

**TWENTY-ONE GRAMS?
(WHAT MAKES YOU-YOU AND ME-ME)**

I. INTRODUCTION

I AM INDEBTED TO THE CLUB FOR GIVING ME THE OPPORTUNITY TO UPDATE MY LAYMAN'S SPECULATIONS ABOUT THE HUMAN CONDITION. THESE STARTED AS MY AGE ADVANCED TO THE POINT OF AWARENESS OF MORTALITY -- PROMPTING AN INQUIRY INTO THE VERY NATURE OF LIFE ITSELF. THE SERIES STARTED IN 1990 WITH A PAPER I CALLED THE PURSUIT OF HAPPINESS WHICH OFFERED THE TANTALIZING PROSPECT FROM THE DISCIPLINE OF PSYCHOLOGY THAT ONE COULD LIVE A LIFE OF HAPPINESS BASED ON PEAK OR OPTIMAL ("FLOW") EXPERIENCES. THIS LED, IN TURN, TO A CONSIDERATION OF WAYS IN WHICH THE MIND MIGHT CLAIM A HEALING POWER OVER PHYSICAL DISEASE. THIS WAS ABOUT MIND-BODY MEDICINE IN 1993 UNDER THE TITLE "PATIENT HEAL THYSELF." BY 1998, I HAD DISCOVERED, IN THE SOCIAL SCIENCES, THE NEO-DARWINISTS WHO "RESCUED DARWINIAN NOTIONS FROM THE SCRAP HEAP OF SOCIAL DARWINISM, EUGENICS AND EVEN NAZISM" TO BRING FRESH INSIGHTS INTO THE INFLUENCES OF "NATURE" AND "NURTURE" UTILIZING A KIND OF REVERSE ENGINEERING OF THE HUMAN MIND AND BODY TO HELP US BETTER UNDERSTAND WHAT ONE WRITER CALLED "THE LOGIC OF THE PUPPETEER." THAT PAPER, CALLED THE ANIMAL WITHIN, WAS FOLLOWED IN 2001 BY A PAPER CALLED THE ANIMAL WITHOUT, WHICH SPECULATED ON THE

DEVELOPING “MISMATCH BETWEEN OUR TECHNOLOGICAL PRESENT AND THE ANIMAL PAST WHICH SHAPED MUCH OF OUR BEHAVIOR,” LEADING TO THE POSSIBILITY THAT HUMAN EVOLUTION MIGHT GIVE WAY ENTIRELY TO NON-HUMAN OR HYBRID MACHINES – AND, BARRING SOME KIND OF UNPRECEDENTED HUMAN INTERVENTION, DO SO WITHIN THE PRESENT CENTURY.

THIS LEFT THE READER AND THIS WRITER IN A QUANDARY AS TO THE FUTURE. WOULD VAST INCREASES IN COMPUTATIONAL POWER INDEED OPEN UP THE OPPORTUNITY TO RE-DESIGN THE WORLD – WHO WOULD DO IT AND WOULD IT BE FOR BETTER OR FOR WORSE? AND, IN SUCH CASE, WHAT WOULD BE THE FUTURE OF “CARBON-BASED” LIFE ITSELF FOR, EVEN UTILIZING THE LATEST TECHNIQUES FOR ENHANCING HUMAN SYSTEMS, WOULD NOT A GENETICALLY ENGINEERED SUPER HUMAN BE JUST A SECOND RATE KIND OF ROBOT?

CENTRAL TO THESE SPECULATIONS WAS THE NOTION OF AN “ORDERED CONSCIOUSNESS,” UNIQUE TO OUR SPECIES I.E., ONE CAPABLE OF DIRECTING OUR ACTIVITIES TOWARD SELF-IMPOSED GOALS, AND OVERRIDING, WHEN NECESSARY, BIOLOGICAL PROGRAMMING. IT IS THIS “CONSCIOUSNESS” THAT WOULD OFFER THE PROMISE OF AN EVOLUTION SATISFACTORY TO THE PRESERVATION AND MAYBE EVEN THE HAPPINESS OF THE HUMAN RACE. THIS PAPER OFFERS OBSERVATIONS ON THE NATURE OF CONSCIOUSNESS, IS IT JUST OUR TIRED OLD COMPUTER OF A BRAIN OR SOMETHING MORE?

II. SOME UPDATES

FIRST, SOME UPDATES ON THE VARIOUS TOPICS OF THE EARLIER PAPERS.

A. EVOLUTION

- POLITICAL ATTACK ON EVOLUTION. BECAUSE THE CENTRAL FOCUS OF THE LATTER TWO PAPERS WAS AN ACCEPTANCE AND EXTENSION OF EVOLUTIONARY PRINCIPLES PERHAPS I SHOULD START BY REMINDING MYSELF AND YOU OF THE POLITICAL ASSAULT ON THE CONCEPT ITSELF. IN AN ARTICLE IN SCIENCE TIMES FOR FEBRUARY 1, 2005, BY CORNELIA DEAN, HEADLINED “EVOLUTION TAKES A BACK SEAT IN U.S. CLASSES,” SHE REPORTED:

“THERE IS NO CREDIBLE SCIENTIFIC CHALLENGE TO THE IDEA THAT ALL LIVING THINGS EVOLVED FROM COMMON ANCESTORS, THAT EVOLUTION ON EARTH HAS BEEN GOING ON FOR BILLIONS OF YEARS AND THAT EVOLUTION CAN BE AND HAS BEEN TESTED AND CONFIRMED BY THE METHODS OF SCIENCE. BUT IN A 2001 SURVEY, THE NATIONAL SCIENCE FOUNDATION FOUND THAT ONLY 53 PERCENT OF AMERICANS AGREE WITH THE STATEMENT ‘HUMAN BEINGS, AS WE KNOW THEM, DEVELOPED FROM EARLIER SPECIES OF ANIMALS.’”

