The Renaissance of Devnagari Akshras

(SANSKRIT SOUNDS)

A Complete Discovery of Spectrum
of Sense in Speech Sounds

by

PREM KRISHNA BHATNAGAR

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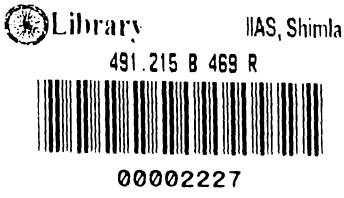

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A Complete Discovery of Spectrum of Sense in Speech Sounds

Energy has quantum (परिमाण) and extensity (परिछिन्नत्व). The nature of energy is to do work and to overcome resistance (रजश्चलम् उपष्टम्भकं).

It is now well known that matter is compounded of primordial energy in the ratio of $E=mc^2$ (Albert Einstein's equation). Cosmic energy is streams of electrons. They are not matter, but spiritual energy.

The ancient Vedic term of this master pulse-beating of creation, the ultimate source of energy that runs the Universe through its effects upon aggregations of matter distributed through space is *Akshra.*

The Nature is, in reality an "indeterminate indefinite continuum" of infinitesimal reals, which are the three "Gunas" or Virtues. These "Gunas" are called Sattva, the Essence—a medium for the reflection of intelligence.

Rajas, Energy

Tamas, Mass or Inertia.

In the sense-key-board, the quality of virtue sublimes (from 'Tamas' to 'Rajas' and to 'Sattva') in the direction from ठ to त and to ञ, i.e. yellow to green and from green to white-blue in the Akshras.

Key to Roman Pronunciation

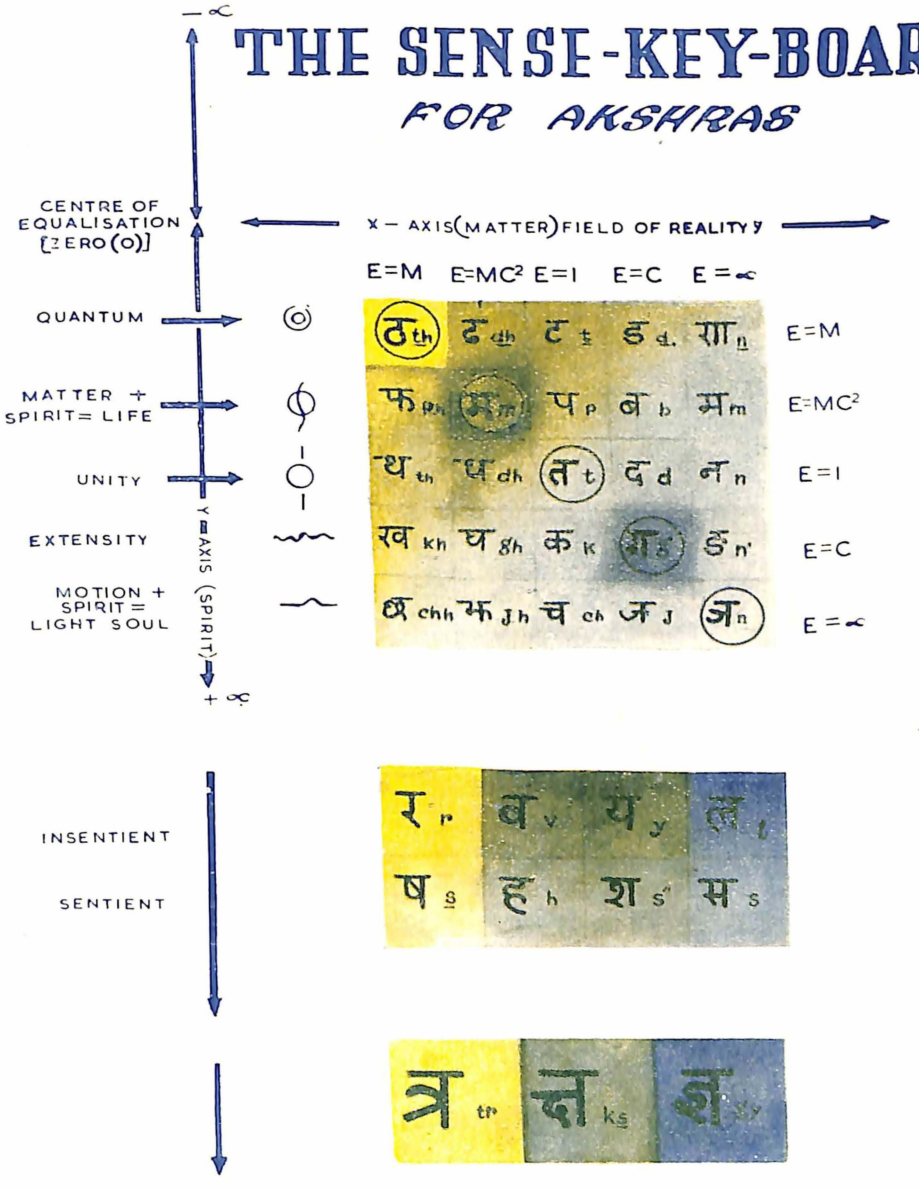
क	ख	ग	घ	ङ
k, q	kh	g	gh	n
च	छ	ज	झ	ञ
ch	chh	j	jh	n
ट	ठ	ड	ढ	ण
t	th	d, r	dh, rh	n
त	थ	द	ध	न
t	th	d	dh	n
प	फ	ब	भ	म
p	ph	b	bh	m

य	र	ल	व
y	r	l	v
श	ष	स	ह
sh	sh	s	h

क्ष	त्र	ज्ञ
ksh	tr	gy

THE SENSE-KEY-BOARD

FOR AKSHRAS



INTRODUCTION

A nation might frame, and let loose a star, to roll in its orbit, and yet not have done so memorable a thing before God as our Rishis, who had let go, Akshras to roll through the generations of time. Akshras are known to world only as Devnagari Alphabetes or Sanskrit sounds and nothing more yet.

It is really an indescribable joy to find that there is a national correspondence between sound and sense, and that words acquire their forms and meanings though a certain sound symbolism, what Patanjali the great grammarian, Commentator and the Writer of 'Mahabhasya', believed, that the nucleus of speech is a sound. He remarked that all roots were origionally monophonic (Dhatavah ekavarnah, artharanto drsyante. M. B.) which is a true science. Our unknown ancient scholars could conceal self-efficient dynamos in the cabinet of these different sounds, and these are not ordinary sounds, but some imperishable machines as their inventors had named them 'Akshra (imperishable). The Akshras not only regulated forms of sound vibrations, with the aid of which deficient energy-quanta is made good, but these are also the enrichment of that effulgent vision of the mind, which was completely in unison with the universal mind, that sense or awakening of the ऋतम्भरा प्रज्ञा (Purest Intellect), that was the greatest apparatus of science (yoga) in their scientific discoveries. Through Akshras came the wise words and in the epics and puranas, in the sayings of saints and writings of philosophers, the endless generations in India has learned the secret of immortality. In cultivation and constructive work Indians attained plenty and prosperity and in arts and philosophies they achieved heights and glories. In the healthy development of agile body and equanimous mind, men ushered in 'the golden age' of the society. For yeas the world reaped the fruits of noble life.

"When and why the music failed, darkness descended, dirt accumulated, visions blurred, views narrowed and hatred usurped, it is difficult to fix exactly. Surely there was a fall for man. And the nights for the world. Perhaps the saints and sages slept away, God Himself seemed to have feel sluggish. No wonder chaos set in. Forces of evil, hasted for ages, furiously swept into the fields of darkness. Brother raised his hands against brother, anger destroyed all sense of kith and kin and hatred wrought mad hovocs to all

those monuments of culture and civilization which mature minds so zealously made for prosperity to ponder over and improve upon. Ruins and relics remained to tell the great story of 'what man has made of man.' The giant minds shrunk down to little hearts nurturing selfishness and tending senses in this arid field of destruction and disillusion. From the free roaming of the whole universe, man retired to become the proverbial frog in the well."

Grudev Ravinder Nath Tagore has however said it, "We have to find some basis that is universal, that is eternal, and we have to discover those things which have an everlasting value. The National Movement was started to proclaim that we must not be indiscriminate in our rejection of the past. This was not a reactionary movement but a revolutionary one, because is set out with a great courge deny and to oppose all pride in merely borrowing....."

With the emergence of India as a sovereign republic we have directed our thought to evolving a "Lingua Franca" for our country and our constitution-makers opted for Hindi and Devanagari was chosen as the script. No wonder, therefore, that from that time onwards Hindi, its 'akshras' and scripts, have been subjected to close scrutiny. An attempt is called for the assess how far the Akshras are truely representative, whether the script is scientific and easy enough for monipulation and the language, all considered, suitable to meet the needs of modren times.

Besides according to our Prime Minister, Shri Jawahar Lal Nehru, "We have not only to draw inspiration from our glorious past because India's cultural and spiritual heritage is in fact, unrivalled by any other nation in the world but also look to the future. 'Tis only blending science with spirituality, as Vinoba has suggested, that the fatters of backwardness binding society would be cast off....."

Therefore, surely "The Renaissance of Devnagari Akshras" is the return of enlightment that brings an end of an age of Magnificent Obsession. Now we cannot afford to spare the bases of wider vision that keep us on to the straight path of eternity where as narrow approaches and walled views enmesh mankind in destructive wrangles.

It is also important to note that we cannot make ourselves free from the debt of western scientists whose discoveries not only have revolutionized human life and thought but also helped us in

bringing orderly thinking into a complex, but practicle subject of Indian philosophy of Duality and Spirituality and made the way smooth for further advances in the field. Investigations which are characterized by a combination of theoritical and experimental methods of approach, thoroughness and maturity of treatment, and elegance in the presentation of results, by virtue of which their contribution to the present discovery of Spectrum of Sense in Akshras has been neither small nor insignificant. Ideas that Devnagari Akshras are spectrum of cosmic vibrations which were before vague and shadowy, after the accomplishment of the present Discovery, acquire a clearer out line. By virtue of such powers a language can make human life fuller and more real. It transfigures life, and not only it transfigures but, it also gives the subtlest shades of more beautiful and more perfect world-mystery and wonder of visible world, and even more the mystery and wonder of inner world, which have called from man his most profound utterances for all ages ; and this is what we find in Sanskrit. Knowledge possessed by Hindus-philosophical, scientifical or astrological was far more deeply based on and intimately correlated to the realities of life than dreamt of in modern times.

Sanskrit has been the language of India from times immemorial. Though gradually in different regions other languages came into being they still continued to draw their inspiration and much of their vocabulary from the parent language and, what is more, had the same, or very nearly the same, Akshras. From the unfailing source of Sanskrit sounds-Akshras radiated, as it were, eight principal lines of speech—each taking its own course and expanding in its own way-namely-the two Asiatic lines: (A) the Indian-Comprising Sanskrit, the various ancient Prakrits, including the Prakrit of the Inscription, the Pali of the Buddhist Sacred Conon, the Ardh Magadhi of the Jains, and the modern Prakrits or Vernacular languages of Hindus, such as Hindi, Marathi, Gujarati, Bengali, Oriya & etc. (B) the Iranian-Comprising the avesta language commonly called Zand or Zend, old Persian or Akhaemenian, Pahlavi, modern Persian, and in connection with these Armenia and Pushtu; and then the six European lines (A) Keltic (B) Hellenic (C) Italic (D) Teutonic (E) Slavonic (F) Lithunian each branching into various sub-lines as exhibited in the present languages of Europe. It is the Asiatic and European ramification of the Aryan languages which has led to their being called Indo-European.

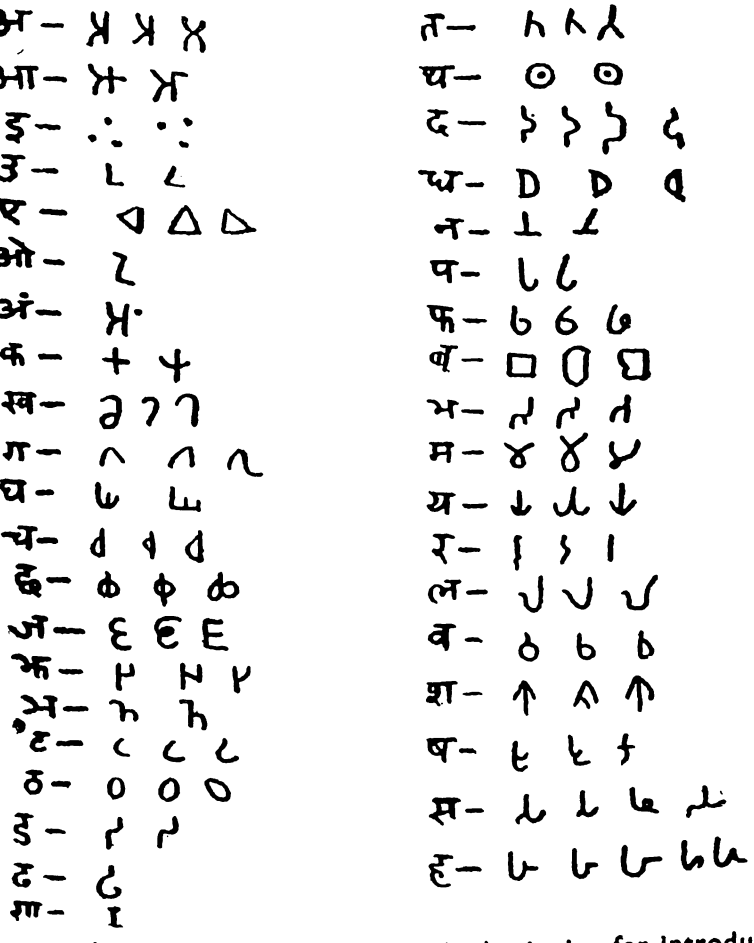
Time has seen Nature's variety supplemented and enriched by man's fare of fashions and flairs, his habits and heresies, his latitudes and languages ! To-day the multitudinous colours seem quite confusing. Still there is an unmistakable unity underlying all these seeming diversities.

At the end I gratefully acknowledge before scholars and masters of the subject concerned that in most of the cases I have borrowed the English language of the articles published in different Science and Astrological Magazines, in toto, as they are best suited in these cases to explain certain facts. The book has been produced in haste and lacks systematic presentation, and proper arrangement of the subject matter.

Rang Purv
(2nd March, 1961)

Prem Krishan Bhatnagar
Hindi Bhawan,
7, Theatre Communication Building,
Connaught Place
NEW DELHI.

BRAHMI SCRIPT



(Devnagari letters have been given in the beginning for introduction)

Sindhu Valley Script	Brahmi Script	Nagari Script
		ट
		क
		ह
		ब
		ठ
		च
		ग
		श
		र
		इ

Avenues to A Universal Language

"When liberation came, Writes George Fradier, Unesco Staff Writer," men turned once more to the task of rebuilding of world, of unifying the nations. Once again they were faced with that long forgotten obstacle—the diversity of languages, In the post war world, the war time symbol was no longer sufficient.

"In the modern world, where so many factors tend to unite us, radio, newspapers, air travel, hopes, fears and especially history-five or six hundred languages are still spoken. Nationalism has succeeded in reviving dialects which a hundred years ago were on the point of dying out.

"This wealth of languages is a cumbersome heritage. It has caused suspicion among nations and misunderstanding between Governments; it has seriously hindered scientific and cultural exchange. How can such an obstacle be overcome? Should there be a universal language ?

"The suggestion that latin be adopted for this purpose was ruled out on the grounds that language is difficult and that it would be a hard task to adopt the style of Thomas Acquinas, to say nothing of Cicero, to modern usage English ideals for business and Commercial exchange, was suggested, but this proposal was countered by dozen of others. Why not French, the traditional language of diplomacy ; spanish, the mother tongue of 22 nations ; Italian, the language of Petrarch ; or Russian, spoken by millions ? And why not Chinese ?

"The fact is that one cannot impose any one language and that a universal tongue, in the absolute sense of the word, would doubtless be disastrous to humanity. A nation's most precious possession is its language, and it is through often untranslatable idioms that people express their distinctive characteristics.

"A man may leave his native land, but he who abandons his mother-tongue loses part of himself. Culture which is not an

obstraction but the embodiment of living history cannot be separated from the vernacular from which it has sprung. Indeed, a language is so intimately bound up with the culture of a nation that it is sometimes impossible to separate one from the other.

"A great philosopher is intimately bound by the syntax and phraseology of his native tongue. The German language produced Luther, the French Voltaire, It has been said of Islam that it is the religion of the Arabic tongues, and a Cantonese friend once said to me ; 'A Chinese is some one who has been brought up in the study of the Chinese language.'

"It is none the less true that a book on mathematics, a treatise on chemistry, a lecture on forestry or a collection of international regulations rarely express the genius inherent in any nation. There is nothing to be gained by printing scientific and technical works in little-known languages.

"It would have been the normal thing for an 18th century Hungarian astronomer to write his treatise in Latin ; during the 19th century, German would have been his medium of expression.

"In both cases, the information it contained was within easy reach of European and American scientists.

"But to-day, he would write in Hungarian, a language known only to some, 5,000,000 persons. This being the case, one may well ask whether a truly international language would not meet some important needs of our present-day world-a language which would not take the place of other tongues or dialects but would serve science and techniques, perhaps eventually diplomacy. Would it not be possible to adopt such an auxiliary language ?

"This suggestion was put forward early in the 17th century by the French philosopher and mathematician, Rene Descartes, In 1629, he wrote to his friend. Father Mersenne, "A Universal language with very simple grammatical structure must be created ....." But Descartes was soon to confine himself to the study of mathematics ; Leibnitz and countless other mathematicians, Latin scholars, thinkers and even musicians were also to abandon language problems for other interests.

"Nothing was accomplished for more than two centuries. Then, in 1870, a Bavarian Priest, Father Martin Schleyer, startled linguists

by declaring, "One cannot invent a language. One can only create one from other living tongues.'

"And Father Schleyer set to work on his "Volapuk." This new tongue, which was formed with the roots of English, German, Italian, Spanish and Russian words, held away for ten years. It was, however, so involved and so difficult that it was soon forgotten.

"In June, 1887, a Young Polish doctor, Ludovic Lazarus Zamenhof, published, under the assumed name of Dr. Esperanto, the plan for his "Lingvo Internacia" based on the common heritage of European tongues, was far simpler than its predecessor and was to meet with a lasting success.

"In spite of war, the hostility of certain Governments, the sneers of writers, and the competition of a dozen other inventors, Esperanto has made steady progress during the past fifty years.

"During a Congress recently held in Paris, Esperanto enthusiasts held out new promises.

"We strive for Union through understanding' they said. On one of the streamers hung across the Congress Hall, were printed these words in Esperanto. 'En Esperantio eksistu nek nacioj, nek rasoj, sed nur homos.' This means, 'In Esperanto there exist neither nations, nor races, but only men.' The problem is probably not as simple as that. But an international language designed for scientists and statesmen may one day help to further the cause of understanding between nations".

Let us start further the quest of a Universal language with the simple defination of Dr Johnson, "Language is only the instrument of science, ond words are but the signs of ideas."

A Beautiful Philological Dream.

[From Sanskrit-English—Dictionary, Elymoligically and Philologically arranged with special reference to Chapter—Cegnate Indo-European Languages by Sir Monier Monier—Williams-Introduction.

Section 1. (Statement of the circumstances which led to the peculiar System of Sanskrit Lexicography introduced for the first time in the Monier-Williams Sanskrit-English Dictionary of 1872.)]

Page xii. "And it will condence to the making of what I have to say in this connexion clearer, if I draw attention at the very threshold to the fact that the Hindus are perhaps the only nation, except the Greeks, who have investigated, independently and in a truly scientific manner, the general laws which Govern the evolution of language.

"The Synthetic process which comes into operation in the working of those laws may be well called *Samskarana*, 'putting together,' by which I mean that every single word in the highest type of language (Called Sanskrit) is first evolved out of a Primary Dhatu —a Sanskrit term usually translated by 'Root', but applicable to any primordial constituent substance, whether of words, or rocks, or living organisms—and then, being so evolved goes through a process of 'putting together' by the combination of other elementory constituents.

"Further more, the process of, 'putting together', implies, of course, the possiblity of a converse process of '*vyakarana*', by which I mean 'undoing' or 'decomposition' that is to say, the resolution of every root—evolved word into its component elements. So that in endeavouring to exhibit these processes of Synthesis and analysis, we appear to be engaged, like a chemist, in combining elementory substances into solid forms, and again in resolving these forms into their constituent ingredients.'

"It seemed to me, therefore, that in deciding upon the system of lexicography best calculated to elucidated the laws of root-evolution, with all the resulting processes of verbal synthesis and analysis, which constitute so marked an idiosyncrasy of the sanskrit language, it was important to keep prominently in view the peculiar character of a Sanskrit root—a peculiarity traceable through the whole family of so called Aryan languages connected with Sanskrit, and separating them by a sharp line of demarcation from the other great speech family usually called Semitic.

"And here, if I am asked a question as to what languages are to be included under the name Aryan—a question which ought certainly to be answered *in limine*', in-as-much as this Dictionary, when first published in 1872, was the first work of the kind, put forth by any English Scholar, which attempted to introduce comparisons between the principal members of the Aryan family—I reply that the Aryan languages [of which Sanskrit is the eldest Sister,

(though the younger sisters sometimes preserve older forms) and English one of the youngest] proceeded from a common but nameless and unknown parent, whose very home some where is Central Asia cannot be fixed with absolute certainty, though the locality may conjecturally be placed some where in the region of Bactria (Balkh) and Sogdiana, or not far from Bokhsa and the first course of the river Oxus. From this centre radiated, as it were, eight principal lines of speech—each taking its own course and expanding in its own way—namely. The Two Asiatic lines : (A) the Indian—comprising Sanskrit, the various ancient Prakrits, including the Prakrit of the Inscription, the Pali of the Buddhist Sacred Canon, the Ardh Magadhi of the Jains, and the modern Prakrits or vernacular languages of the Hindus, such as Hindi, Marathi, Gujarati, Bengali, Oriya & etc. (B) the Iranian—Comprising the avesta language commonly called Zand or Zend, Old Persian or Akhaemenian, Pahlavi, modern Persian, and in connexion with these, Armenian and Pushtu; and then the Six European Lines : (A) Keltic (B) Hellenic, (C) Italic, (D) Teutonic, (E) Slavonic, (F) Lithuanian, each branching into various sub-lines as exhibited in the present languages of Europe. It is the Asiatic and European ramification of the Aryan languages which has led to their being called Indo-European.

"Now if I am asked a second question, as to what most striking feature distinguishes all these languages from the Semitic, my answere is, that the main distinction lies in the character of their roots or *radical sounds*, for although both Aryan and Semitic forms of speech are called 'inflective', it should be well understood that the inflectiveness of the root in the two cases implies two very different processes.

"For example, an Asabic root is generally a kind of hard triconsonantal framework consisting of three consonants which resemble three sliding but unchangeable upright limbs, moveable backwards and forwards to admit on either side certain equally unchangeable ancillary letters used in forming a long chain of derivative words. These intervenient and subservient letters are of the utmost importance for the diverse colouring of the radical idea, and the perfect percision of their operation is noteworthy, but their presence within and without the rigid frame of the root is, so to speak, almost overpowered by the ever prominent and changeless consonantal skeleton. In illustration of this we may take the Arabic tri-consonantal root KTB, 'to write,' using capitals for the three radical consonants to

indicate their unchangeableness; the third pers. Sing. past tense is Ka Ta Ba, "he wrote", and from the same three consonants, by means of certain servile letters, are evolved with fixed and rigid regularity a long line consonants, by means of certain servile letters, are evolved with fixed and rigid regularity a long-line of derivative forms, of which the following are specimens :—Ka TB, and Ki Ta Bat, the act of writing; Ka Ti B, a writer; ma K Tu B, written, taK Ti B, a teaching to write; mu Ka Ta Bat, and taKa Tu B, the act of writing to one another; muta Ka Ti B, one engaged in mutual correspondence; *iK Ta B*, the act of dictating; *ma K Ta B*, the place of writing, a writing-school; *Ki Ta B*, a book; *Ki Ta Bat*, the act of transcribing.

