”=6-1. To do an “a” action start an action or device usage “ax”, “awl”, “arrange“, “alter“, “add”.**

**“b”=6-2. To do a “b” action start an action or device usage “beat“, “beater”, “bat”, “brace”, “brush”, “bend”, “bag”.**

**“c”=6-3. To do a “c” action start an action or device usage “carve“, “coat“, “crack“, “cap”, “corer”.**

**“d”=6-4. To do a “d” action start an action or device usage “dab“, “dart“, “dig“, “disk”, “dent”, “dish”.**

**“e”=6-5. To do a “e” action start an action or device usage “etcher“, “edger“, “erase”.**

**“f”=6-6. To do a “f” action start an action or device usage “file“, “firm“, “fix“, “fit“, “fasten” or “fork”.**

**“g”=5-1. To do a “g” action start an action or device usage “gaff”, “gouge”, “grind”, “grate”, “gash”.**

**“h”=5-2. To do a “h” action start an action or device usage “hook”, “hub”, “hatchet”, “hoe”, “hose”.**

**“j”=5-3. To do a “j” action start an action or device usage “jar”, “jerk“, “jimmy”, “jab”.**

**“i”=5-4. To do a “i” action start an action or device usage “install“, “iron“, “itch“, “in“, “imprint”, “impact”.**

**“th”=5-5. To do a “th” action start an action or device usage “thrust“, “throw” (light blanket).**

**“k”=5-6. To do a “k” action start an action or device usage “kick”, “knocker”, “knife”.**

**“l”=4-1. To do a “l” action start an action or device usage “lid“, “lash”, “lever”, “lump”.**

**“m”=4-2. To do a “m” action start an action or device usage “mat”, “mixer“, “mash”, “mold”.**

**“n”=4-3. To do a “n” action start an action or device usage “nail”, “net”, “nut”, “needle”.**

**“o”=4-4. To do a “o” action start an action or device usage open“, “oust“, “oar“.**

**“p”=4-5. To do a “p” action start an action or device usage “pan”, “pole”, “pull”, “push”.**

**“q”=4-6. To do a “q” action start an action or device usage “quell“, “quake“, “quick”, “quit”.**

**“r”=3-1. To do a “r” action start an action or device usage “rag”, “ram”, “rim”, “rub”.**

**“s”=3-2. To do a “s” action start an action or device usage “sack”, “saw”, “slip”.**

**“t”=3-3. To do a “t” action start an action or device usage “tack”, “tube”, “tip”, “touch”.**

**“u”=3-4. To do a “u” action start an action or device usage “utensil”, “unwrap”.**

**“v”=3-5. To do a “v” action start an action or device usage “veer“, “vase“, “vat”, “vane“.**

**“w”=3-6. To do a “w” action start an action or device usage “web”, “wire”, “wick”, “wrap”.**

**“x”=2-1. To do a “x” action start an action or device usage “xylophone“, “xylem”.**

**“y”=2-2. To do a “y” action start an action or device usage “yaw“, “yield“, “yank“, “yoke”.**

**“z”=1-1. To do a “z” action start an action or device usage “zip“, “zigzag“, “zipper”.**

**ALTERNATIVE INTERACTIONS OF A DEVICE PAIR**

**For every word there is a pair of devices that perform an interaction the word represents. However a device pair can be interacted in many different ways. Each of these ways may be represented by a different word.**

**EXAMPLES OF ONE SYLLABLE MECHANICAL WORDS**

**(Defined words include awl, bag, beat, bore, cap, carve, fall, file, gash, hit, hoe, kick, mar, mash, mat, nick, notch, paint, peg, rake, ram, rub, rut, sack, saw, slash, tack, tow, tree.)**

**AWL. This tool is used to punch leather. Leather is mostly preserved protein fibers cemented together with tannin. It is strong and lightweight and flexible. The A may start from a definite position with strong initial force without earlier action because it is desired that the tool action be very localized. The point of the awl consists of a special tensioned material so that it acts as a 6 body. For "awl" no access procedure for the vowel action is necessary. The penetrating action A=6-1 of the point of the awl is performed with considerable force to abrade and break the crystalline fibers of the leather. Fibers at the point and to the side are abraded locally. The contact surface of the point of the awl moves through the leather as the point penetrates. The W=3-6 involves a 6 body on the leather where the awl 3 is contacting the leather 6. Fibers behind 6 could be broken by W action so as to produce a non localized widening effect. As a non silent letter fibers not in the immediate vicinity of the prong would be broken. If the purpose of the awl is to make a hole without damage and distortion elsewhere then much care is taken that this purpose is achieved. In this case W action is to be avoided in agreement with its being a silent letter. L can supply the proper final action. The L=4-1 is a sideways flexing of the awl prong perpendicularly to the side of the hole in an L=4-1 action whereby the flexure 4 supplies the energy to break down the leather 1 locally and widen the hole locally. As the awl hole reaches the proper size the awl prong 4 is slanted to stop the motion and facilitate the withdrawal of the prong from the hole by making an oblong opening. Another benefit of this is that a range of sizes of rods can be fitted into the opening. A round opening of the exact fit needed would require that a number of awls with different diameter prongs would have to be kept on hand. The oblong opening also offers a more elastic holding power. The energy expended by the operator in performing A is at least ten times that of performing L. This means that L is lightly done and performs only a small part of the penetration. The L action gives more precision to the size of the opening than would simply stopping the motion of the prong. Possible actions are represented by the spellings AW(silent)L, AW(enunciated)L, or AL.**

**BAG. A pile or quantity of clothes to be laundered is floating in zero gravity and is backed by a table, against which they can be compressed. The clothes are loose and unattached and dirt on them facilitates their looseness. The bag rim cannot be pre-shaped but is tensioned by the two hands. This agrees with the general operation of the 6 type which is as a tensioned belt. The assemblage of clothes tends to have a rounded form 2. One side of**

**the bag is plunged into the pile. As the bag is moved forward the tip of the pile enters through the center of the bag opening, according to the letter action B=6-2. At the rim the clothes act as filaments and have trouble getting around the rim. This corresponds to breakdown turbulence of 2. As the bag moves forward the clothes become more jammed by the rim and clothes at the center of the opening cannot enter freely but have their form damaged. The other side of the bag encounters the clothes and the action changes to the letter A=6-1. The jamming of clothes into the bag tenses the side of the bag so that it performs as a 6 body. The mass of the table prevents energy from being absorbed by the table. As the clothes get past the rim friction with the side of the bag occurs. The bag is rotated into an outward direction and there is a transition from A action to G=5-1 action. The clothes act as interlocked crystals 1 in opposing the bringing of the bag out of the pile. The energy of the 6-1 action is at least ten times the energy of the 6-2 and 5-1 actions. Object bottom has right angle bend and this is 2 for 6-2 of B. object bottom is 1 for G = 5-1. The bag is strong enough to do B and G.**

**BEAT. A "beater" or "beat" consists of a circular element of rod or tubing with handle as the device. The environment is the rug plus the dirt which the originally clean rug has accumulated in a self evolution of its own structure. The new dirt part of the rug structure is weaker than the rug fibers so that the damage caused by the beater is confined mostly to the newly evolved rug structure. The "beat" action takes place in a zero gravity environment. In this case the warp of the rug can be assumed to be clamped on and stretched between two rigid rods, corresponding to hanging vertically in gravity. The beater is assumed to be low in mass compared to the rug. Initially the main interaction energy will involve the liquid property 2 of the rug. The first letter is B=6-2. The beater slides on the rug in the warp direction, encountering the weft. At slow speed the weft acts as a liquid 2 because the individual weaves can move inward out of the way. The liquid 2 breaks down to 1 and the resistance results in the beater and rug having the same motion, protecting both rug and beater. For the letter E=6-5 action the dirty rug acts as a vibrating body 5. The dirt is abraded and vibrated from the rug, breaking the dirty rug structure down to elastic 4 cleaner rug structure. Other dirt may have formed as crystal attachments to the crystalline fibers of the rug weave. Therefore action according to the letter A=6-1 is used to breakdown the dirty crystalline structure. This is coincident with some E action to loosen dirt that was held by the attached crystalline dirt. The A action is terminated by T=3-3 action. This consists of dragging the beater 3 on the dirt 3 so as to remove it.**

**BORE. The operator device consists of a hollow tube with a handle at the top. The lower end of the tube is sharpened for cutting. The environment device consists of a block of cork. The O action is accessed by a B=6-2 action. Liquid 2 on the cork surface blocks the cutting action of the core tool because the liquid forms a tensioned spherical surface on the surface of the elastic which is uncompressed. The liquid is broken down to 1 by the B action. The flexible bore tool 4 is then pressed down into the flexible cork 4. During the**

**pressing down the end of the tube does a cutting action which is of energy low in value compared to the elastic energies present. The flexibility of the cutting tool gives extra maneuverability during the action. O terminates in an R=3-1 action used to prevent a splinter of cork at the end of the hole. R is a slower, gentler, more localized action than the previous 6-1 cutting action.**

**CAP. The bottle is held by the left hand and the cap by the right hand. The cap must be of hard strong material or it would come off too easily. The bottle glass has a microscopic roughness which is equivalent to a layer of 3 fluid. The roughness of the cap is stronger so that the cap functions as 6. The operator slides the cap 6 into position with sufficient speed and force that the 3 fluid which initially offered considerable force breaks down, reducing the resistive force nearly to zero, according to the letter C=6-3. The cap is adjusted for best fit of its curvature, a manipulation suggested by the C shape. There may be a cycling of breakdown with a resulting cycling of resistive force. This gives a sense of contact. The limited width of the cap forces a decrease in C action and requires the A action. For the letter A=6-1 the bottle top acts as a crystal 1 while the cap 6 flexes to fit over the rim. Most of the effort in capping the bottle occurs in the performance of A. The motion of the cap is enabled by an abrasion of the glass 1. The inner side of the cap may be considered to form the tool A. The shape of A suggests a forceful downward manipulation of the cap to force the bottle top into the lower part of the somewhat different A shape. The fit is impossible, forcing the upper loop of the A to bend up. As energy of flexure increases the energy dissipated by abrasion remains dominant. Motion of the cap is enabled by expansion rather than by abrasion. The hand imparts elastic energy to the cap 4 by forcing it to expand over the flat edge of the bottle 5, the bottle remaining in position by inertia. The A action decreases and ends and the P action builds up. The cap, continuing to be held by the stationary hand, pulls the bottle into the cap by elastic force, according to the letter P=4-5. The shape of P suggests that the bottle rim is tucked under the loop. This is a single point trigger, which is needed if the fit is to be perfect. As a practical matter the bottle is usually held stationary while the cap snaps over it. This wastes 100% of the elastic energy of the expanded cap. It is more efficient to retrieve the kinetic energy. This illustrates the fact that words in use represent the most energy efficient actions possible. If much of the action in actual practice were represented, the language would be considerably different. The bodies of the cap are 6 to 6 to 4, shaped as C, A, and P respectively, and external, external, internal. The C is half the edge circumference of the flange and A is inside the flange with the loop flexing. P is internal and is in the middle of the cap. All handles are accessed from the top of the cap. These bodies form a triangle.**

**CARVE. In carving the blade position can be adjusted before major alteration of the material begins. In etching alteration begins immediately at contact so that contact must be pre-calculated. Carvings are spontaneous and simple minded. C=6-3 is performed by sliding while at the same time exerting a light pressure to assure penetration into the 3 material. Interaction with 1 fibers is blocked by the 3 fluid in the wood and pressure is too**

**high to be blocked by 2 surface tension. When resistance to sliding fades breakdown of 3 to 2 is known to have occurred. This breakdown enables contact with the wood fibers. Once interaction with the wood fibers 1 begins it becomes the main interaction energy and A=6-1 action takes place. The powerful sliding action of the blade on 1 abrades the fibers and shatters them. The blade is changed from a downward direction to an upward direction. The problem is to avoid splitting the wood. The action becomes a more gentle R=3-1 action resulting from a slicing motion, which enables severing of the chip without splitting. This corresponds to an enunciated R. A silent R would mean avoidance of slicing which could add precision to the cut. A shorter sharper blade might increase precision for the silent R. Omitting the R in the spelling would mean ignoring the splitting. The blade 3 is used to push away the mass 5 of the chip to impel it away, according to the letter V=3-5. 3-5 rather than an alternative action is performed because 3 gives more control than do 4 or 5. 5 collides and does not dissipate. 4 energy gives no control. Thus 3-5 is performed to closely control the chip. The V action does not break down the wood. The V action imparts kinetic energy to the chip. This energy is not retrieved because it is used to get rid of the chip. The E=6-5 is a silent vowel. This action is not performed because it would make the chip fly away too fast and far.**

**FALL. This action is assumed to take place in a zero gravity environment. The environment of the “fall” device consists of a portion containing a 6 surface ending in a pit of 1 material, the remainder of the environment being non energy absorbing. The F represents a stationary or low power rolling action of a 6 body on the 6 surface. The 6 surface makes the transition to the 1 surface. The 6 roller body begins a grinding action into the crystal 1 material. Here complete breakdown would mean that 1 is broken down into gas and falling occurs in the sense that there is no residual solid material. However, some abraded solid material goes off in one direction. The 1 material thus defines the “downward” direction. As the terminating surface of the 1 material is approached the A action decreases. The rotating motion ceases and the “fall” device acts as an elastic 4 body which presses against the remaining crystal powder 1 in a crushing action. This enables the “fall” object to reach the environmental background. The second L is silent, implying that no second elastic force is present. This is required in order to associate the breakage or scattering of pieces only with the vertical descent. In “fall” L operates at great speed. It can do this because of its form. In “fall” the L really collects up a large pile of small crystals, many of which may have acquired a small velocity from the abrasive process. The long stem of the L body is placed over the spray of crystals and pressed down so that the base of the L flexes to hold them down. L only does as small amount of breakdown of the crystals but it is done on many crystals. L really gathers the result of A and puts it on background surface. The second L is silent which means the particles are not to be released, which would occur if the L that is compressed onto the dust were removed. A reverse L action is not to be performed which would recover elastic energy. The particles are fine and scatter too easily. The idea is to avoid dust by keeping pressure on them. L is only a dust collector. L functions as a very weak spring operated over a very long distance.**

**The second L is silent in the same way that E is silent in "rake". A root word represents a finished task which can leave stored energy after its completion. The action 6-1 involves at least ten times the energy of 6-6 or 4-1.**

**FILE. F=6-6 is to be interpreted as a 6 body fixed in position on another 6 body held against force by static friction. There is no injury to the surface. For wood the file is directed cross-grain. The initial positioning enables precise locating and control of the further action. A rotation and lifting from the fulcrum line enables precise striking of the file 5 on the adjacent surface 4, according to the letter I=5-4. The teeth of the file dig straight down into the wood so as to partially break out filings of wood by converting 4 into 3. The projecting flexible file teeth 4 are lifted upward so that the partially broken out filings 1 are removed slowly so that the 3 material does not interfere with breakage of the remaining fibers 1, according to the letter L=4-1. The result is a precise result with minimum disturbance of adjacent wood. The silent letter E=6-5 specifies that the filings are not to be abraded or scattered away from the work. This is somewhat arbitrary because abrading serves as a materials investigative procedure which will improve quality.**