THE NATIONAL SCIENCE FOUNDATION FOR ITS PART WAS PLEASED WITH THE SURVEY SINCE IT WAS THE FIRST SUCH PERIODIC SURVEY TO SHOW THAT A MAJORITY OF AMERICANS HAD ACCEPTED THE IDEA. (IN

PREVIOUS SURVEYS A PLURALITY OF AMERICANS BELIEVED IN THE BIBLICAL CREATION STORY AND TWO-THIRDS OF THEM THOUGH IT SHOULD BE TAUGHT IN THE PUBLIC SCHOOLS.) BY CONTRAST, IN OTHER INDUSTRIALIZED COUNTRIES, 80 PERCENT OR MORE ACCEPT EVOLUTION AND A VERY SMALL PERCENTAGE REJECT IT OUTHRIGHT. IN THE U.S. AND REGRETTABLY IN OHIO IT IS MORE OFTEN SEEN NOT AS AN INSTRUCTION IN SCIENCE BUT, IN THE WORDS OF LUIS LUGO, DIRECTOR OF THE PEW FORUM ON RELIGION AND PUBLIC LIFE, AS “AN ASSAULT OF THE SECULAR ELITE ON THE VALUES OF GOD-FEARING PEOPLE.” WITH THE POLITICAL ASCENDANCY OF THE SO-CALLED RELIGIOUS RIGHT, ISSUES SUCH AS EVOLUTION, STEM-CELL AND GENETIC RESEARCH, GEOLOGY AND OTHER AREAS OF SCIENTIFIC INQUIRY APPEAR TO BE FAIR GAME. PRESIDENT BUSH HIMSELF WAS QUOTED IN THE 2000 CAMPAIGN TO THE EFFECT THAT THE “VERDICT WAS STILL OUT ON EVOLUTION.” AS MAUREEN DOWD HAS POINTED OUT (IN THE NEW YORK TIMES FOR SUNDAY FEBRUARY __, 2005) SOMEWHAT POLEMICALLY:

“HE [THE PRESIDENT] DOESN’T JUST WANT TO DISMANTLE THE ‘60’S HE WANTS TO DISMANTLE THE WHOLE CENTURY – FROM THE SCOPES TRIAL TO SOCIAL SECURITY.”

(REFERENCE TO NEW YORKER JOKE. 1/17/05 ISSUE AT 74 “UNDERSTAND, RICHARDSON, I DON’T BELIEVE IN EVOLUTION BUT I DO BELIEVE IN DARWINISM”)

IF THIS VIEW PREVAILS, OF COURSE, THE GOVERNMENT’S ROLE IN SHAPING SCIENTIFIC ADVANCES WILL BE FURTHER CRAMPED BY IDEOLOGY,

LEAVING THE FIELD OPEN FOR EXPLOITATION BY SCIENTISTS IN OTHER COUNTRIES.

- ARE WOMEN LESS EQUIPPED BY EVOLUTION THAN MEN IN SCIENTIFIC APTITUDE? PRESIDENT LAWRENCE SUMMERS OF HARVARD LIT A SIGNIFICANT FIRE IN ACADEMIA AND BEYOND BY SUGGESTING THAT EVOLUTIONARY HARD-WIRING MIGHT HAVE LEFT WOMEN IN A DISADVANTAGEOUS POSITION TO COMPETE IN THE SCIENCES. IN A WRY OP-ED PIECE IN THE NEW YORK TIMES, (SUNDAY JANUARY 23, 2005) OLIVIA JUDSON, AN EVOLUTIONARY BIOLOGIST FROM LONDON, SENT IN SOME EXAMPLES OF TRULY “MAGNIFICENT” SEX DIFFERENCES FROM THE ANIMAL KINGDOM, AMONG THEM, THE GREEN SPOON WORM: THE MALE IS 200,000 TIMES SMALLER THAN THE FEMALE AND SPENDS HIS WHOLE LIFE IN HER REPRODUCTIVE TRACT, REGURGITATING SPERM THROUGH ITS MOUTH. MS. JUDSON OBSERVES THAT THE SECRET OF SEX DIFFERENCES THROUGH THE AGES SEEMS TO BE IN WHAT TENDS TO PRODUCE DARWINIAN “SUCCESS” OVER TIME. SINCE MALES AND FEMALES SHARE THEIR GENETIC STRUCTURE, AND EVOLVE TOGETHER WHAT WORKS IN ONE MAY NOT WORK AS WELL IN THE OTHER. SHE ARGUES THAT ALTHOUGH “MALADROIT,” DR. SUMMERS MIGHT HAVE A POINT WORTH INVESTIGATING, PERHAPS BY DISTINGUISHED FEMALE SCIENTISTS.

