

## VISION : AN EXTRAORDINARY GIFT

.OF ALL OF OUR RECEPTORS OR SENSES VISION IS THE ONLY ONE THAT INTEGRATES, OR ENABLES US TO MAKE SENSE OF, ALL OF OUR OTHER SENSORIMOTOR SYSTEMS. HENCE VISION IS THE UNIFYING SYSTEM THAT INTEGRATES ALL OTHER SYSTEMS AND ENABLES US TO LEARN ABOUT, INTERACT WITH AND SURVIVE \*<sup>1</sup> IN OUR WORLD.

.TO SURVIVE \*<sup>1</sup> "DISTANT RECEPTORS" ARE VITAL. ONLY THE VISUAL AND AUDITORY SYSTEMS ENDOW US WITH THESE SENSES. OF THE TWO, VISION IS FAR SUPERIOR IN ALERTING US TO PLEASURE, DANGER OR THAT WHICH ATTRACTS OUR ATTENTION.

.MOVEMENT DETECTION IS ALSO NECESSARY FOR SURVIVAL. THE VISUAL SYSTEM HAS THE FASTEST FIBERS, SYNAPSES AND CIRCUITS OF ALL OF OUR SENSES AND GIVES US ADVANCED WARNING OF MOVEMENT AROUND US AS WELL AS INFORMING OUR CNS ABOUT OUR OWN SPATIOTEMPORAL MOVEMENTS, POSTURE AND BALANCE.

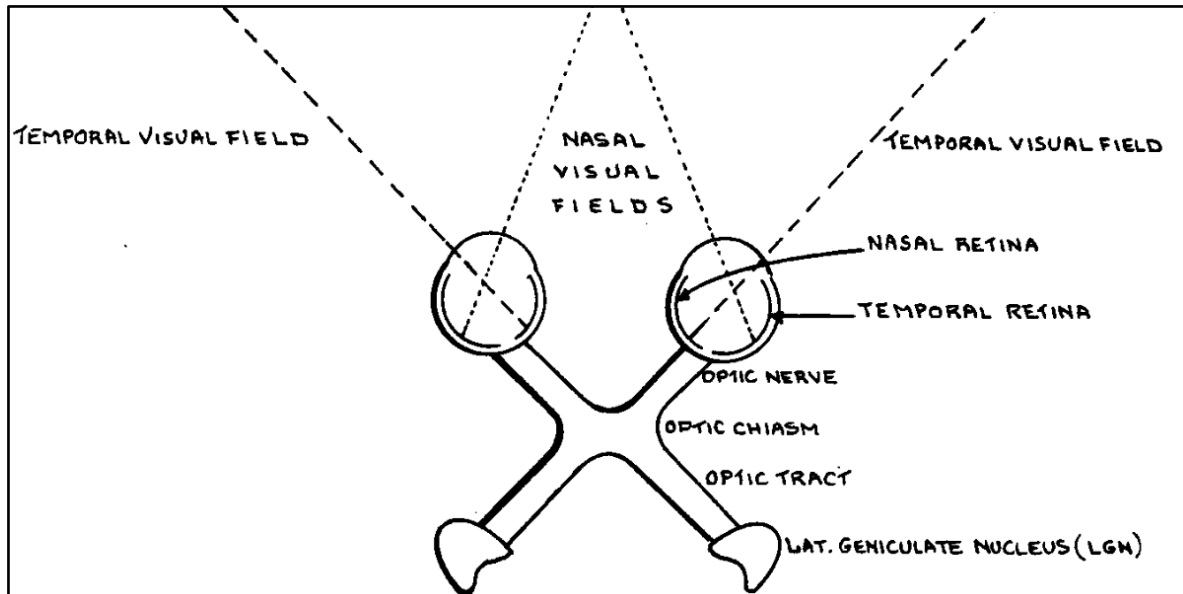
.VISION PLAYS THE MOST CRITICAL ROLE IN ATTENTIVE FUNCTIONS, I.E. AWAKE, ALERT AND ATTENDING TO THAT WHICH IS MOST IMPORTANT FOR LEARNING, COMMUNICATING, INTERACTING WITH, PLUS ADAPTING TO OUR EVER CHANGING ENVIRONMENT.