"In contradiction to this, a sanskrit root is generally a single monosyllable [Of course it is well understood that there are in sanskrit a eartain number of dissylabic roots, but I am here merely contrasting Semitic and Aryan roots generally.] consisting of one or more consonants combined with a vowel, or sometimes of a single vowel only. This monosyllabic radical has not the same Cast-iron rigidity of character as the Arabic tri-consonantal root before described. True, it has usually one fixed and unchangeable initial letter, but in its general character it may rather be compared to a malleable substance, capable of being beaten out or moulded into countless ever-variable forms, and often in such a way as to entail the loss of one or other of the original radical letters; new forms being, as it were, beaten out of the primitive monosyllabic ore, and these forms again expanded by affixes and suffixes, [The vikarana of a root may be called on 'affix' and the verbal termination & c. a 'suffix'.] while every so expanded form may be again augmented by prepositions and again by compositions with other words and again by compounds of compounds till an almost interminable chain of derivatives is evolved. And this peculiar expansibility arises partly from the circumstance that the vowel is recognized as an independent constituent of every Sanskrit radical, constituting a part of its very essence or even sometimes standing alone as itself the only root.

"Take for example, such a root as Bhu 'to be' or 'to exist'. From this is, so to speak, beaten out an immence chain of derivatives of which the following are a few examples :—Bhava or Bhavana, being; Bhava, existence, Bhavana, causing to be; Bhavin, existing; Bhuvana, the World; Bhu or Bhumi, the earth; Bhu-dhava, earth supporter, a mountain; Bhu-dhava-ja, mountain-born, a tree; Bhu-pa

an earth protector, King; Bhupa-putra, a king's son, prince, & c. Ud-bhu, to rise up; Praty-a-bhu, to be near at hand; Prodbhuta, come forth & c. [for the illustrations of this see kri; sru; stha of this volume.]

"Sanskrit, then, the faithful guardian of Old Indo-European forms, exibits these remarkable properties better than any other member of the Aryan line of speech, and the crucial question to be decided was, how to arrange the plan of my Dictionary in such a way as to make them most easily apprehensible.

On the one hand I had to bear in mind that, supposing the whole sanskrit language to be referable to about 2,000 roots or parent-stems [The number of distinct Dhatus or radical forms given in some collections is 1,750 but as many forms having the same sound have different meanings, and are conjugated differently, they are held to be distinct roots and the number is thereby swelled to 2,490. It should be noted, too, that a great many of these Dhatus are modifications or developments of simpler elements, and this Dictionary does not always decide as to which of two, three or more roots is the simplest, although when roots are allied their connexion is indicated. Probably the real number of elementary radicals in Sanskrit might be reduced to a comparatively small catalogue—even, as some think, to a list of not more than about 120 primitive roots. Many sanskrit roots have alternative Prakrit forms or vice versa, and both forms are allowed, to co-exist, as Bhan and Bhan. Dhan and Dhan, Nrit and Nat; others whose initials are aspirated consonants have passed into other aspirated consonants or have retained only the aspirate, as in Bhri, Dhri, Dhvri, Hvri, Hri & c. Again, such a root as Svad is probably nothing but a compound of Su and root ad, and such roots as Stubh, Stumbh, Stambh are plainly mere modifications of each other], the plan of taking root by root and writing, as it were the biographies of two thousand parents with sub biographies of their numerous descendants in the order of their growth and evolution, would be to give reality to a beautiful philological dream—a dream, however, which could not receive practical shape without raising the Lexicon to a level of scientific perfection unsuited to the needs of ordinary students.

Potential Value of A Single Speech Sound.

"Indian Scholars have accepted the potential value of a single sound," according to Dr Bahari ' which they called infinite and

absolute. Sound and Brahma are both Akshara-(imperishable). The Rshis had general faith in the meaning-fulness of individual sounds. The Rgveda says that the prayers reside in the eternal sound where in the meanings manifest themselves. They who do not know the significations of these sounds can gain nothing by the prayers. Patanjali the great grammarian, commentator and the writer of 'Mahabhasya', believes that the nucleus of speech is a sound. He remarks that all roots are origionally monophonic (dhatavah ekavarnah, ortharanto drsyante. M. B.)

Upanishad explains the meaning of the word "Satya" thus-

(Sa) means amrta, immortal.
(ta) means martya, mortal;
(ya) means 'that which determines'

Satya means 'that which determines the immortal and the mortal, the finite and the infinite.

The Gopath Brahmana gives the following of the word bharga -(bha) signifies 'one that kindles'

(ra) Signifies 'one that pleases or gratifies'
(ga) Signifies 'one that moves or directs.
bha iti bha ,sayati timamllokan.
ra iti ramjayati timamllokan.
ga iti gamatitimamllokan.

The word makha is said to denote 'without (for ma) and 'flow, for (kha)

"The Yogashastra of Patanjali includes among 'Sanyamas' of yogas the contemplation of meanings in individual sounds and affixes which are the nuclei of all speech.

"Our Sanskrit Lexicons record the several meanings of almost all individual letters considered as potential words."

I am grateful to Dr. Bahari for this above mentioned Statement, since he has paved a path for linguists to enhance research in this direction. Dr. Bahari has got degree of "Doctor of Letters" from Allahbad University and Shri Sidhashwar Verma, heartily praises him for this work in these words:—

"His thesis for the first time in the history of India gave many entirely new perspectives for the further advancement of comparative philology and in this sense he is not only a master of philology, but one of the members of Comparative philology."

This book was published in 1959 from Bharti Press Publication, Darbhanga Road, Allahbad.

Hence decidedly Dr. Bahari's views on this subject are the most modern and recent among Linguists.

As regards the relationship between Sound and meaning. "Through-out the whole history of the human race" write Prof. Postgate, "there have been no question which have caused more heart- searchings, tumults, and devastations than the questions of the correspondence of words to facts. " Meaning has been defined by a vast majority of philosophers, Indians as well as Europeans in terms of relation (Patanjali, Bhartrhari, Venkata, Vishwanath, Nagesha, Russell, Palmer Stern and others). There is general agreement among scholars that there is constant relation between sound and sense (Siddhe Shabdartha Sambandhe : M.B.) (Shabdairuccari-taistesham Sambandhah samavashtitah). There is no word without a meaning and no meaning without a word. A word which has no relation (Vyapara, Shakti or Vrtti) is of course, meaningless. We learn the meanings of words by relating them to certain objects, ideas or actions.

There is, however, a great difference as to whether this relation is eternal or conventional. The idea that there is a national correspondence between sound and sense, and that words acquire their form and meaning through a certain sound symbolism, has been a favourite one with Indian, Greek, Latin and even Arabian Linguists. Scholars like Shaktayana, Farrar, Humboldt, Paget, Hilmar, Lian Court and Pin Cott, and many others, believe that Language began as an expression of emotion. It was exclamative and not communicative. As such it was echoic too. In echoic sounds the association with meaning was both immediate and easy. That is why first words were concrete, objective and specific. Words are, therefore, immitative in origin. Their further semantic development, of course confuses and conceals that relationship. Abbadbin- Suleiman Zamira and some other thinkers go so far as to suggest that words themselves express meanings through their sounds."

Vedic Sages and their Eternal Sounds.

A nation might frame, and let loose a star, to roll in its orbit, and yet not have done so memorable a thing before God as our Rishis, who had let go 'Aksharas' to roll through the generations of time. 'Aksharas' are known to world only as Devnagari Alphabet or Sanskrit-sounds and nothing more yet.

At present we define alphabet as, "In a language we use many sounds. It is not possible to enunciate or distinguish them as separate entities ; it therefore becomes necessary to judiciously analyse and divide these sounds into separate groups. This management of sounds, symbolized by definite letters, is known as alphabet."

Although above stated defination of alphabet is neither sufficient nor complete for Aksharas. We know as a language Hindi and other Indian Vernaculars are highly developed. As regards their alphabets, they have been adopted from Sanskrit Aksharas and have stood well the test of time. Even to day Aksharas are considered, scientific and based on sound phonetic principles. Our ancient scholars have always emphasized that for phonetic balance, sense is necessary.

It is said in "Shathpath Brahmin "(1/4/4/7)', वाग्वै मनसो ह्रसीयसी— means–voice is inferior to mind, which shows voice is not independent of mind and hence mind has full control on the faculty of speech and thus on language too. Emerson also sensed it and said it so, "A thought embodied and embrained in fit words walks the earth as a living being." Therefore when it is true to a sentence and to a word; why not, it should be true to a single letter ?

It is really an indescribable joy to find that our unknown ancient scholars could conceal self-efficient dynamoes in the cabinet of these different sounds, and these are not ordinary sounds, but some imperishable machines as their inventors had named them 'Akshara' (imperishable). It was the enrich ment of that effulgent vision of the mind, which was Complete by in unison with the Universal Mind, that awakening of the ऋतम्भरा प्रज्ञा (Purest Inlellect), that was, the greatest apparatus in their scientific discoveries.

"Ages ago," writes C.A. Menon, "Rishis in India, from their Himalayan retreats, happy riverside abodes or huddling religious centres sang of the glory of the world. From every humble hut and

huge house there arose the holy echo, 'Let the whole humanity be happy.' The little child nestling in his mother's lap listened to this glorious music, the learning students listed this lofty mantra, the loving householder lived upto this great principle and the lustless old longingly recited this wise wish. From one end to another, India reverberated with one voice, the prayer for peace. To the distant lands and to the far flung forsaken fields this fervent feeling refreshingly floated over age-old frontiers and artificial barriers. In its soothening waft, anger and hatred were swept out and the purified mind enthroned in itself earnest Love. In its reign, man understood man without mechanical means and scientific aids, despite distances and difficulties. Genuine sympathy and generous help flowed freely from affluent areas to the needy nooks. Neither oceans nor mountains baulked Indian minds venturing into unknown regions with a mission of Love. Nor did vain kings and valiant soldiers waste on vendettas and vengeances human lives and energies. Nobly they learned to turn the swords into ploughshares and spears into pruning spokes. In cultivation and constructive work they attained plenty and prosperity and in arts and philosophies they achieved heights and glories. In the healthy development of agile body and equanimous mind, men ushered in 'the golden age' of the society. For years the world reaped the fruits of a noble life."

Although, to-day, we do not preserve the history of invention of Aksharas. "When and why the music failed, darkness descended, dirt accumulated, vision blurred, views narrowed and hatred usurped, it is difficult to fix exactly. Surely there was a fall for man. And night for the world. Perhaps the saints and sages slept away. God Himself seemed to have felt sluggish. No wonder chaos set in. Forces of evil, fasted for ages, furiously swept into the fields of darkness. Hatred captured the throne, avarice ministered it, ambition ordered out and apathy administered the land. The clashes of swords and the clattering of shields created dreadful confusion and the deafening cries of dislike and vengeance drowned the distant echoes of Live and let Live. Brother raised his hands against brother, anger destroyed all sense of kith and kin and hatred wrought mad havocs to all those monuments of culture and civilization which mature minds so zealously made for prosperity to ponder over and improve upon. Ruins and relics remained to tell the great story of 'what man has made of man.' The giant minds shrunk down to little hearts

nurturing selfishness and tending senses in this arid field of destruction and disillusion. From the free roaming of the whole universe, man retired to become the proverbial frog in the well."

Yet in the words of carlyle "The true past departs not, no truth or goodness realised by man ever dies or can die ; but all is still here, and, recognized or not, lives and works through endless changes."

What we should know about Sound

"Shabd" In Sanskrit is used for both sound and word. Like all words, sounds can also be decomposed into their elements which are called Aksharas. The term Akshara does not indicate to speech sound alone but something imperishable in sound. This term of Akshara is only applicable to that eternal force which keeps intact any primordial constituent substance—a Primary Dhatu whether of Words (sounds) or rocks, or living organisms.

The truth of the above statement can be proved here in further analytic study of sound by the help of modern Physics.

No sounds would be audible without the air. All creatures except those living under water would be deaf without it, for it carries all sounds from their sources to our ears and is a prerequisite of our sense of hearing.

Sounds of all types are caused by vibrating bodies which rhythmically compress the air particles around them. A series of waves of dense and rarefied air is created which spreads outwards in all directions. This simple fact is the basic secret of sound, and once you grasp it, its many various and often surprising manifestations are easy to understand.

A body causing such air waves must vibrate at least 16 times a second before a sound can be heard. This would make a very deep note, the deepest our ears could perceive.

The quicker the sound vibrations follow each other, the higher the note. This does not extend indefinitely, however, for the highest audible note is caused by a body which vibrates 20,000 times a second ; the physicist calls this a "frequency" of 20,000 "Hertz."

Higher rates of vibration are inaudible. The whole range of second lies between 16, and 20,000 Hertz. The famous International "A" which is created when a tuning fork vibrates 435 times a second, is of special importance, for our musical scale is based on it and musicians tune their instruments by it.

All frequencies below 16 vibrations per second are called "infrasonic" sounds, and those above 20,000 "ultrasonic." Ultrasonic

sounds have many uses, but can be dangerous in the hands of a novice. In correct doses it can increase the blood flow through the skin or destroy malignantly proliferating tissue. Above a certain strength it can kill small organism.

Industry uses ultrasonic vibrations to coagulate and precipitate dust and soot particles in the air, or to disperse fog, making the fine droplets coalesce and fall to the ground.

It can be used to drill holes through tree trunks, to investigate objects for cracks or other damage, to test the strength of metallic components, to emulsify liquids, or to sterilize surgical instruments-technicians are constantly discovering new uses for this silent, invisible tool.

Some animals are superior to man in their ability to hear ultrasonic vibrations. Bats use them in an extra-ordinary manner to orientate themselves during flight. Their oddly shaped larynx emits ultrasonic cries with a frequency of 30,000 to 80,000 Hertz. These acts as a sort of radar, for their echo is reflected from any object, such as a tree, wall, wire or even a small insect, and returns to the bats ears.

The perfection with which bats use the ultrasonic vibrations has no equal in the animal kingdom, but they are not the only creatures who can hear them. Dogs also have this ability. If you own a dog you can amuse yourself by buying one of those inaudible ultrasonic dog whistles and "calling your dog to heel silently" over fairly long distances.

Notes—Noises—Detonations

The sounds that reach us can be divided into notes, noises and detonations. Physicists classify them according to their origin. Notes are produced by completely even vibrations, noises by irregular ones and a detonation by a single violent air compression.

The air which has been set in vibration by a sound wave behaves like the bellows of an accordion. It is compressed to a variable degree, depending on the strength of vibration of the source. This strength in turn determines the loudness. A characteristic property of our ears is taken into consideration in loudness measurements. If the number of very soft sources of sound is increased, for instance, the increase is clearly felt, but if the number of loud sources is doubled the increase is not nearly so apparent.

Construction of the Ear

The sound waves first of all meet the shell of the ear. This conducts them along a narrow channel, the thickness of your little finger, to the eardrum. This passage is filled with fine hairs, arranged as in a lobster pot, which catch small foreign bodies and insects and prevent them from reaching the eardrum but do not interfere with the sound waves.

The eardrum itself is a fine membrane stretched diagonally across the end of the passage. It is pulled inwards at the center to assume a funnel shape and transmits the sound vibration to three curiously shaped bones in the middle ear. These are the malleus, incus and stapes (hammer, anvil and stirrup), the tiny ossicles of hearing and the smallest bones in our bodies.

The last of them, the stirrup, has the task of transferring the sound waves to an oval window (fenestra ovalis) which in turn transmits them, via the hearing fluid (perilymph), to the organ of hearing proper.

This organ is the Cochlea and its convolutions contain up to 24,000 very fine fibers of all lengths, stretched like the strings of a piano and running in all directions. As the sound waves pass through the perilymph they set some of these fibers in motion, according to the pitch of the original note. The vibrating fibers stimulate the auditory nerves and these in turn lead to the perception of sound in the center of hearing in the brain.

The ear is an astonishing organ. It is debatable which is the more remarkable, the ability to differentiate between fine nuances of pitch, or the ability to find where a sound comes from without the help of sight. If you have ever been in a dark room with a ticking clock you realize how easy it is to locate it by your sense of hearing alone.

We believe that we know how the ear accomplishes this feat. If a sound does not come from directly in front of us the waves will reach one ear a fraction of a second earlier than the other.

Tests have shown that our ears can detect the tiny time interval of O.00003 seconds and use it to determine where a sound comes from.

Speech Sounds

Human speech is a profoundly complex phenomenon.

During the course of intelligent speech, all of the speech organs are in a state of perpetual movement, the pattern of which is dictated by the central nervous system.

One of the most fascinating aspects of the entire speech process is that this series of spoken signals can be perceived by someone else's complex hearing mechanism and invested, in his brain, with approximately the same meaning it had in the mind of the speaker.

Although it is possible to outline the speech process from the brain of the speaker to the brain of the listener, there is still much about the nature of speech, its production, its perception and its comprehension which remains a mystery.

If men were able to develop a machine which would receive speech sounds and transcribe them into printed symbols, we would be clarifying at least a part of this mystery and, at the same time, be solving some practical problems of high speed communication.

Such a machine would have almost limit less applications in the field of high speed automatic telephonic and telegraphic communication, according to George W. Hughes, Assistant Professor of Electrical Engineering at Purdue University, who is one of a number of investigators working on this complicated problem.

The machine which accomplishes the feat of transforming spoken sounds into readable signals will depend for its functioning upon high speed electronic circuitry, but the electrical engineers who work on the problem must first have a sound basic understanding of the structure of human speech.

Human speech is an ever-changing and completely dynamic phenomenon whose separate components are as elusive as the transient "Present."

If three sounds are combined to form a word, for example, we often discover that there is no place where the one ends and the next begins. This fleeting quality of human speech sounds results from the continuous and rapid movement of the organs of articulation

through a great variety of positions, each of which produces a recognizable phonetic unit for only a brief period.

The concept of the separate and separable speech sound is, however, a necessary one in order to explain the observable facts of human auditory perception. For example, we do seem to form particular sounds for what we think are appreciable lengths of time, and people who are listening to us normally hear the same speech sounds in the same order.

That this actually happens suggests the value of making a distinction between concrete and abstract sounds.

A concrete sound is a physical thing. It is a sound actually produced in a particular verbal context.

An abstract sound, on the other hand, is that sound or idea of a sound which can be abstracted from a number of somewhat different utterances, but which we choose to call the same sound. For instance, the sound of the "t" in Tom is clearly different from the "t" sound in hit, or tin or matter. We are able to abstract a quality which is common to all of these, however, and call it the abstract "t" sound, or "t" phoneme.

The phoneme normally consists of one chief member, or phone, together with other related phones or allophones, which take its place in particular contexts without producing the judgment "different" on the part of the listener.

Some phonemes have a great number of allophones ; some have very few. For example, take the "k" sound in the following three words: Key, Coo and Car. The 'k' sound is produced when the flow of air through the articulatory path is briefly stopped by contact between back of the tongue and the soft palate.

For each of these three sounds, however, the contact is made at a different point and produces a different kind of "K". In Key it is quite far forward, in Coo it is part way back, and in Car it is quite far back.

Though different, these are all variants, of the "K" phoneme. The "K" phoneme is an abstraction ; the "K" sound produced in each of these three contexts is a concrete sound. There are some

phonemes, however, which have few or no allophones. The "f" phoneme, for instance, used in almost any context, must be produced by approximately the same contact of lip and teeth and shows little variation.

The vocal context of a speech sound profoundly affects the way in which it is articulated. For instance, the 'l' in leaf is a clear, light front "l" produced with the tip of the tongue. The "l" in peel, coming after sonorous vowel sound, is a dark sound produced toward the back of mouth.

Both of those "l's" must be looked upon as belonging to a single phoneme, however, since the change from the light to the dark "l" is conditioned entirely by the relation the "l" to the other sounds in the sequence. The front "l" is used in a final position and when a consonant follows.

Brains vs. Machine

No machine has yet been devised which can approach the human brain in its capacity to discriminate among sounds and signals and its ability constantly to make corrections on the basis of memory, context and other cues. At this stage, speech recognition machines must operate absolutely on the basis of sound recognition, quite ignoring meaning.

Most languages have anywhere from 30 to 60 phonemes which can be combined in an infinite number of ways. All words and all sentences are made up of these phonemes, and all meanings constructed from them.

If all utterances can be broken down into the relatively few phonemes, these elements are the logical basis on which to construct speech recognition machines.

A speech recognition machine must function on the basis of distinguishing among all utterances that are not repetitions of each other. The question of meaning for such a machine is irrelevant; it can clearly not be built to distinguish pear from pair. It must operate on a purely phonetic basis.

The critical problem for builders of these machines is to discover those properties of speech signals which do not vary from speaker to speaker.

If these properties were discovered, the machine would always pick up the same signal from the same sounds.

For example, the machine must be sensitive enough to be able to classify the words bin and pin as different, even though they are produced similarly by the speaker, and must be able to classify all utterances of pin as the same, even though they are produced by baritones or sopranos, by children or adults, by joyful people or people in distress.

The machine must be able to ignore the certain elements—the quality of the speaker's voice, the emotions implicit in the voice tone, the rapidity of the speech, and so on.

Speech sounds

Now, how do we go about finding the acoustical characteristics of the speech sounds of a language among which a machine can successfully discriminate?

An approach to the solution of this problem lies in describing phonemes on the basis of certain critical features which distinguish any particular phoneme from all other phonemes of the language.

Some of these critical features are voiced sounds as opposed to voiceless sounds, nasal sounds as opposed to nonnasal sounds, and so forth.

The work of Purdue's Professor Hughes toward the development of a speech recognition machine makes use of the distinctive feature approach. Working with the aid of an XR grant from the Purdue Research Foundation, Professor Hughes is being assisted in his research by Dr. Dhirendra C. Sarker and Ph. D. candidates Fausto Poza and Yuen-Sun Fu.

One measurement technique used in determining presence or absence of particular distinctive characteristics in given phonemes involves classification of the sonagraph presentation of a sound. *Sonagram* are three dimensional displays of speech sounds.

They show the relative amount of energy expended in production of a sound, the frequencies at which this energy is concentrated, and the time or duration of the sound. When large numbers of sonagrams of speech are collected, some of the acoustic properties of

the sounds producing particular sonagraphic presentations can be discerned.

Since large quantities of acoustic information are required in this work, a large-scale digital computer is employed as a statistical tools. Also, electronic computers perform complex operations fast enough to allow tracking of the distinctive features during an actual utterance, or in so-called "real time." A number of features already have been tracked over one-and two-syllable words.

Enter the Computer

At present, Hughes and his accociates are constructing an apparatus which will allow the speech signal to be fed into the Datatron 205, the large computer located on the Purdue campus.

Scientists already know much about how the sonic wave is produced in speech and what kind of wave forms can reasonably be expected from various kinds of speech sounds. The next step is to determine what wave form features are stable for the speech of many speakers and which are unstable.

When this has been worked out for all the speech sounds of the language it may be possible to develop machines able to "understand" speech and transcribe it into phonetic symbols of words.

While no machine will ever duplicate the miracle of spoken communication between two people, the development of speech recognition machines will serve two important purposes: it will enrich our understanding of the neurological, physiological, and physical aspects of human speech and hearing, and, at the same time, will provide better and faster techniques of telephonic and telegraphic communication.

Here it is important to point out that the relative amount of energy expended in production of said sonagrams of sound, also breaks the sound into a Spectrum of Senses exactly similar to the spectrum of colours in light. All sound and sense like light and colour reduce themselves to ethereal vibrations or radiations. Infact these vibrations and radiations are the subtle form of energy from which all forms of life are created.

