

PERSPECTIVES ON STRESS

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THIS ARTICLE PROPOSES TO REVIEW THE LITERATURE ON THE CONCEPT OF STRESS FROM 1929 UNTIL THE PRESENT. THE STRESS CONCEPT IS ANALYZED FROM THE PERSPECTIVE OF FOUR DIFFERENT DIMENSIONS: LATERAL, HISTORIC, MOLECULAR AND MOLAR. IN VIEW OF THE MULTIPLE DEFINITIONS OF STRESS, THE THESIS IS ADVANCED THAT ONE MUST BE CAUTIOUS WHEN USING THE CONCEPT AND MUST NOT ASSUME THAT STRESS IS UNIVERSALLY DEFINED.

ONE OF THE MOST SALIENT HISTORIC FEATURES CONCERNING THE CONCEPT OF STRESS, IS ITS FREQUENT USAGE IN SPITE OF ITS DIVERGENT, AND NUMEROUS DEFINITIONS. MASON (1975) DRAMATIZED THE STATUS OF THE CONCEPT OF STRESS IN THE SCIENCES, BY DESCRIBING THE "CHAOTIC DISAGREEMENT OVER ITS DEFINITION", SPECIALLY IN THE FIELDS OF BIOLOGY AND MEDICINE. IN ORDER TO UNDERSTAND THE PARAMATERS OF THE CONCEPT OF STRESS AND ITS MULTIPLE DEFINITIONS, ITS SEEMS PERTINENT TO CONSIDER THE FOLLOWING DIMENSIONS:

- (1) THE LATERAL PERSPECTIVE (ACROSS FIELDS OF KNOWLEDGE)
- (2) THE HISTORICAL PERSPECTIVE (IN ITS PURELY CHRONOLOGICAL ACEPTION)
- (3) THE MOLECULAR PERSPECTIVE
- (4) THE MOLAR PERSPECTIVE

IT SEEMS OF CRUCIAL IMPORTANCE TO POINT OUT THAT THE CONCEPT OF STRESS DOES NOT HAVE ANY MEANING UNLESS ONE OR MORE OF THE DIFFERENT DIMENSIONS MENTIONED ABOVE ARE SPECIFIED. TO TALK ABOUT STRESS WITHOUT SPECIFICALLY STATING ITS DEFINITION IN OPERATIONAL TERMS, AND/OR WITHOUT STATING WHICH DIMENSIONAL ACEPTION WE ARE USING, IS TENTAMOUNT TO OPERATING WITHIN THE "CHAOTIC WORLD" THAT MASON (1975) DESCRIBED.

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THE LATERAL PERSPECTIVE

THE LATERAL PERSPECTIVE REFERS TO THE DIFFERENT FIELDS OF KNOWLEDGE AND ITS TRADITIONAL CLASSIFICATIONS (I.E. PSYCHOLOGY, PHYSICS, BIOLOGY, MEDICINE, ETC). IN ORDER TO ASCERTAIN THE STATUS OF STRESS IN THE LATERAL DIMENSION, ONE HAS TO LOOK AT THE DIFFERENT FIELDS OF KNOWLEDGE TO SEE WHAT CONTRIBUTES TO THIS HYPOTHETICAL CONSTRUCT. WITHIN THE LATERAL DIMENSION, THE FIELDS OF PHYSICS, BIOLOGY AND PSYCHOLOGY ARE THE MOST PROLIFIC IN TERMS OF OFFERING VERY DISTINCTIVE AND VARIED DEFINITIONS OF THE CONCEPT OF STRESS.

IN THE FIELD OF PHYSICS, STRESS IS GENERALLY DEFINED AS "PHYSICAL PRESSURE" APPLIED TO A BODY SO AS TO CAUSE A DEFORMATION OF THE BODY. THIS DEFORMATION IS CALLED STRAIN. IN THIS FIELD, STRESS IS MEASURED BY THE FORCE APPLIED PER UNIT AREA, OR DYNES PER SQ. CM.

IN THE AREA OF BIOLOGY, STRESS MAY BE DEFINED AS ANYTHING CONSTITUTING A THREAT, REAL OR APPARENT, TO THE BIOLOGICAL INTEGRITY OF THE ORGANISM. WITHIN THIS DEFINITION STRESS DEPENDS PARTLY ON FACTORS IN THE ENVIRONMENT AND PARTLY ON THE VULNERABILITY OF THE ORGANISM. THUS, ENVIRONMENTAL FACTORS THAT CONSTITUTE STRESS FOR ONE INDIVIDUAL, MAY NOT BE STRESSFUL FOR ANOTHER WHO IS LESS SENSITIVE OR BETTER ABLE TO ADAPT. IT SEEMS IMPORTANT TO NOTICE THE RELEVANCE THAT THE FIELD OF BIOLOGY ATTRIBUTES TO THE ROLE OF INDIVIDUAL DIFFERENCES IN COPING WITH STRESS.