**GASH. The object that is gashed may be an object such as fruit or other living material that contains distributed fiber and liquid. A single edged knife functions as a "gash" device and would be referred to as a "gash" or "gasher". The knife is given an initial momentum 5 so that it penetrates the very fibrous skin 1, according to the letter G=5-1, damaging the crystalline fibers 1. A large force is needed to break through the strong skin. A high speed collision contains enough kinetic energy to shatter the crystalline 1. The operator's muscles are not strong enough to break through the skin in an A action. The interior which is weak enough for the operator's A muscles now becomes accessible. The A=6-1 action takes over from the G action and maintains a blade speed by supplying all the energy for the A action on the fibers. The incision produced by the curved sweep of the blade reaches a maximum. The knife has moved until it is perpendicular to the surface and opposite the hand. Then reversing the motion by a small hand action of rotating the blade up through the already made incision through the fibers 1, only 2 liquid is involved, according to the letter S=3-2. The operator detects the resistance due to turbulence of 2 to the blade motion. The blade continues to rotate and the operator then relaxes his grip on the knife so that all the kinetic energy of the knife is lost to friction with 2 liquid as the edge of the knife impacts the liquid and departs from the cut, according to the letter H=5-2. Liquid is splashed out of the cut by the H action, which strikes the weakest part of the liquid, which has a figure eight shape linking the two sides of the cut. The H action zeroes the kinetic energy of the knife, leaving it at rest.**

**HIT. A target can be hit with a ball or other small massive object, which can be termed a "hit" or "hitter". the "hitter" consists of a 5 mass surfaced by a viscous layer 3. The target consists of an elastic body 4 faced with a 2 body. The 2 body flattens by being attracted to the 4 body. The attraction originates from an interface energy. The target is backed by a**

**rigid wall that does not absorb energy. The action may be accomplished by accelerating the "hit" projectile to a velocity by constant operator pressure before impact. This target shape is self restoring so as to obscure the effects of impacts from the environment. The impact breaks down 2 to 1. This hardens 2 and results in compressing 4 until it breaks down to 3. Kinetic energy loss by 5 during the 2 and 4 impacts is represented by H=5-2 and I=5-4 because 3 is too hard to absorb energy during these interactions. However, the impact of the hitter 3 on the 3 resulting from breakdown of 4 then occurs and this absorbs the remaining kinetic energy of the hitter device, represented by the letter T=3-3. The hitter device does not penetrate the surface of the target. The energy of the I action is at least ten times that of the H and T actions. A "hit" action occurs only in a limited range of incident kinetic energy. Otherwise there is failure to break down the elastic 4 and there is rebound, or else there is penetration of the target. Penetration of the target is not allowed as this means the interaction is not ended. After interaction the "hit" device must be at rest outside the target.**

**HOE. The ground structure consists of moist soil, thus clinging together by the adhesion of water 2. It must be elastic, that is, compressible. It must be rather lightweight, possibly permeated by many small roots, or containing humus. The hoe and ground are assumed to be operated in zero gravity. The blade 5 of the hoe impacts the ground 2, moving the blade downward and into the ground, according to the letter H=5-2. The result of the impact is that the kinetic energy of the hoe is converted into the energy of liquid 2 distortion plus the turbulent breakdown 1 of liquid. The purpose of H is to access the ground for the O action. The hoe blade 4 is pulled forward against the elastic soil 4, according to the letter O=4-4. The edges of the blade cut the elastic soil as the soil is compressed. The simultaneous cutting action requires an energy much less than the compression energy and therefore is not represented by a letter. E terminates the O action by bringing the severed compressed soil to the surface of the ground by a cutting action of energy low compared to the O compression energy. The hoe comes to rest but the soil decompresses by scattering forward.**

**KICK. This is an action in zero gravity. The device is the shoe (the "kick") and its environment is the football. The interaction of shoe 5 and ball 6 occurs first according to the letter K=5-6. The football is inflated at considerable pressure so that its pebbled shell acts like a tensioned belt. The friction capability of the two sides of 6 can transmit tangential force and the thinness of 6 allows the efficient transmission of perpendicular force. The shoe may strike the football at various angles, positions, with various energies. The shell 6 can transmit perpendicular collision force which can act on the elastic 4 contents of the ball according to the letter I=5-4. To access this interaction the ball must be kicked so that a low energy K action can establish a balanced positioning of the shoe on the ball. If kicked correctly this will automatically happen. K is only allowed to have a rotating action. It cannot slide. The shoe contacts the ball so as to rotate it into full contact with the shoe. The collision of shoe and ball then automatically continues with the I**

**interaction. The I=5-4 action depends on a mass backing that absorbs little energy. This is provided in part by the massive lacing of the ball on the side opposite the shoe contact. The air that inflates the ball provides the elastic 4 capability. The impact of the shoe compresses the air. Compression continues until the ball structure gives way in 3 breakdown whereby the pressure decreases. The collision interaction may then continue with a tangential force on the shell 6 that transmits to the 3 contents of the ball. The mass backing of the ball can enable a C=6-3 interaction energy with a breakdown that releases the force. The football may be constructed to either achieve the C interaction or to avoid it or this interaction may be crudely ignored. The effect of the C interaction can be to impart a spin or tumble to the ball. The breakdown to 3 solidifies the ball, making it dangerous to the shoe. The C action might encounter large force from the 3 fluid which would operate against the mass backing of the ball. The major part of the energy goes to producing compression of the air and most of this is dissipated. A lesser energy goes to giving the ball kinetic energy. This occurs during compression of the air before breakdown of elasticity. The operator seeks to accelerate the ball only during the elastic compression and avoid the injury producing collision with the solidified ball. The final interaction of shoe with football is represented by the letter K=5-6. The kick must occur so that no kinetic energy resides in the shoe. This is the condition for the second K interaction. The energy of I is more than ten times the energy of the other letters. The interaction may be represented with “kick” where C is either silent or enunciated, or by the spelling “KIK”. Kicking can only be performed on a manufactured object.**

**MAR. The environment is a wooden table top. The table top is a material which can exhibit both liquid 2 and crystal 1 behavior. The operator body possesses low mass so that its kinetic energy will not be appreciable. The M=4-2 action is the pressing for a very short distance of the operator device acting as an elastic body 4 on a component liquid 2 of the table top. The A action cannot start directly because the 1 bodies of the wood move down out of the way of the 6 body. The M action solidifies the 2 by means of turbulence so as to prevent this. The elastic body is specially structured so that it produces turbulence as it moves through 2. The 4 bottoms out so that the operator device acts as a 6 body and a sliding action becomes that of a power transferring body 6 on a crystalline body 1, according to the letter A=6-1. The 1 fibers of the wood break down to a powder and this continues as the major energy action of the “mar“ device. This powder combines with 2 to make 3 fluid. The 3 fluid fills the frictional layer of 6 converting it to a 3 layer. The elastic 4 has extended completely due to the gouging of the surface by 6 so that the sliding of the operator body results in an R=3-1 action on the table. The 6-1 action has produced a deep injury to the wood surface. The 3-1 action terminates the action with a shallow damage that mainly breaks some surface fibers perpendicular to the direction of motion. This ends the “mar” action. The major energy for the “mar” device is the A action, which is more than ten times that of the M and R actions.**

**MASH. The heel end of a massive flexible shoe sole 4 presses on a fruit 2 so as to cause**

**turbulence in one side of the liquid body, according to the letter M=4-2. The M breaks down 2 to 1 resulting in a fibrous residue 1 having reduced liquid content. The sole functions as a 6 body when sliding. The operator begins the sliding A=6-1 action, imparting kinetic energy also which is small compared to the 6-1 energy. This action spreads the material and generates fluid which gums up the 6 converting the 6 into 3. 3 then acts on 2 liquid according to the letter S=3-2. When turbulence from 3 is detected the operator then terminates the action by allowing the kinetic energy of the shoe to be expended in an H=5-2 action. H is constructed especially to cause turbulence.**

**MAT. A mat is assumed to consist of a backing out of which stiff fibers project or to be of plated construction. The action is performed slowly enough that the kinetic energy involved is negligible. Shoes are maintained by use of the mat. In zero gravity it is only the relative velocity of shoe and mat that is of interest. Whether the mat is rubbed on the shoe or the shoe is rubbed on the mat is not determinable. One says they are rubbed together. But the mat is the device and the shoe is the environment because it is the evolved shoe that is broken down. The mat may be applied to water on the shoes that contains dirt such as mineral particles. The mat fibers are especially arranged to produce turbulence and solidify the mud. The purpose of the M=4-2 action is to access the A action. The A action cannot start directly because the lumps of matter on the shoe are dispersed in liquid 2. The 6 would slide on the 2 surface without reaching the lumps or would drag the lumps through the liquid without abrading them. M can cause turbulence throughout 2 and also reach around the lumps. M can therefore solidify the entire mass. Sliding the shoe on the mat causes abrasion of the solidified crystalline structure of the mud, according to the letter A=6-1. The result is a fluid paste 3, which also fills the structure of the mat. The paste 3 of the mat then rubs against this fluid without further structural change to it so that it topples off the shoe, according to the letter T=3-3. When 3 shears 3 the fluids spread each other out to a thin layer. This means that some of the 3 on the shoe will remain and part will separate off to the mat. This separation is a breakdown in 3 on the shoe. T can have a breakdown in the environmental 3 if the breakdown energy is small compared to the main T energy. The separation is expressed phonetically by the click sound of the T.**

**NICK. The environment of the "nick" device may be a glazed ceramic object. Unglazed ceramic cannot be nicked because there is no 3 layer on ceramic. Glazes are 3. The nick device must be constructed from a combination of elastic and inertial material, as determined by its constituent letter shapes. The main action of the word is the "I" action. The first letter provides access to this action. "I" is a ballistic action. The initial kinetic energy of the operator device must be chosen so that after interaction with the environmental device the kinetic energy of the operator device is zero. The operator starts from a precise stationary position and compresses an elastic operator device structure which sprawls on the environmental device 3 surface, breaking it down, according to the letter N=4-3. The breakdown of 3 enables the operator device mass 5 to acquire kinetic**

**energy so it impacts the material 4 below the glaze so as to make a fluidization, according to the letter I=5-4. The N action can be precisely set to provide an exact initial operator device kinetic energy. The energy lost to I can only be estimated. The energy lost to C can be more exactly determined. K can absorb energy in a range determined by its rolling distance. Thus the initial energy is chosen so that rolling will stop somewhere on the available surface. After the I action the C action subtracts a definite amount of energy and the remainder will be dissipated in rolling to a stop. Only a manufactured object can be nicked.**

**NOTCH. For NOTCH the main action is O. O in itself produces no permanent change in the wood. It is the lesser energies during the O action that do this. Thus O is a kind of screen for the real actions of interest. The actual cutting of the wood during the O action is a lesser energy interaction not represented by the letter O. The flexing of the blade and wood involves much more energy than the cutting. The purpose of N is to provide easier access to the O action. Initial O action involves a zero or near zero elastic energy. This restricts the cutting energy to too low a value for rapid cutting. The left side of the vee cut is started by flexing the blade 4 and allowing the blade to press quickly through the wood, according to the letter N=4-3. Use of the letter N for the word indicates that the cutting action is fast because fast action guarantees that the greatest energy in penetrating the wood is that of penetrating the viscous 3 lignin matter. The energy expended in 3 material is the viscosity times the velocity times the distance of penetration into the material. For the O=4-4 action the blade is flexed to cut downward and then unflexed to cut upward. The cutting energy is much less than the flex energy and is therefore not represented by a letter. The O action is terminated by the action of the letters TCH. Approaching the surface the flex energy zeroes. The T action gives the operator a feeling for the strength of the wood. He then does C to break through the wood. C action can be adjusted by drawing the blade a little. Not much 2 is required to stop a lightweight blade. The H action absorbs the kinetic energy of the blade by 2 turbulence, bringing the blade to rest at the surface of the wood. Word action cannot be ended by operator absorption of kinetic energy because this requires reversing the reflex action. The operator must not reverse his direction of force, nor absorb energy by dissipation. In order to notch properly the wood must contain sufficient water.**

**PAINT. Painting is best done in zero gravity. The operator device consists of a paint brush that has been dipped in paint. The environment device consists of a surface to be painted. The end of the brush 4 is flexed against the surface having 5 inertia, according to the letter P=4-5. The pressure of the brush brings the bristles into contact with the surface so as to access the main vowel action A. The bristles are dragged along the surface according to the letter A=6-1. The angle of the brush to the surface is slowly decreased causing the paint to flow on to the surface. The bristles break down the coarse (visible) crystal structure of the surface. The paint flows into the bristle trails to make an even layer. The A action is terminated by the sequence INT. The flat of the brush is slammed against the**

**surface according to the letter I=5-4. The paint remaining on the brush fills the resulting imprint of the brush. The tip of the brush is pressed against the surface to distribute remaining paint on the brush. This action is followed by drawing the brush lightly over this paint, according to the letter T=3-3.**

**PEG. The operator device is the peg, the environment device a board or post. The peg action consists of inserting a peg into a hole in a board or post, that is, pegging the post. The main action is represented by E. The P action is used to access the A action. The A action is terminated by the G action. The peg is slanted upward and put into a slightly too small hole. The end of the wooden peg is gently pushed against the side 5 of the hole in the wooden support post containing the hole, which compresses the round peg on its side 4 so it can fit into the hole, according to the letter P=4-5. No damage occurs. E is smooth because collision material 5 must yield accurate collisions. Thus E is not perceptible as to roughness. PAG would be inaccurate so it is PEG. It is desired that PEG be accurate and to stay accurate under force. It must not deviate from perpendicular or it will pull out. The holding power of PEG depends on E maintaining the accuracy of 5. The grain of the peg is parallel to its length and perpendicular to the grain of the post. The sides of the hole past the end of the peg are uncompressed and bulge inward at the end of the peg. The peg is pushed into the hole. The corner of the end of the peg acting as 6 rolls and slides over the compressed wall material 5, abrading it, according to the letter E=6-5, and compacting the powdered wood to the sides of the hole. The E action provides holding friction through the help of the wall compression. The operator desires that the peg be able to withstand the greatest possible side force. This requires that it be at maximum depth. The operator terminates the E action by striking the end of the peg against the bottom of the hole, according to the letter G=5-1. The operator can do this because he knows the depth of the hole so that he is able to protect himself from the impact. The impact should be sufficient that the operator is certain that the bottom of the hole has been reached. If the operator has elastic contact with the peg at the moment of impact this will not affect the interaction. The energy of the E action is at least ten times that of the P and G actions.**