Not only that there is no word without a meaning and vise-versa, there is no meaning without a sense too. The spectrum of senses

classifies scientifically the senses of all the utterances in a language into groups and zones of phonemes which on composition (Sanskarana) give rise to semantics (meanings). These phonemes are able to cast their sense to semantics as digists to mathematics. "No less than the synthetic process which comes into operation in the working of these laws may be well called *Sanskanana*. BHAVA the sanskrit term of sense means nothing else but the production or outcome of *Sanskaran* of *Aksharas*". Only these laws are the logic basis on which to construct Speech Recognition Machines, would make them absolute & complete. Here we should not over-look the fact, "The zero of modern civilization had its origins in India about 500 A D. The benefits modern civilization derives from the use of the zero are incalculable and range from the practical to the theoritical," according to Bernard F. Pierce, "Indeed, it might even be considered some what ironic that our culture, which has such a materialistic emphasis, should be so dependent on a symbol for nothingness.

It is also one of the most interesting factor of the Science of Sense that it is also non the less with Brahmi, Sanskrit and also with other Modren Vernaculars of India that the phoneme ૦ which keeps absolute identity with zero in script, also gives rise to the sense of Insentient Nature and possesses the properties of symbol for nothingness. ૦ denotes the sense of absolute and complete mass without velocity and soul. The Science of Sense can prove it beyond any doubt that digit 'O' and phoneme ૦ are the product of the same philosophy of the same science.

On this subject Prof. Macdonell's tribute is significant "In science, too, the debt of Europe to India has been considerable. There is in the first place, the great fact that the Indians invented the numerical figures used all over the world. The influence which the decimal system of reckoning, dependent on those figures has had, not only on Mathematics but on the progress of civilization in general, can hardly be overestimated. During the eight and ninth centuries, the Indians became the teachers in arithmetic and algebra of the Arabs, and through them of the nations of the West,"

Prof. Macdonell further observes : "We Europeans 2500 years later and in a scientific age, still employ an alphabet which is not only inadequate to represent all the sounds of our language, but even

preserves the random order in which vowels and consonants are jumbled up as they were, in the Greek adaptation of the primitive semitic arrangement of 3000 years ago."

(A History of Sanskrit Litrature, p.424)

According to Goldstucker, "The most scientific grammar that world has ever produced with its alphabet based on thoroughly phonetic principles was composed in India about the 7th or 8th century, B.C."

(Panini His Place in Sanskrit Litrature)

Einstein and the Akshara

It is now well known that matter is compounded of primordial energy in the ratio of $E=mc^2$ (Albert Einstein's equation) that means that every gram of matter (of any kind) has integrated there in the equivalent of 25 million Kilowatt hours of energy. Cosmic energy is streams of electrons. They are not matter, but spiritual energy.

The ancient Vedic term of this master pulse beating of creation, the ultimate source of energy that runs the Universe through its effects upon aggregations of matter distributed through space is *Akshara.*

According to Shri Vasantarao Venkatrao, M. Sc. In his article, Fundamental Particles :—

Nature seems to be ever elusive. The more we try and succeed in unravelling the mysteries of nature the more baffling and multiplied they appear to be. And yet, man, like an undaundted crusader ever increases his pace in the quest for truth. It did not take him long to realise that the river of knowledge turns round many a time in its sonorous journey, but every turn surely takes him nearer the truth. As he intensified his investigations he developed a faith in the simplicity and symmetry of nature. The evolution of the ideas of the atom may be cited as an instance.

From the earliest times some men were engaging themselves in all ages and climes in observing nature in her pristine glory and building up systems of thought based on their observations. Intuitively they felt that the multiplicity and diversity were only apparent and that there exists an indiscernible unity. That thought led them to postulate a few primary or elementary substances which combined in various ways to produce the many substances we come across. The number ranged from four to seven. The Hindu concept put it at five, *viz.*, prithivi, appu, tejas, vayu and akasha. The greatness of this concept lies in the fact that the entire universe can be explained in terms of the five primordial substances or the *Pancha Bhutas.* Prithivi, appu and vayu represent the three states of matter —the solid, liquid and gaseous. 'Teja' is energy and 'Akasha' is space. Some systems included mercury and sulphur in the category of the elementary substances.

All substances are supposed to be made up of small indivisible particles called *Paramanu*—atoms as they are now called. The *paramanu vada* is dealt with at great length in philosophies propounded by the sages Kapila and Kanada, though it cannot be said that the dimensions of the atom as we conceive it today were imagined. Nevertheless the idea of an ultimate particle as forming the basis for the formation of the varieties of matter was there.

From the beginning of the 17th century the idea of the atom was pursued with great avidity. The compressibility of the gases required to be explained in terms of small particles which were quite dispersed normally and which could be compressed by the application of pressure. Evidences from many sources forced the scientists to view matter as an aggregate of small and identical particles which were kept together by forces of attraction. The later chemists definitely stated the difference between an element and a compound and the difference between an atom and a molecule. There are few primordial substances which are called "elements". Each element is composed of atoms which are identical and which are indivisible. In the free state a few atoms may aggregate themselves into clusters; such a cluster is a molecule. The number of such elements was said to be 92. Now we know that it is raised to 102 to this day. Elements combine to form "compounds". Compounds are innumerable and all the variety of substances we come across in the world, and even beyond this world, are made up or various elements combined in various ways. For example, hydrogen and oxygen combine to form water ; they combine also to form hydrogen peroxide. The smallest part of a compound that retains its own properties is called "molecule". A molecule can be broken, but then is splits up and exhibits quite different properties. A molecule of water when chemically split up gives rise to new substances oxygen and hydrogen. Thus, the idea of the atom as an indivisible particle was firmly held by the scientists till the last decade of the last century.

The 1890's was a period of feverish activity. By that time it was definitely established that the atom was not an indivisible particle, since, expriments on the discharge of electricity through gases showed beyond doubt that negatively charged electrical particles were rushing in the tubes from the cathode with great velocities and that whatever substance was used as the cathode the same particles were emanating. So, the atom should be thought of as consisting of two types of electrical particles, the negative and the positive. The

atom has a structure. The discovery of radio-activity confirmed this view Radio-active elements were found to give out spontaneously three types of rays known as alpha, beta and gamma rays. Beta rays had negative charge, while alpha rays showed a positive charge. As both were emanating from the atom it was quite clear that the atom had a positive and a negative part within itself. The negative particles were called "electrons". The positive counterpart is called "proton".

Sir J. J. Thomson suggested an atomic model in which the positive charge was supposed to be uniformly distributed and in its interior the negatively charged particles were floating. The combined negative charge of the electrone was just balanced by the positive charge so that the atom, as a whole, was electrically neutral. This could explain the phenomenon of ionisation ; for, some of the loosely bound electrons can be detached making the atom a positive ion, or some electrons could be attached to the atom making it a negative ion. He was also able to determine the ratio of the charge of the electron to its mass. But the expriments of Rutherford on the scattering of the alpha particles revealed that the positive charge of the atom was concentrated inside the womb of the atom in an incredibly small space along with most of the mass of the atom. In fact, the positively charged part of the atom was thousands of times smaller than the atom itself. At this juncture Niels Bohr put forth the new model of the atom which is analogous to the solar system. In the solar system the Sun is at the centre and the planets revolve round the Sun in different orbits. Most of the mass of the atom comprising the heavy protons was supposed to be at the centre forming the "nucleus" and electrons revolving round the nucleus in different orbits. In the original model some electrons too along with the protons had to be accommodated in the nucleus, but, later on the view is changed. The nucleus is now supposed to contain protons and an appropriate number of neutrons while a number of electrons equal to the number of protons in the nucleus revolves round the nucleus. The total number of protons and neutrons accounts for the atomic weight and the number of electrons in the normal orbits represents the atomic number. So, as far as the atom is concerned, this model appeared to be a workable one.

The faith in the symmetry of nature made it impossible for the scientist to accept the proton as the counterpart of electron. It is true that the charges of both are equal and opposite; but the disparity

in their masses was too much to be swallowed. It was felt that there must be a fundamental particle having the same mass as electron and an opposite charge. Similary it was felt that there should be a particle having the same mass a proton but an opposite charge. The scientists were on the alert and both the particles were discovered. The former is the "positron" and the latter is the "antiproton" or "negatron" as suggested by Max Born some two decades back. Starting with only two fundamental particles, electron and proton, three more, neutron, positron and antiproton were added to the list of fundamental particles.

Remembering that like charges repel and that protons are positively charged particles, it was difficult to explain how so many protons could be squeezed into an incredibly small space and how they could be kept together so stably in the nucleus. Some sort of binding energy was found necessary to impart stability to the nucleus. The Japanese scientist Yukawa suggested a theory to explain the extreme stability of the atomic nucleus. According to him a "charged field" is responsible for holding the protons and neutrons. It is something like an exchange force that passes between a proton and neutron and it is the "meson field". This can be compared to the electro-magnetic field which keeps a peripheral electron bound to the nucleus. Thus, the meson or mesotron was first theoretically visualised and later actually discovered.

The cosmic ray showers helped the scientist to a large extent in identifying some of these so-called fundamental particles. They appear to be fundamental and more often undergo transformations into other known particles. The masses of these particles vary from one electron mass to nearly 2600 electron masses. Only two particles proton and electron, seem to be stable. Next comes the nuetron with a life period of about 12 to 16 minutes. The rest of them have life periods varying from 2×10^{-6} second to 5×10^{-15} second; their lifetimes are very transient. They spin about their axes, and it is this spin that enables us to differentiate the positive particle from the negative one. When subjected to a magnetic field the orientation of the different particles will be different. Each has its own scheme of decay. When a particle encounters its anti-particle they collide with each other and annihilate.

The latest seems to be the discovery of a new property of the nuclear particles. Some of them seem to have a screw-like motion.

They exhibit a direction of movement with a direction of rotation; just as a screw moves forwards or backwards whenever it is given a rotatory motion. What new fields this leads into is a matter for conjecture.

The search for the counter-part of electron, most unexpectedly, resulted in the discovery of a new element, the very first of the series of elements. It is called "positronium". The atom of positronium is different from the atoms of all the other elements in the sense that, while every conventional atom has a heavy positively charged nucleus round which one or more electrons are supposed to be revolving, the positronium atom has no such nucleus. It consists of one positron and one electron, each of the same mass but of different charge. They revolve about a common centre of mass. Like the Radha-Krishna dance they perform a revolving dance for a minute fraction of a second and annihilate each other giving birth to two or more photons, which emerge in the form of gamma rays.

The number of photons or gamma rays that are thus generated by the transformation of matter into energy is stipulated to be at least two by the law of conservation of momentum. Without the gun a shot cannot be fired. As the shot leaves the muzzle of the gun the reaction is taken by the gun. Likewise the moment matter is transformed into energy at least two gamma rays must be born to kick each other and dart off in opposite directions. But the number of gamma rays could be more than two. The annihilating positronium atom registered, in some cases. the birth of three gamma rays also in suitably arranged scintillation counters.

Both the positron and electron have a spin of their own. Both of them may spin in the same direction or in opposite directions. Remembering that a spinning charge behaves as a magnet and that the charges of the positron and electron are opposite in sign, it can easily be seen that when both of them spin in the same direction they behave as magnets with their opposite poles pointing in the same direction and when they spin in opposite directions they behave as magnets with their like poles pointing in the same direction. As they revolve in the orbit, in the former case they are objected to a force of magnetic attraction whenever their axes are farther apart and in the latter case a force of magnetic attraction comes into play whenever their axes are collinear, The first type of atoms form 'orthopositronium" and the second type constitute "para-positronium". The

annihilation of an atom of ortho-positronium results in the birth of three photons while the annihilation of a parapositronium atom gives birth to two photons. In both the cases the photons manifest themselves as gamma rays which could be detected by means of scintillation counters.

The life of positronium atom is very small as judged by our standards of time. From the moment the atom is formed it survives for no more than a tenth of a millionth of a second. The ortho variety lives for less than just two ten millionths of a second while the para variety is still more transient: it lives for a tenth of a billionth of a second. Inspite of their flickering and fleeting lifetimes they dance for a pretty long time and revolve at least a million times before they give up their material existence.

An observation of the spectrum of positronium confirmed the validity of the proposed model of its atom. The absence of a nucleus makes the diameter of the positronium atom double that of the atom of hydrogen. The wavelength of the corresponding line of the atomic positronium should be double that of the hydrogen line; and so it was actually found to be.

Starting with two fundamental particles, electron and proton, we have reached a number about 20 ; we are not sure we have reached the end. In the scientific quest we find that new tools and new methods unravel new and untrodden lands and the time for crying halt seems to be ever receding. But the human intellect is never tired of exploration and it never satisfied with the progress made. It is out to know the ultimate truth; it may be a few years hence or some centuries hence. In the mean-time it cannot rest.

The Cult of the Atom

According to V. Venkataraman Rao, B. A., B. L. :—

The scientific knowledge about the atom has been utilized for various purposes. The photo electric cells, and the cathode ray gave us the modern sound movies and the television pictures. The alchemist's dream is also partly realized. Mercury can be transformed into gold through an expensive process. The rader is used in air navigation. The Geiger counter has become the eye of research, which picks up and traces the movement of radio-active atoms

moment by moment. The atomic power has been used for the submarine—Nautilus—which completed successfully a submerged passage beneath the North Pole.

The scientists are using the atomic energy for the exploration of the outer space. The Soviet Union launched its Sputnik 1 into orbit 560 miles up on Oct. 4, 1957. Then a second sputnik reached a height of 1,062 miles. On January 31, 1958, a third satellite was launched by the United States. The American statellite-the Explorer-reached 1,587 miles above the earth. This explorer and the second Russian satellite are now circling the earth at a speed of 18,000 miles an hour gathering information about the upper atmosphere and transmitting it to earth by radio. The sputniks thus supply valuable information to IGY scientists throughout the world. Space technology affords fresh opportunities for scientific observation and expriment. It will add to our knowledge and understanding of the earth, the solar system and the universe.

The Astronomical Council of the Soviet Academy of science intends to equip the sputnik in future with devices of light reflecting or emitting light during the nights. It will be like a little moon shining in the nightly skies. So one might well sing :—

Twinkle, twinkle, little sputnik,
Singing upto human glory;
Deride not our moon or mimic
Lest thine short life mar thy story.

Arthur H. Snell, director of the physics division of the Oak Ridge National Laboratory, writing in the American Scientist (January 1957) observes that "unsuspected new particles are being found and new properties of old ones, with a rapidity that has pushed experimentation far ahead of theory ; and physicists are faced with a complicated state affairs that invokes a sense of frustration. *Their experience and instincts tell them that there must be some organisation underlying the empirical situation.* The Dirac theory of electrons introduced the concept of anti-particles. The pair theory of particles is now confirmed by experiment and generalisation. Mr. Snell states that "it is now legitimate to speculate about atoms with negative nuclei and positive electrons ; the contraterrane matter of science fiction has come into its own and astro-physicists are on the look out for such matter in the cosmos.

To understand the world of matter (prakriti) and the spirit (or Purusha) has been the time-honoured struggle of the philosopher. Sri Sankara, Sri Madhwachar and Sri Ramanuja interpreted this dualism in their own way. The dawn of nuclear age throws fresh light on this much perplexing question. In Indian philosophy religion is looked upon as affording the hope that Brahman—the Ultimate Reality—is realizable by all.

Thus we see that the splitting of the atom by the scientist or the inward discernment of it by the philosopher both lead to one fundamental Truth. All matter is electrical energy--the Brahma Jyoti pervading the whole world of matter. The duality (Matter and Spirit or Prakriti and Purusha) is preceived only in the natural State of existence. But in the final analysis the dualism resolves and Coalesces into the One Absolute, while yet the soul Consciously maintain its individuality. This the Vishistadvaitic view of Sri Ramanuja. The atom is the borderland of Science and Philosphy. Both teach that there are tremendous forces Concealed in nature and man.

The Vaiseshika Philosophy & the Theory of Relativity.

According to Dr. Dharam Dev Mehta, In the course of our researches into the mechanical, physical, and chemical theories of the ancient Hindus, we come across the remarkable expositions of the *Nyaya Sutras* of *Gautama* and the *Vaisheshika Darshana* of *Kanada*, which deal not only with the methodology of Science but also elaborately dwell upon the concepts of Mechanics, Physics and Chemistry.

Let it be clearly appreciated at the very outset that the *Samkhya System* deals with the principles of cosmic evolution not merely as a matter of metaphysics, but explains so many concepts of evolution in terms of principles of conservation transformation and dissipation of Energy and over and above this, the elucidations of pre-atomic States of Matter.

Kapila's Samkhya philosophy dealing with twenty five principles, speaks about the five elements composing Matter.

The Prakriti is, in reality, an undifferentiated manifold, and *indeterminate infinite continuum* of infinitesimal reals, which are the three "Gunas". These "Gunas" are called Sattva, the Essence-a medium for the reflection of intelligence.

Rajas, Energy.

Tamas, Mass or inertia.

Energy has quantum (परिमाण) and extensity (परिच्छिन्नत्व). The nature of energy is to do work and to overcome resistance (रजश्चलम् उपष्टम्भकं). Primarily, therefore, all energy in the ancient systems is kinetic.

"Kanada, the notable author of the *Vaisheshika* system has given us the Atomic Theory and his exposition of the properties of matter is remarkable....."

"पृथिव्यप्तेजोवाय्वाकाशकाल दिगात्म मानासि"

Nine elements-Prithvi (Earth), Apu (Water), Vayu (Air) Tej (Energy), Akash (Ether), Kaal (Time) Dik (Direction) Mun (Mind) and Atma (Soul) only, are accepted in "Vaiseshik". If we collect the sense behind them, the first five elements define the entire Modern Knowledge of Science.

"The Vaisheshika and Samkhya systems are the earliest documents full of the knowledge on chemistry, exposing as they do, the constitution of Matter and the various hypotheses connected there with."

Kaal and Dik—The Time Dilation in Vishashik Darshan

In Vaisheshik philosophy, atomic energy has been said to be the cause of all creation in the world. Most of us know that Albert Einstein, the great mathematician and physicist, developed theories which helped lead the World into the atomic age. But few people dare to pretend that they thoroughly understand Einstein. It was only this Theory that predicted the release of atomic energy and also time dilation. Only this theory can give explanation of the terms—Kaal (Time) and Dik (Direction or space) mentioned in Vishashik by Kanada.

According to Dr. Z. Esmail-Beygui in his article on "Einstein's Theory of special Relativity"—

In the 17th Century, the famous British mathematician and Physicist, Isaac Newton, announced for the first time the mathematical form of the principle of relativity. This principle says: "A law of

mechanics which is valid in a given coordinate system is equally valid in a second coordinate system moving with constant velocity relative to the first system".

One of the laws of mechanics is the law of the combination of velocities which is accurately verified in all circumstances wherever the velocities involved are small with respect to the velocity of light. It happend. however, that this important law failed in an experiment performed by A. A. Michelson and E. W. Morley, the American physicists, late in the 19th century.

In 1881, Michelson first started the experiment and later was joined by Morley in 1887. For this experiment a very accurate optical apparatus called "interferometer" was designed to measure the velocity of the earth into "ether" by applying the above-mentioned law, the law of the combination of velocities, to the light.

The hypothetical existent medium ether was supposed to be stagnant and was thought to pervade all space; then light waves should travel with definite speed of 186,000 miles per second with respect to this motionless ether itself.

Several experiments were performed with this apparatus for seven years at different times during the day and night, in differents seaons of the year and in differnt continents, using all different possible directions. However,they could not get the logical result expected from it. The failure of this important experiment which was violating the wellestablished law of mechanics, the law of the combination of velocities, was a big dilemma for the scientists of that century.

In 1905 Albert Einstein solved this problem and announced the postulate of his "Special Relativity," which is:" All observers measure the same constant value. c. (186,000 miles per second in vacuum) for the velocity of light, regardless of the inertial systems*in which a particular observer is situated and regardless of the motion of the source of light, the motion of the observer, and the motion of the medium in which the light propagates."

It was then pointed out by Einstein that the reason for the failure of the Michelson-Morley experiment was due to the fact that the apparatus which they designed was based on the assumption of the existence of an apparent relative velocity for the light, different from c, which really did not exist.

This postulate also made the hypothetical existence of the other useless because after this postulate, the velocity of light remains constant and is the same with respect to every real existing object—regardless of its motion.

Einstein also generalized the relativity principle of Newton to all physical laws including optics and electricity and announced: "There is no preferred inertial system. Physical laws and principles must have the same mathematical form when expressed in the coordinate of any inertial system."

But, he said, in order to have this generalized principle applicable to all physical laws we have to renew our conception of space and time because the measurement of time is based on simultaneity of events. and the simultaneity depends upon the judgment of the observer. and his judgment in turn is affected by the existence of relative motion between the observer and the events observed. Consequently, the measure of time is not absolute, but it is a relative quantity that can change from one observer to another.

In fact, the relativistic nature of our judgment of simultaneity can be illustrated by this simple example. Anyone who has watched and listened, from a far distance, to a violinist at play has observed the difference in time which exists between what he sees and what he hears of the same note played by the artist. Because of the very large difference which exists between the magnitude of the velocity of light and the magnitude of the velocity of sound (the latter being almost one million times slower), he sees the motion of the arm of the artist bowing the wire first and at a moment later he hears the corresponding note.

His judgment, if he is unaware of the above-mentioned difference of velocities, will be that the bowing and sounding of the wire were not occurring at the same moment, or, in other words, the two events of bowing and sounding of the wire are not simultaneous events for him.

But this is not the same case for another observer who is near the violinist or for the violinist himself. For these two persons, bowing and sounding of the wire of the violin are judged to be two simultaneous events.

This example shows that two specific events can be judged as simultaneous by one observer and non-simultaneous by another observer. Consequently the measure of time which essentially is based upon the simultaneity takes a relative value which can change from one observer to another.

The measurement of the length, he said, is also based upon the use of the method of coincidence and in a system in motion the use of this method involves the use of time. Consequently, the measure of the same length is also relative and not absolute and can be different from one observer to another.

Actually, the mathematical calculations developed by H. A. Lorentz and Einstein demonstrated that for an observer at rest, the length of a meter stick which is in motion with respect to him, shortens in the direction of the motion, and that a clock in motion with a constant velocity slows down with respect to an identical clock remaining at rest.

Based upon the above-mentioned results, Einstein discarded the conception of space and time as being two absolute separate and independent entities and replaced them by the conception of the space-time, which is an inseparable combination of these two. For Einstein, "space"and "time" mentioned separately have no definite meaning; more over, to every event, both the time and the space should be assigned in order to define specifically that event.

Einstein also explained, by his principle of Special Relativity, the phenomena of the increase of a mass in motion, which was at first observed by J. J. Thompson and W. Kaufman, and he gave the precise law of this increase.

Of course, in order that any changes in the passage of time or in the mass of a moving body be detected by us, the relative motion should be involved and the speed of the moving body should be comparable to the speed of light. For instance, these changes will not be noticed even in the fastest rockets made until now. A velocity of 24,000 miles an hour (which is probably the maximum velocity obtained for the rockets) is only near seven miles per second, which is negligible with respect to the velocity of light.

However, the increase or the mass of the particles moving with large velocity comparable to the velocity of light is a common fact

in measurable quantity which is taken into consideration by engineers in the design of atomic machines such as the betatron and bevatron.

Finally, as the result of Special Relativity, one can mention Einstein's important formula—$E=mc^2$—which relates the change of mass and energy to each other and puts to the domination of man the unlimited source of energy and power

The Vedic View

Einstein believed in a spherical Universe which is static and provides neither for expansion nor for contraction.

The vedic view is different. According to the *Yajurveda* XL, 1, the universe is not static—it is expanding and contracting and is continuously in motion.

ईशावास्य मिदं सर्वं चत्किञ्च जगत्यां जगत् ॥

In 1920, a Russian Mathematician, Alexander Friedmann, pointed out an error in Einstein's calculations in arriving at a static Universe and the error lay in the fact that Einstein divided both sides of an equation by a quantity which may become zero, and division by zero is not permissible in algebraic calculations and the Russian scientist came to the calculation, that the "Correct treatment of Einstein's basic equations leads to a class of expanding and contracting Universe."

Friedmann's work was followed by Hubble's discoveries at the Mount Wilson observatory and the theory of expanding universe was finally developed and amplified by the Belgian astronomer Lemaitre, in modern times.