- EVOLUTIONARY THEORY OF AGING. SCIENTISTS HAVE PROPOSED AN “EVOLUTIONARY THEORY OF AGING” SUGGESTING THAT WE SURVIVE LONG AFTER PRO-CREATION OF OFFSPRING BECAUSE OF THE

NATURAL SELECTION FOR PARENTAL CARE. (SOMETHING TO THINK ABOUT WHEN WRITING COLLEGE CHECKS?) (THE NEW YORK TIMES, DATE UNKNOWN; COPY IN FILE) OTHER RESEARCHERS DISCOVERED A SO-CALLED “GRANDMA FACTOR” SUGGESTING THAT THEY PLAY A POWERFUL ROLE IN CHILD REARING SUCCESS. (THE NEW YORK TIMES, 11/5/02 AT D-1.)

- EVOLUTIONARY MEDICINE. A RELATIVELY NEW MEDICAL FIELD HAS EMERGED INQUIRING AS TO THE EVOLUTIONARY ASPECTS OF DISEASE. WHY, IN EVOLUTIONARY TERMS, DO WE GET SICK AND WHAT NATURAL RESTORATIVE REACTION HAS OUR EVOLUTIONARY HISTORY BUILT IN AS A KIND OF “INNATE WISDOM” TO AID HEALING. FOR EXAMPLE, SYMPTOMS SUCH AS A FEVER OR SWELLING MAY IN THEMSELVES BE RESTORATIVE (E.G., RELIEF FROM FEVER MAY MAKE YOU FEEL BETTER SOONER BUT THE INFECTION MAY PERSIST LONGER). THIS IS NOT AN ALTERNATIVE MEDICINE BUT RATHER ONE WHICH ASKS WHY THE SYMPTOMS OCCUR AND WHETHER ALLOPATHIC MEDICINE CAN GAIN INSIGHT INTO THE EVOLUTIONARY VALUE OF THE BODY’S REACTION AND WORK WITH THESE NATURAL PROCESSES. (CORNELL ALUMNI NEWS, MARCH-APRIL 2001 AT 31)

B. MIND-BODY MEDICINE/GENETICS/NEURO SCIENCE

- MEDITATION. A RESEARCH COLLABORATION AMONG THE DALAI LAMA AND U.S. NEUROSCIENTISTS HAS REVEALED THE BRAIN MECHANISM THAT MAY ACCOUNT FOR THE POWER OF MEDITATION TO SOOTHE, TO QUIET ANXIETIES AND REDUCE ANGER. THIS RESEARCH, INDEED, REVEALED THE DIFFERENT PARTS OF THE BRAIN IDENTIFIED WITH NEGATIVE (RIGHT

PREFRONTAL) AND POSITIVE MOODS (LEFT PREFRONTAL). THIS HAS LED TO OTHER COLLABORATIONS BASED ON ASPECTS OF MIND-BODY MEDICINE WHICH SUGGEST THAT TRAINING IN MEDITATIVE TECHNIQUES CAN IMPROVE THE GENETIC SET POINT OF MOOD AND EVEN REDUCE THE SEVERITY OF PHYSICAL SYMPTOMS OF, FOR EXAMPLE, THE FLU. (SEE: THE NEW YORK TIMES, 9/2/2003 AT D-5 AND 2/4/03 AT D-5)

- THE NEUROSCIENCE OF PARTISANSHIP. RECENT RESEARCH IN NEUROSCIENCE ALSO SUGGESTS THAT WHAT APPEAR TO BE DIFFERENCES OF MAGNITUDE BETWEEN PARTISANS IN “RED” AND “BLUE” STATES MAY NOT BE NEARLY AS GREAT AS THEY SEEM. USING FUNCTIONAL MAGNETIC RESONANCE IMAGING, RESEARCHERS FOUND THAT WHILE PARTISANS SHOWED A STRONG EMOTIONAL ATTACHMENT TO THEIR CANDIDATE (ACTIVITY IN THE VENTROMEDIAL PREFRONTAL CORTEX) THEIR REACTION TO THE OPPOSING CANDIDATE SHOWED “COGNITIVE AND EMOTIONAL CONFLICT” (BY SHOWING ACTIVITY IN THE ANTERIOR CINGULATE CORTEX). (MY OWN EXPERIENCE DOES NOT SUPPORT THIS CONCLUSION.) (JOSHUA FREEDMAN, UCLA CLIP IN FILE)

- COMFORT FOODS. EVEN MORE DELICIOUS IS THE REPORTED EFFECT OF FAT AND SUGAR RICH “COMFORT FOODS” ON THE REDUCTION OF CHRONIC STRESS, IN EFFECT AN EXAMPLE OF HOW THE BODY CAN PUT THE BRAKES ON THE BRAINS STRESS RESPONSE (IN PRIMITIVE TIMES, STRESS LED TO FASTING AND WAS RELIEVED BY FAT-RICH FOODS.) (SEE: THE NEW YORK TIMES, 9/16/2003 AT D-5)

- GENE THERAPY. THE CONTINUING CONTROVERSY OVER WHAT A REAL (OR UNDOPED ATHLETE LOOKS LIKE AND IS CAPABLE OF DOING WAS RAMPED UP BY THE DISCOVERY OF A POSSIBLE GENE THERAPY FOR TREATING SUCH THINGS AS MUSCULAR DYSTROPHY OR EVEN THE LOSS OF MUSCULATURE DUE TO AGING. THIS IS THERAPY THAT BLOCKS MYOSTATIN A “SUBSTANCE THAT CURBS MUSCLE GROWTH.” NICHOLAS KRISTOF IN THE NEW YORK TIMES (8/25/04, P. A23) LAMENTED THAT THE IMPLICATIONS OF GENE TINKERING OF THIS SORT WILL REQUIRE A MAJOR REVITALIZATION OF SCIENCE EDUCATION, ESPECIALLY GENETICS, TO HELP US FIGURE OUT IF WE WANT OUR DESCENDANTS TO BELONG TO THE SAME SPECIES AS WE DO.”