**RAKE. The rake as the device acts to maintain the lawn, which is the environment. In zero gravity there would be no extended lawn nor trees whose leaves fall to be raked up. It is thus expected that the practical rake action would not be well described by the purely inertial rake action derived by the theory of language presented in this book. The rake action is easy to perform with approximately constant force or with approximately constant speed. It is an evolved lawn because leaves 1 have fallen on it. Leaves need shape to gather light and they must maintain this shape against a certain amount of force. This means leaves have considerable crystal 1 quality. It must be assumed that evolution has linked the leaves and lawn into one crystalline mass. The entirety is not a single perfect crystal and therefore not pure type 1 body. The deviation from type 1 can be described in terms of components of types 2 to 6. This means that there must be some crystalline or fibrous linkage 1 between leaves and lawn. Mold or other growth might supply this**

**linkage. The raking action will break this linkage. The rake prongs 3 are bent slightly forward near the ends. This part of the action is performed by the R body. The loop of the R contacts the leaves. The R=3-1 action is performed by a more horizontal orientation of the rake so that the tines rub but do not catch on objects. The purpose of the R action is to access the A action. Starting with A instead of R has difficulties. R offers a better grip on the surface of a leaf. A is better at catching the edge of the leaf. R acts more finely than A and hooks surface irregularities that A will miss. R starts the leaves moving and opens up a spot for A to start. It involves a superficial disturbance of the leaves, dragging only a few of them. The R action effect is proportional to the speed of motion and also to the amount of contact area with the leaves. At zero velocity there is no force on the leaves and the power input is zero. R is a low power action. As the rake becomes more vertical the contact area decreases to zero and the R power decreases to zero. The R body of the rake is at the ends of the prongs.**

**At the same time the rake begins to impact the leaves on their edges in an increasing A action. This part of the action is performed by the A body. As the rake operates as A many more of the bonds between the leaves may be broken and the operator is aware of sudden changes in resistance. R is a low power action, A is a high power action. The rake sweeps all the leaves by a snagging gathering ripping action 6, according to the letter A=6-1. The rake tines function like ballistic masses drawn by flexible attachments, in accordance with the basic structure of 6. It could be said that leaves are removed from the lawn by friction. Unlike R whose force is speed dependent, the "a" force is speed independent, and A power is proportional to speed. No matter how slowly it is done the energy required to rake a given area is the same. 1 represents the lawn which evolved by accumulation of leaves. The leaves may be crystal extensions of the lawn. The breakage must be attributed to crystallinity. Leaves broken from the lawn will tend to fly off into space if gravity is zero.**

**The A action is terminated by the K action. There is a transition to letter K=5-6 interaction as the direction of the prongs 5 change to an upward direction by rotation so that A action decreases to zero while at the same time the 5 energy becomes predominant. The K terminating action requires that a pile of leaves be collected. If the rake is held at an acute angle to the ground and the leaves have hook-like extensions they will tend to collect into a pile even in zero gravity. The rake is trapped by the pile and the K action is required to extricate the rake. The operator carefully releases the rake so that its momentum 5 causes it to roll over the pile 6 while at the same time losing all of its kinetic energy to the pile so as to come to rest. This terminates the A action. Coarser leaves require the KE termination. Finer leaves allow the A action to be directly terminated, represented by the word RA with a short A sound. E supports an evolutionary investigation, which is of more interest for large leaves than small leaves. For this purpose it is an extra action added to that of RAK.**

**RAM. The operator device is a pole and the environment device is a doorway. The action**

**could not be started from a rest position because the force required would be too great. Instead 3 on the end of the pole channels the pole into a path which enables the 6 action to take place by friction rather than collision. The friction tears down the door and then the contents of the room act as a liquid against the elastic flex action of the pole. This cues the operator to terminate the A action. There is a decrease in the retarding A force and a gradual increase of force of the room contents against the elastic pole. The operator will perceive this change in force as he moves at constant speed. He also perceives that he has broken through. He slows to a stop and the force on the pole will decrease to zero as the retarding action of the room contents against the slowing pole zeroes. The ram action is thus characterized by weak or defective or poorly designed spots on the door, a door which has a limited thickness, and a contents on the other side of the door which offer a strongly increasing force above a given velocity but with the operator arbitrarily stopping so as to expend small energy compared with the door break down energy. Thus the meaning of the word "ram" is that of breaking through something.**

**RUB. The operator device is an object and the environment device is a convex surface. The problem is to access the U action in such a way that that the force on 3 from 4 is limited. A visual approach is not possible because the precision required may be too great. The surface of an elastic cannot be accurately sensed. A skin structure enables an exact determination of the location of the surface. If the surface has a skin 1 an R=3-1 action can be started on it. R slightly damages 1 so the operator can get through it to 4. The operator device 3 then skims 4 and can gradually press into it. The U=3-4 action damages and scrapes up the skin but the energy involved in this is negligible compared to the main energy involved in U. Damage to the skin results in the release of liquid 2. This is scraped up with 1. The operator device can escape from the 4 elastic by means of this 2. The device acts as 6 on this 2. This is a B=6-2 action. It enables the operator device to escape the high energy containing 4 body without being damaged. As the operator body begins to depart from 4 the 4 springs back uncontrollably causing possible damage to operator 3. As the operator body enters 2 the turbulence force reduces the spring back of 4. Any spring back produces a waviness in 3 so that it acts like 6, increasing the turbulence resistance.**

**RUT. A rut is made by a wheel having a fluid 3 surface. The environment consists of an elastic layer 4 above which is a layer of fluid 3 surfaced by a thin layer of crystal 1. In the practical case elastic soil may be wetted by rain to a depth converting it into fluid layer 3, and a thin crust 1 may form on it by drying. Initially the device body 3 contacts the environment body 1. The wheel does not press hard enough to break through 1. However it slides and the R=3-1 action enables the breakthrough. The wheel 3 presses through the 3 layer of the ground into 4 and slides on the 4 elastic, according to the letter U=3-4. The wheel pushes the 1 and 3 layers to the side as it slides on 4. The energy required to do this is much less than the energy involved in U and so is not represented by a letter. As the wheel reaches the end of the soft spot in the road it climbs out by sliding on the 3 layer according to the letter T=3-3.**

**SACK. The operator device is the sack, the environment device is the object which the sack is to contain. In zero gravity the object is suspended in space and the operator uses both hands to slide the sack over the object. The sack opening is assumed slightly larger than the object. The A=6-1 action consists of sliding the sack on the object. But accessing this action is difficult to do directly because too much precision is required to fit the sack opening over the object. Instead the sack is applied at an angle to the length of the object, according to the letter S=3-2. Liquid 2 appears at the rounded corners on the bottom of the object. The surface of the inside surface of the opening of the sack is 3 material. Contact on one side indents the object while on the opposite side rapid motion of the sack stiffens the 2 by breaking it down to 1. After the object is slid into the opening of the sack the sack is slid over the object according to the letter A=6-1. The purpose of 6-1 here is not shape change, such as occurs in CARVE. For SACK breakdown of 1 relates to containing the object. 1 builds up structure on its surface. Its surface must be damaged if it is to be contained. The C=6-3 action is performed to insure that the bottom of the sack is not damaged by striking the object. The 3 material on the bottom sides of the object is accessed by rapid motion of the sack whereby the force arising from 3 will be greater than the force arising from 1. This is true because the force of 1 is velocity independent while the force of 3 is linearly increasing with speed. This enables reorientation of the sack and then easy slip-on as 3 breaks down to 2. The C action is performed to insure that the sack will be at rest after the K action. This can only be done if the object is a manufactured object about which information is obtainable which enables the necessary C action to be calculated. The momentum of the sack is then absorbed completely by the object as the sack hits the bottom of the object, according to the letter K=5-6. The sack is then at rest on the object. If the sack were not properly positioned according to the mass distribution of the object it would slide and tear the sack, instead of striking perpendicularly and rolling. The object will tend to stay in the sack because of the frictional 6 character of the inside surface of the sack. Sacking is performed only on manufactured objects.**

**SAW. A toothed metal blade is used to cut a wood board. The operator device contains jagged teeth, the environment device is a wood board. The main effect of S=3-2 is to enable imparting momentum to the blade. This momentum then carries the SAW action against the snagging action of the teeth for the A action. 2 of the wood is dominant on the wood surface. The S action is started lightly so that the 2 of the wood blocks action against the 1 of the wood. 2 offers surface tension which blocks penetration. As the blade speed is increased turbulence resistance occurs and the action to be represented remains 3-2 because the energy involvement of 2 remains greater than the increasing kinetic energy of the saw. The momentum of the saw becomes great enough to cut the fibers 1 without snagging. The action then becomes A=6-1. The action is terminated with W=3-6 when the board is nearly cut through. The sawing action tends to create a layer on the wood which functions like 6. Without changing the speed of the blade the blade is redirected so that the 3 of the blade acts on the 6 of the board. 6 is a narrow belt-like surface running completely**

**around the remaining wood section. The 3 drags this belt around heating up the underlying 3 so that it breaks down to liquid. This liquid gives way so that the board separates.**

**SLASH. Wood or other material has a surface of liquid 2 material, below which is 1 material. The action starts with a rapid drawing of the blade across the surface in a S=3-2 action performed to get through 2. Then an L=4-1 action is performed which stores energy in a flexible handle which exerts pressure on the 1 material. The L interaction involves a breakage of the fibers 1 from pressure. As the rounded blade edge 6 begins to enter the 1 the 6-1 action increases so it involves greater energy than both the L and S energies. As the blade gets deeper the pressure of 4 decreases causing 6-1 to also decrease. Eventually S, which involves the sides of the blade, remains as the greatest power. This is represented by the second S in the word. The operator then ceases his forceful drawing of the blade so that the interaction process is that of the dissipation of the kinetic energy of the blade in turbulence, as represented by H. The blade stops.**

**If the handle is made stiff then the L interaction energy will be negligible. Use of a flexible handle is not considered important, only resulting in denting the material as well as an instability in handling. However, use of the flexible handle gives an automatic quality to the action, missing in the silent L method. The silent L represents the stiff handle. For silent L the depth of cut is not preset by L but is regulated directly by the operator as he performs the slash. Pressure exerted by the operator is included as part of the A action. The operator stops the A action deliberately and has no need to sense that it is stopped. He simply stops drawing the blade and lets it coast to a stop, as represented by H. For this method the second S would only waste time and is therefore silent. This device might also be represented by SAH.**

**TACK. A paper or other soft material is to be attached to a board. The A action cannot begin because it is unknown where the surface of the paper is. The operator cannot perform a motion at high speed low force with the same muscles he will use to do the A function. The latter muscles must exert large force at low speed. The conical point of the tack 3 strikes the paper 3 at high speed. The result is a large force arising from the fact that for viscosity the force is proportional to speed. The tack stops in such a short time that there is not time for heat to build up and cause breakdown of the 3 materials. The operator senses the force and switches to his A muscle system. The energy dissipated is associated with making a small indentation in the paper, according to the letter T=3-3. No actual damage occurs to the paper, the fibers merely being spread apart by the tack. The tack is rotated perpendicular to the board. As the cone point leaves the paper the power 3-3 decreases to zero while at the same time the power expended by the cone in the wood increases to its full value. The point 6 presses into the board 1, according to the letter A=6-1. The point presses and spreads and breaks the wood 1 fibers. Unlike paper the fibers of wood must be broken in order to make an opening because they are continuous and**

**aligned. The required force is not zero at zero speed and therefore 6 action is required by the tack point. Energy is required to break the fibers. Small grooves with raised edges or barbs on the tack shank strike the wood pressing on the shank resulting in an action according to the letter C=6-3. The 3 lignin in the wood is churned violently resulting in large force compared with the A force. The 3 breaks down to 2 and the force zeroes. The operator senses this and lets go of the tack. The momentum of the tack is absorbed by a 6 body as the head of the tack depresses the paper and draws the 6 body at the surface of the paper downward. This action is K=5-6. If the momentum is too great the 5 body will be damaged by the 6 at its weakest point. The weakest point of the 5 body is at the joint of shank and head, which might be broken. Operator skill is required to avoid this. The tack is held to the board by 3 viscosity and stiffness of any wood fibers that may have been caught by the barbs.**

**TOW. The main energy action is O=4-4. This must be accessed. T=3-3 provides access by joining the two elastic connectors of operator and environmental devices. Operator then uses his device to stretch the two joined connectors. He keeps his device fixed while the connectors contract. This brings the towed vehicle forward. The motion is exponentially decreasing with time. Since infinite time is needed to finish the towing a positive termination is needed. W=3-6 provides this. Operator rotates his device around in a U shaped curve and goes in the opposite direction. The connectors are thereby quickly returned to their completely relaxed lengths. The reflex path is a curve rather than a straight line. The W energy is greater than the energy that remained in the connector.**

**TREE. This word is applied to the shoe tree consisting of a projecting steel prong which is slid into the shoe. The shoe is the environmental device. The primary action is E=6-5. The sequence TR accesses the E action. The tip of the tree prong T is touched to the shoe 3 without damage, to establish their relationship, according to the letter T=3-3. No damage occurs. The tree is rotated and slid up to locate the point where the sides 1 of the shoe are contacted by the prong 3, according to R=3-1. The power involved in the second consonant is greater than the power involved in the first consonant. This is an action which locates the surfaces of the shoe. The action is 3 rather than 6 because 6 cannot develop friction on the shoe surface at low pressure. High pressure would grossly break these surfaces. The tree prong 6 is rotated further and strongly forced upward exerting friction on the shoe 5 to the place where the shoe begins to narrow. Under elastic pressure, the friction of 6 on 5 material holds the shoe on the tree. The elastic energy is less than that of E and therefore is not represented by a letter. The second E terminates the first E. It makes sure the prong is securely seated.**

## LIP READING

**This section describes methods by which possibly 100% accurate lip reading ability may**

**be acquired. This means to perceive what is actually spoken, that is, to perceive the same thing that the listener perceives. What is sounded appears equally on the face and thus can be read on the face also. The exact sound that is heard can be read just as exactly from the face.**

## DESCRIPTIONS OF THE LETTERS OF THE ALPHABET FOR PERFECT ENUNCIATION

**The following are descriptions of the lip actions during the making of the sounds of the letters of the alphabet. These are not the sounds of the names of the letters. The names are one syllable words.**

**A** ***Long A*** **starts with lips separated ¼ inch. Lower lip rotates jerkily outward a little randomly during making of the sound as though it were being rubbed outward with sandpaper. It moves up 1/16 inch. No forward or downward jaw motion.**
***Short A*** **starts with lips separated ¼ inch. Lower lip moves upward 1/8 inch during the sound.**

**B Starts with lips together. Lower lip flips out, brushing against upper lip and then out of contact. The action is mostly a surface action on the upper lip. The lower lip then separates 3/8 inch away from the upper lip. No forward or downward jaw motion.**