.VISION IS THE PRIMARY SENSE THAT WE USE FOR UNDERSTANDING NON-VERBAL COMMUNICATION. (GESTURE OR NON-VERBAL "LANGUAGE" COMPRISES ABOUT 70% OF ALL COMMUNICATION BETWEEN INDIVIDUALS, OR THEIR PETS, WHILE ONLY 30% IS ACTUALLY VERBAL LANGUAGE).

.VISION ENDOWS US WITH THE UNIQUE ABILITY TO "PICK UP" SUBLIMINAL PERCEPTIONS OR CLUES FROM OUR ENVIRONMENT, ALL OF WHICH REINFORCES THE ANTICIPATORY CAPABILITIES OF OUR NERVOUS SYSTEMS AND HENCE OUR SURVIVAL AND ADAPTIVE SKILLS.

.LAST BUT NOT LEAST, VISUAL-MANUAL SKILLS, OR EYE-HAND COORDINATION, ALONG WITH OUR AMAZING BRAINS, HAVE ENDOWED US WITH THE EXCEPTIONAL ABILITY TO CONTINUALLY CREATE, INVENT AND DISCOVER NEW THINGS. WE HAVE MOVED FROM BEING SIMPLE TOOL USERS WITH "PRIMITIVE" LANGUAGE ABILITIES TO COMPUTER, FAX AND SATELLITE COMMUNICATORS, INCLUDING MOVING ABOUT IN CARS, PLANES AND "SPACE SHIPS." YET, INSPITE OF ALL OF OUR ADVANCES IN TECHNOLOGY AND SCIENCE WE STILL HAVE TO DEPEND UPON OUR BASIC VISUAL-MANUAL SKILLS FOR LEARNING ABOUT AND USING THE "TOOLS" THAT WE CREATE.

\*<sup>1</sup> THE TERM "SURVIVE" IS USED IN ITS BROADEST SENSE AND INCLUDES LEARNING, PLAYING, WORKING, SLEEPING, INTERPERSONAL RELATIONS AND ALL ACTIVITIES OF DAILY LIVING.



### WHAT DRIVES OUR VISUAL SYSTEM TO SEARCH -----

FOR OBJECTS, FAMILIAR OR OTHERWISE, IN OUR VISUAL FIELDS, OR READ WORD OR SENTENCES, OR LOOK AT A BEAUTIFUL VIEW, OR AT OBJECTS, ETC. ?

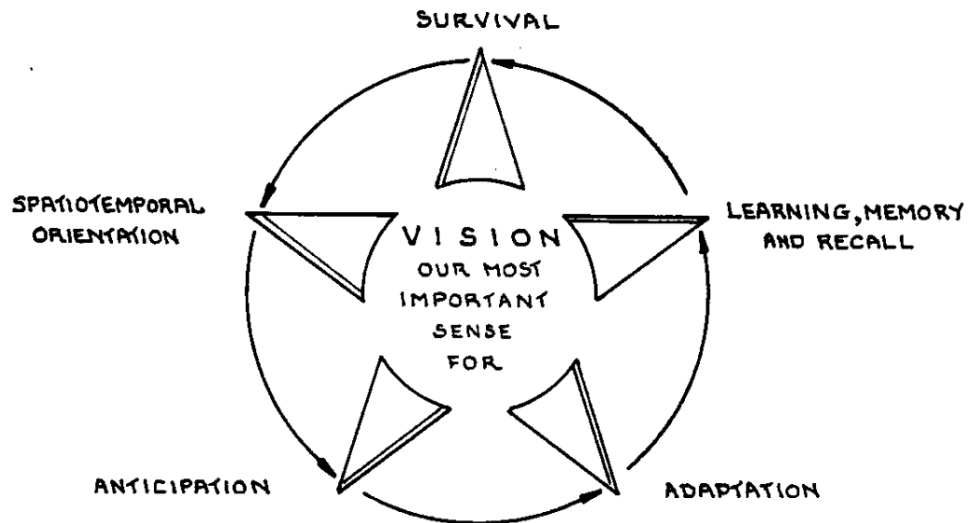
IT IS NOT JUST LIGHT PER SE, BUT PATTERNS. PATTERNS OF LIGHT, PATTERN OF CONTRAST, COLOR PATTERNS AND MOVEMENT PATTERNS, INCLUDING DIFFERENT ORIENTATIONS AND CONFIGURATIONS OF ALL KINDS OF PATTERNS THE SPECIALIZED CELLS OF THE VISUAL SYSTEM, THAT REACT SPECIFICALLY TO CONTRAST, ORIENTATION, COLOR, MOVEMENT, ETC., MUST BE STIMULATED IN ORDER TO DEVELOP A NORMAL VISUAL SYSTEM. HENCE THE C.N.S. DRIVES THE SYSTEM TO SEEK ALL KINDS OF VISUAL STIMULI AND ESPECIALLY PATTERNED STIMULI. THIS IN TURN DEVELOPS THE SPECIALIZED CELLS, AND ONCE FULLY DEVELOPED (AROUND 11 YEARS) HELPS TO MAINTAIN THE FUNCTIONAL INTEGRITY OF THESE CELLS.