- STAYING OR GETTING WELL BY SINGING. A REPORT ON RESEARCH DONE AND PUBLISHED BY THE UNIVERSITY OF CALIFORNIA (IRVINE) SUGGESTED THE IMMUNOLOGICAL BENEFITS OF CHORAL SINGING. THE RESEARCHERS FOUND THAT THE PROTEIN IMMUNOGLOBULIN A INCREASED 150% DURING REHEARSALS AND 240% DURING THE PERFORMANCES. THE WORK IN QUESTION WAS BEETHOVEN’S MISSA SOLEMNIS, WHICH THE CLEVELAND ORCHESTRA CHORUS IS REHEARSING NOW FOR PERFORMANCES THIS SUMMER HERE AND IN EUROPE. (BOSTON GLOBE, 3/31/01 AT 5)

- MARRIAGES – GOOD AND NOT SO GOOD. THE HEALTHFUL EFFECTS OF A GOOD MARRIAGE HAVE BEEN WIDELY REPORTED AS HAVE THE UNHEALTHY EFFECTS OF AN UNHAPPY MARRIAGE. MARITAL ARGUMENTS APPARENTLY CAUSE CHANGES IN ENDOCRINE AND IMMUNE SYSTEMS. AND

THERE IS EVIDENCE THAT THE BENEFICIAL EFFECTS ARE LESS SUBSTANTIAL FOR WOMEN WHILE THE HARMFUL EFFECTS ARE SOMEWHAT GREATER. (THE NEW YORK TIMES, 10/22/02 AT D-5)

- CASANOVA GENE. WALTER KIRN IN THE NEW YORK TIMES SUNDAY MAGAZINE (7/18/04) SUGGESTED THAT THE DISCOVERY OF A GENE GOVERNING SEXUAL BEHAVIOR MAY OFFER THE PROSPECT OF “CURING CASANOVA.” THE ARTICLE QUESTIONS WHETHER SUCH A DISCOVERY WOULD BE OF GENUINE BENEFIT TO SOCIETY. THE RESEARCH WAS DONE ON MEADOW VOLES.

- ADDICTED TO WHAT? MOTHER LOVE. MEADOW VOLES CONTRIBUTED ANOTHER THESE: THAT MATERNAL SUPPORT HAS AN OPIATE COMPONENT AND SUCH NURTURING IS POWERFUL ENOUGH NOT ONLY TO OVERCOME CERTAIN GENETIC FRAILTIES, BUT ALSO TO PRODUCE GOOD PARENTS. (THE NEW YORK TIMES, DATE UNKNOWN; COPY IN FILE)

- STATUS “RULES”. FURTHER, DETERMINING THE HEALTH EFFECTS OF STATUS (AS DISTINCT FROM EDUCATION, MONEY, NUTRITION, QUALITY OF MEDICAL CARE, ETC.) (ACCORDING TO PATRICIA COHEN WRITING IN THE NEW YORK TIMES) HAS BECOME A CUTTING EDGE OF PUBLIC HEALTH RESEARCH. ACCORDING TO SIR MICHAEL MARMOT, A BRITISH EPIDEMIOLOGIST (KNOWN FOR HIS STUDY OF CIVIL SERVANTS AT WHITEHALL) AND BASED ON 25 YEARS OF RESEARCH, STATUS AS A DETERMINANT OF HEALTH AND LONGEVITY IS MORE IMPORTANT THAN GENETICS, FAST FOOD OR SMOKING. WHILE THE RATIONALE IS NOT FREE FROM DOUBT AND CONTROVERSY SIR MICHAEL

OPINES THAT “YOUR POSITION IN THE SOCIAL HIERARCHY VERY MUCH RELATES TO HOW MUCH CONTROL YOU HAVE OVER YOUR LIFE AND YOUR OPPORTUNITIES FOR FULL SOCIAL ENGAGEMENT.” THIS IN TURN AFFECTS THE LEVELS OF LONG-TERM STRESS WHICH AFFECTS BOTH IMMUNOLOGICAL AND CARDIOVASCULAR SYSTEMS. (HIS BOOK IS THE STATUS SYNDROME: HOW SOCIAL STANDING AFFECTS OUR HEALTH AND LONGEVITY). THEN, TOO, HIGHER STATUS OFTEN GENERATES A STRONG SOCIAL NETWORK, INCLUDING MARRIAGE AND PARTICIPATION IN VOLUNTARY ORGANIZATIONS. A STUDY OF 1,649 PERFORMERS NOMINATED FOR OSCARS REVEALED THAT THE EXTRA STATUS WINNING AN OSCAR ADDED NEARLY FOUR YEARS TO THE LIVES OF THE WINNERS (THE NEW YORK TIMES, DATE UNKNOWN, COPY IN FILE).