IN THE FIELD OF PHYSIOLOGY STRESS IS TRADITIONALLY DEFINED AS AN ENVIRONMENTAL AGENT OR INFLUENCE, AFFECTING AN ORGANISM ADVERSELY. THE WORD STRESS IS USED IN THIS FIELD TO DESCRIBE THE EFFECTS OF STRESSOR AGENTS SUCH AS HEAT, COLD, NOISE, ETC. ANOTHER COMMON DEFINITION WITHIN THE FIELD OF PHYSIOLOGY IS TO DESCRIBE STRESS AS THE STATE OR CONDITION OF AN ORGANISM SUBJECTED TO A LOAD OF SUCH STRENGTH AS TO CAUSE A DEPLETION OF RESERVES GREATER THAT CAN BE RESTORED IN THE TIME AVAILABLE FOR RECOVERY. IN OTHER WORDS, STRESS IS THE STATE OF AN ORGANISM SUBJECTED TO PRESSURES TO WHICH ITS HOMEOSTATIC MECHANISMS CANNOT READILY ENABLE HIM TO ADAPT. THE CONCEPT OF STRESS IS ALSO USED BY SOME PHYSIOLOGISTS TO DESCRIBE THE DISTURBANCE OR STRAIN PRODUCED IN AN ORGANISM SUBJECTED TO A LOAD (GERALD, 1967; LUCZAK, 1971). IN THIS SENSE OF THE WORD, A STRESS CAN BE DESCRIBED IN TERMS OF THE DISPLACEMENT OF FACTORS SUCH AS BLOOD PRESSURE, AND BLOOD METABOLITE LEVELS, WHICH ARE CONTROLLED BY THE HOMEOSTATIC MECHANISM.

IN THE FIELD OF PSYCHOLOGY, STRESS SEEMS TO BE DEFINED AS THE STATE OR CONDITION OF AN ORGANISM WHOSE REACTION TO THE ENVIRONMENT IS CHARACTERIZED BY ANXIETY, TENSION, OR DEFENSIVE BEHAVIORAL RESPONSES. STRESS ITSELF IS AN ABSTRACT CONCEPT DERIVED PARTLY FROM SUBJECTIVE EXPERIENCE AND PARTLY FROM THE OBSERVATION

OF RESPONSES IN SITUATIONS THAT ELICIT THEM. PSYCHOLOGICAL STRESS SITUATIONS ARE GENERALLY CHARACTERIZED BY CONFLICT OR INCENTIVES (I.E. APPROACH-APPROACH), OR OF BASIC DRIVES (I.E. SEXUAL VS. HUNGER) (HULL 1943). IT IS EXPECTED THAT WHEN THE INDIVIDUAL CONFRONTS CONFLICTS, THE ORGANISM IS COMPELLED TO ACT BY ADAPTATION OR BY EXPERIENCING DISORGANIZATION (E.G. MENTAL DISEASES). PSYCHOLOGY MAKES THE DISTINCTION BETWEEN CHRONIC MENTAL STRESS, AS FOR EXAMPLE A LONG TERM UNHAPPY MARRIAGE RELATIONSHIP, AND ACUTE STRESS, AS THE ONE GENERATED IN A VERY SPECIFIC MOMENT LIKE THE TEST SITUATION FOR A STUDENT (SPITZER, 1980). STRESS MAY BE PRODUCED IN AN INDIVIDUAL OR AN ANIMAL BY METHOD SUCH AS GIVING THE SUBJECT INSOLUBLE PROBLEMS TO SOLVE, STRESS MAY BE CONSCIOUSLY EXPERIENCED AS SUCH OR MAY BE UNCONSCIOUS AND RECOGNIZED ONLY BY THE AFTER - EFFECTS. WHILE THE CONCEPT OF CONFLICT AND STRESS IN THE AREA OF EXPECTATIONS PERTAINS TO THE SCHOOL OF LEARNING PSYCHOLOGY, THE CONCEPT OF CONFLICT AND STRESS VIS A VIS THE UNCONSCIOUS, PERTAINS TO THE PSYCHOANALYTIC SCHOOL OF THOUGHT.

IT SEEMS IMPORTANT TO EMPHASIZE THAT WITHIN THE LATERAL DIMENSION WE ARE JUST DESCRIBING, THE MOST SALIENT DEFINITIONS OF STRESS. WITHIN EACH FIELD THERE ARE MORE THAN ONE CONTENDING DEFINITIONS OF STRESS. IT IS BEYOND THE SCOPE OF THIS PAPER TO DISCUSS ALL OF THEM. IN GENERAL, IT SEEMS THAT THE MOST IMPORTANT CONCEPT TO REMEMBER WITHIN THE LATERAL DIMENSION, IS THE VERSATILITY AND RICHNESS OF THE HYPOTHETICAL CONSTRUCT OF STRESS. FURTHERMORE, THE LATERAL DIMENSION BRINGS TO OUR SCOPE THE FOLLOWING CONTRIBUTIONS:

1) FROM THE FIELD OF PHYSICS, THE EMPHASIS IN QUANTIFICATION, IS ONE OF THE MOST SALIENT CONTRIBUTIONS. QUANTIFICATION OF THE CONCEPT OF STRESS WAS THE FIRST STEP TOWARDS AN OBJECTIVE DEFINITION OF THIS CONSTRUCT AND TOWARDS STANDARDIZATION OF ASSESSMENT OF THIS CONCEPT.