(Science in the Vedas P. 12)

Upnishad says :—

यथा सुदीप्तात्पावकात्स्फुलिंगा सहस्रशः प्रभवन्ते सरूपाः ।
तथाक्षराद् विविधाः सौम्य भावाः प्रजायन्ते तत्र चैवापि यन्ति ॥
(मुण्डकोपनिषत्)

जिस प्रकार धधक कर ऊपर उठती हुई अग्नि की लपटों से अनेक चिनगारियाँ उड़-उड़कर हवा में फैल जाती हैं, उसी प्रकार सृष्टि के मूल में

प्रतिष्ठित अक्षर तत्त्व की शक्ति से अनेक पदार्थ उत्पन्न होते हैं। और फिर उसी में विलीन हो जाते हैं। फैलना और सिमटना, या बढ़ना और सिकुड़ना, यही अक्षर का स्वभाव है। ब्रह्मांड के मध्य में अक्षर तत्व उस धौंकनी के समान है जिसकी श्वास-प्रश्वास से विश्व की प्राणन क्रिया हो रही है। इसे ही प्राण तत्व कहते हैं। प्राण की सबसे सटीक परिभाषा यही है—

प्राणो वै समञ्चन प्रसारणम्। **(शतपथ ब्राह्मण)**

प्राण वह शक्ति है जिससे विश्व का स्पंदन नियमित हो रहा है। समंचन केंद्र की ओर आगति है और प्रसारण केंद्र से उठकर परिधि की ओर जाने वाली गति कहलाती है। केंद्र और परिधि के बीच में फैलने और सिकुड़ने वाली शक्ति की धारा ही जीवन है। यही अक्षर तत्व का चमत्कार है। यही वह चमक या विद्युत् है जिसकी सत्ता जीवन और विश्व का मूल है। इसे ही इंद्र शक्ति या अग्नि शक्ति कहते हैं। यही प्राणन और अपानन की महती प्रक्रिया है—

अन्तश्चरति रोचनास्य प्राणदपानती।

व्यख्यन्महिषो दिवम्। (ऋग्वेद १०। १८९।२)

यह जो द्युलोक के अनंत विस्तार और देश के ओर-छोर तक एक महामहिमाशाली शक्तितत्व सर्वत्र प्रकाशित है, उसके आभ्यंतरिक संस्थान या भीतरी रचना में एक रोचना या विद्युत् शक्ति फड़क रही है जो प्राण से अपान की ओर जाती है और पुनः अपान से प्राण की ओर लौट जाती है। उसकी गति दुर्धर्ष है। वह शक्ति ही विश्व की रचना करती है—

शक्तिः सृजति ब्रह्माण्डम्— **(देवी भागवत १।८।३७)**

वह शक्ति अपने मूल रूप में प्रसुप्त रहती है। पर जब वह तप्त होती है तो उसमें तप की महिमा से, ताप के प्रभाव से प्राणन-अपानन क्रिया का आरंभ हो जाता है। इस ताप या समिधन को ही 'इंद्र' कहते हैं। जो इंधनात्मक तेज है वही इंद्र है।

तम् इन्धं सन्तम् इन्द्र इत्याचक्षते
परोक्षेण, परोक्षप्रिया वे देवाः प्रत्यक्षद्विषः ।

(शतपथ ब्राह्मण)

शक्ति का जागरण कहें या अग्नि का दहकना कहें, या प्राण-अपान की चमक कहें—तथ्य एक ही है। यह रोचना ही जीवन की रहस्यमयी विद्युत्-शक्ति है जिसकी अभिव्यक्ति से द्यावा-पृथिवी के बीच समस्त रचना प्रादुर्भूत हो रही है। उसका सर्जन अनादि-अनंत है। अमृत-मृत्यु उसी के दो पंख हैं। कोई महान् कर्मार या कारीगर अपनी भट्ठी के पास बैठा हुआ इस धौंकनी की दुर्धर्ष शक्ति से भूतों की रचना कर रहा है—

ब्रह्मणस्पतिरेताः सं कर्मार इवाधमत् । (ऋग्वेद १०।७२।२)

अग्नि या ताप या विद्युत् ही वह ब्रह्म शक्ति है जिससे विश्व का बृंहण होता है। मूल का तूल भाव में प्रकट होना ही बृंहण है। यही नाना-भाव या बहुभाव है। एक का बहुधा हो जाना ही सृष्टि है। इस ब्रह्म रूप विश्व के पति या देव की संज्ञा ब्रह्मणस्पति है। उसकी शक्ति वह अग्नि है जिसका संधमन ही जगत् की रचना है। एक सबसे बड़ा लुहार है जिसकी धौंकनी के खुलने-मुँदने से विश्व का स्पंदन चल पड़ता है, वही अनंत अक्षर देवता है। उसी अक्षर की नाभि में अन्य सब स्पंदन पिरोये हुए है। वह अक्षर ही अंतर्यामी रूप से सबके भीतर विद्यमान है। जब तक अक्षर का सूत्र हमारे भीतर है तभी तक जीवन का अनुभव किया जाता है।

अक्षर के विस्तार की ही वैदिक संज्ञा 'विमान' है। वह अक्षर विश्व के विराट् लोकों का मापन करता है, अतएव उसे विमान कहते हैं। एक-एक ब्रह्मांड में उसका सूत्र मापन करने वाला एक-एक अक्षर देव है। प्रत्येक सौरमंडल में उसी अक्षर का प्रतिनिधि एक-एक सूर्य है। सूर्य अपने सौरमंडल या सौर ब्रह्मांड का विमान है। सूर्य ने ही उसका मापन किया है। सूर्य की शक्ति और गति से ही सूर्य के लोक या मंडल का वितान हो रहा है। सूर्य एक स्पंदन है, वह एक छंद है। उसके छंद में जो समाया हुआ है वह अनंत देश और काल में गति के संचालन का अनुशासन मानता हुआ अपने-अपने स्थान पर ध्रुव ब्रह्मचक्र में नियंत्रित है। प्रत्येक विराट् लोक या नक्षत्र अपनी धुरी पर अविचाली सत्र कर रहा है। किंतु इस भ्रमणशील ब्रह्मचक्र में स्थिर होते हुए

भी सब कुछ गति से नियंत्रित है। यहाँ स्थिति और गति का अपूर्व समन्वय है। प्रत्येक संस्थान स्पंदित है, पर वह और सब के साथ पारस्परिक गति-संतुलन से संतुलित है।

जो दशा विराट् की है वही पिंड की है। शरीर में प्रत्येक घटककोष के भीतर जीवन या प्राण का स्पंदन है। उनका सम्मिलित स्पंदन हृदय की गति है। वही श्वास-प्रश्वास के रूप में प्रकट हो रही है। एक-एक अणु-परमाणु घटककोष, शरीर-पिंड एवं खगोल के ग्रह नक्षत्र आदि सभी विश्व की रचना में विमान का रूप धारण किये हुए हैं। गति और आगति के दो पंखों की शक्ति से वे संचालित हैं और देश-काल में संतुलित हैं। वस्तुतः विभाग का मूल स्वरूप एक ही है। उसकी अभिव्यक्ति अणु और महत् में सर्वत्र और बहुधा है जो भूत है। वह क्षर है—**क्षरः सर्वाणि भूतानि** (गीता)।

उसी क्षर को धारण करने वाला विधृति तत्व अक्षर है। अक्षर से ही भूतों की रचना होती है। अक्षर ही भूतों के विस्तार और गति का नियामक है। अक्षर ही दुर्दमनीय गति तत्व है। अनंत आकाश में घूमते हुए ग्रह-नक्षत्र क्या हैं? वे उन पक्षियों के समान हैं जो अक्षर की शक्ति से पंख फड़फड़ाते हुए उड़ रहे हैं। ये सब द्युलोक के सुपर्ण हैं। सूर्य भी एक सुपर्ण है जिसे वैदिक भाषा में गरुत्मा या गरुड़ कहा जाता है। चंद्रमा भी सुपर्ण है—

चन्द्रमा अप्स्वन्तरा सुपर्णो धावते दिवि।

विश्व का जो महान् परमेष्ठी देव है, जो सब में व्याप्त होने से विष्णु है, उसका छंदोमय गरुड़ ही विश्व का वाहन है। छंद ही स्पंदन है जिसकी लय से काल भूतों की रचना कर रहा है। काल तत्व ही महान् अक्षर तत्व है। वही विश्व की मूलभूत गति है। स्थिति के ध्रुव धरातल पर गति ही अक्षर का स्वरूप है। उसी से समस्त रचना का सूत्रमापन या सूत्रविन्यास होता है।

(वासुदेव शरण अग्रवाल,)
कादम्बिनी, दिस०, १९६०.

The Signification of Mun (Mind) and Atma (Soul)

The Paingala Upnishad tells us that, at the Final Dissolution, the Brahmanda or primal Universe and its effects the worlds are drawn in into their cause, the subtle organs of sense and action and the four internal organs mixed to-gether, and all things composed of

the elements are resolved into their primal elements. The earth is resolved and drawn in into Water, Water into Fire, Fire into Air, Air into Ether, Ether into Egoism (Ahankara), Egoism into Mahat (Secular Reason or Intellect), Mahat into Avyakta (Prakriti, the primary germ of Nature or productive principle out of which all the phenomena of the material Universe are developed), and lastly Avyakta into Purusha (the Supreme Spirit). Like Space and Matter, Time also is Swallowed up in Him, and the Supreme Being becomes then the Eternal, Universal and Unconditioned Time. The Anadi Vaikuntha, the Heaven of Vishnu which has no beginning, with its souls enjoying Jivan-Mukti (Living Freedom), and even the Gods Brahma, Vishnu and Ishwara, emancipated from the Vehicle of Maya (illusion), are absorbed into or reunited with Parmatman (Supreme Self)

According to the Scientist, mere physical laws govern the Universe and its destruction. But according to the Hindus, God is the efficient and material cause of the Universe. That is to say, the source of the whole Universe as well as the place where into it dissolves again. In other words, the Universe is a projection of the Lord or the Lord Himself. Here lies the contrast between Modern and Hindu Philosophy of Science.

(Astrological Magazine)

It is a pity that with the advent of Shankara's *Advaita Theory*, the atomic theory of Kanada and the theory of the twenty five principles of Kapila, which completely encompassed the conception of Modern Physics and chemistry by the ancient sages dealing with matter, energy, gravity, light, sound, heat ether, and electricity, the panchabhutas etc. etc. received a great set back and the Indian Scholars lost the scientific touch and approach.

In his History of Hindu Chemistry, Vol. 1. p. 195, P. C. Ray rightly observes :—

"The *Vedanta Philosophy* as modified and expanded by Shankara, which teaches the unreality of the material World is also to a large extent responsible for bringing the study of physical science into disrepute-Shankara is unsparing in his strictures on Kanada and his system (vide his commentary on II, 2, 18 on the Vedanta Darshan)."

(Science in the Vedas)

Spectrum Analysis of Sense in Speech Sound

In his article 'Colour Influences' Agastya writes—All living beings in their physical and spiritual form—structures have luminous emanations radiating from their bodies and Man is no exception to this. Planets and stars also radiate energy. These emanations occur in the shape of vibrations. These vibrations have a certain frequency though most of them may not be perceptible to our visibal sense. Therefore differences in shades of colours are due to the differences in their vibrations. Spectrum analysis of the white light from the Sun reveals seven distinct colours assigned to different planetary bodies in the astrological texts. All colours are produced by certain vibrations which differ for each individual colour. All sounds are also produced by vibrations which differ for each sound. So the difference between colour and sound is one of difference in vibration. The ancient Maharshis with Yoga Drishti were able to realise this grand truth and formulated rules for performance of remedial measures which consisted of mantras—adjusted forms of sound vibration—for averting certain planetary influences—light vibrations. Human senses have their own limitations and because we cannot percieve subtler vibrations, it does not mean they do not exist.

According to A. J. Davis, the following are the tabulated colour vibrations :—

Colour	Length of wave in Mil of inch	Undulation per inch	Vibrations per second in Billions per second
White	...	—	...
Violet	167/10	59,750	720
Purple	185/10	54,070	658
Blue	196/10	51,110	622
Green	211/10	47,460	577
Yellow	227/10	44,000	535
Orange	240/10	41,610	506
Red	266/10	37,640	458

It will be seen from the above that the violet has the greatest number of vibrations and red the least, According to the sages, man has a spiritual aura surrounding him. The truth of this is being corroborated by the findings of scientists that each human-being has an electrical field surrounding him. The emanations from the human body constitute the aura surrounding a person and is clearly seen by Yogees and highly evolved souls. If the human body is a megnet radiating some sort af magnetic and electrical currents, then the human brain must be an equally important electrical apparatus and then our thoughts—so many vibrations must have their own definite wave length. In fact Dr. Crile demonstrated before the National Academy of Sciences at Cleveland that the brain tissue gives off a visible radiation and also infra-red radiations and radiations of wave lengths beyond the ultra-violet. In the study of vibrations, we acquire very valuable knowledge which concerns every activity of the mind, body and soul. Colour is vibration, thought is vibration, sound is vibration the intensity of thought calls into existance brighter colours and those who have advanced a little in Yoga are said to know these matters better. If colour (or sound) and thought are vibrations—the difference being one of frequency, and if our emotions are due to thought differences, then it is reasonable to assume that colour (or sound) do influence emotions which in their turn react on circulation, respiration and digestion either for good or for bad. A man is afraid to go in the dark. Fear causes a cold perspiration. Anger fills the mouth with a bitter taste. By training the good emotions life and health are promoted while the bad emotions shorten life. Thus even in its chemical nature the universe is moral. The power of colours and the power of music (sounds) upon the insane and the mentally afflicted is but a forceful demonstration of vibrations, "being able to assist Nature in adjusting the vibrations of the human mind and body which have lost their rythm and therefore lack mental harmony".

Spectrum Analysis of Devnagri Consonants

'प' वर्ग.....प	ब	फ	भ	म			
'त' वर्ग.....त	द	थ	ध	न	ल	र	
'ट' वर्ग.....ट	ड	ठ	ढ	ण			
'क' वर्ग.....क	ग	ख	घ	ङ			
	स		प		श		
'च' वर्ग.....च	ज	छ	झ	ञ			

The consonants which are formed by exactly the same organic motions, (the only difference being the material which the actions modify) form one Varga (Group) Ex. त द थ ध न form one Varga viz., त वर्ग। क ग ख घ ङ form 'क' वर्ग।

The relation that each element of the same 'varga' bear to one another:—from left to right, the first element of each 'varga' is 'surd'; the second is its corresponding 'sonant'; the third is its corresponding 'aspirate'; and the fourth is the corresponding 'aspirate' of the second; and the fifth is the nasal sound from the shut position of the same.

Examples:—

Take any varga, say, 'प' वर्ग। Here प (first element of the same varga) is surd; second element ब is the sonant (or vocal form) of प; the third element फ is the aspirate of प, the fourth element भ is the aspirate of ब and the fifth element म is the nasal sound from the same shut position.

All the above elements are given from the same position, but they differ in quality. The first four vargas have been placed in order of visibility.

All elements are to be taught is combination with the natural vowel, i.e., आ।

In all non-nasal sounds the naso-pharynx is kept shut by the uvula.

'प' वर्ग।

प।

Formation :—Lips tightly shut (a cavity is found within the mouth with the tongue in the position of आ, the air within is compressed) and then "separated with an audible expulsion or puff of breath".

Examples:—पाल, साँप।

Note—In the case of पा the puff of breath and the voice are simultaneous and the former blends with the latter. This is true of all other surds.

Method of Development:—(i) Imitation (ii) The puff of breath can easily be felt on the back of the palm (iii) It may also conveniently be taught by holding a strip of paper before the lips as the sound is given.

व ।

Formation:—Lips shut as for प (the cavity within is also the same. Active organs, here, the lips, are less tightly compressed than for प, consequently the air within is under comparatively less pressure) voice is given just before disjunction. This is true of all sonants as compared with their corresponding surds" (Arnold).

Examples:—वाप, टव ।

Note:—In cases of initial sonants (वा, दा, डा, गा) the voice given just before disjunction, continues synthetically without any breake to be shaped into the vowel following them (sonants).

Method of Development:—Contrast with प । By feeling the presence (in the case of व and absence of vibration in the case of प) with the hand or tip of the fiinger on the teacher's lower lip. (vibrations for व is very prominent here) chin and chest.

Note:—For all sonants there is vibration on the chin, chest and throat while there is no vibration in cases of surds.

ह् ।

ह् may be vocalised or non vocalised. A. C. Chatterjee says, "For the deaf vocalised ह् is very difficult and may be done away with" The latter (non vocalised ह्) serves all practical purposes. Non vocalised ह् is the same as English H and "It is an expulsion of breath" for a very short while "through the open glottis." The position of the tongue is the same as for आ । A. C. Chatterjee says "The glottis is open to the degree sufficient for producing obstruction at the edges of vocal cords to produce the fricative sound ह्" ।

Examples:—हाथी, महा pressure for this element can easily be felt on the abdomen.

Method of Development :—

(i) Imitation (ii) "Hold pupil's (a) back of the palm, (b) a mirror or (c) a slate before the teacher's mouth "while he or she

gives ह । Draw the pupil's attention to the vaporous impression on the mirror or slate. Induce him to do the same.

Note :—ह "is the emission of breath through the position of the vowel following it" Yale.

फ ।

Lips shut as for प and the "oral action is precisely the same". The difference between प and फ is—in the case of प, the vowel that follows blends with the puff of breath on disjunction i. e., the puff of breath and the voice are simultaneous; on the other hand in the case of फ, the vowel that follows it comes after the puff of breath and does not blend with it at all. All these happen synthetically and without any break. Pressure is also greater than that for प and that can be felt on the abdomen. The above notes are true of all surd aspirates as compared with their corresponding surds.

The formation of फ may also very briefly be put in the following way :—फा=प् +हा (non-vocalised) synthetically.

Final aspirates are the same as their corresponding surds or sonants.

Method of Development :—(i) Contrast with प (ii) Hold pupil's back of the palm or a strip of paper before the mouth when this sound is given.

भ ।

Lips shut as for ब voice is given just before the disjunction, then separated with a puff of vocalised breath by extra pressure and then comes the vowel that follows it. All synthetically, and without any break. The above is true of all sonant aspirates as compared with their corresponding sonants.

The formation may be very briefly represented in the following way :—भा=ब् +हा (vocalised) synthetically.

Examples :—भात, सभा । Vocalised ह is very difficult for the deaf, so A.C. Chatterjee advocates teaching of the sonant aspirates with non-vocalised हा । In his opinion 4th elements thus articulated are fairly intelligible.

Method of Development :—Analogy from प and फ and contrast with ब ।

Drill as पा फा, बा भा ।

म ।

"Lips shut as for प or ब while voice passes through the nasal passages." It is the same as English M. There is a cavity in the mouth just as for प or ब, "Voice passes entirely through the nostrils but reverberates in the mouth."

माँ, आम ।

Method of Development :—Attract the pupil's attention to the presence of vibration in the nose. This is true of all nasal sounds.

त वर्ग ।

त ।

Whole tip of the tongue shut against the normal opposite i. e. inner surface of the upper incisors, caines, 1st bicuspids and the upper gum (a closed cavity is formed behind the area of contact "with the sides of the rest of the tongue held against the insides of the upper teeth"; air within is under pressure) then removed with an audible expulsion or puff of breath.

Method of Development :—(i) By analogy from प । See methods of development of प and notes given there.

Note :—"Let the pupil observe that the action is the same in giving both the sounds, although neither the active nor the passive organ remains the same." This is true in the case of all surds. After fixing ता drill as पाता, पाता, in the same breath.

Examples :—ताला, सात ।

द ।

Tip of the tongue shut as for त and voice is given just before disjunction. See notes on sonants as quoted under ब ।

Examples :—दाम, चोद ।

Method of Development :—Contrast with त । By analogy from ब ।

Draw the pupil's attention to the fact that the action is the same in giving the sounds ब and द although neither the active nor the passive organ remains the same. This is true in the case of all sonants. After fixing द drill as बाद्ा, बादा, in one breath.

थ।

Tip of the tongue shut as for त and then separated with an audible expulsion or puff of breath and the vowel that follows comes after the puff of breath on disjunction. See the notes on surd aspirates as quoted under फ।

It may also be briefly represented as :—था=त्+हा।

Final थ is the same as final त।

Examples :—थार्ला, रथ।

Difference between त and थ is the same as that between प and फ।

Method of development :—(i) Contrast with त (ii) Analogy from फ।

Action in giving all the surd aspirates is the same, only active and passive organs change. Drill as :—पा फा, ता था।

After fixing था drill as, फाथा, फाथा।

ध।

Tip of the tongue shut as for त, voice is given just before disjunction; then separated with an puff of vocalised breath and after this puff of breath comes the vowel that follows. All synthetically, and without any break. It may also be represented as धा=द्+हा (vocalised).

See notes on sonant aspirates as quoted under भ।

Examples :—धाम, बोध।

Action in giving all sonant aspirates is the same, only active and passive organs change.

Method of Development :—(i) Contrast with दा। (ii) Analogy from भा।

Drill as :—बा भा, दा धा and then as भाधा भाधा।

न

Tip of the tongue shut as for त while voice passes though the nasal passages. There is a cavity behind the area of contact and voice escapes by the nose only when it reverberaties in the said cavity. This न is called dental न and is only used when followed by any element of 'त' वर्ग।

Examples: - अन्तर ; अनन्द ।

Method of Development:—By analogy from म । By feeling vibrations in the nose with the tip of the finger.

ट वर्ग ।

ट

It is the same as English T. Edge af the "tongue shut against the upper gum (there is a cavity behind the line of contact and the air within the cavity is compressed) then removed with an audible expulsion of breath,,

Examples:—टाल; खाट ।

Method of development:—(i) Imitation (ii) By analogy from प and त ।

See notes as quoted under प and त । Drill as, पाताटा ।

ड

Edge of the tip of the tongue shut as for ट, voice is given just before disjunction. Other actions are the same as that for बा दा ।

Examples:—डालो । See notes as given under ब and द ।

Method of Development:—(i) Contrast with ट (ii) Analogy from ब and द । Drill as, बादाडा, बादाडा ।

ठ

Edge of the tip of the tongue shut as for ट and the vowel that follows begins after the puff of breath on disjunction. Briefly

ठा=ट्+हा । *Examples*:—ठाकुर. आठ ।

See notes as given under फा and था

Method of Development: Contrast with ट analogy from फ and थ।

Drill as, फाथाठा, फाथाठा।

ढ

Edge of the tip of the tongue shut as for ड, other actions are the same as for भा and धा।

Briefly ढा=ड+हा। *Example*:—ढाल।

Drill as, भाधाढा in the same breath.

ण

Edge of tip of the tongue shut as for ड other actions are the same as for न।

Method of Development:—By analogy from म and न। By feeling the presence of vibration in the nose.

ल

It is the same as English L. Edge of the tip of the tongue is shut against the root of the upper gum "with an opening on each side which allows the flow of an uninterrupted stream of voice".

Examples:—लाल, याल।

Method of Development:—(i) "Teach by quick repetition., ला ला। (ii) ल may be started by placing edge of the tip of the tongue against the upper lip, "taking care that there be distinct apertures at the corners of the mouth. When this position is well taken, the pupil's tongue may be drawn back slowly until it reaches the root of the upper gum". Vibrations can be distinctly felt in the cheeks. ल is often made with tongue too narrow.

"From canine tooth to canine tooth is a safe rule for the width of application.

र

Tip of the tongue is raised and then turned up and very closely approximated to the upper gum so as to from a very narrow opening. The tip is then made to trill by a vocalised stream of breath directed through the opening. *Examples*:—रात, तार।

Method of Development:—Start with the practice of the trill of both the lips. Next place the inner formation of the tip or top of the tongue in-between the lips. The tip protudes forward beyond the lips. Try trill of the tip and lower lip in that position. Finally draw the tip inwards to the normal position and give trill from that place.

र । (untrilled)

Trilled र is some times very difficult for the deaf children and if not properly taught, it is very unnaturally and disgustingly articulated by them. In most cases र without trill gives much better results.