C. ADVANCES IN COMPUTER POWER AND RISKY TECHNOLOGIES

- MANY OF THE ADVANCES DESCRIBED IN MY EARLIER PAPERS CORRESPOND TO EVER-INCREASING COMPUTATIONAL SPEED AND POWER. SCIENTISTS HAVE RECENTLY MANIPULATED INDIVIDUAL ATOMS TO REPRESENT BITS OF INFORMATION WHICH, ACCORDING TO PRINCIPLES OF QUANTUM PHYSICS, CAN PERFORM MULTIPLE OPERATIONS AT THE SAME TIME (ATOMS CAN REPRESENT 1 OR 0 AT THE SAME TIME; THIS IS CALLED “SUPERPOSITION.”) THIS SUGGESTS THE POSSIBILITY THAT MOLECULAR COMPUTERS CAN BE DEVELOPED TO EXECUTE MILLIONS OF SIMULTANEOUS COMPUTATIONS. NANOTUBES (100 TIMES STRONGER THAN STEEL, IMPERVIOUS TO TEMPERATURES UP TO 6,000 DEGREES (F); A NANOMETER IS

ONE TWENTY-FIVE MILLIMETER OF AN INCH) CAN BE ADDED TO TRANSISTORS AND CAN INCREASE THE AMOUNT OF CURRENT SAFELY HELD BY THE TRANSISTOR BY 1,000 TIMES. NANOTUBES MAY ULTIMATELY SUPPLY CONNECTIONS AMONG TRANSISTORS AND A NEW KIND OF COMPUTER CHIP. DR. RICHARD E. SMALLEY, A NOBEL LAUREATE FOR HIS STUDY OF CARBON NANOTUBES, IS NOW ACTIVE IN THE DEBATE OVER FUTURE ENERGY NEEDS. HE SEES STRINGS OF NANOTUBES WOVEN INTO TINY WIRES AS MAKING POSSIBLE THE DISTRIBUTION OF SOLAR AND WIND POWER TO PLACES WHERE IT IS NEEDED. COMPUTERS MADE OF DNA HAVE ALSO BEEN INVOLVED IN EXPERIMENTS THAT MIGHT LEAD TO DEVELOPMENT OF “MD’S IN THE BODY”: TINY IMPLANTS THAT CAN DIAGNOSE GENETIC BASED DISEASE AND DISPENSE MEDICATION. (THE NEW YORK TIMES, APRIL 29, 2004, P. A23). (SEE ALSO: THE NEW YORK TIMES, 2/22/05 RELATIVE TO PRACTICAL USES OF NANOTECHNOLOGY)

- THE ENVIRONMENTAL RISKS INHERENT IN DEVELOPING NANOTECHNOLOGY HAVE AGAIN BEEN HIGHLIGHTED, THIS TIME BY A GROUP CALLED “ETC” (WEB: WWW.ETCGROUP.ORG), ESPECIALLY THE RISK OF “GREEN GOO,” MICROORGANISMS MANIPULATED BY NANOTECHNOLOGY TO PERFORM AS MACHINES. JUST AS BILL JOY DID AS REPORTED IN MY 2001 PAPER (IN RESPECT OF NANOTECHNOLOGY, GENETIC ENGINEERING AND ROBOTICS) OF ETC CALLS FOR A MORATORIUM ON ITS COMMERCIAL DEVELOPMENT UNTIL PROPER SAFEGUARDS ARE IN PLACE. (THE NEW YORK TIMES, 2/03/03)

III. WHERE SCIENCE IS NOW

IN THE FOREGOING SKETCH, I HAVE NOT EVEN EMPHASIZED THE VAST POSSIBILITIES OF STEM CELL RESEARCH, SYNTHETIC BIOLOGY OR --- PERHAPS THE MOST SIGNIFICANT AND TROUBLESOME OF ALL: THE POSSIBILITY OF CELLULAR MANIPULATION TO EXTEND HUMAN LIFE, PERHAPS INDEFINITELY. THIS LATTER PROSPECT HAS ADDED TO THE PUBLIC WARNINGS ABOUT RUNAWAY TECHNOLOGY I REFERENCED IN MY EARLIER PAPERS. DR. LEON KASS ADDRESSED THAT ISSUE AT THE CWRU MEDICAL SCHOOL A FEW YEARS AGO ADVOCATING STRICT PUBLIC LIMITS AND SUPPRESSION OF SUCH ADVANCES, REFERENCING THE VAST SOCIETAL CHANGES THAT SURELY WOULD RESULT.

IN ANY CASE IT SEEMS SAFE TO CONCLUDE THAT DEVELOPMENTS IN THE SCIENTIFIC UNDERSTANDING OF THE HUMAN CONDITION HAVE CONTINUED APACE -- PERHAPS AT AN ACCELERATING PACE -- SINCE MY EARLIER PAPERS, COMING EVEN CLOSER TO THE ABILITY TO EXPLAIN AND EVEN REPLICATE LIFE ITSELF, EITHER AS PARTLY-ENGINEERED CARBON-BASED LIFE OR HUMAN-LIKE ROBOTS; ALL SUPPORTED BY CONTINUED IMPROVEMENTS IN COMPUTER SPEED AND POWER. (ARMY ROBOTS)

IV. THE EDGE OF EVOLUTION

THE CURTAIN OF MYSTERY HAS BEEN DRAWN BACK TO THE POINT AT WHICH GENETIC SELECTION SEEMS EVEN MORE TO BE THE DOMINANT FORCE IN SHAPING HUMAN BEHAVIOR. IN FACT, IT SEEMS AS THOUGH EVOLUTION ITSELF IS NOW MORE SQUARELY WITHIN HUMAN CONTROL.