2) FROM THE FIELD OF BIOLOGY, THE MOST SALIENT FEATURE IS ITS EMPHASIS IN POINTING OUT THE ROLE OF INDIVIDUAL DIFFERENCES AND ITS EFFECTS ON THE PARAMETERS OF STRESS. THE CONCEPT OF THE "CRITICAL POINT" INTRODUCED BY CANNON IN 1929, ALERTED THE BIOLOGIST TO THE NEED TO CLASSIFY STRESS BY ITS INTENSITY, AND ITS DEGREE OF "HARMFULNESS" TO THE ORGANISM. SINCE THE INTRODUCTION OF THE CRITICAL POINT IN THE AREA OF STRESS, SCIENTISTS STARTED TO UNDERSTAND STRESS NOT ONLY FROM THE PERSPECTIVE OF HOW MUCH STRESS IS NEEDED TO HARM THE ORGANISM, BUT TO CONSIDER THE FACT THAT CERTAIN AMOUNT OF STRESS COULD BE BENEFICIAL OR NEUTRAL TO THE ORGANISM. THE FIELD OF BIOLOGY HAS ALSO CONTRIBUTED TOWARDS A BETTER UNDERSTANDING OF THE MICROSCOPIC OR MOLECULAR REACTIONS OF THE ORGANISM TO STRESS. ITS EMPHASIS IN THE SPECIFICITY OF THE RESPONSES TO STRESS HELPED TO KEEP THE CONCEPT REALISTICALLY OPERATIONAL. THE FIELD OF PHYSIOLOGY OVERLAPPED WITH THE FIELD OF BIOLOGY IN THIS RESPECT, THIS

SCIENCE (PHYSIOLOGY) ALSO EMPHASIZED THE NEED TO STUDY THE MICROSCOPIC REACTION TO STRESS. THE INTRODUCTION OF THE CONCEPT OF "HOMEOSTASIS" AND "ADAPTATION" AS CRITICAL STAGES OF THE ORGANISM UNDER STRESS, WERE CRUCIAL IN FURTHERING THE UNDERSTANDING OF THIS CONCEPT (STRESS). THE CONCEPT OF HOMEOSTASIS SERVED TO DESCRIBE THE ORGANISM PRIOR TO THE STATE OF STRESS. THE CONCEPT OF ADAPTATION HELPED TO UNDERSTAND DIFFERENT REACTIONS OF THE ORGANISM AFTER THE IMPACT OF STRESS. FURTHERMORE, IT HELPED TO CLASSIFY AND ORGANIZE THE COMPLEX RESPONSE OF THE ORGANISM TO STRESS.

THE FIELD OF PSYCHOLOGY CONTRIBUTED TO THE EXPANSION OF THE CONCEPT STRESS BY INTRODUCING THE CONSTRUCT OF THE UNCONSCIOUS VS. THE CONSCIOUS FORMS OF RECEIVING STRESS FROM DIFFERENT SOURCES IN THE ENVIRONMENT. THE INTRODUCTION OF THE ROLE OF CLIENT AND ITS RELATIONSHIP TO STRESS, WAS ANOTHER DIMENSION ADDED BY THE FIELD OF PSYCHOLOGY TO THIS CONSTRUCT. PSYCHOLOGY ALSO EMPHASIZED THE NEED TO VIEW STRESS FROM THE PERSPECTIVE OF ITS EFFECT ON PERFORMANCE AND LEARNING. THE FIELD OF PSYCHOLOGY WAS THE FIRST TO INTRODUCE THE CLASSICAL INVERTED U SHAPE CURVE, TO EXPLAIN THE RELATIONSHIP BETWEEN PERFORMANCE AND STRESS (STENNET, 1957). FURTHERMORE, THE PERFORMANCE CURVE WAS THE FIRST TO ILLUSTRATE OPERATIONALLY "BENEFICIAL" EFFECTS OF A MINIMUM OF STRESS IN THE ENHANCEMENT OF PERFORMANCE AND LEARNING IN SOME SPECIFIC TASKS (WELFORD, 1972). IN ADDITION, THIS FIELD INTRODUCES THE CONCEPT OF "DEFENSIVE MECHANISMS", "FATIGUE", AND "ANXIETY" AS A WAY OF MEASURING THE EFFECTS OF STRESS IN THE ORGANISM. IT WAS FROM THE FIELD OF CLINICAL PSYCHOLOGY THAT THE CONCEPT OF STRESS BRANCHED OUT TO THE AREA OF PSYCHOSOMATIC DISORDERS AS RELATED TO STRESS. THE INTRODUCTION OF TREATMENT TECHNIQUES TO HELP COPING WITH EXCESSIVE STRESS WAS ANOTHER OF THE CONTRIBUTIONS OF THE FIELD OF CLINICAL PSYCHOLOGY (I.E. BIOFEEDBACK, THE USE OF RELAXATION AND COUNTER-CONDITIONING TECHNIQUES, MEDITATION, ETC.)

THESE CONTRIBUTIONS IN ANY WAY SHOULD NOT BE VIEWED AS ALL INCLUSIVE. THEY SHOULD BE VIEWED AS AN ILLUSTRATION OF THE RICHNESS OF THE LATERAL DIMENSION, AND ITS ROLE TOWARDS THE DEVELOPMENT OF THE CONCEPT OF STRESS. BY BECOMING AWARE OF THE PARAMETERS OF THE LATERAL DIMENSION OF THE CONCEPT OF STRESS, THE RESEARCHER IS ALERTED TO THE FACT THAT WHEN ONE ADDRESSES THE CONCEPT OF STRESS IT SEEMS UNAVOIDABLE TO SPECIFY THE FIELD THAT WE ARE STEMMING FROM.