**C** ***Long C*** **starts with lips separated 3/16 inch. A slow forward and downward motion of the lips 1/32 inch which changes suddenly to a faster motion for a longer distance 1/16 inch. A small forward jaw movement but none downward. Lower lip turns outward.**
***Short C*** **starts with lips separated 1/8 inch. A downward motion of the lips 1/32 inch which changes suddenly to a faster motion for 1/32 inch.**

**D Starts with lips separated ¼ inch. Tensing of lips more than for C. Lips drawn out at the corners. Lower lip jerks upward 1/16 inch and then jerks downward 1/8 inch. Forward motion of lip. Downward but no forward jaw movement.**

**E** ***Long E*** **starts with lips separated 1/8 inch. Slight smooth lip motion outward during making of the sound. Lower lip moves up 1/16 inch. No forward or downward jaw motion.**
***Short E*** **starts with lips separated ¼ inch. No motion.**

**F Starts with lips together. Lips roll together outward carefully. The entire upper lip structure rolls. Effort shows on the chin, as by wrinkles and bulges. No forward or downward jaw motion.**

**G** ***Long G*** **starts with lips separated ¼ inch. Lower lip and jaw flip up and are slowed a distance 1/16 inch.**
***Short G*** **starts with lips separated ¼ inch. Lower lip moves up 1/32 inch to a stop.**

**H Starts with lips separated 3/8 inch. Lower lip and jaw move up 1/8 inch.**

**J Starts with lips separated 5/16 inch. Jaw and lip flip upward with a large deceleration and forward a short distance 1/8 inch and then suddenly relax upward in a 1/32 inch motion. Large forward jaw movement.**

**I** ***Long I*** **starts with lips separated 3/8 inch. Slow lower lip motion, moves upward 1/8 inch. Lip is stably fixated to lower jaw. Sound is made during a momentary jamming of the lower jaw which is actually a slight upward motion.**
***Short I*** **starts with lips separated ¼ inch. Slow lower lip motion. Lower lip motion is the sum of jaw motion and lip muscle action, moving upward 1/16 inch during the sound.**

**THETA (TH) =Starts with lips separated ¼ inch. Lip carefully and knowingly flips closer 1/16 inch to upper lip gently and rebounds back 1/16 inch. Involves a slight jaw motion.**

**K Starts with lips separated 3/16 inch. Lip and jaw move upward 1/32 inch but do not bounce but stay up a short time before moving down 1/16 inch.**

**L Starts with lips separated 3/16 inch. Lips remain flat. Lip motion is very smooth. A single 1/16 inch upward lower lip movement.**

**M Starts with lips together. Does not kick the lips out. Lower lip moves strictly up and down. The lower lip moves fast 1/8 inch against and into the upper lip, compressing itself, and stops, ending the letter. The action ends with the lips together. No forward or downward jaw motion.**

**N =Starts with lips separated 3/8 inch. The lower lip moves upward slowly 1/16 inch and then suddenly relaxes by coasting upward 1/32 inch freely to a stop. No jaw motion.**

**O *Long O* starts with lips separated 3/16 inch. Lips move together making an elastic pursed shape and then unpurse. The maximum separation in the center is 1/8 inch. Sound occurs during pursing-unpursing motion of the lips. No upward or forward jaw movement.**
***Short O* starts with lips separated 7/16 inch. Lower lip moves upward 1/8 inch during the sound.**

**P Starts with lips separated ¼ inch. Lower lip moves upward compressing against the upper lip and stops for ¼ second, forcing the upper lip to move upward 1/32 inch. Tends to kick the lips out. The action is gentle and careful. No forward or downward jaw motion.**

**Q Starts with lips separated 5/16 inch. Lower lip timidly jerks up 1/16 inch and down 1/8 inch.**

**R Starts with lips separated 1/8 inch. Lower lip moves down slowly but accelerating 1/16 inch and then suddenly does a step increase in speed down, more quickly 1/8 inch in a motion that dies out. No forward or downward jaw**

**motion.**

**S Starts with lips separated 1/8 inch. A fast uniform downward motion of the lower lip 1/32 inch is followed suddenly by a gradually slowing downward motion 1/16 inch which stops after a short distance. Lower lip remains flat. Some forward jaw movement but none downward. Low effort.**

**T Starts with lips separated ¼ inch. Some downward jaw movement. Separation increases slightly 1/16 inch with smooth gentle single motion. A limited self protective careful increase.**

**U *Long U* starts with lips separated 3/16 inch. Lip motion occurs at the corners of the mouth. The lower lip moves upward 1/16 inch during the sounding. Lower lip moves forward from chin during the sound. No upward or forward jaw movement.**
***Short U* starts with lips separated 3/16 inch. Lower lip moves upward 1/16 inch during the sound.**

**V Starts with lips together. Lips may fully close or be closed only at the corners. The inside of the lower lip draws the upper lip causing the latter to move outward 1/32 inch. The action is gentle and careful. No forward or downward jaw motion.**

**W Starts with lips separated 1/16 inch and corners spread wide. Starting from corners the contact length increases and lip spread also decreases for 1/5 second, forming pursing at center of lips where the separation remains constant.**

**X Starts with lips separated 1/8 inch. Moves downward 1/16 inch slowly. Moves suddenly freely downward 1/4 inch in a relaxing motion. No forward or downward jaw motion.**

**Y *Long Y* starts with lips separated 5/16 inch. Slowly, and unstably but gently the lower lip slightly decreases the separation. The lower lip moves upward**

**1/16 inch during the sound. The lower lip may move unstably in all directions during the sound. No forward or downward jaw movement.**
***Short Y*** **starts with lips separated 3/16 inch. Lower lip moves upward 1/32 inch during the sound.**
***Y consonant*** **starts with lips separated ¼ inch. Lower lip slowly and unstably moves narrower 1/16 inch in 1/3 second and then goes out of control into a freely moving more separating motion 1/8 inch down for 1/10 second.**

**Z Starts with lips separated 3/16 inch. May be considered a combination vowel and consonant. Only the slightest slow barely perceptible separating motion of the lower lip. A forward movement of the jaw occurs.**

**RULE 1.**
**Read it as you see it! Use the above procedures to determine the letters. These letters should be in agreement with the letters as determined by careful listening. For a poor speaker very often the letters will not form a standard word. For example, if a word was spoken as WY it might be debatable whether the speaker really meant TRY or WY or even Y. For the syllable PRISE as in ENTERPRISE the P action may not give enough time for the upper lip to be affected by the lower-lip pressure. The syllable will sound more like RISE than PRISE. The action for P may not be interpretable as any letter but suggest that P may be partially present. However, an interpretation of MRISE or BRISE might equally be made. The sound may be as much like MRISE or BRISE as PRISE. This could result from a nose obstruction, or from an attempt to communicate something basically unrelated to the text. The result of starting the S at too wide a lip separation may result in confusion with PRICE.**

**RULE 2.**
**All one syllable words contain a vowel sound. A one syllable word usually has the form consonant sounds-single vowel sound-consonant sounds. Some one syllable words are of the form consonant sounds-single vowel sound or single vowel sound-consonant sounds. A and I are the only one syllable words containing only a vowel sound. E, I, U sounds are either short or long. A and O may have other sounds but which are similar to short or long versions of the vowel. Multiple vowels in a one syllable word are always the sound of one of the single vowels.**

**RULE 3.**
**Lip motions such as in a video may occur without sound. Usually these do not identify well with letter motions and can be dismissed as speech-unrelated motions. A letter interpretation of these motions may tend to reveal the thoughts of the speaker.**

**RULE 4**
**Silent letters cannot be identified by lip reading or by auditory means. They are identifiable only from written or printed material. Examples are the second L in FALL, the K in KNOB, the A in BEAT, the E in RAKE. By either lip reading or sound they would be interpreted as FAL, NOB, BET, RAK.**

**RULE 5**
**Enunciate all letters strongly. "Careful" consonants (first digit equal to or less than second, for example P) are enunciated with maximum care, not with maximum force of mouth parts, and not with maximum loudness. Other consonants are enunciated with maximum mouth and jaw action and force, not with maximum breath or loudness. The result will be to produce a mental image of the word in the listener. SPEAK will produce a mental image of a person speaking, HOME will produce a mental image of a person at home. The role of each letter in the image will be apparent. This will also produce an image on the lips and face of the meaning of the word. An image of SPEAK or HOME will appear on the face. Lip reading will be facilitated by the image.**

**RULE 6**
**The action of every word is pictured by the lips and other mouth parts. The interaction of the two word devices occurs in a two dimensional section which moves progressively through the devices. The lips are a two dimensional section on which the action is displayed. The action also displays on the tongue tip which forms a section also. As the word is enunciated the lips and tongue can be observed to see the action so that the meaning of the word is evident. From the observed action it can be inferred what the word is.**

**RULE 7**
**A group of consonants may occur together in a one syllable word. If the group begins the word the first letter is usually sounded most completely. The other letters may not be sounded or may be sounded partially. Or they may influence**

**the sound of the first letter in a way to prevent their being sounded. The case is similar for groups of consonants at the end of a word or for a group of vowels. Such words are more difficult to lip read. For example, HAND contains the consonant group ND. Both N and D may be sounded, or the D sound may be modified so that sounding of a preceding N would be more difficult. Or the N may not be sounded at all.**

**CONSONANTS LISTED BY STARTING LIP SEPARATION**

**1/16 inch. W**
**1/8 inch. S, X, R, short C**
**3/16 inch. Long C, L, K, Z**
**1/4 inch. D, T, long G, short G, TH, P, Y**
**5/16 inch. J, Q**
**3/8 inch. H, N**

**VOWELS LISTED BY STARTING LIP SEPARATION**

**1/8 inch. Long E**
**3/16 inch. Long O, long U, short U, short Y**
**1/4 inch. Long A, short E, short I, short A**
**5/16 inch. Long Y**
**3/8 inch. Long I**
**7/16 inch. Short O.**

**CONSONANTS THAT START WITH CLOSED LIPS**

**B, F, M, V.**

**CONSONANTS THAT START WITH OPEN LIPS BUT SHUT THEM DURING ACTION**

**P.**

**CONSONANTS LISTED FOR UP AND DOWN LOWER LIP MOTION, INCHES.**

**Fixed.**
**W. Width of opening decreases to 5/8 inch at constant separation.**
**Z. Constant separation.**

**Up.**
**Short G. 1/32**
**Long G, L. 1/16.**
**H. 1/8.**

**Down.**
**T. 1/16.**

**Up, Up.**
**J. 1/8, 1/32.**
**N. 1/16, 1/32.**

**Up, Down.**
**D, Q, Y. 1/16, 1/8.**
**TH. 1/16, 1/16.**
**K. 1/16, 1/32.**

**Down, Down.**
**Short C. 1/32, 1/32.**
**Long C, S. 1/32, 1/16.**
**R. 1/16, 1/8.**
**X. 1/16, 1/4.**

**LIPS PURSED.**
**Long O.**

**HOW TO DISTINGUISH CONSONANTS FOR WHICH THE LIPS OCCUR TOGETHER DURING THE ENUNCIATION.**

**B. Starting in contact lower lip flips outward from face brushing upper lip, then separates 3/8 inch from upper lip.**
**F. Starting in contact lower lip rolls upper lip outward from face.**
**M. Starting in contact lower lip jerks and is compressed 1/8 inch into upper lip**

**and stops.**
**P. Starting ¼ inch below upper lip the lower lip compresses itself a limited amount of 1/8 inch against the upper lip and remains in that position for ¼ second. This propels the upper lip upward 1/32 inch. Lower lip drops downward ¼ inch.**
**V. Starting in contact the inside of the lower lip draws the upper lip causing the latter to move outward from the face 1/32 inch.**

## CONSTRUCTING THE LOWER LIP MOTION OF A ONE SYLLABLE WORD USING THE INDEX FINGER

**Represent the lower lip by the right index finger held horizontally. The left index finger may be used to represent the upper lip. Use the above information to move the right finger according to the letter. Action when the fingers are together can be performed as described above. For example, for F the lower finger can roll the upper finger. While the fingers are moving say the sound that occurs during the action.**

**Example words:**

**JA (name of the letter J).**
**J. Start with index fingers 5/16 inch apart.**
**Move the lower finger up 1/8 inch in a decelerating motion.**
**Move the lower finger up 1/32 inch in a quicker relaxing motion.**
**Transition to long A: move finger down as fast as possible 3/32 inch.**
**Long A: keep the finger stationary for a time.**
**Using a mirror speak the letter name in synchronization with the finger movements so that the lip movements are the same. This results in good enunciation for the letter name.**

**COG.**
**Short C: Start 3/16 inch between bottom of left finger and top of right finger.**
**Move the lower finger downward slowly 1/32 inch.**
**Move the finger downward fast for 1/16 inch.**
**Transition to short O: move finger down as fast as possible 5/32 inch.**
**Short O: keep the finger stationary for a time.**
**Transition to short G: move the finger as fast as possible up 3/16 inch.**

**Short G: move the finger up 1/32 inch to a stop.**

**BOG:**
**B: Start with index fingers together.**
**Transition to O: Move the right finger as fast as possible downward 7/16 inch.**
**O: hold finger stationary for a time.**
**Transition to short G: move the finger as fast as possible up 3/16 inch.**
**Short G: move the finger up 1/32 inch to a stop.**

**BOX:**
**B: Start with index fingers together.**
**Transition to O: Move the right finger as fast as possible downward 7/16 inch.**
**O: hold finger stationary for a time.**
**Transition to X: move the finger as fast as possible up 5/16 inch.**
**X: Move finger downward 1/16 inch slowly.**
**Move finger suddenly freely downward for 1/4 inch in a relaxing motion.**

**PRACTICE METHODS**

**1. Use a mirror to watch your lips. Enunciate a word. To study the action of a particular letter enunciate the word with the letter omitted. Also try substituting other letters for the letter. Compare with the descriptions of the letters given above. For example, enunciate "MICROSCOPE" and then "MYCROSCOPE" to reveal how the lower jaw is momentarily jammed during enunciation of long "I". Use a mirror to watch your lips. Speak a one syllable word. Resolve the lip action into letters using the above identifications. You may find that these letters are incorrect. However, it may be that these letters represent what you actually spoke. For example, if you intended to speak "TRY" you might correctly identify the letters "WY" as actually spoken.**

**2. Make a video by separating the syllables of words. Separate the syllables so that each is easily accessible to your video player. This may require up to ten seconds or more separation. Do not move your lips between syllables. Go through the syllable video a syllable at a time.**

**3. Have someone speak to you a syllable at a time. Have them wait for you to**

**analyze and identify it before going to the next syllable.**

**4. Have someone speak to you in one syllable words only. For this ordinary text can be converted into one syllable words and read. Try to identify the words in terms of three or less letter groups of a single vowel and at most one consonant on each side of the vowel.**

**5. Make a DVD or hard drive video of your own lip movements. Speak only one syllable words. Prolong the vowel sounds of the words to two or three seconds. Speak the consonants at normal speed. Be sure to blend in the consonants before and after the vowel sound with the vowel sound. This method of speaking makes lip reading much easier.**