SURELY MANKIND'S IMPACT ON THE ENVIRONMENT IS NOW A MAJOR FORCE GOVERNING ITS FUTURE. AS STATED BY ANDREW REVKEN, WRITING IN THE NEW YORK TIMES FOR AUGUST 30, 2002:

“SCIENTISTS HAVE CONCLUDED THAT HUMANS NOT ONLY NOW DOMINATE THE PLANET, BUT HAVE ALSO BECOME THE DOMINANT DRIVER OF NATURAL SELECTION , THE MACHINERY OF EVOLUTION”

V. THE HARD PROBLEM

FOR CENTURIES, PHILOSOPHERS HAVE PONDERED THE EXISTENCE AND NATURE OF HUMAN SELF-AWARENESS AND SO-CALLED FREE-WILL. RENE DECARTES'S EXPRESSION: COGITO ERGO SUM, “I THINK THEREFORE I AM,” POSITS A DUALITY BETWEEN THE MIND AND THE BRAIN. CONSCIOUSNESS, HE THOUGHT, WAS AN OBSERVER IN THE HEAD, SEPARATE FROM THE WORKINGS OF THE PHYSICAL BRAIN. RELIGIONISTS, OF COURSE, DESCRIBED THIS AS THE “SOUL,” A REPOSITORY OF HUMAN VALUES SUCH AS SELF-CONTROL, ALTRUISM, RESPONSIBILITY, PERSEVERANCE AND DEVOTION TO FAMILY, FRIENDS AND CHURCH.

MEDICAL SCIENCE ONCE TACKLED THE ISSUE OF “SOUL SUBSTANCE ITSELF.” IN A PAPER ENTITLED “THE SOUL: HYPOTHESIS CONCERNING SOUL SUBSTANCE TOGETHER WITH EXPERIMENTAL EVIDENCE OF THE EXISTENCE OF SUCH SUBSTANCE,” DUNCAN MACDOUGALL, M.D. OF HAVERHILL MASS, REPORTED TO AMERICAN MEDICINE, IN THE APRIL 1907 ISSUE ON HIS

EXPERIMENTS WEIGHING PATIENTS IN THE ACT OF DYING. DR. MACDOUGALL CONCLUDED:

“[A] LOSS OF SUBSTANCE OCCURS AT DEATH NOT ACCOUNTED FOR BY KNOWN CHANNELS OF LOSS. IS IT THE SOUL SUBSTANCE? IT WOULD SEEM TO BE SO. ACCORDING TO OUR HYPOTHESIS SUCH A SUBSTANCE IS NECESSARY TO THE ASSUMPTION OF CONTINUING . . . PERSONALITY AFTER BODILY DEATH, AND HERE WE HAVE EXPERIMENTAL DEMONSTRATION THAT A SUBSTANCE CAPABLE OF BEING WEIGHED DOES LEAVE THE BODY AT DEATH”

THE 2003 MOVIE: “21 GRAMS” MADE CREATIVE USE OF THIS BELIEF IN A SEPARATE SOUL SUBSTANCE.

IN HER BOOK THE ALCHEMY OF MIND (REVIEWED IN THE NEW YORK TIMES BOOK REVIEW FOR AUGUST 29, 2004), DIANE ACKERMAN GIVES THE CONCEPT OF CONSCIOUSNESS A LITERARY FEEL:

“CONSCIOUSNESS IS THE GREAT POEM OF MATTER”

BUT, ALAS, ESSAYIST TOM WOLFE IN HIS SHORT PIECE ENTITLED “SORRY BUT YOUR SOUL JUST DIED” (PRINTED IN THE COLLECTION HOOKING UP, FARRAR, STRAUS AND GIROUX, 2000), TELLS US THAT RELATIVELY NEW TECHNIQUE OF “BRAIN IMAGING,” BUTTRESSED BY TECHNOLOGY SUCH AS THREE-DIMENSIONAL ELECTROENCEPHALOGRAPHY, PET SCANS, FUNCTIONAL MRI AND MRS (MAGNETIC RESONANCE SPECTROSCOPY), CAN

RELATE BEHAVIOR TO SPECIFIC BRAIN FUNCTIONS AND, IN EFFECT, CAN CONFIRM THE CENTRAL THESIS OF NEO-DARWINISTS, THAT THE HUMAN BRAIN IS NOT A BLANK SLATE AT BIRTH BUT AN “EXPOSED NEGATIVE WAITING TO BE SLIPPED INTO DEVELOPER FLUID.”

“THE PRINT IS THE INDIVIDUALS’ GENETIC HISTORY, OVER THOUSANDS OF YEARS, AND THERE IS NOT MUCH ANYBODY CAN DO ABOUT IT. . . . [G]ENETICS DETERMINE NOT ONLY THINGS SUCH AS TEMPERAMENT, ROLE PREFERENCES, EMOTIONAL RESPONSES AND LEVELS OF AGGRESSION BUT ALSO MANY OF OUR MOST REVERED MORAL CHOICES WHICH ARE NOT CHOICES AT ALL IN ANY FREE-WILL SENSE BUT TENDENCIES IMPRINTED IN THE HYPOTHALAMUS AND LIMBIC REGION OF THE BRAIN . . .” (WOLFE AT 91).