HISTORICAL DIMENSION

ACCORDING TO TANNER (1960), THE WORD STRESS WAS PROBABLY DERIVED FROM THE WORD "DISTRESS". STRESS WAS ORIGINALLY USED TO DESCRIBE ANY KIND OF HARDSHIP, BURDEN, PRESSURE, OR COMPULSION INFLICTED ON A PERSON OR ON A MATERIAL OBJECT.

THE WORD IS NOW USED IN SEVERAL DIFFERENT CONTEXTS: (1) TO DENOTE PRESSURE OR EMPHASIS, (2) TO DESCRIBE AN ADVERSE FORCE, OR INFLUENCE, (3) TO DENOTE THE STATE OR CONDITION OF A PERSON OR SUBJECT TO ADVERSE INFLUENCES CAUSING TENSION OR STRAIN, OR (4) TO DESCRIBE A GENERAL STATE OF AFFAIRS (E.G. LIKE THE "STRESS OF MODERN LIVING"). IN GENERAL, IT SEEMS SAFE TO SAY THAT THE CONCEPT OF STRESS IS DEFINED DIFFERENTLY IN THE FIELDS OF PHYSICS, BIOLOGY, PHYSIOLOGY AND PSYCHOLOGY.

ONE OF THE PIONEERS IN THE USE OF THE CONCEPT OF STRESS, AS A HYPOTHETICAL CONSTRUCT, WAS CANNON (1929). HE ATTEMPTED TO EXPLAIN THE NATURAL TENDENCY FOR ANIMALS TO PREPARE THEMSELVES FOR CONFRONTING THREAT AS A STATE OF AROUSAL THAT PREDISPOSES THE ORGANISM FOR TWO ANTI-THETICAL RESPONSES: "FIGHT OR FLIGHT".

USING A BARKING DOG TO AROUSE A CAT, CANNON WAS ABLE TO DEMONSTRATE THE ROLE OF THE SYMPATHETIC NERVOUS SYSTEM AND THE ADRENAL MEDULLA IN DETERMINING THE PHYSIOLOGIC NATURE OF THIS RESPONSE TO A CHALLENGE. HIS SUCCESSFUL DELINEATION OF THE RELEASE OF CATECHOLAMINES INTO THE BLOOD STREAM DURING A REACTION WHICH PREPARES THE ORGANISM FOR FIGHT, OR PRIMES FOR FLIGHT, LED TO THE DISCOVERY OF A BROAD SERIES OF NEUROENDOCRINE RESPONSES TO PSYCHOSOCIAL STIMULATION. IF PSYCHOSOCIAL STIMULATION IS VIEWED AS STRESS IN A GIVEN SET OF CONTINGENCIES, THEN STRESS CAN BE SEEN AS A DIRECT CAUSAL FACTOR IN INCREASING SYMPATHETIC AND ADRENAL-MEDULLARY ACTIVITY. IT SEEMS IMPORTANT TO NOTICE THAT CANNON'S PIONEER WORK WAS DONE WITHIN A FRAME OF REFERENCE OF WHAT IS TRADITIONALLY DENOMINATED "BASIC SCIENCE". IT WAS NOT UNTIL DECADES LATER, THAT HIS FINDINGS WERE GENERALIZED TO THE REALM OF HUMAN BEHAVIOR (BRENNER, 1979; RAHE, 1978; AND MASUDA, 1967).

ANOTHER PIONEER EFFORT IN DEFINING THE CONCEPT OF STRESS, IS ATTRIBUTED TO SELYE. DURING THE DECADE OF THE 30'S SELYE EXPERIMENTED WITH RATS, AND ITS REACTION TO EXTERNAL STRESSORS, LIKE HEAT, COLD, OR TRAUMATIC INJURY. HE CONCENTRATED IN DEMONSTRATING THE RESPONSES OF RATS TO ENVIRONMENTAL STRESS, (SELYE, 1946) AS AN ADAPTATIVE COPING MECHANISM. THIS COPING MECHANISM WAS MEDIATED BY AN ADRENAL-CORTICAL-DRIVEN PROCESS.

THE WORD STRESS WAS ALSO USED BY GERALD (1957) TO DESCRIBE THE DISTURBANCE OR STRAIN PRODUCED IN AN ORGANISM SUBJECTED TO A LOAD. ACCORDING TO TANNER (1960), IN THIS SENSE OF THE WORD A STRESS CAN BE DESCRIBED IN TERMS OF DISPLACEMENT OF FACTORS SUCH AS BLOOD PRESSURE AND BLOOD METABOLITE LEVEL WHICH ARE CONTROLLED BY THE HOMEOSTATIC MECHANISM. ONE COMMON FACTOR IN ALL THE DEFINITIONS DESCRIBES ABOVE, IS THE FACT THAT STRESSORS ARE VIEWED AS VARIABLES TO WHICH THE ORGANISM NEEDS TO ADAPT IN ORDER TO AVOID OR MINIMIZE THE DAMAGE THAT MAY BE CAUSED BY THEM.