Formation:—Tip of the tongue is raised and turned up and very closely approximated to the upper gum so as to form a very narrow opening. The tip is made to vibrate or quiver by a stream of vocalised breath directed over it.

ड़ ।

The tip is drawn back and is curled up and its edge is approximated to the hard palate, just behind the spring of the palate to form an opening larger than that for untrilled. The tip is then made to quiver by a stream of vocalised breath directed over it. The duration of this vocalised stream of breath is very short. The tip then comes to the position of आ giving a very light flap against the spring of the palate.

Examples :—कड़ा । पापड़ ।

Method of Development:--(i) Imitation (ii) Analogy from untrilled र ।

क वर्ग

क ।

"Back of the tongue" shut against the soft palate then separated with an audible expulsion of breath.

Examples:—कान; शाक ।

See note on surds as quoted under प, त and ट ।

Method of Development:—By analogy from प, त and ट ।

Drill in one breath as, पाताटाका ।

ग

Back of the tongue shut as for क, voice given just before disjunction, other actions are the same as that for त द ड ।

See notes given under त and द ।

Examples:—गाल; जाग ।

Method of Development:—Contrast with क, analogy from द ड and ड ।

Drill as, बादाडागा, in one breath.

ख ।

Back of the tongue shut as for क, other actions same as that for फ, थ and ठ ।

It may also be briefly represented as खा=कू×हा

See notes as given under फ and थ ।

Examples:—खराब; सुख ।

Method of Development:—Contrast with क, analogy from फ, थ and ठ । Drill in the same breath as, फाथाठाखा ।

घ ।

Back of the tongue shut as for क, other action same as that for भ,ध, ढ । It may be briefly represented as घा=गू×हा See notes as given under भ and ध ।

Examples:—घास; बाघ ।

Method of Development:—Contrast with ग, analogy from भ, ध, ढ ।

Drill in the same breath as, भाधाढाघा ।

ङ ।

Back of the tongue shut as for क against the soft palate and held while voice passes through the nasal passages.

Method of Development:—analogy, from म, न and ण ।

स ।

Same as English non vocalised S.

Formation :—"Forepart of the tongue raised so as to leave only a small centre apertute between" the inner formation of the tip and the upper gum while the tip rests against the inner side of the lower incisors. "Through this aperture the breath passes out striking against the teeth very closely approximated but not touching".

Method of Development:—(i) Imitation. "Show the pupil the centre aperture over the tongue and attract his attention to the central stream of breath to be plainly felt through the nearly closed teeth." "Use a strip of paper to show the direction and force of the breath."

"Nearly close the teeth while giving" whispered इ ।

ष ।

Formation:—The action is the same as for स only the tip is drawn back a little and the tip does not rest against the inner side of the lower incisors.

Method of Development:—Analogy from स । Draw the pupil's attention to the fact that the action for स and ष is the same but in the case of ष the tongue is drawn back slightly and consequently the tip does not rest against the inner side of the lower incisors.

श ।

Formation:—"Forepart of the tongue is raised" the "tip is drawn further back than for ष and is blended with top" and a centre aperture is formed just behind the spring of the palate. "Through this aperture the breath passes out striking the edges of nearly closed teeth."

Method of Development:—(i) Analogy from स and ष (ii) Attract the pupil's attention to the altered position of the tongue."

च वर्ग ।

च ।

Formation:—The tip of the tongue rests against the inner surface of the lower incisors. Inner formation of the tip of the tongue shut

against the gum; a closed cavity is formed behind the line of contact with the sides of the tongue held against the insides of the upper teeth. The air within is pressed which forces open a narrow centre aperture at point of contact and a continuous stream of breath of a very short duration passes out. The quantity of this stream of breath is hissing.

It is clear that the formation consists of the following two parts:—

(i) The shut position.

(ii) Forcing out of a stream of breath though a centre aperture at the point of contact.

These two parts are very important.

Examples:—चांद; पांच।

Method of Development:—

(i) Touch.

(ii) It is also generally developed from स by shutting the centre aperture through which the stream of breath passes. Sometimes good results are obtained if the process is reversed i.e., first the shut position is drilled and then the flow of breath.

ज।

Formation:—"Position and action of the tongue is the same as for च of which ज is the vocalised form. Voice, which is given just before the centre aperture is formed, is shaped into a vocalised stream of breath that forces out through the centre aperture at the point of contact. It is a buzzing sound and is like English J. This continuous stream of breath should be drilled separately otherwise it is very difficult to have an idea of that sound. This latter part of ज is very important. It is this that gives the peculiar quality of ज।

Method of Development:—Contrast with च Teach initial ज as जा and final as आज, । In East Bengal ज is given without the shut position, and is like vocalised स। There is another ज given from further back that is from the position of श with closure or without closure.

छ ।

It is the aspirate form of च । It may also be represented as च+ह (non vocalised) synthetically. Final छ is the same as final च, and obeys the same laws of adjustment of final च ।

Method of Development:—Contrast with च and by analogy from फ़ा था ठा खा ।

To be taught with आ Pressure in the abdomen in between आ and आ ।

Examples:—छाता, छत, राछ ।

झ ।

It is the aspirate from of ज । Its aspirate portion is also vocalised. It may also be represented as ज़ । ×ह synthetically. Should be taught as झा झा ।

Method of Development:— Contrast with ज and by analogy from भ, ध, ढ, घ ।

ञ ।

It is the nasal sound given from the shut position of च । The voice passes entirely through the nostrils, but reverberates in the cavity formed behind the line of contact.

Method of Development:—By analogy from न । Imitation. The student very often mistake the sound with (English ng). This defect, when detected, should be checked at the very beginning. This sound has no independent existence and is only used with the elements of च वर्ग ।

Examples:—पञ्ज पञ्जाब

'क' वर्ग	क	ख़	ग	घ	ङ	are Velar Sounds
'च' वर्ग	च	छ	ज	झ	ञ	are Cerebral Sounds
'ट' वर्ग	ट	ठ	ड	ढ	ण	are Palatal Sounds
'त' वर्ग	त	थ	द	ध	न	are Dental Sounds
'प' वर्ग	प	फ	ब	भ	म	are Lebial Sounds
and	य	र	ल	व		
	श	ष	स	ह		
	क्ष	त्र	ज्ञ	are on the whole thirty six consonants		

Inventors of Aksharas, have actually classified the whole voice on the basis of pronunciation by using sense along with sound, and symbolized it by Aksharas. They named Aksharas by their natural pronunciation and they wrote them as they pronounced them. Pronunciation we learn only by training and practice, by applying mind to sound repeatedly. It is the mind which differentiates and regulates the proportion of mass and velocity of the breath by means of perpetual movement of the speech organs, the pattern of which is dictated by the central nervous system and thus it differentiates and regulates the pronunciation of different Aksharas which ultimately attains the ability of creating faculty of speech. It is only the pronunciation which has given man power of speech and consequently language otherwise birds and animals could also talk and a child needed never a mother to teach him his mother-tongue. Aksharas are pronounced sounds created by mind.

Hence pronunciation is the clue of the invention of truely imperishable phonetic alphabet. The proportion of mass and velocity of breath puffing through the mouth for pronouncing an Akshara is directly in proportion with the projection of energy, which is absolutely under the control of mind or sense. This projection of proportion of matter and motion of energy that produces sound, if in unison with the energy of universe, naturally creates a harmony between Mind and Matter. Thus a wonderful imperishable cycle of communication of energy between mind and matter is maintained through Aksharas in our language about which we are quite unaware uptill now. Thus how true Dr. Bahari is when he writes "Indian scholars have accepted the potential value of a single sound which they called infinite and absolute. Sound and Brahma are both "akshara"— (imperishable). The Rshis had general faith in the meaningfulness of individual sounds. The Rigveda says that the prayers reside in the eternal sound where in the meanings manifest themselves. They who do not know the significations of these sounds can gain nothing by the prayers. Patanjali the great grammarian, commentator and the writer of 'Mahabhasya' believes that the nucleus of speech is a sound. He remarks that all roots are originally monophonic (dhátavah ekvarnah arthavanto drsyanti. M. B.)". This upholds the idea that there is a national correspondence between sound and sense, and that words equire their form and meaning through a certain *pronounce* symbolism, this contradicts all other theories on this subject. *Akshras were invented for all times and for entire universe.*

An Acid Test for Speech Sounds

If an *Akshara* is "Primordial Energy" in sound as colour is in white light, it should give response to the equation—E=mc^2 and The Theory of Relativity likewise; and from here to onwards, it shall become an acid—test for elphabet of every language to stand as *Akshra* (Imperishable), as Devnagari Akshras do:—

Classification of Akshras on the basis of sound management.

Velar	क	ख	ग	घ	ङ
Cerebral	च	छ	ज	झ	ञ
Palatal	ट	ठ	ड	ढ	ण
Dental	त	थ	द	ध	न
Labial	प	फ	ब	भ	म
	य	र	ल	व	
	श	ष	स	ह	

Classification of Energy (E)

Main equation is $mc^2=E$

This (E) energy can be presented in following five forms :—

1. Suppose m is unity and c is also unity. Then the product mc^2 becomes unity and therefore E becomes unity.

$$i.e.\ mc^2=1\times1\times1=1=E$$

2. Suppose c is unity, then the product of mc^2 becomes only m, and therefore energy becomes equal to m

$$i.e.\ m\times c^2=m\times1\times1=M=E$$

3. Suppose m is unity, then the product of mc^2 becomes c^2 or C and therefore energy becomes equal to C

$$i.e.\ m\times c^2=1\times c^2=C=E$$

4. Energy as it remains in the main equation *i.e.* $mc^2=E$.

5. Suppose m is equal to infinity, c^2 is also equal to infinity. Then the product of mc^2 becomes infinity and therefore energy (E) also becomes equal to infinity.

$$i.e.\ m\times c^2=\infty=E$$
$$\infty\quad\infty$$

As Akshras are sound phonetic characters they give full response to this equation in their natural form.

E=1	E=M	E=C	$E=mc^2$	$E=\infty$
क	ख	ग	घ	ङ
च	छ	ज	झ	ञ
ट	ठ	ड	ढ	ण
त	थ	द	ध	न
प	फ	ब	भ	म
य	र	ल	व	
श	ष	स	ह	

Classification of Akshras on the basis of sense.

From the above mentioned classification of energy it is evident that Akshras can be divided into five groups *i.e*, 1. Unit-Energy-group. 2. Mass-Energy-group. 3. Velocity-Energy-group. 4. Universal Energy-group. 5. Infinity-Energy-group.

Let us discuss the sense signification of these five groups separately.

1. Unit-Group :—

Manifestation of one into various units of countless shapes is the principle of creation. The sense of Akshras in this group represents only unit energy. Therefore energy is feeble, initial, ordinary, in miniature, and etc. Because of, mass and velocity, are also evenly divided, combination of these two characters of energy produces also an effect of eveness, and prettiness, etc. Hence the akshras of this group carry a sense of these characterstics of energy.

2. Mass-Group :—

The sense of Akshras in the mass-group represents energy in the form of absolute quantum. Hence these akshras carry the sense of properties of matter as their characterstics, *i.e.* Solidity, hardness, certaintity, slowness, deformity and etc. The properties of "Prithvi" of Veseshik are included in this group.

3. Velocity-Group.

The sense of Akshras in the velocity-group represents, energy in the form of absolute extensity. Hence these akshras carry the

sense of properties of motion as their characterstics, *i.e.* Accelaration, extension, sensation, and etc. The properties of 'Tej' of Veseshik are included in this group.

4. Energy Group.

The sense of Akshras in the Energy-Group represents energy in full force and also proper proportion of mass and velocity in combination. These akshras carry the sense of universal, natural, happenings in general and etc.

The properties of Veseshik's Prithvi, Jal, Vayu, Tej, Akash, Kaal, Dik are all included in the above mentioned four groups, which can also be called "Bhotik", or Mortal.

5. Infinity-Group.

The sense of Akshras in infinity-group represents the refinest form of energy, so much so that senses fail to give response to this energy and only mind can realize it, and thus it deals with spiritual properties of energy like joy, sorrow and etc. This is the state which is described as where and when direction and time unite into one to become infinite and eternal. The properties of Veseshik's Mun and Atma are included in this group.

The contrast among the five Energy-Groups.

1. Unit-Group :—It is the feeblest group among the five groups. Besides there is equal combination of matter and motion only in this group. The combination of matter and motion brings it in close resemblance with 4th Energy-Group, but it is not strong and Universal as Energy-Group is, because of latter's fullness of energy. It is not exclusively one in nature, either as quantum or as extensity as mass and velocity groups are. Thus this group is devoid of strength and wholesomeness etc., either of matter or motion groups. It possesses the properties of manifestation of creation. Therefore, this group is in contrast with the 5th or infinity group, which belongs to the properties of elements of unwordly group. Hence, Akshras of this group carry a sense quite different than that of aksharas of other groups, although they possess much similarity among themselves.

2. Matter Group :—This is the only static group among the five groups. Besides it has resemblance with Velocity group in keeping absolute and independent nature while it is in full contrast

also with velocity group as matter is in contrast with motion. It has got no momentum as compaired to 4th Energy group. Therefore it has got less energy than 4th and 5th groups. But it is stronger and more effective than Unit-group. It belongs absolutely and completely to quantum and can be realized by entire sense of certainty, It possesses the properties of elements of Nature and hence altogether is in contrast with 5th or infinity group. Therefore in this group also Akshras carry quite different sense than that of Akshras of other four groups, although they possess much similarity among themselves.

3. Velocity-Group :—It is the lightest among the first four groups. It is absolutely mobile and possesses all properties of extensity. It is stronger than the first group but has less momentum than the 4th, Energy group. It is not as refined as infinity group is. Therefore, in this group also Akshras carry quite different sense than that of Akshras of other four groups, although they possess much similarity among themselves.

4. Energy Group :—Energy group possesses the highest momentum among the first four groups. Hence it possesses the full and universal energy. Thus it is the strongest and the most effective group. It is the seat of soul and therefore automatic in nature and alive. But it is not as refined as 5th or infinity group is. Therefore, Akshras of this group also possess class affinity.

5. Infinity group :—It is the refinest group among the five groups, so much so that its effect can only be realized by mind. Thus it can be said as possessing the properties of sense of Un-Wordly elements. Thus the sense of Aksharas of this group can be contrasted with all the other Akshras, while they possess class affinity.

Anumaana (Precognition)

The Aksharas are the product of the Vedas. The Veda meaning wisdom, is the accepted name for the highest spiritual truth which the human mind is capable of grasping. It is the work of the Rishis or Seers. "The truth of the Rishis are the products of spiritual intuition—Divya Drishti or divine vision. The Rishis were able to discover the eternal truths by rising their life-spirit to the plane of immortal spirit. Their utterances are based not on transitory vision but on a continuous experience of resident life and power. When the Veda is regarded as the highest authority, what is meant is, that

the more exacting of all authorities is the authority of fact. With a flexible and perfect language like Sanskrit in their hands, the thought of the great savants revealed the solutions of the sublest problems of philosophy or psychology. It is no exeggeration to say that there is no other nation in the world which has been able to keep its ancient litrature in tact as we Indians have been able to do. The very works of the Rishis or the great sages on every conceivable subject—philosophy, grammar, physical and chemical sciences, engineering, botany, medicine, sculpture, dancing, music, agriculture, physiology, yoga, stronomy and astrology, have come down to us in their entirety and we can see in them a clear picture of their achievement. According *Surya Siddhanta* Jyotisha, *i.e.* astronomy-cum-astrology is the foremost *anga* or limb of the Vedas, which is secret, supreme, pure and exalted science. The Vedas are supposed to be the repositories of all knowledge, and astrology has been called Vedha Chakshu or the eye or the vision of the Vedas. Thus a very important place has been given to astrology in Vedas. It must be noted that in Hindu Philosophical System in which astrology has its roots, the short span of life whose problems seem beyond our ability to solve, is but a small section of our destiny and the chief value of astrology lies in its use in determining the relationship which this life bears to the whole. The modern theory of evolution deals only with the past and fails to formulate any law for the future. It is essentially materialistic and has got nothing to say of the spirit which governs that matter and shares its future-course of destiny through the series of progressive expansions or unfolding. Man's existence here, says one of the disciples of the great Sage Kapila the first evolutionist in the world, is a more repetition and reproduction of his other previous existences. His present existence is but a link in the chain of eternal existences connecting the past with the future. In his each birth, he carries one step forward the inceptive purpose of his creation, to its goal and consummation, until he attains the one in which the past, present and future are blended together and time and space are annihilated.

To the Hindu sources of knowledge are three fold. There are really six of them, *pramanas*, as they are called. But the more important of them are (1) Saakshaatkara or pratyaksha, (2) Shabda or Sruti, meaning, revelation and (3) Anumaana. The first one is the intellectual source of knowledge. But according to Prof. C. T. K. Chari, M. A., Ph. D. :—

"Precognition or foreknowledge is so baffling a problem that one casts about for some hypothesis, however far-fetched or incredible, in confronting it. P, D. Ouspensky's queer hypothesis of a "circular time" and "recurrent events" naturally presents itself to us. In his *Tetrium Organum*, Ouspensky advances the hypothesis that our "time sense" is an "imperfectly developed space-sense". "The time-'sense' is itself, in susbtance, the *limit* or the *surface* of our 'space-sense'. Where the 'space-sense' ends, there the 'time-sense' begins". It is in his book *A New Model of the Universe* that Ouspensky advances the hypothesis which has inspired one of J. B. Priestley's "Time Plays". Ouspensky says that we ordinarily think of the duration of a human life as a straight line or rather as a segment of a line, the two limiting points representing birth and death. May it not be a *curve* ? A man may die in 1912 and find himself back in 1877. Precognition would then be merely memory. The pilgrim in time "remembers" the places he is going to visit ; he has been there *before*, like Dr. Gortler in Priestley's play.

"Is there any support for Ouspensky's notion of 'time-curvature' in modern mathematical astronomy ? Cosmological speculation about the time along relativistic lines is still in too unsettled a state. Einstein's early "cylindrical model" posited three spatial dimensions belonging to a curved hypersphere and a fourth co-ordinate which is explicit, isolated, free from all disturbance. De Sitter's model shared with Einstein's a curved space, but it introduced a curved "hyperbolic" time instead of Einstein's "rectilinear" time. In this strange universe, time, for each observer, appears to "stand still" at a "horizon" ; the "slowing down", however, is apparent ; everything goes "normally" for an observer actually situated in the concerned region. Eventually it was recognized that the models of Einstein and De Sitter could be only the "limits" of an evolving universe. In postulating a universe in which the density of matter was not zero, Einstein introduced an arbitrary, universal constant, the "cosmological constant" Eddington, Lemaitre and others demonstrated that the "constant" entailed a "repulsion" and, therefore, an "expansion" of the universe, proportionate to the distance from the point taken as the origin. Friedmann proved that a model whose spatial metric was a function of time could allow "expansion" even without the cosmological constant. Friedmann studied models in which the cosmological constant was zero, positive or negative, confining his attention, however, to spaces with a positive curvature. Heckmann

considered cases in which the space curvature was zero, positive or negative. The 'expanding models" are of two types according to the curvature of space. In one set (Type I), the radius increases continually from zero at some epoch tending to infinity after an infinite lapse of time. In the other set (Type II), the radius had a definite non-zero value when the "expansion" began. With a negative cosmological constant and *any* space curvature, we get "oscilating" models. With a constant of zero, we get either "oscillating" or "expanding" (Type I) models. With a positive "cosmological constant", we get either "expanding" (Type I and II) or "oscillating" models according to the space curvature. The accompanying table sets forth the possibilities.

"There remains a unorthodox models in which "time" is curved Kurt Godel showed in the *Reviews of Modern Physics* that Einstein's field equations of gravity can yield solutions with *closed*, "time-like" lines. In this weird model, we cannot assume that time *increases* always as we move in a "time-like" direction ; it is *possible* to "travel" into the "past" and "influence" it. Godel has cautioned us that the physical relevance of his model is far from demonstrated. Since the radius of the smallest "time-like" lines in it is of the same

Casmological constant	*Space curvature*		
	Negative	*Zero*	*Positive*
Negative ...	Oscillating	Oscillating	Oscillating
Zero ...	Expanding I	Expanding I	Oscillating
Positive ...	Expanding I	Expanding I	Expanding I Expanding II Oscillating

magnitude as the world-radius in Einstein's static model, it is far from clear whether Godel's hypothesis, even theoretically solves the problem of precognition in a terrestrial frame of reference. B. Abramenko, in the *British Journal for the Philosophy of Scierce*, has

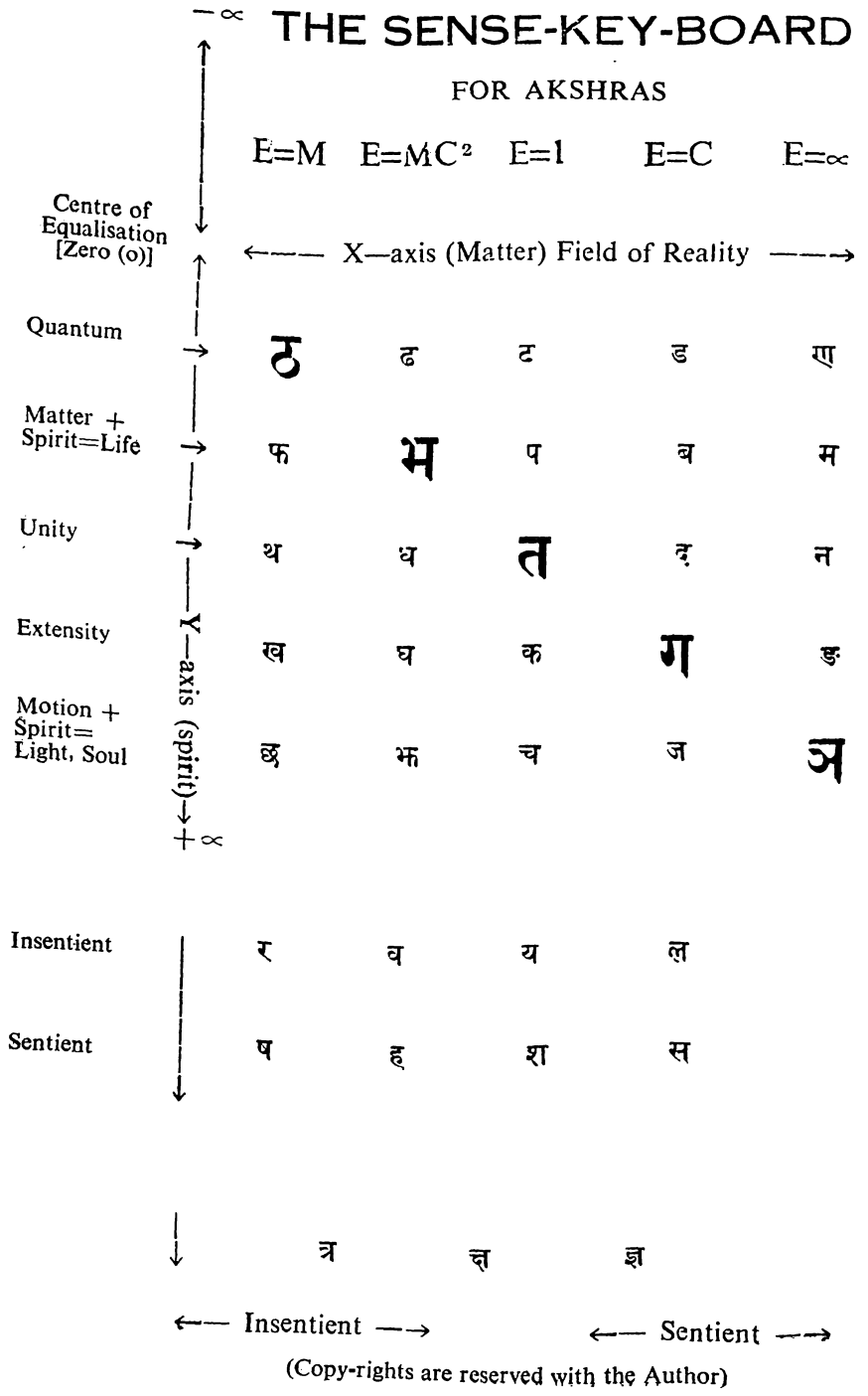
explored the possibility of an "elliptic time". But the effects of "time curvature", in this model, are "usually insignificant" and become noticeable only at "large distances and long intervals". Precognition does not seem to require these long distances to time-intervals. In the *Journal of Parapsychology*, recently, the Dutch astro-physicist J. M. J. Kooy has dwelt on the implications of a hypersphere on which *both* space and time are curved. I have commented on Kooy's hypothesis in the same Journal (*J. Parapsychology*. March 1958, Pp. 40-54). I am afraid that Kooy fails to make clear how the "curvature of time" solves the problem of foreknowledge. One wonders whether the whole hypothesis of "time-curvature" is not a complication unwarranted by cosmology. Milne's "Kinematic Relativity" recognizes two scales of time. On one, time ranges from minus infinity to plus infinity ; on the other it has a definite origin at a certain epoch. Motions of particles, on the second scale, are fundamentally irreversible ; time has an "arrow" right from the start. The question of "time curvature" does not arise. In the "new cosmologies" of Bondi, Lyttelton, and Gold, matter is supposed to be continuously created to compensate for the "thinning out" produced by "expansion". Local decreases in entropy can occur. The overwhelming impression, again, is of a *temporal* universe. Pascaal Jordon offers us a Kaluza-Klein 5-dimensional model with a *variable* gravitational constant. Non-static solutions of the field equations provide for the birth of matter in the shape of giant super-novae.