**6. Make a DVD or hard drive video of your own lip movements. Read a passage of text in all capital letters, enunciating in capital letter manner. Upper case words are naturally spoken when headings and titles are read. They sound more like a series of isolated upper case letters. Lower case letters are naturally spoken when the body of a text is read. Upper case words are easier to lip-read than lower case words. In lower case words enunciation is adjusted for speed and for combination with other letters. The letters contain less energy and action and individuality and do not show on the lips and face as much. Enunciation may be better if the face is horizontal so that gravity does not interfere with jaw motion and air flow.**

**7. Read the lips of announcers and speakers on television.**

**8. Read the lips of speakers on commercial DVD videos.**

**9. Use special video playback software which allows control of stop and pause, seeking, speed, and individual frames.**

**10. Make use of Rule 6. Write down a small list of twelve or more one syllable words which contain all the letters of the alphabet. For a syllable or one syllable word compare the action with the meaning of the twelve words to determine which meaning best approximates the action. Or if the action is directly recognized as that of some word use this word. The mouth is a “video” of the speaker’s meaning. Watch yourself in a mirror as you enunciate words**

**to see how the action is displayed on the mouth. As an example, as an article is SACKed the mouth displays the opening of the sack enveloping the bottom of the object, then the object passing along the sides of the sack, then the bottom of the sack hitting the bottom of the object. For a RAKE the mouth displays the rake edging through the leaves and then gathering the leaves and finally being withdrawn from the accumulated pile. You spontaneously recognize that sacking or raking action is taking place in the mouth because the mouth actually contains equivalent mechanisms to the devices involved.**

## LIP READING AND LIP TALKING

**Lip reading is done by observing the lips and the jaw. The width of both the lips, their vertical positions on the face, their separation, the speed of their action, their position toward and away from the face, and their action on each other such as rubbing are observed. Also the action of the jaw up and down is observed.**

**Unvoiced lip speaking is faster than voiced lip speaking. The mind is too slow to follow the details of the lip action. Lip reading must be practiced as a skill.**

**Lip reading of lower case is considerably more difficult for lower case. For lower case it often is difficult to detect the lip motion of a letter. For this reason timing is more important for lower case. Duration of a fixed or varying lip position will indicate how many letters are enunciated during the action. If one knows which letters have the least lip motion then only these letters need to be considered at a fixed open mouth position. It needs to be decided whether an action is one or two or three letters. Then subtle differences in letter action have to be considered.**

**The relation of the lip action to the inner mouth action, where there is inner mouth action, must be understood. Lips cannot be read if there is no lip action for a letter. There has to be some exterior action for the letter to be read visually.**

## REPEATING LETTERS

**The letters of the alphabet vary in repeatability. All letters can be repeated after a sufficient time interval. Some letters can be repeated in a continuous fashion. All letter actions are limited by the limited capability of the operator for power and velocity. Operator action is either power determined or velocity limited. Where there is no opposing force it is velocity limited. Where there is force it is power limited. Thus there are only two operator speeds. The letters are coded by these and by duration.**

**A.  As in Aaaah.  A is very repeatable because it is back and forth or rotary tangential. In terms of physical bodies A is an abrasion of a crystal. This can be continued until the crystal is completely worn down. Thus it can continue for a long time. Long duration power limited. Interaction and operator action are the same position, velocity, force profile. Instant starting.**

**B. This is a plosive. 6 breaks a liquid to 1 which blocks further liquid so that a recovery period is needed. 6 operates by tangential action so that breakdown of 2 immediately forms a very thin layer of 1, cutting off B action immediately. It is poorly repeatable. Short duration power limited. Interaction and operator action are the same position, velocity, force profile. Instant starting.**

**If 2 layer is thinner breakdown occurs at lower speed. Or 2 for B may break down differently from 2 for S. 2 area is much smaller for B. Thus B speed may be same as S if B power is the same. B is much more effective than S in breaking down 2 and requires less area and speed. The lip is a small area. The lower lip is much more effective than the 3 tongue in breaking down 2. The lower lip goes off of the upper lip and into free motion and thus a large motion. S does not operate on a limited area 2. This is communicated. It is inefficient to have a larger surface than is traversed. Thus the lower lip leaves 2 and is in free motion. This communicates important information about 6 and 2.**

**For B you wish only to communicate that breakdown has occurred to 2. This is similar to S. For a given amount of breakdown the force for S and B is the same. But the operator velocity may be much higher for S. This means that much power is lost for S. For B all operator power goes to break down 2. For S much of it may go to dissipate in 3 so that S power may be much more than B power. We assume operator power is the same in both cases. Turbulence in 2 is determined by the velocity on its surface. S has difficulty producing this velocity. B wants to show breakdown but needs to expend much less power to show it. B exerts the same force but at much lower speed. B is able to stop much faster. This is plosive. For B the operator will go a much smaller distance before stopping assuming he is operating with the same internal friction and mass. In comparison with S he stops immediately.**

**C. This is not repeatable because heat buildup creates a liquid which very effectively blocks repeatability. Long C is very unrepeatable, short C is more repeatable because the thinness of the 3 layer allows quick heat absorption. Dash-dot and dot-dot for long and short C. Interaction and operator action are the same position, velocity, force profile. Instant starting.**

**D.  D d d d d d! This is quickly repeatable. After breakdown to 3 there is nothing blocking a repeat action as fast as the operator is capable of performing it. Dash dot. Interaction and operator action are the same position, velocity, force profile. Instant starting.**

**When D breaks there is only a gradual decrease in force. It originates from 4 on 3 which drops off exponentially. Operator does not continue moving to infinite time. Operator only wants to show breakdown. It is possible that 4 rapidly separates 3. But breakdown of 3 is to be avoided so separation of 3 is not allowed. Operator during 3 must continue only long enough to show its presence. If operator is super skilled it would be impossible to conclude information about bodies from operator action. There has to be an assumed relation between force and operator action. Operator is basically limited in capability and is efficiency oriented. To communicate about bodies we take on conventions in operator behavior in relation to force and efficiency. Operator "lets go" after sufficient communication has occurred. If operator is limited in sensing he does not react to resistance change at breakdown. The result is a strong effect on operator's inertia. Operator continues pulling hard and at same time resistance decreases so that operator jerks forward. This is the lip jerk you see. About this time operator senses situation and relaxes his force. This causes him to jerk backward. This also you see as a lip jerk, opposite to first jerk. Thus D lip shows a forward and reverse jerk.**

**E. As in EEEEK! E is very repeatable because it is a back and forth or rotary tangential abrasion of a rigid mass. The breakdown product does not interfere with interaction. Back and forth abrasion causes the mass to stay in the same position. E is longer lasting than A because 5 is more difficult to abrade away than 1. Power limited. Interaction and operator action are the same position, velocity, force profile. Instant starting.**

**F. F is difficult to repeat because it involves power transfer to the environment, which is unknown or difficult to know. Limited power, short duration. Interaction and operator action are the same position, velocity, force profile. Slow cautious starting.**

**G. G is difficult to repeat because it is a collision process. Collisions are difficult to arrange. Dot dash and dot for long and short G. Acceleration time may be included in the letter. This is silent, power limited. Dash dot dash for long G, dash dot for short G. The operator may not be present during interaction of 5 and 1. Interaction and operator action are different position, velocity, force profiles. However the letter is silent during this time. Slow starting.**

**G requires a constant loss of energy with distance. This implies that deceleration is constant since dU/dx=c(t) so dv2/dx=c is independent of x or 2vdv=cdx or 2vdv/dt=cdx/dt=cv is independent of x so dv/dt=c/2 is independent of x.**

**H. H is difficult to repeat because it is a collision process. Collisions are difficult to arrange. Interaction and operator action are different position, velocity, force profiles. Acceleration time may be included in the letter. However the letter is silent during this time. Slow starting.**

**J.  J is difficult to repeat because it is a collision process. Collisions are difficult to arrange. Interaction and operator action are different position, velocity, force profiles. Acceleration time may be included in the letter. However the letter is silent during this time. Slow starting.**

**I.  IIIII don't know! I can be arranged to last for a considerable period of time. A large mass moving at low velocity may have considerable kinetic energy if the mass is large enough. It may require a long time to travel the compression distance of an elastic body but have sufficient kinetic energy to break it down. Interaction and operator action are different position, velocity, force profiles. Acceleration time may be included in the letter. Slow starting.**

**TH. This is not repeatable because it is a cautious letter. TH is difficult to repeat because it is a collision process. Collisions are difficult to arrange. Interaction and operator action are different position, velocity, force profiles. Acceleration time may be included in the letter. Slow cautious starting.**

**K.  This is not repeatable because it is a cautious letter. K is difficult to repeat because it is a collision process. Collisions are difficult to arrange. Interaction and operator action are different position, velocity, force profiles. Acceleration time may be included in the letter. Slow cautious starting.**

**L.  For L the operator must compress to break point and then travels a distance desired. His speed maybe limited by his power capability. We do not ascribe infinite speed to L. Operator moves to compress and then moves to break down. There is a slowing at end of compression and a continued limited speed, which assures to proceed at maximum power exhibited in compression. Thus L expresses operator power capability. L is done at maximum speed mouth is capable probably limited by tongue capability. L tends to be one motion at maximum speed. It is not lip maximum speed but tongue maximum speed. It is simply a repositioning such as for EL. This repositions from E. The voicing of the L expresses the limiting tongue speed. L is less likely than A because L is pressure while A is repeatable because it is tangential. The interaction is not the same as operator action. Interaction and operator action are different position, velocity, force profiles. The letter includes the compression of the elastic prior to or during interaction. Slow starting.**

**For L the operator must compress to break point and then travels a distance desired. His speed maybe limited by his power capability. We do not ascribe infinite speed to L. Operator moves to compress and then moves to break down. There is a slowing at end of compression and a continued limited speed, which assures to proceed at maximum power exhibited in compression. Thus L expresses operator power capability. L is done at maximum speed mouth is capable probably limited by tongue capability. L tends to be one**

**motion at maximum speed. It is not lip maximum speed but tongue maximum speed. It is simply a repositioning such as for EL. This repositions from E. The voicing of the L expresses the limiting tongue speed.**

**M. Mmmmmmm! EM expresses maximum lip speed. EM needs to be voiced only to breakdown. Repeated M's can express a churning of 2. The 1 formed does not interfere with repeat action. M is perhaps the most long lasting because 2 is not used up. This allows infinite time duration for repetition of M. Interaction and operator action are different position, velocity, force profiles. The letter includes the compression of the elastic prior to or during interaction. Slow starting.**

**N. Nnnnno! A flexible rod may be used. The 2 formed by interaction does not interfere with the interaction. Interaction and operator action are different position, velocity, force profiles. The letter includes the compression and expansion of the elastic prior to or during interaction. Slow starting.**

**O. Ooooooh! O is the only non breakdown letter that is repeatable. These letters require too much carefulness to be easily repeatable. The non breakdown with equal digits are most repeatable. F is difficult to repeat because it involves the environment which is unknown but O does not. Interaction and operator action are different position, velocity, force profiles. The letter includes the compression of the elastic prior to or during interaction. Slow cautious starting.**

**P. This is not repeatable because it is a cautious letter. The operator cannot continue P without traveling. Interaction and operator action are different position, velocity, force profiles. The letter includes the compression of the elastic prior to or during interaction. Slow cautious starting. Will be done slower than M because caution always requires slowness.**

**Q. This is not repeatable because it is a cautious letter. Interaction and operator action are different position, velocity, force profiles. The letter includes the compression of the elastic prior to or during interaction. Slow cautious starting.**

**R. Brrrrr! Interaction and operator action are different position, velocity, force profiles. Operator contact with the fluid will be different from fluid contact with the environment body. Instant starting. R is short duration at the start of a word, long duration at end of word.**

**S. Hissss! Interaction and operator action are different position, velocity, force profiles. Operator contact with the fluid will be different from fluid contact with the environment body. Instant starting. It is the 1 resistance that ends the letter.**

**T. This is not repeatable because it is a cautious letter. T is too subtle as to heat buildup. Interaction and operator action are different position, velocity, force profiles. Operator contact with the fluid will be different from fluid contact with the environment body. Slow cautious starting.**

**U. This is not repeatable because it is a cautious letter. Interaction and operator action are different position, velocity, force profiles. Operator contact with the fluid will be different from fluid contact with the environment body. Slow cautious starting.**

**V. This is not repeatable because it is a cautious letter. The operator cannot continue V without traveling. Interaction and operator action are different position, velocity, force profiles. Operator contact with the fluid will be different from fluid contact with the environment body. Slow cautious starting.**

**W. This is not repeatable because it is a cautious letter. Interaction and operator action are different position, velocity, force profiles. Operator contact with the fluid will be different from fluid contact with the environment body. Slow cautious starting.**

**X. Interaction and operator action are different position, velocity, force profiles. The letter includes the compression of the liquid sphere prior to or during interaction. Slow starting.**

**Y. Y is too difficult to control. Interaction and operator action are different position, velocity, force profiles. The letter includes the compression of the liquid sphere prior to or during interaction. Slow cautious starting.**

**Z. Z is repeatable. Interaction and operator action are the same position, velocity, force profile. Instant starting.**

## LONG AND SHORT LETTERS

**Both long O and short O involve widening of mouth opening, thus representing conservative energy. Long vowels are used in impure situations such as dirt or disease. Long vowels are resonant. A long vowel is more active, less passive toward the environment. Thus rack and mat are less likely to be used as verbs than is rake. The sound of a long vowel stands out more against noise. Thus short O is made using 4 in a different part of vocal system. Long C occurs before E. Thus we have cede, generate, genius accede, crede. The long C or G is meant to add more safety to what the long vowels present do. Variations in amount of longness also occur for vowels. Thus O in "do" is longer than O in "cod". Thus in lip reading it is helpful to try to read or discern amount of longness or danger being communicated. In context the same word such as rake may be spoken with more or less longness. Rake and rack sound like rak. Rak may have short or long A. The C**

**in rack makes it short. If A is short we automatically interpret it as RACK which is not dangerous. Straightening a flexible rod is safer because you are pulling away from device. Thus short O is non dangerous. Long O is dangerous to perform. Long letters are also dangerous for the vocal system to perform. Long letters are spoken because the environment is dangerous.**

**Short vowels are finer than long vowels. Therefore the performance of short vowel actions requires consonant pairs to more closely regulate the action. This is the reason that consonant pairs tend to make vowels short. Long vowels are associated with silent E. The silent E represents an evolutionary investigation of the larger scale long vowel action.**