### ANOTHER DRIVING FORCE OF THE BRAIN IS TO BRING OBJECTS TO OURSELVES.

FOR EXAMPLE: 1. TO EXPLORE OBJECTS WE GRASP THEM, FEEL THEM, AND THEN MANIPULATE THEM TO GAIN AN UNDERSTANDING OF WHAT WE HAVE IN OUR HANDS  
2. TO SEE THINGS CLEARLY WE BRING OBJECTS INTO OUR NEAR POINT VISUAL FIELDS SO WE CAN FOCUS ON THEM AND SEE DETAILS. THE NASAL VISUAL FIELDS ARE SAID TO BE THE DRIVING FORCE BEHIND BRINGING OBJECTS TO US FOR OPTIMAL VISUAL ACUITY AND BINOCULAR VISION.

### SURVIVAL IS ANOTHER DRIVING FORCE OF ALL CREATURES AND VISION IS

CRITICAL TO SURVIVAL. (1.) IT IS ONE OF ONLY 2 DISTANT RECEPTORS WE HAVE AND ACTS AS A "FORE-WARNER OF THINGS TO COME." (2.) OUR TEMPORAL VISUAL FIELDS DEVELOP AND FUNCTION FIRST AND ENDOW US WITH A VISUAL FIELD RANGE OF ABOUT 180°. (3.) OUR VISUAL SYSTEM IS GENETICALLY PROGRAMMED TO REACT TO ANY MOVEMENT, ESPECIALLY IF IT OCCURS IN OUR PERIPHERAL VISION. ALSO, WE ARE "WIRED" TO AUTOMATICALLY TURN TOWARD THE STIMULUS TO BRING IT INTO FOCUS. (4.) THE GANGLION CELLS (M CELLS) OF THE RETINA AND LAT. GENICULATE NUCLEUS THAT DETECT MOVEMENT ARE THE FASTEST CONDUCTING CELLS OF OUR VISUAL SYSTEM. HENCE THEY GIVE US AN "EARLY WARNING SYSTEM" WHICH ASSISTS IN OUR SURVIVAL.



**SURVIVAL:**

OF OUR TWO DISTANT RECEPTORS, VISION IS OUR PRIMARY EARLY ALERTING SYSTEM, ESPECIALLY FOR MOVEMENT DETECTION, WITH THE AUDITORY SYSTEM SECOND. ALL OTHER RECEPTORS ARE CONTACT RECEPTORS.

**SPATIOTEMPORAL ORIENTATION:**

PERIPHERAL VISION IS CRITICAL FOR ORIENTATION & MOVEMENT IN SPACE, TOGETHER WITH THE VESTIBULAR & PROPRIOCEPTIVE SYSTEMS OF THE NECK & BODY. THESE SENSES ENABLE US TO MAINTAIN DYNAMIC POSTURES, BALANCE, COMPLEX MOVEMENT PATTERNS AND MOVE FREELY IN THE ENVIRONMENT.

**ANTICIPATION OR THE ANTICIPATORY NERVOUS SYSTEM:**

VISION, BEING OUR MOST FAR REACHING SENSE, PLAYS THE MAJOR ROLE IN THE ANTICIPATORY N.S.'S PLANNING & PROGRAMMING THE COMPLEX POSTURES & MOVEMENTS NECESSARY FOR OBTAINING GOALS. VISION IS THE ONLY SENSE CAPABLE OF CONSTANTLY UPDATING THE CNS ABOUT OUR EVER CHANGING ENVIRONMENT THUS ENABLING THE N.S. TO RESPOND APPROPRIATELY TO ALL ON-GOING CHANGES.