NEEDLESS TO SAY THIS THESIS CREATES A COURT OF HUMAN BEHAVIOR FROM WHICH, IN WOLFE’S WORDS, “THERE IS NO APPEAL,” AND PUTS TO REST THE NOTION OF A DISTINCT “SELF” SOMEWHERE IN THE BRAIN. IN THE VIEW OF NEUROSCIENCE, GIVEN COMPUTERS OF SUFFICIENT POWER IT WOULD BE POSSIBLE TO PREDICT THE “COURSE OF ANY HUMAN’S LIFE MOMENT BY MOMENT, INCLUDING THE FACT THAT THE POOR DEVIL WAS ABOUT TO SHAKE HIS HEAD OVER THE VERY IDEA.”

IN 1882, NIETSCHE POSITED THE DEATH OF GOD IN THE FACE OF RATIONALISM AND THE RISE OF SCIENTIFIC INQUIRY, MORBIDLY PREDICTING THAT, WITHOUT GOD, MANKIND WOULD POUR ITS ENERGIES INTO BARBARIC NATIONALISTIC BROTHERHOODS; ULTIMATELY (IN THE 21ST CENTURY) THE DEATH OF GOD WOULD LEAD TO THE “TOTAL ECLIPSE OF ALL VALUES.” WOLFE POSITS THAT IN 2010 OR 2030, SOMEONE WILL ANNOUNCE THE DEATH OF THE SOUL AND MANKIND WILL BE TOTALLY DEPENDENT ON ITSELF – ON ITS GENETIC HARD-WIRING, A LEGACY OF DARWINSIM.

OF COURSE, THE NOTION OF GENETIC HARD WIRING AFFECTING ALL OF OUR BEHAVIOR AND ORIGINATING IN A MECHANISTIC HUMAN BRAIN IS ANATHEMA TO MANY. IT MAY EVEN UNDERLIE THE RED STATE/BLUE STATE DICHOTOMY; IT CERTAINLY MITIGATES AGAINST TRADITIONAL NOTIONS OF INDIVIDUAL RESPONSIBILITY AND THE BELIEF IN THE VAST POSSIBILITIES OF SELF-REALIZATION.

AND THE UNDERLYING SCIENCE IS STILL INCOMPLETE. ANTONIO R. DAMASIO, WRITING IN THE SCIENTIFIC AMERICAN FOR DECEMBER OF 1999, NOTES THE MAIN PROBLEMS IN EXPLAINING THE BIOLOGICAL BASIS OF THE CONSCIOUS MIND: (I) THE MIND AS DISTINCT FROM THE BRAIN, IS SUBJECTIVE, UNIQUE AND ACCESSIBLE ONLY TO ITS OWNER; (II) DETAILED OBSERVATIONS OF THE BRAIN PRODUCE ONLY DETAILS OF THE PHYSICAL STATE OF THE BRAIN, NOT THE SENSE OF THE INDIVIDUAL; AND (III) OF NECESSITY, INVESTIGATING THE CONSCIOUS MIND MUST UTILIZE THE CONSCIOUS MIND OF THE INVESTIGATOR AND THIS MAKES THE APPROACH

ESPECIALLY COMPLICATED. NEVERTHELESS, THE AUTHOR CONCLUDES THAT THE SELF LIKELY EMERGED AS A SURVIVAL ADVANTAGE AND RESEARCH WILL, BY THE YEAR 2050, PROVIDE A BIOLOGICAL BASIS FOR THE MIND AND THE SELF. IN THIS VIEW, WHILE THE DUALITY OF MIND AND BRAIN (MIND/BODY) WILL DISAPPEAR THE MIND, THE SELF WILL SURVIVE AS A COMPLEX SET OF BIOLOGICAL PHENOMENA. IN HIS VIEW

“THE MIND WILL SURVIVE EXPLANATION, JUST AS A ROSES PERFUME, ITS MOLECULAR STRUCTURE DEDUCED, WILL SMELL AS SWEET”

BUT OTHERS SEE THAT EVOLUTION ITSELF HAS CREATED A LIMITED BEING, AND IF THE MIND IS MERELY A PHYSICAL APPARATUS IT HAS A FINITE LIMIT AND WILL PROBABLY NEVER HAVE THE POWER TO COMPREHEND -- LET ALONE SUPERCEDE -- HUMAN EXISTENCE. AND OF COURSE THERE IS THE ATTACK ON EVOLUTION ITSELF DISMISSING IT AS A MERE THEORY NOT A SCIENTIFIC DISCOVERY (REFERENCES TO WORKS, SUCH AS DAVID BERLINSKI'S, THE DENIABLE DARWIN ARE FOUND IN WOLFE AT 108.)