## AVAILABLE MOUTH STRUCTURES FOR SPEECH

**In order for the vocal actions of speaking to be interactions of physical bodies ascribed to the letters these physical bodies must be present in the mouth. These bodies must be used to originate the letter sounds. This includes the six basic types of bodies. For example, D results from action near base of tongue far back in the throat. Probably a rubbery liquid is involved. D depends on a localized digging in using tip of tongue. C depends on large area and time to heat. D picks up liquid and stretches it. Thus it depends on tongue lifting off of surface of palate. The breakdown occurs with tongue not in contact. C requires contact for breakdown. B might work by drawing out a 2 film. There are different types of 4 structures in the mouth. There is a hard 4 which is not sticky and keeps its shape under gravity. There is a soft 4 which is sticky and does not keep its shape under gravity. It is like a fluid or liquid. It can be stretched by adhering while hard 4 must be stretched by digging into it. There may be different varieties of sticky 4 in the mouth. For stretching the sticky 4 should be very pliable. This enables it to make full contact with 6 surface. Hard 4 is preferred for 5-4. Sticky 4 is preferred for 6-4. There may be different pronunciations for D depending where in the mouth the 4 is found or used. For D the 4 may be found far back in the mouth at the base of tongue or in front of mouth at tip of tongue. The resulting Ds are somewhat different. The one at back of mouth is heavier but otherwise sounds the same. There is less variation for D than for C or G. 1, 3, and 5 vary the most in the mouth. 5 can have a microscopic structure which however is much larger than 1 structure. 1 occurs as both macro and micro scopic. Microscopic appears in 2 and 3. The microscopic in 3 is larger and more stable than that in 2. 2 in 3 merely disperses 1 but in 4 its individuality characteristic of surface tension occurs. You cannot tell very well whether the D you say is correct or not because you are too uncertain as to what is correct enunciation. Ds produced by theory will however be recognized as correct even though it is difficult to remember them. If compared immediately with other Ds the errors in the latter can be determined. The memory for correctness is correct. Thus continual reference to theory or to material strongly motivated to correctness is required. It is otherwise practically impossible to avoid lapsing into incorrect enunciation.**

**ENUNCIATION ERROR AND ENUNCIATION INTENTION**

**Digital pair means physical process such as conservative transfer of energy by collision. But there are different ways to do this. The letter pictures the way it is done and may look different for different ways. Thus different alphabets arise depending on preferences for ways. Phonetics will be somewhat different for these different ways corresponding to the different letter used. Thus one may have difficulty understanding the language. Errors in translation are easy to make and can cause trouble. Different shapes of the approximately same letters may require translation also. That is, letters as well as words may need translation. 4 can hold some energy for a long time. 5 holds a lot more energy for a very short time. Good enunciation is exceedingly difficult to maintain. One says a million things while speaking what purports to be a single letter. Thus A may be confused with I, C with SIR. J may sound like SHAVE. P may sound like PUSH because you are opening the lips too much after being together. Short U is a wider opening than long E.**

**Context is used to obscure what is said. Thus if you are saying the letters of the alphabet the context is the alphabet. It is immediately assumed that what is being said is the letters of the alphabet. When a letter sound is obscure one does not try to determine what the sound is most like but rather what letter sound it is most like. In this way you can say a million different things while saying the letters of the alphabet and all these things will be interpreted only as letters. However, what it most sounds like has some kind of effect on our behavior and we can call this our mind or imagination, thought. But the most competent person confines himself to the exact pronunciation of the letters. He does not distort the alphabet sounds. He confines his speaking only to the exact alphabet sounds. These sounds can be calculated from theory. Only by referring constantly to the theoretical sounds of the alphabet can correct enunciation be maintained. Social forces are too strong to maintain good enunciation in any other way. However, strict adherence to the correct lip movements produces very good enunciation.**

**For syllables in two syllable words such as SUPPLY the first P may not be retreated from by opening the lips. Instead the lips stay together and a second compression occurs immediately after the upper lip has moved from the first compression. When we say a word we do not claim that we made the actual sound but that the word can be inferred from context. By “said” we mean what was intended or what we claim was intended. “Say” means to express as words. We try to fit words as close as possible to what we have in mind. We say one thing but this does not mean it is what we have in mind. “Say” means the literal interpretation of what was spoken. The problem is that enunciation may be poor. You may be speaking poorly in an attempt to express yourself. You are trying to communicate some intense problem or desperation that ordinarily is not present for a person. We break the conventions of language to do this.**

**4 is not aware of concept of motion in 4-5. It must stay far from its extreme near**

**breakdown values. Thus it does things in a weak way. It tries to avoid the stronger members of 5 such as large masses. P retreats fast from the lip as a part of caution rather than by dynamic cause. 4 does not start action from a location near 5 but moves in fast from a distance. Good enunciation requires energy and effort and cannot be done lazily. Good enunciation will agree with theory. M can be started at lip contact but must be done at minimum speed and distance and time. It can be retreated from quickly to the next letter or relaxed in contact. Keep in mind that voicing is related to consonants or is attached to them. Construct the lip action and visualize it before looking in a mirror. Compare with a well enunciated mirror image. For "mob" you have a difficult time seeing both M and O. If you see O you cannot see M. In this case visualize a slower lip action and perform a slower enunciation to match it. Then keep watching while you speed up the enunciation. For R it takes a lot of operator acceleration to make a small acceleration of 3 on 1. Thus operator acceleration is a main feature of R action. R involves an acceleration and then a step increase in speed when breakdown occurs. For ROB the step increase is used to open the lips for O. In fast motion the action looks like a sticking of the lip at the start, or simply a slower start than OB. Thus we have the concept of fast and slow starts of the lip. The mind is too slow to watch the lips. You have to learn skills. The lower lip can be moved up and down about ¼ inch without moving the jaw. Good enunciation requires motivation as well as energy. If you are enunciating COD imagine you are giving a lecture on COD to a conservation society. The best motivation is money. Imagine you are getting a commission for the lecture.**

**EXAMPLES OF ENUNCIATION ERROR**

**The general rule is that a word must always be pronounced as printed. It is not correct to represent an action as being one sequence of letters orally and a different one in print. All the letters in a printed one syllable word except possibly silent letters are enunciated. Even the silent letters may be communicated orally. Each letter has a unique pronunciation except short and long letters. To enunciate any one syllable word determine which letters are silent and for each letter whether it is short or long according to the possible choices for that letter. Whether a word is one syllable or more syllables must be first determined.**

**No special pronunciation symbols are necessary aside from the letters themselves, silence, and degrees of short or long.**

**LOUD. This is almost a two syllable word LO-UD.**
**OIL. This is almost a two syllable word O-IL.**
**ONE. Pronounce as O-N with long O. Do not pronounce as W-U-N. Take special care to avoid the E sound. This will have an effect on the sound of ONE.**
**OWN. Pronounce as O-N with long O. Take special care to avoid W sound. This will have an effect on the sound of OWN.**
**EIGHT. Pronounce as E-I-T with short E and I, not as A-T with long A. This will have an**

**effect on the sound of EIGHT.**
**FEW. Pronounce as FEW with long E followed by W, not FU with long U.**
**TOY. Pronounce as T-O-Y, not T-O-I.**
**BROW. Pronounce as BROW, not BROU.**
**STICK. Pronounce as STICK or STIK.**
**FULL. Pronounce as F-U-L-L or F-U-L.**
**CRAMP. Pronounce as C-R-A-M-P with short C, not K-R-A-M-P.**
**DISK. Pronounce as D-I-S-K, not D-I-S-C with short C.**
**DISC. Pronounce as DISC, not DISK.**
**PHONE. Pronounce as P-H-O-N, not F-O-N. The E may be silent.**
**SURE, Pronounce as SUR with long U, not SHUR.**
**SWITCH. Pronounce as S-W-I-T-C-H with the non silent or silent enunciations, or simply S-W-I-H.**
**THICK. Pronounce as THICK or THIK.**
**THEY. Pronounce as THEY, not THA with long A. No letters are silent.**
**BUY. Pronounce as B-U-Y or B-Y with long Y, not B-I with long I.**
**BY. Pronounce as B-Y with long Y, not B-I with long I.**
**BOUGHT. Pronounce as B-O-U-G-H-T with silent or non silent enunciations or B-O-T with medium length O.**
**VIEW. This is almost a two syllable word.**

**REPEATING A LETTER**

**Repeated M's can express a churning of 2. We can do Brrr and Hissss. There is Aaaah and Moooo. "IIIII don't know". Plosives cannot be repeated easily. L is less likely than A because L is pressure while A is repeatable because it is tangential. E is tangential also. "I" can be arranged to persist for a while but is not indefinite. M is perhaps the most long lasting because 2 is not used up. N can be arranged some. O is the only non breakdown letter that is repeatable. These letters require too much carefulness to be easily repeatable. The non breakdown with equal digits are most repeatable. F is difficult to repeat because it involves environment which is unknown. O does not. T is too subtle as to heat buildup. Z is repeatable. Y is too difficult to control. All the letters can be done intermittently but G to K are the most difficult of these because collision is difficult to arrange. Continuous A produces a fluctuating lower lip that is not solidly fixed as is lower lip of R or N which is flexed for steadiness or tensed against itself.  We have EE but not AA in words because E is longer lasting than A. O lasts indefinitely because it merely tenses. P does not last indefinitely because we do not allow the operator to travel. We can repeat long E but not short E. We repeat long A as in SAAAAY! We can do WHYYYYYY! Also RUUUUULE! Thus all vowels can be prolonged. All the letters can be prolonged by special arrangement. Thus J is prolonged by a large mass and delay of heat buildup. This prolongs the pre breakdown portion. Some such as B are especially difficult.**

**SILENT LETTERS**

**Any consonant action can be avoided. Consonant actions make reflexes more automatic. Some letters of a group are more likely to be made silent. In a starting consonant group the first consonant is least likely to be made silent. In a terminating consonant group the last consonant is least likely to be made silent. The rule for vowel groups is less regular.**

**A letter in speech can be made silent by pronouncing neighboring letters so that it is difficult to enunciate the letter to be made silent. Within the mouth to combine a letter and a following silent letter move the first letter near the position of the second. This displaces the second and makes it difficult to enunciate. For a double letter such as in FALL do the first letter so strongly that you are out of position for the second L. For BEAT do not move the tongue much for E so it will be out of position for A. For KNOCK require N strong so K which is far away has no chance. For EDGE overemphasize G.**

**LETTER COMBINATIONS CONTAINING SILENT LETTERS**

**SH S silent as in SHIP or MASH**
**UR U short, R silent as in TURF**
**AN A short, N silent as in RANK**
**ON O short, N silent as in LONG**
**DGE D, E silent, G long as in EDGE**
**CK C silent as in LICK**
**LL second L silent as in MILL**
**AY A long, Y silent as in SAY**
**EA E long, A silent as in BEAT**
**OA O long, A silent as in BOAT**
**CH C long, H silent as in CHOP or MUCH**
**AW A short, W silent as in SAW**
**GHT G and H silent as in LIGHT**
**OUGH O, G, H silent, U long as in THROUGH**
**AKE E silent, A long as in RAKE**
**AI A long, I silent as in SAIL**
**OE O long and half cycle to make E silent as in HOE**
**OW O long, W silent as in TOW**
**UE U silent, E short as in GUESS**
**SS second S silent as in MESS**
**OO first O modified to make second O silent as in BOOK**
**OO first O modified, second O silent as in BROOM**
**TCH T, C silent as in MATCH**
**KN K silent as in KNOB**
**IR R silent as in SMIRK**

**EY E long, Y silent as in KEY**
**WR W silent as in WRAP**
**OUGH O silent, U long, G and H silent as in THROUGH**
**OUGH O long, U silent, G and H silent as in THOUGH**
**ONGUE N, U, E silent as in TONGUE**

**SPEAKING LETTER COMBINATIONS**

**Letter transitions are not made infinitely fast but are equal time to consonant. For GIFT we do G and begin voicing and making transition to I. Thus consonant G is partially voiced. Both F and T have to be spoken together. The tongue can be in T position while lips do F. Thus while voicing both F and T will show in the voice sound. When different parts of the tongue are used for two consonants they can also be combined to both show in the voice sound. In TESTS a different tongue configuration is used from that of ST in order to rapidly do STS. Lip configuration may also be different for ST versus STS. In requiring each letter to be exact more vocal parts are enlisted for the combination and thus the combined sound is more present in voicing.**

**Enunciation for voicing cannot be too slow. For whispering any speed can be done. For GIFT the transition from G to I occurs at constant lip separation so there is no slow transition lip movement. For FT there is a slow transition from I to FT. Thus often there is a slow transition movement of lips on each side of a vowel.**

**A microphone may enable whisper speaking to an audience. Speaking without a microphone to a large audience is a specialized speaking ability. This speaking may lip read differently from whispering and is easier to lip read. Capital letters conjure up a vivid mental image. Capitals are used in loud speaking. Small letters are primarily for reading and correspond to subliminal visual perception.**

**The last letter of a word is spoken to end all further letters. This knowledge is a help to lip reading because the effect on enunciation enables the lips to be read to determine that a word has ended. Syllables are spoken in such a way to end letter sequencing. This speaking can be lip read to determine the locations of the ends of syllables. The mouth controls the syllable airflow. The lung muscles control word air flow. Each syllable vowel sound gets a separate puff of air that is controlled by the mouth. Therefore each syllable gets a separate puff of air through the mouth. Each well-enunciated word gets a separate puff of air from the lungs, produced by a separate muscle action. Within a word the air flow requires no further muscle effort in the lungs. Lung muscle action is easily discernible as a heaving of the chest or abdomen. Syllabication is accomplished by the requirement that the minimum number of mouth movements must occur for a word. For example, BENEFIT is syllabicated as BE-NE-FIT. The N and F block the air stream and would require extra opening mouth movements if they occurred at the end of syllables.**

**CONSUMER is syllabicated as CON-SU-MER. The N does not completely block the air flow and provides enough for S. For BEN-E-FIT the N does not provide enough flow for E and so an extra movement would be required. Syllabication may be different for different types of speaking. For public speaking without microphones the syllabication may be different from public speaking with microphones. The former case requires maximum enunciation of all letters, represented by upper case letters, with all consonants carried on vowel sounds.**

**A consonant is naturally more emphasized at the start than at the end of a one syllable word. Syllables are a matter of making a word easiest to say constrained by your speaking purposes. For speaking without a public address system it may be assumed syllables start with consonants. This rule can be used in lip reading.**

**The function of consonants is other than energy input so they can be short duration. Vowels are energy input and must have a minimum duration while consonants have no minimum duration. On this basis you can always pick out a vowel by duration. There is no other way. If you note the length of time of a word, and the tremors that the consonants consist of, you can see the vowel. The vowel must be identified by the amount of lip opening. Compare the observed opening with various vowel openings to determine its identity. Lip pursing must also be used to identify vowels. Other factors such as stability for Y must also be used and may be more difficult. Consonants present may offer some context type identification. Where consonants occur together they should all be enunciated within a time short compared to vowel duration. Thus a word should be a quick quiver followed by a long vowel duration followed by a quick quiver.**