IN 1944, VOGT ATTEMPTED TO RELATE EPINEPHRINE RELEASE AS DIRECT CONSEQUENCE OF STRESSFUL STIMULI. IT SEEMS IMPORTANT TO NOTICE THAT THIS WAS ONE OF THE PIONEER EFFORTS IN ATTEMPTING TO ESTABLISH A ONE-TO-ONE RELATIONSHIP BETWEEN STRESS AND SPECIFIC PHYSIOLOGICAL RESPONSES.

LEVINE (1953) ATTEMPTED TO EMPHASIZE THE IMPORTANCE OF ADAPTATION SUBSEQUENT TO THE "ALARM REACTION" OF THE ORGANISM TO STRESS. HE POINTED OUT THAT ADAPTATION PLAYS AN IMPORTANT ROLE IN THE TIME AN ORGANISM CAN ENDURE STRESS THE MORE TIME FOR ADAPTATION, THE MORE STRESS CAN BE ENDURED. HE WAS ONE OF THE FIRST RESEARCHERS TO CONCEPTUALIZE OBESITY AS CHRONIC STRESS IN THE ORGANISM.

VON EULER (1951) CONCEPTUALIZED STRESS AS "HEAVY WORK". HE ATTEMPTED TO STUDY PROLONGED CONDITIONS OF STRESS (AS DEFINED AS HEAVY WORK), AND ITS RELATIONSHIP WITH THE ELICITATION OF NORADRENALIN.

RICHTER (1953) WAS ONE OF THE FIRST SCIENTISTS TO STUDY THE BEHAVIORAL MECHANISMS INVOLVED IN EITHER AVOIDING OR COUNTER-ACTING STRESS. HIS STUDIES WERE BASED ON LABORATORY ANIMALS.

THE HISTORICAL PERSPECTIVE IN ITS CHRONOLOGICAL ACCEPTION, PROVIDES US WITH A PROLIFIC WORLD OF OVERWHELMING DEFINITIONS. JUDGING BY THIS PROLIFIC PRODUCTION, IT SEEMS THAT THE DIFFERENT AUTHORS DID NOT REVIEW THE LITERATURE ON STRESS PRIOR TO STARTING THEIR WORK ON THIS FIELD. NEVERLESS, OF ALL THE HISTORICAL CONTRIBUTIONS, THE MOST SALIENT SEEM TO BE THE ONES BY SELYE AND CANNON (DUE TO THEIR ORIGINALITY AND THEIR ATTEMPTS TO EXPLAIN PROCEDURES BEYOND DESCRIPTIVE DEFINITIONS). THE FOLLOWING IS A BRIEF RECOUNT OF THEIR FORMULATIONS WITHIN THE HISTORIC DIMENSION.

THE CONTRIBUTIONS OF CANNON AND SELYE

ACCORDING TO MASON (1975), THE TERM STRESS WAS POPULARIZED BY PROFESSOR HANS SELYE IN HIS INITIAL WRITINGS IN 1936, ALTHOUGH WALTER CANNON HAD USED THE TERM BY 1914. PRIOR TO CANNON, THE CONCEPT OF STRESS WAS USED RATHER LOOSELY, TO IMPLY NERVOUS STRAIN. EXPRESSIONS AS "NERVOUS STRESS" AND STRAIN HAD LONG BEEN COMMONLY USED BY PSYCHIATRISTS AND PSYCHOLOGISTS, TO DESCRIBE MENTAL TENSION (SELYE, 1956).

ONE OF THE PIONEERS IN CONCEPTUALIZING STRESS AS PROMOTER OF DISEASE, WAS WALTER CANNON IN 1928. IN AN ADDRESS TO THE MASSACHUSETTS MEDICAL SOCIETY, CANNON STATED: "THE DOCTOR IS PROPERLY CONCERNED WITH THE WORKING OF THE BODY AND THEIR DISTURBANCES, AND HE SHOULD HAVE, THEREFORE, A NATURAL INTEREST IN THE EFFECTS OF EMOTIONAL STRESS, AND IN THE MODES OF RELIEVING

IT (CANNON, 1928, PAG. 11). FURTHERMORE, CANNON (1935), ATTEMPTED TO DEVELOP THE USE OF AN ENGINEERING CONCEPT OF STRESS AND STRAIN IN A PHYSIOLOGICAL CONTEXT. AT THIS POINT IN HISTORY HE CLEARLY CONCEIVED STRESS AS INVOLVING PHYSICAL AS WELL AS EMOTIONAL STIMULI. HE RESERVED THE TERM "STRESSES", FOR DESCRIBING FACTORS AS LOW BLOOD SUGAR, LOSS OF BLOOD, LACK OF OXYGEN, COLD AND HOT. IT WAS IN THIS PAPER THAT HE INTRODUCED THE CONCEPT OF "CRITICAL STRESS LEVELS" TO DESCRIBE SITUATIONS WHICH ARE CAPABLE OF INDUCING A BREAKING STRAIN IN THE HOMEOSTATIC MECHANISM, AND SIGNIFICANTLY ALTER THE STEADY STATE OF THE INTERNAL ENVIRONMENT (MASON, 1975).