**ADAPTATION:**

TO COPE WITH AN EVER CHANGING ENVIRONMENT WE MUST CONSTANTLY ADAPT, AND ADAPTING DEPENDS UPON PLANNING AHEAD & BEING PREPARED. THE VISUAL SYSTEM ENABLES US TO BE CONSTANTLY AWARE AND UPDATED ABOUT THE CONTEXT OF THE ENVIRONMENT AND LEADS OTHER SENSES IN "TELLING THE C.N.S." HOW BEST TO ADAPT TO COMPLETE A TASK OR SURVIVE.

**LEARNING, MEMORY AND RECALL:**

LEARNING IS CONTEXTUAL AND MOST OF OUR LEARNING AND MEMORY IS OBTAINED THROUGH OUR VISUAL SYSTEM. MEMORIES ARE BEST RECALLED WHEN ONE IS IN THE CONTEXT OR VISUAL SURROUND WHERE THE LEARNING OCCURRED. WHEN OUT OF CONTEXT AND TRYING TO RECALL A MEMORY (PERSON, PLACE OR THING) VISUAL SEARCHING AND "MIND-PICTURES" USUALLY PRECEDE RECALL. [CONTEXT = THE SURROUNDING ENVIRONMENT, CIRCUMSTANCES OR FACTS, WHICH HELP US GAIN A TOTAL PICTURE OF SOMETHING. REF: FRANKLIN DICTIONARY & THESAURUS.] JCM ::

<u>TERMINOLOGY : SIGHT</u> * <sup>1</sup> VERSUS <u>VISION</u> * <sup>2</sup>	
SIGHT * <sup>1</sup>	VISION * <sup>2</sup>
<ul style="list-style-type: none"> <li>.THE SPECIALITY FIELD OF OPHTHALMOLOGY (M.D.) OR OPTOMETRY (O.D.)</li> <li>.THE FUNCTIONS OF THE EYE (OCULUS OR GLOBE) IN RELATION TO VISUAL FIELDS, REFRACTION, ACCOMMODATION - CONVERGENCE REFLEXES, LIGHT (PUPILLARY) REFLEXES, THE FUNCTIONS OF THE RETINAL RECEPTORS IN PERCEIVING AND RELAYING VISUAL INFORMATION VIA THE OPTIC NERVES, CHIASM AND TRACTS, AND <u>ESPECIALLY VISUAL ACUITY.</u></li> <li>.FUNCTIONS OF THE 6 PAIRED EXTRINSIC EYE MUSCLES OF THE GLOBES AND THE LEVATOR PALPEBRAE SUPERIORIS OR UPPER EYE LIDS.</li> <li>.THE FUNCTION OF THE LACRIMAL GLANDS IN LUBRICATING THE EYES, LACRIMAL PUNCTA &amp; NASAL-LACRIMAL DUCT.</li> <li>.INFECTIONS, TUMORS, WOUNDS &amp; DISEASES OF THE GLOBE, ORBIT OR OPTIC NERVE.</li> <li>.SURGERY ON VARIOUS COMPONENTS OF THE EYEBALL : CATARACTS, CORNEAL TRANSPLANTS, REALIGNMENTS OF EYE MUSCLES, OPERATING ON TUMORS, ETC. (M.D.s)</li> <li>.IN OTHER WORDS, ANYTHING THAT HAS TO DO WITH THE EYE, ORBIT &amp; MUSCLES, RETINA &amp; OPTIC NERVE, CHIASM &amp; TRACT.</li> </ul> <p>*<sup>1</sup>  <u>NOTE : PATHOLOGICAL CONDITIONS OF THIS PART OF THE VISUAL SYSTEM IS FREQUENTLY CALLED <u>OCULAR IMPAIRMENTS</u> OR THE <u>ANTERIOR COMPONENTS OF THE CORTICAL VISUAL SYSTEM.</u></u></p>	<ul style="list-style-type: none"> <li>.THE SPECIALITY FIELD OF THERAPISTS TRAINED IN VISION REHAB., THE FIELD OF NEURO-OPTOMETRIC REHAB.(O.D.) AND/OR BEHAVIORAL OPTOMETRY(O.D.)</li> <li>.THE FUNCTIONS OF THE ENTIRE VISUAL SYSTEM IN RELATION TO HOW THE EYES AND THE REST OF THE VISUAL SYSTEM (32 AREAS OF THE CEREBRAL CORTEX, THE LIMBIC, KINETIC AND SYNERGIC SYSTEMS INCLUDING THE SPINALCORD) PERCEIVES THE WORLD AND/OR MATCHES VISUAL INFORMATION WITH ALL OF THE OTHER SENSES INCLUDING FEEDBACK FROM ALL MOTOR BEHAVIORS, INCLUDING THE MOVEMENT OF THE EYES IN THE ORBITS &amp; THE MUSCLES INVOLVED IN THESE ACTIONS.</li> <li>.THE FUNCTIONS OF <u>BOTH THE AMBIENT AND FOCAL VISUAL SYSTEMS</u> AND HOW THESE WORK SYNERGISTICALLY IN MOVEMENT DETECTION, POSTURE/BALANCE, DYNAMIC MOVEMENTS INCLUDING NAVIGATING THROUGH SPACE AS WELL AS LEARNING AND MEMORY AND ALL A.D.L.(ACTIVITIES OF DAILY LIVING).</li> <li>.TREATMENT TECHNIQUES THAT HELP IMPROVE A PERSONS "VISUAL QUALITY OF LIFE" AND/OR TEACHING AN INDIVIDUAL COMPENSATORY TECHNIQUES TO ACHIEVE SIMILAR GOALS.</li> </ul> <p>*<sup>2</sup>  <u>NOTE : PATHOLOGICAL CONDITIONS OF THIS COMPONENT OF THE VISUAL SYSTEM IS FREQUENTLY CALLED <u>OCULOMOTOR IMPAIRMENTS</u> OR <u>CORTICAL VISUAL IMPAIRMENTS (CVI)</u> OR THE <u>POSTERIOR COMPONENT OF THE CORTICAL VISUAL SYSTEM.</u></u></p>