**A phrase is a sequence of quiver pairs. RATE is spoken with long A and this makes it difficult to sound E after the T. Short A allows E after T. Long A carries through T to exclude E. When enunciating do not equally strongly enunciate all consonants. It is wrong to enunciate careful consonants such as P, V, K, T as strongly. Careful consonants can be quickly enunciated because they represent timidly performed actions. OO as in BOOK involves rotation of the lips. In BULB you speak LB as fast as possible. You will notice that B is faster than LB and this distinguishes them. In STREAM the S and R do destruction of the mouth and this affects E even if no R or S positions are present in mouth parts. This is why the careful consonants K, F, P, V, T, W, Y, Z cannot be combined only among themselves, especially at the beginning of words. When combinations of them do occur they must be enunciated slowly. The damage to the speech mechanism by one letter affects how the next letter will be performed. Thus for GR the G damages 1 in the speech mechanism and thus affects R. For TR the distribution of 3 may be affected by T which changes the R action, possibly making it more like T. For BR the B creates 1 (breakdown of 2) which affects R. In fact these changes are the reason for the use of these combinations.**

**Multiple consonants can be enunciated faster if they are more strongly done. This does not mean louder. Increasing air stream makes them louder but more tongue force action makes them stronger. This is independent of loudness. Stronger performance makes lip reading easier. Enunciating the careful letters stronger means doing them more carefully rather than with more force. Enunciating consonants stronger elicits more mental image from what is heard. The lips may tend to show more of a picture also. If enunciated correctly you get a mental image of the function of each letter in the word action. For K the 5 should stop on 6. For BASE you get a picture of wobbling about the base. In BAG the bag shows to be full. In HOME there is permanent rest. This shows the 4 should come to rest in M.**

**In general consonant combinations that occur involve active parts of the mouth that are close together. Thus L and K often occur together as LK because both use the root of the tongue. S and T often occur together as ST because both use the tip of the tongue. T presses forward from S and this is where 3 is, while 2 is further back toward where S operates. This is a second reason favoring the combination. They are in the same direction of motion. Also S slows down naturally to the speed needed for T. TS does not occur because T goes out of position for S.**

**LISTING AND ANALYSIS OF CONSONANT PAIRS**

**Symbolism:**
**2S, 1S, 0S=common, some, rare occurrence at start of word.**
**2E, 1E, 0E=common, some, rare occurrence at end of word.**

**Examples. Some reasons for association of the letters are indicated.**

**BB O BB**
**BC O BC 0S 0E**
**BD O BD 0S 0E**
**BF O BF**
**BG O BG 0S 0E**
**BH O BH 0S 0E**
**BJ O BJ**
**BTH O BTH**
**BK O BK**
**BL O BL 2S 0E leaves middle of tongue on floor of mouth**
**BM O BM 0S 0E**
**BN O BN 0S 0E**
**BP O BP 0S 0E**
**BQ O BQ**
**BR O BR 2S 0E Compatibility. Leaves middle of tongue on floor of mouth**

**BS O BS 0S 2E**
**BT O BT 0S 1E Only DEBT and DOUBT. Proximity but slow.**
**BV O BV**
**BW O BW 0S 0E**
**BX O BX**
**BY O BY**
**BZ O BZ**

**CB O CB**
**CC O CC**
**CD O CD**
**CF O CF**
**CG O CG**
**CH O CH 2S 2E same tongue. Prior roof. Leaves tongue on floor of mouth**
**CJ O CJ**
**CTH O CTH**
**CK O CK 0S 2E Proximity.**
**CL O CL 2S 0E Proximity. Leaves tongue on floor.**
**CM O CM 0S 1E Tongue and lips compatible**
**CN O CN Two tongues not compatible.**
**CP O CP**
**CQ O CQ**
**CR O CR 2S 0E Proximity. Leaves tongue on floor.**
**CS O CS 0S 2E**
**CT O CT 0S 2E. ACT. Proximity.**
**CV O CV**
**CW O CW**
**CX O CX**
**CY O CY 0S 0E**
**CZ O CZ 0S 0E**

**DB O DB**
**DC O DC**
**DD O DD**
**DF O DF 0S 0E**
**DG O DG 0S 2E Only in the form DGE as in EDGE. Proximity.**
**DH O DH 0S 0E**
**DJ O DJ**
**DTH O DTH 0S 1E Only four words including width and breadth.**
**DK O DK**
**DL O DL 0S 0E**
**DM O DM 0S 0E**

**DN O DN  0S 0E**
**DP O DP 0S 0E**
**DQ O DQ**
**DR O DR  2S 0E Proximity. Fast. Leaves tongue on floor.**
**DS O DS  0S 2E**
**DT O DT  0S 1E.  Only word is VELDT.**
**DV O DV  0S 0E**
**DW O DW  1S 0E  Dwell Dwarf are the only words. Compatible but slow.**
**DX O DX**
**DY O DY**
**DZ O DZ  0S 1E  Only word is ADZ.**

**FB O FB**
**FC O FC  0S 0E**
**FD O FD**
**FF O FF**
**FG O FG  0S 0E**
**FH O FH  0S 0E**
**FJ O FJ**
**FTH O FTH  0S 1E  Only words are twelfth and fifth.**
**FK O FK**
**FL O FL  2S 0E  Proximity. Leaves tongue on floor.**
**FM O FM  0S 0E**
**FN O FN  0S 0E**
**FP O FP**
**FQ O FQ**
**FR O FR  2S 0E  Compatibility. Leaves tongue on floor.**
**FS O FS  0S 2E**
**FT O FT  0S  2E  LEFT. Proximity.**
**FV O FV**
**FW O FW**
**FX O FX**
**FY O FY**
**FZ O FZ**

**GB O GB**
**GC O GC**
**GD O GD**
**GF O GF**
**GG O GG**
**GH O GH  0S 2E  As in ROUGH. Short G and H. Proximity.**
**GJ O GJ**

**GTH O GTH  0S 2E As in LENGTH.  Proximity.**
**GK O GK**
**GL O GL  2S 0E  Proximity. Leaves tongue on floor.**
**GM O GM  0S 0E**
**GN O GN  0S 0E**
**GP O GP**
**GQ O GQ**
**GR O GR  2S 0E  Proximity.  Leaves tongue on floor.**
**GS O GS  0S 2E**
**GT O GT  0S 0E**
**GV O GV**
**GW O GW**
**GX O GX**
**GY O GY**
**GZ O GZ**

**HB O HB**
**HC O HC**
**HD O HD**
**HF O HF**
**HG O HG**
**HH O HH**
**HJ O HJ**
**HTH O HTH**
**HK O HK**
**HL O HL**
**HM O HM  0S 0E**
**HN O HN  0S 0E**
**HP O HP**
**HQ O HQ**
**HR O HR**
**HS O HS  0S 2E**
**HT O HT  0S 0E**
**HV O HV**
**HW O HW**
**HX O HX**
**HY O HY**
**HZ O HZ**

**JB O JB**
**JC O JC**
**JD O JD**

**JF O JF**
**JG O JG**
**JH O JH**
**JJ O JJ**
**JTH O JTH**
**JK O JK**
**JL O JL**
**JM O JM**
**JN O JN**
**JP O JP**
**JQ O JQ**
**JR O JR**
**JS O JS**
**JT O JT**
**JV O JV**
**JW O JW**
**JX O JX**
**JY O JY**
**JZ O JZ**

**THB O THB**
**THC O THC**
**THD O THD**
**THF O THF**
**THG O THG**
**THH O THH**
**THJ O THJ**
**THTH O THTH**
**THK O THK**
**THL O THL 0S 0E**
**THM O THM 0S 1E LOGARITHM.**
**THN O THN 0S 0E**
**THP O THP**
**THQ O THQ**
**THR O THR 1S 0E THROW.**
**THS O THS 0S 2S**
**THT O THT**
**THV O THV**
**THW O THW**
**THX O THX**
**THY O THY**
**THZ O THZ**

**KB O KB**
**KC O KC**
**KD O KD**
**KF O KF**
**KG O KG**
**KH O KH**
**KJ O KJ**
**KTH O KTH  0S 0E**
**KK O KK**
**KL O KL  1S 0E  No practical words.**
**KM O KM  0S 0E**
**KN O KN  0S 0E**
**KP O KP**
**KQ O KQ**
**KR O KR  1S 0E.  No words except foreign.**
**KS O KS  0S 2E**
**KT O KT  0S 0E**
**KV O KV**
**KW O KW**
**KX O KX**
**KY O KY**
**KZ O KZ**

**LB O LB  0S 1E  The only word is BULB.**
**LC O LC  0S 1E  The only word is TALC.**
**LD O LD  0S 2E  WILD FIELD. Proximity.**
**LF O LF  0S 2E  SHELF GULF SELF.  Compatibility.**
**LG O LG  0S 1E  Only as LGE in BILGE BULGE INDULGE.  Slow**
**LH O LH  1S 0E**
**LJ O LJ  0S 0E**
**LTH O LTH  0S 1E. Only in four words HEALTH WEALTH. Slow.**
**LK O LK  0S 2E.  TALK BALK SILK. Proximity.**
**LL O LL**
**LM O LM  0S 2E  FILM CALM  Compatibility.**
**LN O LN  0S 1E  Only KILN. Slow.**
**LP O LP  0S 1E  Only five or six words PULP HELP PALP WHELP.  Some compatible.**
**LQ O LQ**
**LR O LR**
**LS O LS  0S 2E**
**LT O LT  0S 2E  SALT ADULT  Proximity.**
**LV O LV  0S 2E  Only as LVE as in VALVE. Compatible.**

**LW O LW**
**LX O LX 0S 1E Only two words CALX FALX**
**LY O LY**
**LZ O LZ 0S 0E**

**MB O MB 0S 2E LIMB THUMB. Lips only.**
**MC O MC 0S 0E No MCE.**
**MD O MD 0S 0E No MDE.**
**MF O MF 0S 0E**
**MG O MG 0S 0E No MGE**
**MH O MH**
**MJ O MJ**
**MTH O MTH 0S 1E Only word is WARMTH.**
**MK O MK 0S 0E**
**ML O ML 0S 0E No MLE.**
**MM O MM**
**MN O MN 0S 0E**
**MP O MP 0S 2E PUMP CAMP. Lips only.**
**MQ O MQ**
**MR O MR**
**MS O MS 0S 2E**
**MT O MT 0S 0E**
**MV O MV**
**MW O MW**
**MX O MX 0S 0E**
**MY O MY**
**MZ O MZ 0S 0E**

**NB O NB 0S 0E**
**NC O NC 0S 0E**
**ND O ND 0S 2E AND FOUND. Proximity.**
**NF O NF**
**NG O NG 0S 2E Proximity.**
**NH O NH**
**NJ O NJ**
**NTH O NTH 0S 2E MONTH. Proximity.**
**NK O NK 0S 2E RANK. Proximity.**
**NL O NL**
**NM O NM 0S 0E**
**NN O NN**
**NP O NP 0S 0E**
**NQ O NQ**

**NR O NR**
**NS O NS  0S 2E**
**NT O NT  0S 2E  DENT.  Proximity.**
**NV O NV**
**NW O NW**
**NX O NX  0S 1E  About five words. LARYNX. Slow.**
**NY O NY**
**NZ O NZ  0S 1E  Only one word. BRONZE. Slow.**

**PB O PB**
**PC O PC**
**PD O PD**
**PF O PF  0S 0E**
**PG O PG  0S 0E**
**PH O PH  2S 2E  PHYSICS GRAPH.  Compatible. Slow. Leaves tongue on floor.**
**PJ O PJ**
**PTH O PTH   0S 1E  One word DEPTH.  Compatible. Slow.**
**PK O PK**
**PL O PL  2S 0E  Compatible. Leaves tongue on floor.**
**PM O PM  0S 0E**
**PN O PN  0S 0E**
**PP O PP**
**PQ O PQ**
**PR O PR  2S 0E  Compatible.  Leaves tongue on floor.**
**PS O PS  2S 2E  Psychology. Compatible.**
**PT O PT  1S 2E  Scientific start. ABRUPT.  Compatible.**
**PV O PV**
**PW O PW**
**PX O PX  0S 0E**
**PY O PY**
**PZ O PZ  0S 0E**

**QB O QB**
**QC O QC**
**QD O QD**
**QF O QF**
**QG O QG**
**QH O QH**
**QJ O QJ**
**QTH O QTH**
**QK O QK**
**QL O QL**

**QM O QM**
**QN O QN**
**QP O QP**
**QQ O QQ**
**QR O QR**
**QS O QS**
**QT O QT**
**QV O QV**
**QW O QW**
**QX O QX**
**QY O QY**
**QZ O QZ**

**RB O RB 0S 2E Compatible.**
**RC O RC 0S 2E Proximity.**
**RD O RD 0S 2E Proximity.**
**RF O RF 0S 2E Compatible.**
**RG O RG 0S 2E Proximity. As RGE BARGE URGE.**
**RH O RH 0S 0E**
**RJ O RJ**
**RTH O RTH 0S 1E FORTH BIRTH. Proximity.**
**RK O RK 0S 2E Proximity.**
**RL O RL 0S 2E Proximity.**
**RM O RM 0S 2E Compatible.**
**RN O RN 0S 2E Proximity.**
**RP O RP 0S 2E Compatible.**
**RQ O RQ**
**RR O RR**
**RS O RS 0S 2E**
**RT O RT 0S 2E Proximity.**
**RV O RV 0S 2E No words. Use RVE. CARVE. Compatible.**
**RW O RW**
**RX O RX 0S 0E**
**RY O RY**
**RZ O RZ 0S 0E**

**SB O SB**
**SC O SC 2S 0E SCALE. Proximity.**
**SD O SD**
**SF O SF 0S 0E**
**SG O SG 0S 0E**
**SH O SH 2S 2E Proximity. The H is reduced in height to fit S space because of same 2.**

**Leaves tongue on floor.**
**SJ O SJ**
**STH O STH  0S 0E**
**SK O SK  2S 2E  Proximity.**
**SL O SL  2S 0E  Proximity.  Only as SLE. Three words. AISLE ISLE TUSSLE.**
**SM O SM  2S 2E Compatible.**
**SN O SN  2S 0E  Proximity.**
**SP O SP  2S 2E  SPOT BOAST Compatible.**
**SQ O SQ**
**SR O SR**
**SS O SS**
**ST O ST  2S 2E**
**SV O SV**
**SW O SW  2S 0E  SWITCH Proximity.**
**SX O SX**
**SY O SY**
**SZ O SZ  0S 0E**

**TB O TB**
**TC O TC**
**TD O TD**
**TF O TF**
**TG O TG**
**TH O TH**
**TJ O TJ**
**TTH O TTH**
**TK O TK**
**TL O TL  0S 0E**
**TM O TM  0S 0E**
**TN O TN  0S 0E**
**TP O TP  0S 0E**
**TQ O TQ**
**TR O TR  2S 0E  TREAT Proximity.**
**TS O TS  0S 2E**
**TT O TT**
**TV O TV**
**TW O TW  2S 0E  TWIST TWIN TWIG. Compatible. Proximity.**
**TX O TX  0S 0E**
**TY O TY**
**TZ O TZ  0S 1E  Two words WALTZ QUARTZ.**