IN 1946, SELYE ATTEMPTED TO RELATE STRESS TO WHAT HE CALLED "A GENERAL ADAPTATION SYNDROME". HE POSTULATED THAT CONTINUOUS EXPOSURE TO EVOCATIVE, NOXIOUS AGENTS PROVOKES THREE BASIC REACTIONS IN ORGANISM, "THE ALARM REACTION, THE STAGE OF RESISTANCE AND THE STAGE OF EXHAUSTION". IN TERMS OF PHYSIOLOGICAL MECHANISMS, SELYE'S HYPOTHESIS WAS THAT THE DIVERSE STIMULI OR AGENTS, (COLD, HEAT, EXERCISE, ETC), ALL HAVE A COMMON QUALITY OF BEING "NOXIOUS" TO THE ORGANISMS, AND ALL ACTIVATE SOME UNKNOWN COMMON AFFERENT SYSTEMS OF ONE OR MORE "FIRST MEDIATORS". SUCH FIRST MEDIATORS THEN CARRY THE MESSAGE OF EXPOSURE TO "NOXIOUS AGENTS" THROUGH NEURAL PATHWAYS TO INTEGRATIVE CENTERS, WHICH IN TURN, BRING ABOUT THE NONSPECIFIC RESPONSE TRIAD, INCLUDING STIMULATION OF THE PITUITARY-ADRENAL-CORTICAL SYSTEM. SELYE'S BASIC THEORY STATES THAT "CERTAIN DISEASE OF ADAPTATION MAY REPRESENT BY-PRODUCTS OF ABNORMAL ADAPTATIVE REACTIONS TO STRESS". THE CONCEPT OF STRESS IS USED BY SELYE AS SYNONYMOUS OF "EVOCATIVE AGENTS", OR OUTSIDE FORCES ACTING ON THE ORGANISM (AS A STIMULUS).

IN 1950 SELYE PUBLISHED A BOOK ENTITLED "STRESS". IN THIS BOOK, HE PROPOSED TO USE THE TERM STRESS IN A NEW ACCEPTION. HE INTRODUCED THE CONCEPT OF "SYSTEMIC STRESS" DEFINED AS DENOTING A CONDITION WITHIN THE ORGANISM IN RESPONSE TO EVOCATIVE AGENTS. FOR SUCH EVOCATIVE AGENTS, HE FURTHER PROPOSED THE NEW TERM "STRESSORS" (MASON, 1974). IT SEEMS IMPORTANT TO NOTICE THAT SELYE CHANGED HIS DEFINITION OF STRESS FROM AN OUTSIDE AGENT, TO A BODILY RESPONSE. ACCORDING TO MASON (1974), SELYE WAS INCLINED TOWARDS DEFINING STRESS VARIOUSLY IN TERMS OF EITHER STIMULUS, A RESPONSE OR INTERACTION BETWEEN STIMULUS, A RESPONSE. IN 1956, SELYE APPARENTLY HAD REACHED A FINAL DECISION THAT "STRESS IS FUNDAMENTALLY A PHYSIOLOGICAL RESPONSE, AND SHOULD BE DEFINED AS 'THE SUM OF ALL NONSPECIFIC CHANGES CAUSED BY THE FUNCTION OF DAMAGE'" (PAGE 4). AS RECENTLY AS 1974 IT WAS RESTATED BY SELYE THAT STRESS IS THE NON-SPECIFIC RESPONSE OF THE BODY TO ANY DEMAND MADE UPON IT.

SELYE'S WORK PARTICULARLY STIMULATED RESEARCH IN THE AREA OF PSYCHOSOMATIC MEDICINE AND IN THE PSYCHIATRIC FIELD DURING THE DECADE OF THE 50'S. SPECIFICALLY, HIS PIONEER WORK STIMULATED A NEW THRUST INTO THE SEARCH FOR SPECIFIC ADAPTATION SYNDROMES (I.E. DISEASES AND ITS RELATIONSHIP TO STRESS).

DISTINCTION BETWEEN CANNON AND SELYE'S CONSTRUCT OF STRESS

SINCE CANNON AND SELYE SEEM TO BE TWO OF THE MOST SALIENT CONTRIBUTORS TO THE CONCEPT OF STRESS FROM A HISTORICAL PERSPECTIVE, IT APPEARS APPROPRIATE TO CLARIFY THEIR MAIN THEORETICAL CONCEPTS WITHIN THE CONSTRUCT OF STRESS. IT SEEMS THAT ONE OF THE MAIN DIFFERENCES RELATES TO THE AREA OF PSYCHOLOGICAL RESPONSES TO STRESS. CANNON'S FIGHT-FLIGHT OR RAGE RESPONSE, WHICH LEADS TO AN INCREASE IN SYMPATHETIC AND ADRENAL-MEDULLARY ACTIVITY AND EVENTUALLY TO CARDIOVASCULAR DETERIORATION DUE TO ARTERIOSCLEROSIS, AND THE SELYEAN RESPONSE THAT PRIMARILY INVOLVES ACTIVATION OF THE ADRENAL-CORTICAL MECHANISM. THE LATTER IS ASSOCIATED WITH WITHDRAWAL BEHAVIOR, INDICATIVE OF DEPRESSION, AND WITH INCREASED VAGAL ACTIVITY. THE DISEASES ASSOCIATED WITH CHRONIC ACTIVATION OF THE SELYEAN STRESS RESPONSE DO NOT APPEAR UNIFORMLY THE SAME AS THOSE ELICITED BY CHRONIC AROUSAL OF THE CANNON FIGHTING RESPONSE. WHILE HIGH-AROUSAL HIGH BLOOD PRESSURE CHARACTERIZES THE CANNON RESPONSE, INCREASED CORTICOSTERONE CHARACTERIZES THE SELYEAN CONCEPTUALIZATION OF A PHYSIOLOGICAL STRESS RESPONSE.