"Has quantum theory any bearing on hypothesis of "time-curvature" ? Schroedinger argued, on general grounds, that *space* must be closed and finite in order that the wave equations describing the quantum-mechanical behaviour of matter may permit a discrete spectrum. This leaves the question of time unsettled. Martin Gutzwiller, in *Helv. Phys. Acta* (29, 1956), has investigated the Klein-Gordon, Maxwell and Dirac equations, as well as their quantization, in a 4-dimensional space-time continuum of constant curvature with *space-like* geodesics of *finite* length and *time-like* geodesics of *infinite* length."

A Sense-Key-Board for Akshras.

Yoga is the harmonious blending of the two divine forces—Purusha (C) and Prakriti (M) or the Sivam and Sakti of the Cosmic Stream of life. The ultimate goal of man since the beginning of the creation has been to endeavour to find out ways and means by which the harmonization of these forces (positive and negative) could be achieved. Our Yogis and Rishis selected the inner centres in man to investigate this problem. It is the path of *Antharmukham* enquiry. The scientists took up the path of *Bahirmukham* enquiry in the field of Nature to investigate it. The one belongs to the realm of spirit and the other to the World of matter. Whereas the research into the nature of spirit is confined to the nervous centres hidden in the nervous system of man, the other embraces the infinite field of matter. The venue in one case is defined and limited, and in the other, it is undefined and unlimited. Hence the nature of the Spirit or Purusha was conveniently studied and mastered by the Rishis of the old. The scientific investigation could not be so easily studied or mastered owing to the vastness of its field and the enormous equipment necessary for carrying out the experiments. The sage hit at the Paramanu of the Infinite Spirit and the scientist at the inmost core of the nucleous in the atom within the immensity of matter. The research of the Spirit enabled the sages to assess the human values correctly for the proper conduct of man in the world of heterogeneous nations.

According to V. Venkataramana Rao, B. A., B. L., "Thomas Carlyle has given us a marvellous method of assessing the value of human life. Lest the force of his statement should be marred by abridgment, the quotation is given in full. "The fraction of life can be increased in value not so much by increasing your numerators as by lessening your denominator. Nay, unless my algebra deceives me. Unity itself divided by zero will give infinity. Make the claim of wages a zero, then, thou hast the World under the feet". Man could thus transcend all the temptations and limitations of the material world. Let the Divine monand in man be represented as the numerator and the material body (or world) as the denominator. In other words let the numerator be regarded as Spirit (S) and the denominator as Matter (M). The human life may be represented by



the fraction S/M. It is by decreasing the denominator M to zero that the value of the fraction S/M (human life) increases to infinity as the limit less Purusha or Spirit. The New Yoga may be said to transform the Prakriti—Matter to a subtler and subtler digree until it becomes the pure Divine Spirit itself. Hence the subtler the Prakriti in man, the subtler or diviner he is. It is Thus man can equate himself to Divinity or Brahman".

This mây be illustrated in the Key-Board by refrence to another mathematical convention. The subject of graphs deals with the X-axis and Y-axis. The convention is that the X-axis and the Y-axis are in the same plane intersecting at right angles at zero. All values above X-axis are negative and all values below it are positive values extending to plus infinity and the negative values to minus infinity. The positive values and the negative values meet on the X-axis either to the left or right of the point of intersection of the two axes. So long as the value of a concept is unlimited, its value cannot be fixed. The positive or negative values become real only when they can be determined in a field of Reality. This field of Reality is where the positive and the negative values become reduced to zeros. So that the field of Reality in this case is the X-axis, a line between plus and minus infinity. And each point on this X-axis where the positive and negative values meet is a centre of equalisation. The X-axis is therefore a field where opposing and divergent forces could be made to acquire real values. This field of Reality is the Earth on which we move and have our being. Kaka Bhujander has therefore rightly sung that, "existence have on this planet above is *moksha* or salvation. The concept of Reality is something which is concrete and fixed but not imaginary. So that all human souls whether now living or not must meet on this field of Reality (the Earth) and attain salvation. This is the goal of human evolution.

Horizontal Shades

Energy has quantum (परिमाण), **m, and extensity** (परिच्छिन्नत्व) **c. The nature of energy is to do work and to overcome resistence** (रजश्चलम उपष्टम्भकं).

Pertaining to the Sense Key Board, we find that there are five more horizontal groups on Y axis, similar to corresponding vertical groups on X—axis. The points of intersection of similar vertical and horizontal groups give rise to five centres, **viz. 1. ठ the centre of Equalisation at zero. 2. भ—The centre of sentient-nature 3. त—The centre of Manifestation (4) ग—The centre of extensity 5. अ. The centre of Infinity.**

The centre of Equalisation and origion of digit zero and the Akshra ठ.

The Akshra ठ in the Sense—Key—Board governs the situation at the crossing of horizontal as well as vertical Matter—group (E=M). ठ is the centre of quantum-energy alone, and therefore gives full sense of properties of matter and insentient nature. This may be well illustrated in Sanskrit and *tatsm* Hindi words as well as in the other Vernacular words which are beaten out or moulded into countless ever variable forms, and often in such a way as to entail the loss of one or other of the original radical letters; new forms being, as it were, beaten out of the primitive monosyllabic ore. Note the solidity & certainty of sense in the meanings of following words due to Akshra ठ—

कठिन—Difficult, कठोर — hard, ठोस solid ठठ — crowd, throng. अनुष्ठान – Diterminations निष्ठा—Firm faith, वैकुन्ठ Heaven, मिष्ठान, Sweets ठीक—Correct.

Note the Insentient Nature of ठ.

ठठरी—Skeleton ठूंठ—dead tree, ठाठ Wordly pump & splunder प्रतिष्ठा—Prestige (Material force).

Ugliness of disposition and of action—

हठ—Obstinacy रूष्ठ—Angry, कुण्ठा—Disability, ष्ठ—to spit. ठगना—to deceive.

Static-nature: हठ—Obstinacy, ठौर—Station, ठहरना—to be stationary ठप होना—to come to an end abruptly.

Unison of Mind Waves, and Drivation of Different Senses.

According to Dr. C. Kunhan Raja, M.A. Ph. D. :—

"In our own day, the atom has been split up, and we have electrons and other forms as the smallest material particle. Now, one has to ask the question whether, at least theoretically, an electron cannot be split up into smaller parts. Scientists say that an electron has a size, special extention, and they speak of the size of an electron in terms of the size of ordinary material objects. An electron can be indivisible if an electron by its very nature is proved to be so. But what has a size cannot, by that nature, be indivisible; it must be otherwise. Size means an inside and an outside, a right and a left, a front and a back, and a top and a bottom. When there is, thus, a middle between extensions, there must be the theoretical possibility of a further division into at least eight parts. Or scientists must say that at the stage of an electron, matter has been split up into parts that have lost their special extension.

"Or, the impossibility of further division must be due to the limitations of human ability to continue the process of division any further. But is human limitation the test for an objective nature ? What was not possible, the division of an atom, became a possibility; why should not a further division be possible at some later stage ? The limitation of man's ability to break up an atom was due to the fact that nothing by way of a tool was available that could penetrate through the infinitesimally small interval between an electron and an electron within an atom. But a particular ray was found capable of doing this. Why should not man's intellect devise means for sending a new dagger even through the theoretically possible, parts of the electrons ?

"According to indian rationalism, a further division of a material particle by man becomes impossible only when the parts cease to have special extension. That does not mean that such a part has no parts of its own of which it is a composite; it means simply that man's ability stops with the diappearance of special extension. When a material object is divided into parts, the division is into numerical fractions. But the special extension is reduced through a process of subtraction. When there is a reduction of anything into fractions,

there is no stage when we arrive at a zero ; when the reduction is through a process of subtraction, a stage of zero is inevitable. Thus, when the matter can have parts, its special extension can cease to exist. The parts of what has parts, must have parts of their own. Who can handle the parts of the minutest particle devoid of special extension to bring them together and from a new whole from those parts ; Even a parts at the stage when a further division deprives the parts of special extension is an effect of its own further parts; Who produced this smallest material particle with a special extension, out of its parts that do not have special extension themselves ? It cannot be man. Who moved the parts to one another so that the effect is produced, who holds them together ?

"We can plant a tree or a creeper, we can water them, manure them, protect them from weather and do various things to produce some ultimate effects. But can we produce a leaf ? How is the matter called a leaf produced and who produced it ? It is not merely an absorption of the particles of matter scattered in the air by the plant or the tree. There is a conversion of what was not matter with special extension into gross matter with special extension and with life. It may be said that this is a natural phenomenon ; in the course of material evolution there arose what is called bio-chemical matter, and under certain conditions of the radiation of ultraviolet rays from the Sun into the earth's surface, the bio-chemical matter acquired the new feature of life and became "cells". The condition disappeared as the ultra-violet rays cannot now reach the earth, being absorbed by the atmosphere filled with material particles. Many puzzling questions will arise if such a position is taken up. The only satisfactory answer for a true rationalist is that corresponding to man who can plant the tree and water it and manure it and protect it, **there must be some power that can combine parts that had no special extension into matter with special extension, and also a power that can infuse life phenomenon into matter.**

"The existence of such a universal power behind phenomena that are beyond the capacities of man is a natural deduction from the facts observed within the field that can be controlled by man; it is only a rationalistic extension of knowledge within observation into regions beyond observation, through reason. Here, in this process of extending a law from experience to regions beyond experience, there is a difficulty. All agencies with intellect within our experience

are embodied; is that universal agency also embodied; and if so, how was that body produced ? The agent behind the production of that body of the universal agent cannot be an embodied agent. Here the rationalistic thought of India has parted ways and the two parties have their own explanation.

"One answer is that within the sphere of the causal aggregate there are three kinds of facts, among which only certain facts, and not all, come really within the scope of the true causal aggregate ; the others are intimately related to the facts of the true causal aggregate in their own nature and not in their nature as causes. Even among what come within the real causal aggregate there are facts that form only certain conditioning factors which are not causes but through which alone the causes can operate to produce the effect. A body is found associated with all agents who handle material effects that have a special extension ; that does not mean that all agents must be embodied. There can be an agent that handles matter without special extension, who need not have a body to function as an agent. Thus the body is not an absolute necessity in all agents that produce an effect ; a body is a necessity only in an agent who handles and produces material effects that have a special extension. This is one position.

"Body is conditioning factor associated with all agents and "it is only an embodied intelligence that can function as an agent. So, agency in the matter of producing effects is to be restricted to embodied ones. It is not necessary that in so far as all effects are found produced by an agent as one among the causes, the whole world as a unit too must have an agent as a common factor. The changes in the world take place according to a universal law. There can be intelligences attached to all material objects. It is not necessary to postulate a universal agent ; an infinite number of intelligences will serve the situation that we have to explain. We must draw a distinction between an eternal law and an agent that operates according to that law. If there is a universal agent, there are various difficulties; the law itself must be a creation and the question of a "why" steps in.

"In both of the positions thus taken by the rationalists of India' there is no real creation and no real creator. Matter is not created ; matter is always there. What takes place in the phenomenon of evoluation in the world is that matter is put into various "forms",

and such "forms" are also eternal. That is our experience so far as tangible effects are concerned. No agent creates the material nor the form ; all agents put the matter into a form, both matter and form having been there. As between the two positions taken up relating to the question of an agent, the real difference is that one position draws a distinction between the infinite number of embodied agents and a single, unembodied, universal super-agent, while in the other position there is only one type of intelligent agents represented by man and there is nothing that is really different from and superior to man. The world according to both is dynamic; either it is a machine controlled by a single agent with a large number of sub-agents working in each part of the machine, or the world is a machine operated by a large number of agents according to a universal law ; no agent of that nature knows that law as a whole and there is no super-man, there is no omniscient. In both the positions, each part is related to the others in the world as a whole. There is scope of theology only in the position where a universal agent in the form of a super-intelligence is accepted. In the other position, there is only a study and understanding of a law. But astrology is common to both the positions.

"If the National Laboratories can start on a new process of investigation with the background of this kind of National Science, there are various other possibilities. I have already said that an object can be split up only with a thinner object. An axe can cut a wood, but for cutting a diamond we must have thinner, finer instruments. Material objects can be split up in various ways ; but an atom can be split up only through a "cutter" that can penetrate through the parts of an atom. If the parts of an atom, like electrons, are material particles with special extension, then they by their very nature, must be capable of being cut into parts. What is it that is finer than the parts of an electron which can pennetrate through such parts and split up the electrons ? Scientists say that there is no such cutter that they are able to think of. Can ancient Indian thought reveal such a "cutter" ?

"One may ask what purpose will be served by attempting an answer to such idle questions, since science is able to get on without the aid of a universal agent or of a universal law worked out by an infinite number of intelligences. Science deals with the material world, and such questions, have no place in science. I have no

difficulty about a suitable reply to such an objection ready at hand. Suppose Einstein could project his thoughts backwards through time and contact Newton and had suggested to the latter certain new methods of approach regarding the nature of time, space and matter; perhaps Newton would have advised Einstein to proceed along his own line of approach with a three dimensional space extending in straight lines, and make further progression in science instead of wasting his intellectual powers and his time over such idle positions. And if Einstein had surrendered, what would have been the position of science today ? Similarly, if Democritus could have reappeared in the world and asked Rutherford not to think of splitting up the atom, but to work out scientific problems within the range of his own theories about atoms, and if Rutherford had accepted the advise of the Greek philosopher, what would have been the position of science today ? **Life and intelligence and certain hidden powers in man are not to be ignored as unworthy of being introduced into the realm of science.**

"What is experienced as "sound" is, according to ancient Indian thought, a certain manifestation of a phenomenon in a finer medium that is subtler than anything thought of in the material world. Those waves are finer than the *gama* rays and may penetrate through forms of matter finer than the electrons of which electrons are the composits. Then there are gradations in this system of waves also, as there are gradations in the known waves of radiations. If scientists are hoping to get together the electrons and construct an atom, there are further possibilties of man being able to collect together the finer parts of sach electrons and construct electrons. An investigation into what is manifested as the phenomenon of sound may have very valuable consequences in science.

"Scientists have accepted certain mysteries about the sound-waves and their relations to biology. Then there is the phenomenon known as the mind. Scientists are completely ignoring this very important subject-matter. Mind has lost its reality at present in the eyes of the scientists and has been reduced to a "behaviour". Let it be only a behaviour and let there be no substance called the mind. But the question stares us in the face what this "behaviour" is. Is it anything different from what behaves or is it that itself ? A behaviour is the thing that behaves in a particular state or it is the effect of something outside on the thing which behaves in such a way. Either

there is the personality in a particular state or a behaviour which is called the mind, or there is a thing called the mind which produces a particular behaviour in the personality. Scientists must investigate into the nature of this "mind", and in this investigation, the background of ancient Indian thought will be great help.

'Mind may be taken as a sort of wave, which wave is much finer than the sound-wave, and as such it is capable of splitting up the atom or electron or even the parts of electron much more easily than the latter. Mind, being an aspect of the intellect itself, is capable of functioning by itself, whereas the sound-wave can function only through the agency of the intellect. Mind by itself, or through the instrumentality of the sound-waves, can not only split up the smallest particle of matter known in science, it can also collect such finer parts and compose an electron and such small particles of matter. It can also infuse life into matter and convert matter into living or organic matter. Mind has this capacity; but the capacity has to be developed and made operative.

"Intellect at this stage acquires certain new potentialities. Certain powers of combining parts of matter without a special extension into composite matter with special extension, or certain powers like infusing life into matter, were assigned to a super-intellect, according to some systems of thought in India; in other systems, such an intellect was not accepted, and they accepted only a universal law, of which only parts came within the sphere of the knowing process of the infinite intellects. When the individual and limited intellect develops certain powers through the operation of the sound-waves or through the operation of the mind itself, at that stage, the intellect acquires powers that were restricted to the super-intellect; in the view of there being no such super-intellect, the individual intellect widens its powers of understanding within the limits of the universal law, and sometimes can even expand the sphere to such an extent that for practical purposes they may be accepted as omniscient. In the normal state, the individual intellects can grasp only the behaviour consequent on the operation of the law, and not the nature of the law itself; but at the trained stage the individual intellects acquire the power of realising the true nature of the law itself, though limited in scope.

"Whether such statements regarding these advanced intellects in ancient Indian literature relate only to the postulations of theortical possibilities in science or were actual records of real achievements

among humanity, does not make much of a difference to us in the present context; even such a postulation is worth acceptance for investigation. Have modern scientists even dreamt of such immense possibilities for man? Whence other than from ancient Indian thoughts can science receive an inspiration for making an open effort to lift the position of man to such heights of knowledge and power ?

"There are various other problems that rise up for consideration when the sphere of science is expanded to such extents. Is there a beginning for the world process? If so, what is it and how is that point to be determined? Can there be a point on a scale without a prior to it? Is there a goal and a termination for the world process? If there is a termination, there must certainly have been a beginning. If there is not such a terminus there is no goal, and without a goal there is no progression; progression is an orderly movement towards a fixed end along a pre-determined method. If there is a beginning what was there prior to it, and if there is an end what will there be after it ? Is the movement from absolute uniformity to absolute differentiation or is it the opposite way ? Why should there be such a change and what is it that determined the preference for one over the other ? If there is no such reference, why should there be such a migration? Again, is the change from a static state to a state of movement or is it a change from movement towards a static state ? Is the universe by nature static or dynamic and is the change meant for attaining its real nature again ? Why was the world upset from its real nature, simply to be restored to that real nature ?

"Ancient Indian thought is not silent over such facts nor are the thinkers indifferent such problems. They did not also consider such questions idle or impertinent. Literature bearing on the problems is full of suggestions regarding the solution for such questions, though we may not have any finished commodity with labels on the packets and directions for use."

2. म—*The centre of Sentient Nature :—*

The akshra म reigns the sphere at the crossing of horizontal and vertical ($E=mc^2$) groups in the Sense-Key-Board. Here Energy contains both quantum and extensity, which is the cause of Universal expansion. It is the centre of combination of Soul with matter that gives rise to sentient nature and Time Dialation :—

भू—'To be' or 'To exist', भाव—'Being'. नासतो विद्यते भाव :—Something cannot be created out of nothing. भूमि—Earth प्रभात—Morning शोभा Natural Beauty, भुवन Universe भूत—Past—भविष्य—Future.

Expansion :—भाषा—Language, सभ्यता Civilization, भाल—forehead, भीम terrible, horrible भय fear and etc.

3. त —*The centre of Manifestation*— of one into many. According to Patanjali, This is the process of "*Prsarana*"—the manifestation of creating force into countless shapes of creation.

The akshra त belongs to the sense-zone which is situating at the crossing of horizontal and vertical Unity-groups (E=1). It, therefore, manifests the latent sense of this group with full force. It also carries the sense of balance and individuality, singularity and smallness within itself. i. e. तम—Similar तल level, तुला—Balance—तरण Crossing तंतु Fiber, तट Bank, shore and etc.

4. ग—*The centre of Extensity*. This governs the situation at the crossing of horizontal and verticle velocity (E=c) groups. It therefore manifests the latent sense of the group—the properties of motion in full force and thus carries a sense of absolute velocity and extensity without quantum i.e :—गति—speed, गत past or gone, गीता Narration वेग—velocity, गंगा, गोमती, गोदावरी, flow of water—river. मार्ग—way, path.

Movement in Animals :—गरुड, खग, गौ, मृग विहग गज, and etc.

5. ञ—*The centre of Infinity* :—This akshra governs the situation at the crossing of horizontal and vertical light group (E=∝). It is the lightest and the most refined akshra in the entire alphabet and therefore can be imagined only in terms of joy and beauty. Being an extremity it retains no individuality of its own, but its character alone can keep association with ज च झ and ञ akshras of noble sense, to gratify their latent senses, only.

Example :—**रञ्जन** : Delight, joy, colour. **रञ्च** : infinitely small **मञ्च** : dais, stage, a bed etc. **मञ्जु** : good, beautiful, pleasing. **मञ्झार** : In the middle. **किञ्जल्क** : Lotus, filament contained in the flower of a lotus etc,

PROPERTIES PERTAINING TO SENSE OF INDIVIDUAL AKSHRA

Properties of Sense of Akshras in perpendicular Mass-group from ठ to ह्र.

There are five ठ फ थ ख and ह्र Akshras in this group. All these Akshras possess latent sense of properties of quantum energy. But every one of them manifests it altogether in different shade, due to, divergent horizontal group effect.

Let us explore their properties of sense individually and separately.

(ठ)

Please see the properties of this akshar under "The Centre of Equalisation" on page 66.

(फ)

This Akshra governs the situation at the crossing of horizontal Alive-group ($E=mc^2$). This shows that in this space quantum is generative, and this akshra manifests this sense. The Askhra is projective one.

Examples :—फल = Fruit. फहरना = to flutter out in the air. फण—a Snake's hood. फटना=to split out, to explode, to be torn out. फैलना=spread out, to extend, फोड़ा : abscess etc.

(थ)

This Akshra governs the situation at the crossing of horizontal Unity—group ($E=1$). This gives the sense of properties of matter. Although it is quite similar to ठ yet the difference of sense between the two is that, the ठ is the centre of quantum alone, while it is the point at the surface of quantum, where it comes in contract with extensity also.

Examples:—थल=Land. स्थूल=Solid. स्थिर=Stationary. रथ = Chariot. थाह् = bottom. थकना = fatigue. थम्भ=Pillar. यथाथ=Precision, accuracy etc.

ख

This Akshra governs the situation at the crossing of horizontal Velocity-group (E=c). Here it is also a note-worthy point that even from script it is quite clear that this Akshra is the combination of र and व. The senses of these two Akshras, are yet to discuss where र stands for acceleration or rate of change of extensity while व stands for Universal-space. Although it also possesses properties similar to थ and ठ yet —'Kha' possesses Volume of negligeable density and therefore it is one of the lightest Akshra of this group.

Examples :—खगोल : Stronomy. खग : Bird. खाली , Empty. खिसकना : To slip away. खनिज : Mineral. खाड़ी : Valley. खिन्न : Sad. कोख : Womb.

छ

This Akshra governs the situation at the crossing of horizontal light group (E = ∝). This combination of light with quantum gives infinite volume of zero density. The quantum-energy bestows it with sense of enveloping and penetration, etc.

Example :—छाया = Shadow. विच्छेद = separation. छेदना = piercing. छण = moment. छल = deceit, fraud. छिछला = Shallow etc.