**VB O VB**

**VC O VC**
**VD O VD**
**VF O VF**
**VG O VG**
**VH O VH**
**VJ O VJ**
**VTH O VTH  0S 0E**
**VK O VK**
**VL O VL  0S 0E**
**VM O VM  0S 0E**
**VN O VN  0S 0E**
**VP O VP  0S 0E**
**VQ O VQ**
**VR O VR**
**VS O VS  0S 2E**
**VT O VT  0S 0E**
**VV O VV**
**VW O VW**
**VX O VX**
**VY O VY**
**VZ O VZ**

**WB O WB**
**WC O WC**
**WD O WD**
**WF O WF**
**WG O WG**
**WH O WH  2S 0E  WHITE.  Proximity and compatible.**
**WJ O WJ**
**WTH O WTH  0S 0E**
**WK O WK  0S 0E**
**WL O WL  0S 1E  Proximity, compatible. Slow.**
**WM O WM**
**WN O WN  0S 0E**
**WP O WP**
**WQ O WQ**
**WR O WR**
**WS O WS  0S 2E**
**WT O WT  0S 1E  One word NEWT.  Proximity, compatible. Slow.**
**WV O WV**
**WW O WW**
**WX O WX**

**WY O WY**
**WZ O WZ**

**XB O XB**
**XC O XC**
**XD O XD**
**XF O XF**
**XG O XG**
**XH O XH**
**XJ O XJ**
**XTH O XTH**
**XK O XK**
**XL O XL**
**XM O XM 0S 0E**
**XN O XN**
**XP O XP**
**XQ O XQ**
**XR O XR**
**XS O XS 0S 2E**
**XT O XT**
**XV O XV**
**XW O XW**
**XX O XX**
**XY O XY**
**XZ O XZ**

**YB O YB**
**YC O YC**
**YD O YD**
**YF O YF**
**YG O YG**
**YH O YH**
**YJ O YJ**
**YTH O YTH**
**YK O YK**
**YL O YL**
**YM O YM**
**YN O YN**
**YP O YP**
**YQ O YQ**
**YR O YR**
**YS O YS**

**YT O YT  0S 0E**
**YV O YV**
**YW O YW**
**YX O YX**
**YY O YY**
**YZ O YZ**

**ZB O ZB**
**ZC O ZC**
**ZD O ZD**
**ZF O ZF**
**ZG O ZG**
**ZH O ZH**
**ZJ O ZJ**
**ZTH O ZTH**
**ZK O ZK**
**ZL O ZL**
**ZM O ZM  0S 0E**
**ZN O ZN**
**ZP O ZP**
**ZQ O ZQ**
**ZR O ZR**
**ZS O ZS  0S 2E**
**ZT O ZT  0S 0E**
**ZV O ZV**
**ZW O ZW**
**ZX O ZX**
**ZY O ZY**
**ZZ O ZZ**

**LISTING AND ANALYSIS OF CONSONANT TRIPLES**

**These have more complicated lip motions than the consonant pairs.**
**GHT  LIGHT**

**MPLE  AMPLE**

**NGTH STRENGTH**

**PHR  PHRASE**

**RBLE  WARBLE**

**RCH SCORCH**
**RMTH WARMTH**
**RNT BURNT**
**RPH MORPH**
**RPT EXCERPT**

**SCR SCRIPT**
**SPL SPLASH**
**STR STRONG**
**SPR SPRING**

**EXAMPLES OF ONE SYLLABLE MULTICONSONANT WORDS**

**This section illustrates how the definition of some words can be seen in their letters. Say the first consonants very fast, say the vowel for a long time, say the last consonants very fast. Note that clarity in meaning develops as enunciation is improved.**

**SPEAK. P and K are careful and timid low energy letters requiring mental concentration in order to perform. S is a violent letter requiring energy and vigorous force. Something coming from the mouth.**
**TREAT. To hand out something good.**
**STEP. Carefully move forward (ST) and transfer weight (P).**
**SHOP. Walk around (SH) and look at things (P).**
**SMART. Clever. S and T use the same part of the tongue.**
**FACT. Book (F) knowledge (CT). C and T use parts of the tongue close together.**
**WALK. Making (W) even strides (LK). L and K use parts of the tongue close together.**
**GIFT. Transfer (G) your soul or full value (FT). F and T use parts close together.**
**MUST. You (M) are subject to force (S). S and T use parts of the tongue close together.**
**PRICE. Give up (PR) loss (C ).**
**RANGE. Try (R ) to cover a distance (NG).**
**TURN. Start (T) to change direction (RN). R and N use parts of the tongue close together.**
**MEND. Smear cloth (M) and pass through fast (ND).**
**FROM. Scenery (FR) view (M).**
**GREEN. GR is a fast pair because they both operate on 1.**

**A METHOD OF DETERMINING DEVICES FOR WORDS, MOUTH VIDEO**

**Every one syllable word has a main vowel action but you have to know how to start it. This is the preceding consonant. Also it requires an ending. You need to know how it ends in order to avoid the unexpected and to know you do not just stop the main action. You have to know it will end itself and how it will. Some words have no ending and it is up to operator when to stop. At the start the environmental device presents material which must**

**be handled by the operator device construction. The operator device must first access this body. It is impossible to avoid doing this first. Determining the main meaning of a word is often difficult. A dictionary may help in this. The first letter is to access what you want to achieve in the vowel action variation you want. In general the ending is controlled partly by the single reflex criterion. The ending must not involve higher mental function such as memory. The ending must be based in the situation itself. The reflex is learned or conditioned from the situation itself and from the benefit of it.**

**Generally you cannot invent the device but must associate a device you already know. The word is a cue or hint. Assuming you know the device the word gives you valuable cues to its operation or mechanism. You understand the device. Understanding the structure and principles of words helps in interpreting them.**

**A word represents the interaction of two devices. The mouth contains instances of these devices and it is possible to see some of the interaction taking place as the word is spoken. For example, during the speaking of the word SACK it is evident that the mouth is to be used as a sack. You initially see only the mouth of the sack but as the sack moves out of the mouth you see the action of the bottom of the sack appearing on the lips as the letter K. You see a moving section of the sack from opening to bottom. The upper lip shows what is being sacked and this is less active. If the tongue is seen in the mouth this also shows the action and is helpful in identifying what is happening.**

**The Roman alphabet pictures the tongue and lip positions for enunciating the letters. This enables the enunciation of any word. Viewed from outside the mouth the enunciation of a word shows the action of the word. The mouth acts as a kind of video of what you are saying. This enables one to see the contribution of each letter to the meaning of the word. The tongue and lower lip act as the active device. The roof and upper lip act as the environmental device. These are exact copies of the two physical devices that the word represents and interact in the same way. It is only necessary to look at the mouth to see the construction of the devices and how they interact. Examples:**

**RIP. The portions of the environmental device are a crystalline portion of the palate behind the teeth corresponding to R, an elastic portion of the palate further back corresponding to I, and the upper lip, corresponding to the mass body of P. These portions are all joined together. The upper lip joins by a strip of material running up the inside of the upper lip and down over the gum and teeth and up the teeth and gum inside the mouth, to the palate portion of R. The action begins with the R action whereby the tongue acting as a 3 body weakens the 1 of the palate. This is followed by the main action of the tongue acting as a 5 body colliding with the elastic of the palate, breaking it down to 3. Then the lower lip acting as an elastic body imparts velocity to the upper lip body. As this gains velocity it takes up the slack by pulling up the connecting strip into the palate so that it yanks up the weakened material on the palate splitting it into two parts. This initiates**

**the splitting of the 3 of the "I" portion of the palate completing the rip. This action can be seen as the word is enunciated.**

**FILE. The portions of the environmental device are a crystalline portion of the palate behind the teeth corresponding to L, an elastic portion of the palate further back corresponding to I, and the upper lip, corresponding to the body of F. These portions are all joined together. The upper lip joins by a strip of material running up the inside of the upper lip and down over the gum and teeth and up the teeth and gum inside the mouth, to the palate portion of L. Further back there is an elastic area corresponding to the letter I. The action begins with the F action whereby the upper lip rotates outward so that the jaw is drawn outward by the lower lip. This is a positioning action. This is followed by the main action of the tongue acting as a 5 body colliding with the elastic of the palate at an exact location, breaking it down to 3. At collision speed the breakdown material acts like 3. Then the elastic body acts at slow speed to remove loose crystals. The crystals are held together by 3 but at slow speed the 3 does not dissipate energy. The main energy of 5 is involved in breakdown of elastic to 3. This enables the loosening of crystals that were held in place by elastic attachment. The tongue represents the file with the bottom of the tongue showing the bottom of the file pressed against the roof of the mouth. You must start with 6-6 because you are trying to collide two flat surfaces. This can only be done by a rotation so the 6-6 contact must be established first. This makes use of the no-slide character of 6 which maintains the center of rotation. For a single file motion you do not want to get rid of the filings but merely to press them down to a more smooth level result and this is done with L.**

**CALM. The portions of the environmental device are a crystalline portion of the palate behind the teeth corresponding to A, a viscous portion of the palate further back corresponding to C, and the upper lip, corresponding to the liquid body of M. These portions are all joined together. The upper lip joins by a strip of material running up the inside of the upper lip and down over the gum and teeth and up the teeth and gum inside the mouth, to the palate portion of A. The action begins with the C action whereby the tongue acting as a 6 body liquefies the 3 of the palate. The liquid sphere blocks forceful air flow. This is followed by the main action of the tongue acting as a 6 body abrading the crystals of the palate, breaking them down to crystal powder and gas which is the substance of the calm. The word calm means that there is no wind over solid ground. Then the lower lip acting as an elastic body imparts turbulence to the upper lip body so that it acts as a crystalline body 1. The calm portion formed by A is bounded by the liquid formed by C and the crystal formed by M. The M action seals up the portion formed from A from outside disturbances. The liquid formed from C serves to bound the other side against disturbance. C seals better against inside disturbance, M better against outside disturbance. It is seen that the word "calm" refers to a system subjected to small system limited inside disturbances on the one side, to large system unlimited outside disturbances on the other side. The calm action can be seen as the word is enunciated. This illustrates**

**the fact that a "word" is a creation process. The space above the tongue resting on the bottom of the mouth shows the volume of the calm. The upper lip rigidized by contact with the lower lip represents the calm area behind a volume disorganized by the lower lip so as to form a barrier.**

**RAKE. The portions of the environmental device are a crystalline portion of the palate behind the teeth corresponding to R, a crystalline portion of the palate further back corresponding to A, and a mass portion further back corresponding to K. These portions are all joined together. The tongue forms the R moving toward the teeth and then shifts to the A shape whose tip is a little further back on the tongue than the R contact point. There is also a shift backward in the mouth away from the mouth opening. For the K the shift is away from the tip of the tongue, acting on the palate where the A left off. The A contact point is further back from the teeth than the R contact point. Everything fits together so that enunciation is easy. The bottom of the tongue shows the rake moving toward you.**

**BAG. AG forms the end of the bagging process. This is evident in the facial appearance of the word. You assume you are seeing the end of the process that involves the object settling into the bottom of the bag. B shows the object being scooped up. Lip contact represents the contact of the bag opening with the bottom of the object. The waves in the upper lip represent bumping with the object. Outward motion of the lower lip represents motion of the bag opening toward you, located at the mirror. The tongue in the mouth pictures the bottom of the bag and then the end of the bag.**

**CAP. The portions of the environmental device are a crystalline portion of the palate behind the teeth corresponding to A, a viscous portion of the palate further back corresponding to C, and the upper lip, corresponding to the mass body of P. These portions are all joined together. The upper lip joins by a strip of material running up the inside of the upper lip and down over the gum and teeth and up the teeth and gum inside the mouth, to the palate portion of C. The action begins with the C action whereby the tongue acting as a 6 body converts 3 of the palate into 2. 3 remains distributed over the cap until placement. For placement the 2 reduces the viscous resistance so placement can be easily accomplished. This is followed by the main action of the tongue acting as a 6 body abrading the crystal of the palate, breaking it down to gas. In doing this the tongue flattens over the roof. The purpose of A is not to make a fit but to smooth for a perfect seal. Then the lower lip acting as an elastic body stretches and draws over the upper lip while the upper lip body accelerates inertially but gains negligible energy. The P shows a gentle controlled pushing up of the cap over the edge of the upper lip. P may also include an elastic cork liner in the cap. The tongue for C shows the cap sliding.**

## TERMINOLOGY

**Alphabet (as amended) = consists of the 27 letters representing the allowed interactions of device bodies.**

**Beneficial = characterizes an operation which satisfies operator needs and/or otherwise contributes to his survival according to the opinion of the operator.**

**Body, single isolated = A pure perfect absolute type of material is said to be a single isolated body. A body is characterized roughly by a boundary which can move but across which matter does not flow. A body is prevented from losing matter mechanically by nonzero forces which arise between parts of the body.**

**Body, device = A device body is an approximation to a single isolated body that a device presents to another device during the interaction of the devices.**

**Breakdown = transformation of one of the basic types of materials, 2, 3, 4, and 5 to the material of next lower digit. The crystal type 1 breaks down to non-cohesive matter.**

**Breakdown-type-letter = a letter whose first digit is greater than the second digit.**

**Consonant = a letter which functions to begin or end the energy of a vowel in a word.**

**Controlled device = the device of two interacting devices that is consciously controlled by the operator.**

**Cooperative word = a word starting with an equal type of letter.**

**Damage = change of type of material of a part or whole of a body by interaction with another body.**

**Device = a simple mechanical device with no moving parts.**

**Device damage = A device is said to be damaged by an interaction if any of its bodies is damaged.**

**Direction of evolution = is either toward the environment or toward society.**

**Equal type of letter = a letter the first digit of which is lower than or equal to the second digit.**

**Isolated body pair interaction = one of the 36 ordered pairs of the digits 1 to 6 representing the types of pure isolated bodies.**

**Letter = one of the 27 allowed ordered pairs of the digits 1 to 6 representing the types of two interacting bodies.**

**Letter meaning = the operator-caused interaction of the bodies of a letter.**

**Manipulate = a society member exerts mechanical contact force in a zero gravity environment.**

**Meaning = the detailed aspects of the physical interaction of material bodies.**

**Operator = a society member who uses his body to manipulate his environment by direct area contact.**

**Phonics = vocal system articulations which represent the letters.**

**Resolution into bodies = the sequence of bodies which one device presents to another device during their interaction.**

**Selfish word = a word starting with a breakdown type of letter.**

**Simple mechanical device = is operated by a single continuous action or reflex. It consists of only one movable part.**

**Vowel = a letter whose function is energy input.**

**Word = a one syllable word. A word relates to a device-environment interaction. The device-environment interaction is analyzed into a sequence of body pair interactions and these correspond to the letters of the word.**


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