IT SEEMS IMPORTANT TO NOTICE THAT BOTH SCIENTISTS ARE FOCUSING ON DISTINCT PHYSIOLOGICAL PHENOMENA TO EXPLAIN WHAT ACTUALLY GOES ON AS A RESPONSE TO STRESS. BOTH DESCRIPTIONS ARE NOT NECESSARILY MUTUALLY EXCLUSIVE, DUE TO THE FACT THAT DURING INTENSE OR INTERMEDIATE STATES OF STRESS, BOTH RESPONSE PATTERNS COULD BE ACTIVATED SIMULTANEOUSLY (HENRY & STEPHENS (1977)).

MOLECULAR VS. MOLAR DIMENSION

TRADITIONALLY, THE MOLECULAR MODE OF ANALYSIS, IS DEFINED AS THE ONE THAT VIEWS THE PHENOMENON OF STRESS AS EXPLAINABLE IN TERMS OF SPECIFIC PHYSIOLOGIC UNITARY FACTORS. THE MOLECULAR ANALYSIS IN THE FIELD OF STRESS TENDS TO BE IDEOGRAPHIC IN NATURE, AND ORIENTED TOWARDS DEFINING THE ELEMENTS RELATED TO THIS PHENOMENON IN TERMS OF LIMITED AND MEASURABLE VARIABLES. THIS MICROSCOPIC VIEW TENDS TO DEFINE THE PARAMETERS OF STRESS WITHIN A VERY NARROW SCOPE. HOWEVER, WHAT IS GAINED IN PRECISION IS LOST IN SCOPE.

MOST OF THE STUDIES DONE RELATED TO THE CONCEPT OF STRESS IN THE BEGINNING OF THE CENTURY WERE VERY BIASED TOWARD MOLECULAR ANALYSIS. SINCE THE FIELD OF STRESS WAS LIMITED TO BASIC SCIENCE, AND IDEOGRAPHIC STUDIES, IT SEEMS THAT THERE WAS NO NEED TO RELATE THE LABORATORY FINDINGS TO THE MACROCOSM OF SOCIAL AND COMPLEX INTERACTIONS. IT WAS NOT UNTIL THE DECADE OF THE 60'S THAT THE NEED TO RELATE THE CONCEPT OF STRESS TO MORE COMPLEX SITUATIONS WAS PURSUED (THE MOLAR DIMENSION). THE PIONEER WORK OF RAHE (1964), MOSS (1969), MASUDA AND HOLMS (1967), DOHRENWED (1969), AND BRENNER (1973) SET THE TONE IN TERMS OF MOVING THE CONCEPT OF STRESS AWAY FROM THE MOLECULAR DIMENSION TOWARDS A MORE MACROCOSMIC ONE (THE MOLAR PERSPECTIVE). THE DECADE

OF THE SIXTIES MARKED A PERIOD WHERE THE RESEARCHERS STARTED ADDRESSING THE ISSUE OF THE ROLE OF PSYCHOSOCIAL AND ENVIRONMENTAL FACTORS, AND ITS RELATIONSHIP TO STRESS.

SUMMARY NOTES ON THE CONCEPT OF STRESS

A HISTORIC ANALYSIS AND REVIEW OF THE CONCEPT OF STRESS HAS BEEN ATTEMPTED IN THE PREVIOUS PAGES. TO OUR SURPRISE THE CONCEPT OF STRESS IS WIDELY USED ACROSS DIFFERENT FIELDS OF KNOWLEDGE WITH VERY DISTINCT AND VARIED ACCEPTATIONS. AN ATTEMPT WAS MADE TO ORGANIZE THE DIFFERENT CONTRIBUTIONS OFFERED IN THE LITERATURE, VIS A VIS FOUR MAJOR PERSPECTIVES. OUT OF THIS ORIGINAL FORM OF ORGANIZING THE STRESS CONCEPT, A FEW DISTINCT AND SPECIFIC PRINCIPLES WERE FOUND: FIRST, THE DEFINITION OF STRESS IS NOT UNIFORM ACROSS FIELDS OF KNOWLEDGE, NOR HISTORICALLY. SECOND, THAT THE CONCEPT OF STRESS HAS BEEN VIEWED AS A STIMULUS, AS A RESPONSE AND AS AN INTERACTING STATE BETWEEN STIMULUS AND RESPONSE. THIRD, THAT THE EARLY DEVELOPMENT OF KNOWLEDGE IN THE FIELD OF STRESS STEMS FROM AN IDEOGRAPHIC AND MOLECULAR MODE OF ANALYSIS, AND THAT LATER ON, IT INVOLVED AS A BONA FIDE CONCEPT WITHIN THE MOLAR DIMENSION.