Properties of sense of Akshras in perpendicular Energy group ($E=mc^2$) from ड to झ.

There are five ड भ ध व झ Akshras are in this group. All these akshras possess latent sense of properties of momentum of quantum & extensity, but every one of them manifests it altogether in different shade, because of, divergent horizontal group effect. Let us find out their properties of sense individually and separately.

ढ

This Akshra reigns the sphere at the crossing of horizontal Matter group (E = M). This Akshra therefore possesses the resultant sense of energy full of quantum with little extensity. Hence this is the lethargiest Akshra among all. Being the nearest neighbour of ठ and भ, it gets effected by shades from both sides.

Example : ढलना=To decline, to be moulded into shape. ढर्रा tradition दृढ़=Strong. ढचर=Slow ढकना=to cover, a lid. ढीला=loose. ढीठ=Obsinate, impudent ढेला = lump of earth ढेर=heap etc.

भ

The properties of sense of this akshra has been discussed under "The centre of Sentient-Nature" on page 73.

(ध)

This Akshra reigns the sphere at the crossing of horizontal Unity group (E=1). This Akshra, therefore manifests latent sense of momantum with full extensity and unit quantum. Hence it is one of the most forceful akshra. धावा—invasion धारा-current, ध्वनि-sound, धाक; renown, credit.

Examples :—धंधा = Business, trade, profession. धक्का =Push Dash, stroke, clamity, damage धंसना=Penetration. धन = Wealth, धरा=earth. धूल=Dust. धूम्र=Smoke. धर्म= Duty, religion धूप=Sun Shine.

(घ)

This Akshra reigns the sphere at the crossing of velocity group (E=C). Because of fullness of quantum and tramendous Velocity, there is confused and rotatry extensity of quantum.

Examples :—घूमना : Rotation.

घना : Dense or compact घनघोर=very loud, very thick घनिष्ठ=intemate घमण्ड=Pride घिन=Aversion. घुन्ना one who conceals his emotions घोषणा=Announcement proclamation घेरा=Circumference घोल=Solution.

(झ)

This Akshra reigns the sphere at the crossing of light group. (E=∞). Because of infinite momentum of quantum and extensity, it carries the sense of illusion and confusion both.

Example :—झंझा = a hurricane, a gale accompanied with rain. झंकार = Ringing clinking झंझन = Rattling झंझट = botheration झख = wailing lamenting झट = instantly, quickly etc.

Properties of sense of Akshras in perpendicular Unity-group from ट *to* च.

There are five ट प त क च Akshras in this group. All these Akshras possess the latent sense of properties of Unity-group, but every one of them manifests it in accordance with the divergent shade of horizontal group.

Here we explore their properties of sense individually and separately.

(ट)

This Akshra belongs to the sense zone situated at the crossing of horizontal (E=M) group. It, therefore, carries a sense of reduction, pause, division, and portion etc.

Example :—टुकड़ा = Piece, टूटना = to break, झट = Instantly. atonce (portion of time) टट्टू = Pony, टका = Coin टहनी = Branch टाँका—Stitch टापू = Isle टीला = mound, hill टुच्चा = trivial.

(प)

This Akshra belongs to the sense zone situated at the crossing of horizontal ($E=mc^2$) group. A touch of soul gives it a sense of possesion and aliveness; and because of its initial and unit extensity it picks up acceleration immediately along with itself, and become प्र from प. Because of its alive nature it develops association with other Akshras without much difficulty.

पवित्र : poise, प्राप्ति : gain सम्पति = property तृप्ति = satisfaction.

Example :—पालन = to rear पार्श्व = Nearness पार्थक्य = separation, difference पाश = fetter, boundage पिष्ट = ground प्रारम्भ = beginning प्रभात = Morning प्राण = life.

(त)

The properties of sense of this akshra has been discussed under 'The centre of manifestation" on page 74.

(क)

This Akshra belongs to the sense zone situated at the crossing of horizontal velocity group (E=c). It, therefore, carries the sense of extensity a sense for variety, forms and shapes, prettiness and delicacy, smallness and infency, pause and portion.

Example :—कण=Particle कंकड़=a small piece of stone कुछ=some कज=defect कटाक्ष= a side look, ogling कत How much, where कम = little scanty, कल=Tomorrow, Yesterday काल = time कर्म = deed कार्य = Work, कुच = the female Breast कुटी = Cottage किरण = ray कान्ति = lusture कादम्बिनी=a row of clouds.

(च)

This Akshra belongs to the sense zone situated at the crossing of horizontal light group (E= ∝). It therefore, carries the sense of pause, twinkling, inconstancy, piece, part and portion, etc.

Example :—चंचल=agile, restless चट : quickly, चंपा चमेली : very small flowers चमक : lusture, glare, flash, चक्र : wheel चाल : Gait, movement, etc.

Properties of sense of akshras in perpendicular velocity group (E=c) from ड to ज

There are also five ड ढ द ग ज Akshras in this group. All these akshras possess latent sense of properties of extensity, but every one of them manifests itself altogether in different shade, because of divergent horizontal group effect.

Let us find out the properties of senses of these akshras separately,

ड

This akshra governs the situation at the crossing of horizontal matter-group (E=m). It therefore, carries the sense of extensity of quantum.

Example:- डोलना : to roam, to wander. डिगाना to move awayfrom a fixed position. डील डौल : Personality डिम्ब Egg. डुबकी a plunge. डालना to pour. डांवा डोल fickle unsteady.

ब

This akshra governs the situation at the crossing of horizontal alive group ($E=mc^2$). Because of their proportion here quantum and extensity are thick in one another, and therefore. are arrested in one another. Moreover owining to the effect of the momentum automatic force is generated which bestowes it with generating force.

Example :—ब्रह्मा : The God of creation. बंधन boundage, attachment. बंद Confined. बंधुत्व : relationship. बट a twist. बल force, बाधा Hindrance. बिन्दु drop, point. बीज seed. बहुल abundance.

द

This akshar governs the situation at the crossing of horizontal Unit-group. It represents the point of extremity of extensity, at the border of infinity. It, therefore gives a sense of sensation, light and virtue etc.

Example :—दिव to shine. द्रुत Swift, दिक Direction, दान Charity. दया Compassion. दंभ hypocrisy, etc.

ग

Properties of sense of this akshra, has been discussed under "The Centre of Extensity" on page 74.

ज

This akshra governs the situation at the crossing of horizontal light group ($E=\propto$) and also the place between the centre of Extensity ग and the centre of Infinity ञ by virtue of them it manifests a sense of light and spirit—Extreme extensity,

Example :—ज्योति—Light, जीवन life, जन्म birth, जीव soul, जय Victory, जागृति awakening, जोग enlightment, जगत Universe.

Properties of sense of akshras in perpendicular infinity-group :—

There are five akshras ण म न ङ ञ in this group. Like all other groups, akshras in this group also possess latent sense of their group—properties of Mind (मन) or infinity but every one of them manifests it altogather in different shades, because of, divergent horizontal group effect.

Akshras in infinity groups are vaparous in character and are in the state of extreme extensity they possess the sense of ideas of mental realizations only. They, therefore easily amalgamate with akshras of their horizontal groups to exaggerate their qualities respectively. The Sanskrit rule of spelling laid down that you could always choose between the *anuswara* and the last letter of the verga to which the letter needing the nasal ending belonged. Thus you could write रंक or रङ्क, पंच or पञ्च, ठंड or ठण्ड, संत or सन्त दंभ or दम्भ.

This rule also belongs to the Science of sense of akshras that due to the quantum in ण it can only be associated with quantum group alone while other groups of extensity and infinity cannot tolrate it.

ण

The akshra governs the situation at the crossing of horizontal matter group (E=m). It therefore signifies extremly refined qualities of quantum, moreover, it is the thickest akshra among the all infinity group-akshras. No doubt it can keep Association with akshras of horizontal and perpendicular matter-groups (E=m) alone comfortably and because of quantity of quantum it contains, it is capable to hold its separate standing too.

Example :—क्षण : Moment, कण particle, अणु Atom, रण War, प्राण : Life, त्राण Freedom, खण्ड Segment, section विष्णु : The God of creation, etc.

म

This akshra governs the situation at the crossing of horizontal sentient group ($E=mc^2$). It, therefore represents the seat of soul in quantum. Because of, quantity of quantum it keeps, it is saturated and can keep separate standing of its own.

Example :—आत्मा—Soul, मकरन्द—Nector of a flower मख—Sacrifice, मठ—a monastry, मरण—death, मर्मज्ञ Having a deep insight into a subject, मणि—a gem, मन : Mind.

(न)

This akshra governs a situation at the crossing of Unity group ($E=1$). It therefore, carries a dual characters of sense in it. Firstly because of Unity group it carries a sense of newness, lowness and variety etc. Secondly the direction of force due to latent infinite nature is away from the centre, as much as that it is a point situated at the border of negative infinity and consequently gives sense of negativeness, etc.

Example :—नि : A negative prefix निःकाम Unattached निःफल In vain, नूतन New, नाना प्रकार Varied, several, नन्हा Small, नारायण All Mighty God.

ङ

The akshra governs the situation at the crossing of horizontal velocity group ($E=c$). Therefore this akshra carries a sense of tremendous extensity.

Example :—गरूड़ God of Motion, उड़ना to fly, गड़गड़ाहट Thunder, रङ्क Penniless, शंङ्ख A Conch-shell. लङ्का An Isle, शंङ्का Tdoubt, तुङ्ग High.

(ञ)

The properties of sense of this akshra has been discussed under "The Centre of Infinity." (on page 74)

Focused Shades of Sense.

Bhrigu in his article "Hindu Methematics" writes, "Aryabhatta was the first to insert a definitely mathematical section (ganita). He deals in it with evolution and involution, area and volumes, progression, algebraic identities, and indeterminate equations of the first degree (ax+by=c). It defines that the product of three equal numbers is a cube and it also has twelve edges. His notation is expressed in consonants, viz., क to म for 1 to 25, य to ह for 30 to 100, vowels denoting multiplication by powers of 100, A being 100 and B 1000."

From above statement it is also quite evident that different shades of sense behind the twenty-five Consonants, that we have discussed at length, are focused into another set of only eight group representative Akshras. These eight Akshras possess a focused character of their respective groups which they represent in terms of proportion of quantum and extensity. If we refer to the Sense-Key-Board, there is a note-worthy point that there could not be such portresses of fith perpendicular Infinity group because of Infinity-group knows neither quantum nor extensity, but is an absolute and free from all boundages of Space and Time.

These group-portresses are in two sets and are intensely energetic in character.

The first set of Akshras is र व य ल which belongs to the horizontal Insentient group in the Sense-Key-Board, while second set of Akshras is ष ह श स, which belongs to the horizontal Sentient group.

The resultant characterstics of sense possessed by these Akshras are as follows—

(र)

The focused shade possessed by this Akshra at the crossing of perpendicular (E=m) group and the the horizontal Insentient group, bestows it with a sense of rate of change of extensity in quantum and that of acceleration in motion. Inspite of this, it is not deprived of its latent quality of quantum.

Example :—रथ Chariot, थर थर Trembling, शर Arrow, रय Swiftness, acceleration, रल Intermixed रव Cry नरक Hell रंक beggar, रस Essence रार Fray राहू Typhon.

Words carrying a sense of contineous process generally ends in र

Example :—प्रसार Extensity विचार Thought प्रचार Propoganda व्यवहार Behaviour क्षार Decline धार Current.

When र joins an Akshra, as in प्र, it causes expansion of the properties of the Akshra whom it joins, as heat melts a metal.

Example :—प्रभात Morning, भ्रम Confusion विग्रह Separation श्रम labour त्राण Relief & Liberty क्षेत्र Area.

Moreover, when र joins as in र्व, it also sublimes properties of its Akshra, पूर्व, East, Before: अर्थ Meaning, Wealth, Substance: कर्म Deeds हर्ष Delight.

(ष)

This Akshra gives intensified qualities of र alone. One can easily note its affinity towards र and ठ, quantum and Insentient nature.

Example :—उत्कर्ष : Development, आकर्षण: Attraction, घर्ष : Friction, हर्ष: Delight, destruction of destructive force is delight. संघर्ष : Struggle, श्रेष्ठ: The best, रूष्ठ: Angry.

(व)

The Akshra governs a sense zone situated at the cross roads of perpendicular Universal Energy-group and Insentient horizontal group. The focused energy of this Akshra manifests a Universal Space—Time Sense. "Space" and "Time" mentioned separately have no difinite meaning ; moreover, to every event, both the time and the space should be assigned in order to difine specifically that event.

Example :—विश्व Universe, विनाश Complete destruction, वितान : Tent, वय : Age, Duration.

विष Poision (Note : Insentient Nature) विवि Two Seconds (Note the smallest space between the two) विविधता Variety, व: Prefex, which intensifies the sense of the meaning of words. विलय The annihilation of the world. विकास Progress, विशाल Large Gigantic वरूण God of Ocean वश Power, Authority, Control वाणि Voice, व्यवहार Behaviour विस्तार Expansion.

(ह्)

This Akshra gives the sense of extensity of Insentient Nature which intensifies qualities of व only.

Example :—हनन Destruction, murder, हत्या murder हीन Low, inferior हवि : Oblation to God हठ persistency. हर=Revolting, Killing. हरि=The Destroyer of destructive force : God.

(य)

The Akshra reings the situation at the cross roads of Perpendicular Unit-group and horizontal Insentient-Group. Hence य manifests the focused qualities of Unit-Group, i. e. duality, limitation of space and time, distribution of one into many, and varied creation.

योग Addition, Combination, Unity, सहयोग Co-operation वय Age, duration, यमज : Twin, युग a pair, a Couple, era of Time योग्य Befiting योजक One who combines योजना Plan, Abstract nouns generally ends in य, One can easily note its close affinity with त "The Centre of Unity." त्य manifests a refine shade of this group: सत्य Truth त्याग To leave, sacrifice तथ्य: Fact, शून्य Zero Vacuum, etc.

(श्)

This Akshra gives extensified qualities of the properties of sense of (य).

शक्ति Power शेष Residue (Note श for part and ष for whole) शैशव Childhood शान्ति Peace यश Fame Reputation

(ल)

Pertaining to the Sense-Key-Board, it is evident that ल possesses a shade of focussed extensity (E=C) group and Insentient nature. Consequently the resultant sense of this Akshra is the extensity of Universe. According to the Yajurveda XL, 1. the universe is not static—it is expanding and contracting and is continuously in motion.

Example :—लम्ब : Perpendicular, लम्बा Long, लाठ Piller, लाठी Long Stick, लीक a line, लीला Display, लिङ्ग Male Sex, लो Flame, लोभ greed, ललक ambition, लाभ Profit लज्जा Shame, लट tangled hair, lock.

(स)

One can easily note that this Akshra belongs to the corner of extensity of sentient nature. It is very easy to find out the poise and Virtuous nature of स in Sanskrit Words. It always carries a tinge of Soul alongwith.

Example :—सत्य : Truth, संस्कृति Culture, सभ्यता Civilization सर्वदा Eternal साधना Accomplishment, Devotion, सामर्थ्य Ability, influence and Strength.

As its very name tells Sanskrit is a highly purificd refined and cultured language. All its words are coined out of shades of sense which is due to proportion of quantum and extensity, Insentient and Sentient nature of energy. The spectrum of only eight shades is etxended into twentyfive consonents, Being the most energetic, these eight shades are the most important Akshras among the whole lot. Moreover these eight shades are also drawn into three fundamental shades ; viz, त्र, क्ष, ह्र, त्र is a shade of an Insentient energy, ह्र is that of a sentient energy, while क्ष is of varied creation.

Example :—क्षेत्र Area, field, ज्ञान Wisdom विज्ञान Science क्षय Decline रात्रि Night छत्र Umbrella.

Vedanta begins with "सः रोक्ष" which means that He, the almighty God, desired and became two, a male and a female. Note the sense in क्ष.

Akshras : A Spectrum of Cosmic Energy.

Cosmic rays are recent discovery. They are known as electro-magnetic waves, differing from other kinds of rays, e.g., radium rays, X-rays or visible light rays in size or wave length. It is common knowledge with the scientists that smaller the size or wavelength of the waves, the more peneterating and more far-reaching are they. An ordinary brown paper may stop the light waves, but X-rays by virtue of their smaller wavelength can pass through several inches of human or animal flesh which enables the physician to take photos of the bones, of internal organs, and of foreign bodies in the system. Radium rays are twenty times shorter in wavelength than the X-rays and they can, therefore, penetrate about three times as far into solid-Substances; they can do so through six inches of lead. The cosmic rays are in all likelihood hundred times shorter in wavelength than the most powerful radium rays and therefore it is no wonder then that they can pass through fifteen feet of solid block of lead. Scientists are of opinion, that cosmic rays come from the outer cosmos, i.e., the less explored regions of this stupendous universe. For the study of these rays special apparatus have been devised. Our world, and therefore, we and our minds, are under heavy and continual bombardment not only from the sun, planents, constellations of starts but also from the outer cosmos. Penetration of human soul by cosmic rays is almost certain when fifteen feet thick layer of so solid a metal as lead behaves as well as thick layers of glass towards the light rays. Are not the vagaries and the abnormal and subnormal sensibilities of human minds due to these rays ?

It is interesting to note that according to vedanta Philosophy, all matter—solid, liquid and gaseous—has evolved out of Akasha and at the end of this cycle of evolution it will meet into the Akash again. The Vedas say that at the end of a cycle of evolution, all manifested energy becomes finer in the shape of words and than thought. Then in the next cycle, first the thought changes into words and out of these words, the whole Universe is produced.

According to Gita the creative, protective and destructive agencies are embedded in the mystic syallable "OM" (ॐ).

भूमिरपोऽनलो वायुः खं मनो बुद्धिरेव च ।
अहंकार इतीयं मे, भिन्ना प्रकृतिरष्टधा ॥
अपरेयमितस्त्वन्यां, प्रकृतिं विद्धिमेपराम् ।
जीव भूतां महाबाहो, ययेंद धार्यते जगत् ।
मयि सर्वमिदं प्रोतं, सूत्रे मणि गणा इव ॥

गीता ७/४,५,७.

(Earth, water, fire, air, ether, mind reason and also egoism these are the eight fold divisions of lower (insentient) nature, the other than this, by which the whole universe is sustained, is higher (sentient) nature in the form of the Jiva. Just as several beads are strung on a string, so is all this Universe strung on that supreme being.)

It is in his book "Science in the Vedas" that Dr. Dharma Deva Mehta advances—A study in Origional Sources, on the basis of *Mantras* from Vedas. There he explaines, "Einstein believed in a spherical universe which is static and provides neither for expansion nor for contration. The vedic view is different. According to the *Yajurveda* XL, 1. the universe is not static—it is expanding and contracting and is continuously in motion.

ईशावास्यमिदं सर्वं यत्किञ्च जगत्यां जगत् ॥

A spectrum analysis of the sense of the word जगत also confirms the vedic views. ज denotes light and life, ग denotes "Centre of Extensity" while त denotes ' the Centre of Manifestation".

According to the laws of Manu, "the ether engenders light, the atmosphere ; the atmosphere transforming itself engenders light; the atmosphere and light giving rise to heat produce water, and water is the mother of all creature."

Thus this also justifies the composition of the word जल for water.

The process of Sense Analysis is as scientific as the process of chemical analysis is. For Example, hydrozen and oxygen combine to form water ; they combine also to form hydrogen peroxide. The smallest part of a compound that retains its own properties is called "molecule". A molecule can be broken, but then it splits up and exhibits quite different properties. A molecule

of water when chemically split up gives rise to new substances oxygen and hydrogen.

According to Dharm Dev Mehta "Before studying the process of manifestation of the universe as given in the *Rigveda* let it be clearly understood that the process is so vast, complex and incomprehensible that it can neither be borne by any personal evidence nor can it ever be known, completely, to the highest sage or scientist. Two vedic mantras are worth of attention in this connection, Rigveda X, 129, 6 emphatically states, "Who verily knows and who can here declare it, whence it was born and whence came this varied creation ? The learned sages were born after the world's production. Who knows then, whence it first came into being ? (Griffith's translation).

cf. को अद्धा वेद क इह प्रवोचत्
कुत आजाता कुत इयं विसृष्टि : ।
अर्वाग्देवा अस्य विसर्जनेन
आथा को वेद यत आ बभूव ॥

(Rigveda X, 129, 6)

The second mantra viz Rigveda X, 129, 7, states that the entire mystery of creation is known only to God, or perchance, He also knowns not (according to Macdoneil and other western scholars).

The matra runs thus :

इयं विसृष्टिर्यतः आबभूव
यदि वा दधे यदि वा न ।
योऽस्याध्यक्षः परमे व्योमन्त्
सो अङ्ग वेद यदि वा न वेद ॥

He the first origion of this creation upholds it. He is the supervisor of even the highest heaven, He verily knows it and who knows it, if He also does not know. (or according to Griffith's translation 'He verily knows it or perhaps He knows not').

The Nasadiya Sukta of the Rigveda.

How did this universe come into being ? In the vedas there is no where a more comprehensive survey about this question, than in

the Nasadiya sukta in the Rigveda tenth mandal and 129 hymn; propounding the process of manifestation and expansion, the famous Nasadiya hymn which is "Subline and unique in its lofty idealism and the most convincing in its advanced logical theory."

It holds that there was the primordial chaos in the beginning, there was neither the **Asat (the Manifested cosmos) nor the Sat (first stage of matter evolved out of the primordial matter for creation of the universe)** nor were there the nebulae nor the sky beyond them.

नासदासीन्नो सदासीत्तदानीं
नासीद्रजी नो व्योमा परोयत् ।

And what did then exist ? The vedic sage answers ; 'There was something which covered all, like a haze involved in a huze and unbounded collapse. There was no death, nor inmortal life there was no night nor day; God alone himself breathed, although no wind existed, by His own inherent Might ;

किमावरीवः कुहकस्य शर्मन्
अम्भः किमासीद्गहनं गभीरम् ॥
न मृत्युरासीदमृतं न तर्हि
न रात्र्या अह्न आसीत् प्रकेतः ॥
आनीदवातं स्वधया तदेकं
तस्माद्धान्यन्न परः किं चनास ॥

There was darkness in the beginning, all this was concealed in darkness, and there was undiscriminated chaos.

तम आसीत्तमसा गूढमग्रे
अप्रंकेतं सलिलं सर्वमा इदम् ।
तुच्छ्येनाभ्वपिहितं यदासीत्
तपसस्तन्महिनायातैकम् ॥

In this connection we cannot forget the "Hypothesis of unlimited complexity" which the swedish astronomer V. Charlier brought out as a result of his observation on galaxies. Charlier suggested, "that just as the multitude of stars surrounding our sun, belongs to a single cloud known as our galaxy, galaxies themselves, form a much larger cloud, only a small part of which falls within the range of our telescopes. This implies that if we go farther and farther into space,

we would finally encounter a space beyond galaxies. However, this super giant galaxy of galaxies is not the only one in the universe, and much farther in space, other similar systems can be found. In their turn, these galaxies of galaxies cluster in still larger units *ad infinitem*. In triguing as it is, this picture of an ever increasing aggregation of matter is unfortunately outside the possibility of observational study."

How Modern Science Looks at this Process of Existence :—

Concluding his masterly thesis, on the creation of the universe Prof. George Gamow observes, "In the dim pre-galactic past, we perceive a glimpse of a meta physical "St. Augustine's Era" (Since it was St. Augustine of Hippo who referring to the pre-squeeze era, first raised the question as to "What God was doing before He made heaven and earth"), when the universe, whatever it was made of, was involved in a gigantic collapse. Of course we have no information about that era, which could have last from the minus infinity of time to about three billion years ago, since all archaelogical records pertaining to that distant past must have been completely obliterated, when the cosmic masses were squeezed into a pulp. The masses of the universe must have emerged from the Big Squeeze in a completely broken-up state forming the primordial ylem of neutrons, protons and electrons. As the ylem cooled rapidly through expansion, these elementory particles began to stick to one another, forming aggregates of different complexities which were the prototypes of the atomic nuclei of to-day."