PERHAPS THE MOST OPTIMISTIC OBSERVER OF THESE MATTERS IS RAY KURZWEIL WHO BELIEVES THAT OUR OWN TECHNOLOGICAL CREATIONS WILL SOON ECLIPSE US AND THAT THEIR CREATION WILL EVENTUALLY ECLIPSE THEM. HE SEES A TRANSITION FROM HUMANS TO MACHINES OCCURRING WITHIN THIS CENTURY, NOTING THE CURRENT USE OF NEURAL AND RETINAL IMPLANTS. HE SEES THE EVOLUTION OF TECHNOLOGY AS A “CONTINUATION OF THE EVOLUTIONARY PROCESS THAT GAVE RISE TO US” (KURZWEIL, “THE

COMING MERGING OF MIND AND MACHINE,” SCIENTIFIC AMERICAN, SEPTEMBER, 1999). WITH EVER INCREASING COMPUTATIONAL POWER, HE SEES THE COMPLETE REVERSE ENGINEERING OF THE HUMAN BRAIN AND A SIMULATION OF EVOLUTION ITSELF.

SIGNIFICANTLY, HOWEVER, DR. KURZWEIL PONDERES WHETHER A “DOWNLOADED” MIND WOULD BE CONSCIOUS, AND CONCLUDES THAT IT PROBABLY WOULD NOT BE PROVABLY SO BUT THAT SINCE IT WILL HAVE THE FULL RANGE OF EMOTIONAL AND SPIRITUAL QUALITIES OF ITS HUMAN COUNTERPART, IT PROBABLY DOES NOT MATTER. DR. KURZWEIL CONCLUDES:

“AN EVOLUTIONARY PROCESS ACCELERATES BECAUSE IT BUILDS ON ITS OWN MEANS FOR FURTHER EVOLUTION. HUMANS HAVE BEATEN EVOLUTION. WE ARE CREATING INTELLIGENT ENTITIES IN CONSIDERABLY LESS TIME THAN IT TOOK THE EVOLUTIONARY PROCESS THAT CREATED US. HUMAN INTELLIGENCE -- A PRODUCT OF EVOLUTION -- HAS TRANSCENDED IT”

VI. CONCLUSION

AT THE START OF THIS PAPER, I ASKED WHETHER THE “MIND” – OUR UNIQUE SELF, OUR CONSCIOUSNESS WAS JUST OUR “TIRED OLD COMPUTER OF A BRAIN OR SOMETHING MORE.” I BELIEVE THAT IT IS BOTH.

1. WITHOUT SUSPENSION OF RATIONAL INQUIRY, IT SEEMS CLEAR THAT THE BRAIN CREATES THE MIND. AS EDWARD O. WILSON HAS OBSERVED (CONSILIENCE, AT 119):

“IT IS NOT AN INEFFABLE BEING LIVING APART WITHIN THE BRAIN. . . . IT MUST EXIST AND PLAY ON CENTER STAGE, BECAUSE THE SENSES ARE LOCATED IN THE BODY AND THE BODY CREATES THE MIND TO REPRESENT THE GOVERNANCE OF ALL CONSCIOUS ACTIONS”

2. AS AN INEXTRICABLE PART OF THE BRAIN, IT HAS NO PARTICULAR LOCUS BUT CONSISTS OF COMPLEX LINKAGES AMONG VARIOUS PARTS OF THE BRAIN. THE BIOLOGIST, S.J. SINGER, PUTS THIS MODERN TWIST ON DESCARTES: “I LINK, THEREFORE I AM.”

3. THE BRAIN IS THE PRODUCT OF 400 MILLION YEARS OF TRAIL AND ERROR (WILSON, CONSILIENCE AT 106), FIRST TO GOVERN INSTINCTUAL BEHAVIOR, WITHOUT CONSCIOUSNESS, THEN ASSEMBLED AS “REASON” FROM ACCUMULATED EXPERIENCE INTO A BASIC INSTRUMENT OF SURVIVAL. NO TWO ARE ALIKE.

4. THE “SOMETHING MORE” IS THE UNIQUE, SUBJECTIVE EXPERIENCE OF EACH INDIVIDUAL: THE CONFIDENCE OF THE MIND IN FREE WILL OR THE ILLUSION OF IT. THE MIND -- YOURS AND MINE -- IS EVOLVING AS THE BODY EVOLVES, FORMING NEW SCENARIOS OUT OF THE SUBJECTIVE LESSONS OF OUR UNIQUE EXPERIENCE.

IN SAMUEL BECKET'S PLAY "HAPPY DAYS," THE CENTRAL CHARACTER ("WINNIE") PLAYS THE FIRST ACT BURIED TO HER CHEST IN A MOUND OF EARTH; IN THE SECOND, UP TO HER NECK, YET, THROUGHOUT, SHE DISPLAYS AN INDOMITABLE SPIRIT USING THE ROUTINES OF DAILY LIFE TO MAINTAIN HER SELF-SUFFICIENCY AND DEFEND AGAINST THE AWFUL REALIZATION OF HER FATE. THE PLAYWRIGHT'S "MESSAGE" MAY BE THE COSMIC FUTILITY OF ALL HUMAN EFFORT – OR IT MAY BE THE TRIUMPH OF THE "SOMETHING ELSE" OVER THE HARSH REALITIES OF LIFE.

ARTHUR V.N. BROOKS
February 22, 2005
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FOR DISCUSSION:

- RESPONSES IN HIGHER BRAIN TO FAMILY, ETC (NYT 2/8/05)
- A GOD GENE (BOOK BY DEAN HAMER) REF'D IN NYT 2/12/05
- ROBOT SOLDIERS NYT 2/16/05
- TWO ASPECTS OF "HARD-WIRING" NO ONE ACCEPTS (1) INTELLIGENCE TESTING (_____) (WOLFE).