IN VIEW OF THE RICHNESS OF THE FIELD IN TERMS OF THE NUMEROUS AND VARIED DEFINITIONS OF THE CONCEPT OF STRESS, THE NEED TO ARTICULATE AND SPECIFY TO WHICH DEFINITION AND/OR DIMENSION WE ARE REFERRING TO, WHEN USING THIS CONCEPT SEEMS UNAVOIDABLE. TO USE THE CONCEPT OF STRESS LOOSELY, IN VIEW OF THE STATE OF AFFAIRS OF THE LITERATURE JUST REVIEWED, IS SIMPLY NOT WARRANTED.

ACCORDING TO LAZARUS (1977), THERE HAS BEEN A TENDENCY TO DISTINGUISH THREE BASIC TYPES OF STRESS: (A) SYSTEMIC OR PHYSIOLOGICAL, (B) PSYCHOLOGICAL, (C) AND SOCIAL. SYSTEMIC STRESS IS CONCERNED PRIMARILY WITH THE DISTURBANCES OF TISSUE SYSTEM (I.E. CANNON, 1929; SELYE, 1956), PSYCHOLOGICAL STRESS WITH COGNITIVE FACTORS LEADING TO EVALUATION OF THREAT (E.G. LAZARUS, 1966) AND SOCIAL STRESS WITH THE DESCRIPTION OF SOCIAL UNITS (E.G. SWELSER, 1963). WHILE SOME PEOPLE BELIEVE THAT THESE THREE TYPES OF STRESS ARE RELATED, THE NATURE OF THIS RELATIONSHIP IS NOT CLEAR AND AT TIMES CONFUSING. AS MENTIONED BEFORE, THE MOST SURPRISING EXPERIENCE SUFFERED IN THE PROCESS OF REVIEWING THIS CONCEPT, HAS BEEN THE LACK OF AGREEMENT ON THE DEFINITION OF STRESS. MASON (1975), DESCRIBED THIS CONFUSION AS FOLLOWS: "WHATEVER THE SOUNDNESS OF LOGIC MAY BE IN THE VARIOUS APPROACHES TO DEFINING STRESS, THE GENERAL PICTURE IN THE FIELD CAN STILL ONLY BE DESCRIBED AS ONE OF CONFUSION" (PAGE 8). THE DISENCHANTMENT FELT BY MANY SCIENTISTS WITH THE STRESS FIELD IS CERTAINLY UNDERSTANDABLE WHEN ONE VIEWS TWO DECADES IN WHICH THE TERM "STRESS" HAS BEEN USED VARIOUSLY TO REFER TO "STIMULUS" BY SOME WORKERS, "RESPONSE" BY OTHERS AND "INTERACTION" BY ANOTHERS. IT SEEMS RATHER DOUBTFUL THAT THIS CONFUSION OVER TERMINOLOGY IS CORRECTABLE IN THE NEAR FUTURE.

DUE TO THE PROBLEMS OF MULTIPLE DEFINITIONS OF THE TERM "STRESS" AND THE PERVASIVE TENDENCY TO CONFOUND MEASURES OF STRESS WITH STRESSORS FACTORS, SOME RESEARCHERS HAVE PROPOSED TO ABANDON THE TERM "STRESS" (HINCKLE, 1974; MASON, 1975). OTHERS HAVE ARGUED FOR USING STRESS AS A GENERAL LABEL FOR DESCRIBING A LARGE, COMPLEX INTERDISCIPLINARY AREA OF INTEREST AND STUDY. IN 1966, LAZARUS SUMMARIZED THIS ISSUE BY STATING: "STRESS IS NOT A STIMULUS, NOR A RESPONSE OR AND INTERVENING VARIABLE, BUT RATHER A COLLECTIVE TERM FOR AN AREA OF STUDY" (p. 27).

IN VIEW OF THE STATE OF AFFAIRS, REGARDING THE CONCEPT OF STRESS, THE LEAST A RESPONSIBLE PSYCHOLOGIST COULD DO IS TO AVOID USING THIS TERM OR DEFINE ITS ACCEPTION OPERATIONALLY WHEN REFERRING TO IT.

FURTHERMORE, IN VIEW OF THE FACT THAT THE ROLE OF INDIVIDUAL DIFFERENCES HAS BEEN DOCUMENTED AS A VARIABLE THAT IMPINGES ON STRESS (DEFINED AS STATE OF AFFAIRS), SPECIFIC OBSERVATIONS SHOULD BE SOUGHT REGARDING WHICH CONCRETE SUBJECTS WE ARE FOCUSING, AND WHAT SPECIFIC CONTINGENCIES ARE AFFECTING OUR PARTICULAR EXPERIMENTAL ENTERPRISE. CONCEPTS AS "THE EFFECT OF STRESS ON WOMEN" OR "THE EFFECT OF STRESS ON CHILDREN" SHOULD BE AVOIDED FOR BEING TOO GENERIC AND FULL OF SURPLUS MEANING.

IF WE CONTINUE USING THE CONCEPT OF STRESS AS LOOSELY AS OUR REVIEW OF LITERATURE SUGGESTS, WE RUN THE RISK OF CORNERING THIS HYPOTHETICAL CONSTRUCT TO A NON-SENSICAL LIMBO, LIKE I DID WITH CONCEPTS SUCH AS "ANXIETY" AND "THERAPY".

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