(The creation of the Universe, P. 137)

The earlist ' Cosmic Mass" in the vedic terminology is known as अप्रकेतं सलिलम् (Rigveda X, 129, 3) which is almost the same as "*Primeval atom*"—a highly compressed, extremely rarefied and completely homogeneous state, whence the universe started its evolutionary process, in the words of the Belgian astronomer, George lemaitre, Modern physicists are inclined to introduce a better term as "primeval nucleus".

It may be appreciated that the word सलिलम् is not "water" as is popularly understood, and translated, but has a technical meaning, in the vedic terminology, a close resemblance to the 'primeval nuclues' of modern science, in which the ordinary matter did

not count and the primary role was played by "intensely hot radiations".

This is also a crystal clear explanation of a sense behind akshar ल. Excluding स which gives a sense of element of soul in the word सलिल, ल remains as a symbol of extensity of universe. We can further study its shades with other consonents.

Example :—थल Land, जल Water, चल To Move, to walk, फल Fruit, काल Time, ढ़लना To decline, गलना to desolve, लहर Wave, Radiation and etc.

Dr. Dharma Dev Mehta explains the vedic conception of construction of this universe which proceeded with a order called Satya (सत्य) and a law called the Rita (ऋत), The universal law and order ruled supreme. As the vedic verse proclaims :—

ऋतं च सत्यं चा भीद्धात् तपसोऽध्यजायत
ततो रात्र्य जायत ततः समुद्रोऽर्णवः

Born out of the effulgent cosmic sacrifice was the Eternal Law and the Order—then was all dark, then came forth the arnava—ocean, all-enveloping.

The mantra goes on to say :—

समुद्रादर्णवादीध—संवत्सरो अजायत
अहो रात्राणि विदधद्विश्वस्य मिषतोवशी ॥
सूर्याचन्द्रमसौ धाता यथा पूर्वमकल्पयत्
दिवं च पृथिवीं चाऽन्तरिक्षमथो स्वः ॥

From that same billowy flood of Sea, the Samvatsara was produced, ordaining the days and nights, Lord over all, then formed in due order as in the previous Kalpa, the Sun and Moon. He formed also the Diva and the Earth as well as interstellar regions and the region beyond diva i. e. sawaha.

In the light of the above axplaination, the Words संवत्सरो, सत (First stage of matter evolved out of the primordial matter for creation of the universe) and स्वः The region of Soul, it is evident that स radiats the rays of Sense of Soul or Sentient Nature.

म *is the centre of primordial matter and* न *is a point at the outer serface of manifested cosmos* (असत्) the sphere between the two is माया (illusion). The force of expansion is मन

मनु—According to Dr. Dharma Dev Mehta, "It will be interesting to study the mode, based on astronomical evidences, adopted by the Hindu sages, to arrive at the age of the universe, which is remarkably close to the age independently arrived at by modern science. According to this calculation, our creation (more accurately Expansion/Contraction process) consists of 14 Manus, One Manu is 71 Chaturyuga, which means 43,20,000 years. At the present stage of expansion, we are in the seventh Manu, called the Vaivasvata वैवस्वत मनुः

(आपः)

As it is explained in the Book—"Science in the Vedas", The Aditya—the indestructible source of energy, as the Scientist Prof. Karl Kiepenheauer observes, "It is a glowing ball of gas of diameter 8,64,000 miles. It is held together by gravitational forces and its diameter is unlikely to have changed a great deal in billions of years. In all prohability, the sun will retain its shape for billions of years to come." (The sun-p. 78)

Such is the Sun, the Aditya, the सहस्ररश्मिः, which we are going to investigate through the ancient vedic texts, together with Sun's composition, with its hydrogen, coming close to, but not completely synonymous with the Apah (आपः) of ancient vedic sciences.

The astronomer's sun differs greatly from the lay man's, for where the latter sees a brilliant disc spreading light, warmth and well being, the astronomer sees a star, or a hydrogen sphere, with a surface temprature of approximately 10800 °F. This sphere does not rotate as a solid body, and its surface is studded with spots, faculae and prominences".

The matter composing the Sun :

The sun contains as its substances the आपः वायुः, and अग्निः etc.

What is आपः in the terminology of modern science ? It is closely akin to hydrogen, although the अपः virtually is hydrogen plus something more. Of all the elements that compose the sun, the hydrogen element is of the maximum percentage and it is the

transmutation of hydrogen into helium that supplies energy to the Sun. There is another substance called *Corona* which, according to mathematical calculation accounts for only 10^{-15} of the sun's total mass. This corona is believed to be composed of interplanetary matter, that is to say, dust and meteors. *There is a constant gravitational pull of matter into the corona.*

Talking about the hydrogen contents of the sun, Prof. Mc. Crea observes.

"One set of estimates puts the hydrogen content at about 80 percent, by numbers of atoms, the helium at about 20 percent and the heavier elements at about one percent. Another puts the hydrogen at nearly 100 percent, the helium at about one per cent and the heavier elements at something very much less than one per cent."

(Physics of the Sun and Stars, p. 105)

The following references from the vedas will show that the sun contains आपः

(i) Yajurveda XIII, 30, clearly refers to this

अपो गम्भन्नसीद मा त्वा सूर्योऽभिताप्सीत्

Commenting on this mantra, the Shatapath Brahmana says

एतद् ह अपां गम्भिष्ठं एतत् तपति (VII, 5, 1, 8)

certainly, the sun is the deepest seat for heavenly apah.

(ii) The Jaimini Brahmana II, 62 holds the same view in अथ यद् एतन्मण्डलं ता आपः and the same Brahmana further clarifies in II, 145 as under :—

ये ह वा एत आदित्यस्य रश्मय एतानि ह वा एतस्य शृङ्गानि ।
मध्य उ ह वा एष एतद् अपाम् । तासु वारवन्तीयम् ॥

(iii) The entire core of the sun is filled with आपः and this gives vitality to the sun. It is on account of this आपः that the sun can rise in the morning and set in the evening. It is its vital strength for heat and light. As Aitareya Brahmana confirms it in IV, 20—

एष (आदित्यः) वा अब्जा अद्भ्यो वा एष
प्रातरूदेति अपः सायं प्रविशति ॥

Sun is virtualy Apah and Apah is sun. There is no distinction between the two, such is the outstanding importance of this substance in the sun, says Shatapatha Brahmana in X, 6, 5, 2—

आपो वाऽर्कः

No Solid Substance in the Sun.

Modern science believe that "the sun is a wholly gaseous state.

Abetti observes in this connection, "The earth's density is some four times as great as the Sun's. Since the density of the earth is 5.5 times that of water, that of the sun (taking the density of water as unity) is 1.4. Already we are beginning to glempse the fact that the Sun cannot be in a solid state, for its constituent material are on the average much less dense, than those solid materials of which the earth is composed".

Prof. Rarl Kiepenheuer also holds thus :

"The Sun is one among a host of stars, that is, it is a gaseous body with a diameter of 8,64,000 miles and a mass of 2.10^{33} grams."

What cause can be attributed to the gaseous state of the Sun ? A question arises, why, inspite of the fact that the average density of the sun is 1.4 grams per cubic centimeter and despite the fact that matter on the sun has almost one and one half times the weight of water, (according to scientific calculation) is the sun taken as gaseous ?

The answer is traced only in the very high surface temprature of the sun, which is almost as high as 11000 °F. This is unimaginable, in asmuch as the temperature of the red hot iron is 1100°F and that of the white-hot filament of an electric bulb almost 3600°F. and at so high a surface temprature as 11000°F. One can imagine. even carbon, which offers the greatest resistance to heat, would melt.

The sense-analysis of आपः also gives full response to the above explaination प which is the crossing point of vertical unit-group at horizontal Universal Energy Group, denotes the properties of a sense of neutron and the constant gravitational pull of matter into the Corona. While ग्ने in अग्नेय denotes the motion and direction of electrons away from the centre. Meanwhile वायु denotes transmution

of hydrogen into helium that supplies energy to the Sun and responsible of its gaseous state.

To day a great difficulty is realized by Indian scientists in writing science—equations in Hindi. It, however, sounds strange, but is also perfectly true that whatever we write in Sanskrit is nothing but equations of science and philosophy with mathematical accuracy. The discovery of the sense of Akshras reveals that Sanskrit words are perfect illustrations of conception of science and Philosophy of ancient India. "Sanskrit Dhatus" are shades of sense of the cosmic process of evolution of universe.

In the fifteen lighted aspects of the moon, the vedic science declares, the moon draws cosmic energy and electricity from the solar system governing this earth and condenses them. In the fifteen dark aspects of the moon, it releases that energy to the earth in a form and in a manner suitable for use and consumption by the earth. That is the cause and purpose of the lighted and dark aspects of the moon.

Then the Vedic science proceeds to analyse the terrestial consequences of this acquisition and release of solar energy through the medium of the moon. The first result is stated in the observed fact that, during the lighter fifteen aspects of the moon, there is contracting or lessening of the waters of the seas and the oceans, while there is expansion of them during the darker fifteen aspects of the moon, akin to expanding and contracting universe. The result is that the seas and the oceans are never dried up completely. The conclusion drawn is that the ultimate function of the moon in relation to the earth is to turn the solar energy into liquid or water. The proposition put in that form may sound naive, but when it is taken as indicative of the theory that hydrogen and carbon are the active principles of energy, then it at once wears a most advanced scientific look. According to Indian scriptual writings, on of the elements is आपः which in the absence of any better terminology in English, is incorrectly translated as 'water principle'. It is said that this आपः is the panic energy immanent in and activating the universe, including this earth. So आपः is associated with energy and electricity, which may be compendiously called by the vedic term of 'Vaisvanara Agni'. The first conclusion drawn by the vedic science is therefore

that the moon acts as the great medium of this solar system to condense and release the vital solar energy, the activating essential principle, in the usable form of liquid or water (understood in the above sense) for the earth. Apart from the effects of the moon on seas and oceans, its effects on the human, animal, and vegetable bodies are the subject of close study and analysis by the vedas.

This water or आप: as the substance or food of life is either saline or fresh. Here the vedic science asserts that, when the moon releases the condensed solar energy during the darker aspects, it imparts salinity to the water, because, according to it, the taste of electricity or energy or fire is saline. That is why it asserts that the sea water is saline. No doubt, modern science says that the sea-water is saline due to the presence of many salts and minerals therein. But that is not an ultimate analysis, because the question is, where does the salt or mineral come from ? The vedic conclusion about fresh-water being created by large evaporation, clouds, and final distilation is practically the same as that of the modern science. The three elements of Indian metaphysics, namely Ksiti (earth), ap (water), and tejas (energy or electricity) are co-ordinated by the vedas to explain the emergence of the earth with reference to the sun and the moon. The sun represents the solar energy (tejas); the moon turns that energy into the life-principle of 'water' (ap) ; and from ap comes the slush or the solid representing the earth. *Hence the meaning of the word* क्षार *are both waning and Alkali* and one can easily understand the symbolic signification of the word.

Use of Sound Segments in Sanskrit.

The peculiar characterstic of Sanskrit languages, is the use of sound segments and also weighing of the sounds by use of proper measures. This, now can be well understood by virtue of accuracy of sense-analysis of akshras.

Example : ध्द्, च्छ् Gives a sense of increase in extensity—वृद्धि Increase, वृद्ध Old man of advanced age, समृद्धि Prosperity बुद्धि Intellect, उच्छृखलं over active Naughty, प्रच्छन्न : Extensity त्थ, थ्य, ष्ठ : Gives a sense of certaintity of quantum, तथ्य Fact, मिथ्या False, उत्थान Development, वरिष्ठ, श्रेष्ठ, Senior, Best etc,

क्त : Shows the sense of unit, one person, and particularity, व्यक्ति Person, Individual, शक्ति Force विरक्त Detachted रिक्त Empty etc.

क्र : Gives a sense of Declined extensity or virtue.

क्रान्ति Decline or revolution, क्रूर Cruel, क्रोध Anger, etc.

Measurement of Sounds. (ा ी ू े etc.)

By Virtue of the use of the proper measures in Sanskrit sounds, these Sounds are regulated and weighed. The signification of measures is not only for regulation of pronunciation but also for regulation of sense in an akshra. For example measure of आ ा induces a sense of Extensity or पुरुष while (इ, ी) induces a sense of quantum or प्रकृति to the energy of sound.

Example : (ा) shows expansion काल Time माला Garland, शाला Mansion, Big Building, प्रभात Morning नाना Varied, ज्वाला Fire, रार Fray.

इ Personifies nature, (scientifically speaking, condenses quantum towards its centre). It forms abstract nouns and Famine genders.

क्रान्ति Decline, revolution, प्रकृति Nature, स्त्री Woman शान्ति Peace भ्रान्ति Confusion, स्थिति Circumstances, Situation, etc.

ऋ Gives a sense of Gratification and glow of light etc.

ऋषि Sage, ऋत Order, ऋतु Season, ऋभु: A ray of the sun which is extremely glowing.

SCRIPT

Although I have introduced this chepter in the last yet it is not the least important to find out how script of Devnagari Akshras give response to this discovery of sense in Akshras.

For comparison I have given illustrations of Sindhu Valley Script, Brahmi Script and Nagari Script at the out set of this book, which were the earliest scripts of India, as illustrated, in his book by Shri Bhola Nath Tiwari.

It is evident from these illustrations that ठ and थ are illustrated by a circle while ग by only a arrow head, and श and र by an arrow or a waved line. Hence it can be discovered in the light of this theory with full confidence that the logogram used for depicting the sense of proportion of quantum and extensity in the earliest script of India was of a line cutting a circle ⌀. Circle & zero represents quantum, while a waved or straight line represents energy or extensity.

Here with confidence we can say why our figure for one in numbers is waved one (१) and not a straight line, which is a Strong argument with a clearity of crystal that Indian figures and letters are constituated out of the sense of philosophy of Duality of Vedanta. Figure among zeros means actually sentient energy in matter. If we extract this sentient extensity from quantum we get zero and nothing else. This can be further illustrated from the sense of the word गणना which means Counting. ग is the centre of Extensity णन gives the sense of increase in Extensity only.

Logogram is a pictorial symbol substituted for something which we cannot easily represent by a picture. We still use some logograms in printed books. Besides numbers, we have signs such as &, £ and $. The signs ☿ and ♂ etc. in books on astronomy stand for mercury, Venus, and Mars,. In books on biology they stand for male, female, and hermaphrodite. Similarly in Chinese, originally the characters were recognizable picture symbols, and the composite sign would then have been something like tree, moon etc. In the course of centuries the basic picture symbols have become more and more conventionalized, partly owing to changes in the use of writing-instruments (style, brush, wood blocks, Bhoj Patra, or of materials i. e. pen, ink, paper etc).

Shri Mahavir Prashad Duadi also writes in his essay "Swyam-Vah-Yantra" that the ancient scholars, not of India alone, but of Europe also, had a firm faith that by the use of a rod and a wheel, all sorts of wishful work could be extracted.

Pertaining to the Sense-Key-Board, Again the relationship between Purusha and Prakriti may be illustrated by the mathematical concept of two parallel forces running indefinitely, one parallel representing Purusha and the other Prakriti. Imagine also that there is a line running in between them parallel to and equidistant from both of them. The Purusha and Prakriti should meet on this line with equalized forces. This line is the Line of Divine Reality. Such meeting has been going on since the creation of man by slanting lines alone. But it does not help humanity to have even a glimpse of the Divinity. The slanting lines from these parallels make only unequal angles with the mid-line of Divinity. They are shortest when vertical. The descent or penetration should be therefore by verticals, that is at right angles. So the descent or penetration is one right angle's work. It is here the equilibrium between Purusha and Prakriti forces should be reached. This equalization is attained only by right yoga.

A geometrical line has length but has no breadth. Such a line is only in theory. A line, however finely drawn, has some degree of breadth. So a line can be termed an oblong figure as there is length and breath. Again point has position but has no magnitude. But however minute such a point may be, it still has some length and breadth and it is not a geometrical point. So that a line may be said to have length and breadth having dots or decimals or centres each piled upon another. A centre may be defined also as a point or decimal.

Suppose every dot on the midline of the parallel forces—Purusha and Prakriti— is a jiva aspiring to attain the equilibrium of the spiritual and material forces. The shorter the distance of it to the mid-line the quicker is its approach to its goal. The shortest bridge is the vertical joining these parallel forces of the cosmic stream of Life—the Purusha and Prakriti—at right angles.

The centre can be known by equal lines meeting together from the circumference and converging to the smallest circle which is called its centre ; for a geometrical centre is only a point and is in itself a miniature circle. Radius is extension from the centre to the

circumference. The new energy of yoga radiates from the centre along the radii to the circumference.

Every jiva may be likened to a globe also. The centre of this globe formed by the converging lines from its surface is the real centre manifesting equilibrium of forces. In this case the vertical and the horizontal diameters of the jiva-globe make a plus at the centre. Such a jiva having a plus at its centre will be in eternal communion with Brahman. But the centres of some jivas may be in 'into' form. Here the angles made by the 'into' may be right angles in which case each centre will be a plus; and if the angles made by the 'into' are not right angles they cut the plus of the Divine centre forming acute and obtuse angles. But even if the 'into' makes a plus it may not coincide with the Divine centre. It may be made to coincide with the plus of Divinity by giving it a turn equal to the complement of a right angle or the supplement of two right angles respectively as the angle in question is obtus or acute. A centre as stated above already is known by equal vertical lines from the circumference converging to the smallest conceivable circle. The plus is the Brahman centre and the "into" coinciding with the "plus" centre of the divinity is the human centre. This is the work of the new yoga.

Till now the jiva is like a tangent, just touching the plus circle and not reaching the Divine centre completely in the cosmic stream of existence. The jiva has got two things to do. It should make a plus in the midline forming a real centre and coalesce with the divine centre in equal vertical and horizontal lines. To form such a centre another centre must fix it. This centre becomes fixed at distance of a diameter from the original centre. It stands at one radius distance of that original centre. These two centres will have then equal dynamic force. To transform the jiva into such a divine centre of force is the work of the new yoga.

There is an angle formed by a tangent touching the circumference of a circle. This angle is less than a right angle. Suppose each tangential point represents a jiva or a monad. This jiva instead of going at a tangent without touching the divine centre may be fixed by brackets. If bracket are formed on all its sides it will be fixed completely. For a bracket on all sides forms a centre or a decimal. Thus the erratic life of a jiva can be controlled by cutting off its numerous births forcing it to approach the centre of Divinity. Thus

the jivas are put on the path of salvation. The new yoga endows the jiva with the energy for controlling its erratic way of life. Till now the human life has been a tangential force, just touching but not completely touching, the centre of Divinity and passing away again and again indefinitely into oblivion. The new yoga effects, an economy in the cosmic process of creation by eliminating death. The goal of human evolution is to evolve the superman and invest this earth with an everlasting Life of Divine Bliss—the Brahmanandam sought for by man, since creation.

if we compare important Greek letters with Devnagari-letters we shall find a remarkable similarity in the two Scripts. For example compare ठ (centre of quantum) with "theta" θ (Greek) and ग (Centre of Extansity) with 'gamma' γ (Greek), ड with δ delta (Greek) and so on, there is a remarkable similarity between the two.

At the end I conclude this thesis in the words of Shri Bharigu from his article on "Sanskrit and the European Languages."

Sanskrit and the European Lamguages.

The European philologists have developed many a pet belief into a theory, by repeating which they claim to be enunciating a truth. One such belief centres round Sanskrit. The early Sanskritists of Europe believed that Greek, Latin and other Aryan languages were derived from Sanskrit. The later philologists argued that Sanskrit, Greek, Latin and the other Aryan languages are cognate languages which presuppose a common source styled as the primitive Indo-European. This hypothetical language is constructed in the same fashion as the Esperantos. The basis of this argument is said to be provided by the geneological and morphological classifications. And the argument is repeated as a truism even by Prof. J. B. S. Haldane when he says in an article in a recent issue of *The Hindu* that "the theory that Greek, Latin and so on were derived from Sanskrit was quite reasonable 150 years ago, but is certainly false".

Before we proceed further, we have to consider one factor. If there was a common language which was spoken by all the Aryans, then at least one branch of this homogenous group must have preserved it; and the same language as spoken by others must have brought forth dialectal and other variations in course of time because of migrations, contacts with other peoples, and geogra-

phical changes. Take Sanskrit root 'bhar' meaning to 'to bear'. The English word 'bear' lost the initial aspirate sound showing that it is subsequent to the Sanskrit word. The Greek word is 'phero'. Here 'bh' has become 'ph', again pointing to a corruption of the intial sound because many Aryan languages have in this word the sound *b* and not the *p* sound. What does this show ?

The European linguist argues that Sanskrit retained the sound of the parent language, while the others changed it. Here one has to assume the exitence of a parent language. It is easier to dispence with this assumption and argue the derivation of these languages from Sanskrit. This is a sane principle accepted in grammer, logic, epistemology, science and metaphysics. An argument that constructs a hyphothetical language is to be rejected in favour of one that need not have such a construction

This contention acquires a greater value from another quarter. The emergence of texts in the Indo-European languages is the quarter concerned. The earliest available texts of the Indo-European family are found in Sanskrit Next in temporal sequence come the Avestic texts of Iran. Later still are the Baltonslavonic and Greek texts. Long after the Greek works arose the first works in Latin After these came the works in the Germanic or Teutonic branch. The historical order is thus from east to west; and this was further corroborrated in recent times in the emergence of the texts in the Americas. If all the Aryan languages are cognates derived from a mythical parent language, why did these Western Aryans wait so long for the movement from the east to the west? Works ought to have emerged simultaneously ; and this did not take place.

As we move West, we find that linguistically Greek presents a simplification of nominal declensions and verbal conjugations found in Sanskrit. Latin further simplified the structure of Greek language. This simplification is carried almost to perfection in English. It is therefore not surprising to find Prof. Haldane arguing that even the symbolism of the bees' language was invented in India only.

The comparative philologist proceeds with the assumption of cognate languages. Spanish, French and Italian are cognates to one another and yet they are all derived from Latin. The Dutch, Danish, Scandinavian, German and English are likewise cognates belonging to the Teutonic branch ; and these must be said to be

derived from old High German. Is Sanskrit also the cognate of Latine and Greek and German ? Take the first numeral. It is *eka* in Sanskrit. The European branches have no *k* sound, they have only *n* sound as in *one*, *ein*. This points out not to two words for the same numeral in the mythical language, but to a corruption of the sound. To prove this one has only to see that the Sanskrit or Vedic *sha* is pronounced *kha* in northern India. Thus *Purusha* is pronounced as *Purukha*. This does not mean that the sanskrit *sha* points to an original *kha* sound. The word '*pasu*' similarly became '*pecu*' in Latin, as '*satam*' became '*centum*'.

Morphologically speaking too we find every Sanskrit word having a root or stem plus a suffix. These suffixes tend to disappear in the other Aryan languages. Such a disappearance does not make them cognates with Saskrit but cognates with the Prakrits which are derived from Sanskrit. Take the example of the word *aunt*. Sanskrit *stri* appears in Prakrits as *itthiye* or *atthiye*. Tnese Prakrit forms alone are nearer the word *aunt*. Consider the morphology of the *asmi*. Here the stem is *as*. The Greek and Latin forms are *esmi* and *limi*, and the English is *am*. By themselves these words point to their source word in Sanskrit.

Some may argue that forms not appearing in Sanskrit are found in Greek and Latin, and that therefore all these are cognate languages. This is no valid argument since it depends only on the language available to us in the texts, and not on the language spoken once. Thus some Vedic forms are loss in Sanskrit. And it is also likely that later languages developed new forms. At times they preserved forms they derived from the Vedic. Thus there may not be a form corresponding to Sanskrit *eka* in Greek or Latin ; but the Greeks had Ecbatana which points to the original Sanskrit *eka pattana*.

A conjunct consonant tends to become dissyllabic as a language develops out of an original. Thus the Sanskrit *dvou* became *duo* in Latin. Aspirate sounds were deaspirated in Greek and Latin. **All these point to the common source of the Aryan languages in Sanskrit.**

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