## THE BASIC ESSENTIALS NECESSARY FOR

### LEARNING, MEMORY, RECALL & FORGETTING

A FAIRLY INTACT NERVOUS SYSTEM THAT ENABLES ONE TO HAVE :

.CONCENTRATION :

PARTLY DEPENDENT UPON THE RETICULAR SYSTEM , PLUS SLEEP , FOOD , AND THE ENVIRONMENT IN WHICH ONE LIVES .

.MOTIVATION OR DRIVE:

THE DESIRE TO LEARN AND KEEP ON LEARNING. ONE CAN BE SELF MOTIVATED, EXTERNALLY MOTIVATED OR BOTH.

.SUFFICIENT INTELLIGENCE, AND TALENTS, IN ONES AREAS OF INTEREST, FOR LEARNING.

TECHNIQUES AND SUGGESTIONS FOR ENHANCING LEARNING, MEMORY, ETC. THAT WHICH IS BEING LEARNED MUST BE...

.MEANINGFUL AND PURPOSEFUL TO INDIVIDUALS, PLUS APPROPRIATE TO AGE, EDUCATION, PHYSICAL, MENTAL ABILITIES

.CHALLENGING OR "FORCING THE SYSTEM" CONCEPT.

.MULTISENSORY INPUT : THE MORE SENSES INVOLVED WHILE LEARNING, THE FASTER ONE LEARNS, THE BETTER THE RETENTION AND HENCE RECALL

.NOVEL STIMULI : THE N.S. ATTENDS TO NEW CHALLENGES BUT HABITUATES RAPIDLY TO KNOWN OR UNCHALLENGING STIMULI.

.TIME : TIME TO LEARN, TIME TO CONSOLIDATE NEW INFORMATION AND TIME TO PRACTICE AND REPEAT NEW INFORMATION.

.CONTEXTUAL : ALL LEARNING IS CONTEXTUAL, BUT LEARNING IS BEST IN A KNOWN, SAFE OR SECURE ENVIRONMENT, INCLUDING ALL POINTS NOTED ABOVE, AND RECALL IS OPTIMAL WHEN ONE IS IN THE CONTEXT (ENVIRONMENT) OF THE SITUATION IN WHICH ONE LEARNED INITIALLY.

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