h Art of Thinking

9-18-58

Mon

Scholar Has Helpful Hints For Students

LOS ANGELES (AP)—Millions of students are back in class wondering if they have what it takes to shine as scholars.

They should lend an ear to Dr. Leslie N. Nason, professor of education at the University of Southern California. He's specialized for 20 years in the helping students do better at exams.

Study habits, he says, can make all the difference. And he has a lot of helpful hints.

HERE ARE some he devised for college freshmen—"the freshman year is an ideal time to cultivate proper methods" — but which should benefit students at other levels:

"1. Read the material in the table of contents of whatever book you are studying.

"2. Read the first paragraph or two of the first chapter.

"3. Skim through the chapter rapidly.

"4. Read the summary at the end of the chapter.

"THEN start reading the chapter carefully. At the end of each paragraph, ask yourself, 'What did the writer say?' And if you can't answer this question, you were reading too slowly.

"Slow reading allows extraneous thoughts and material to penetrate the consciousness. Reading faster serves to whip the mind to a faster rate of operation, thus limiting the circle of perception exclusively to the material at hand."

ON LECTURES:

"You have to prepare for the lecture by glancing at the material to be lectured on beforehand. You get an over-all pattern in mind. You are filling up mind space which is not utilized by the lecturer. He's not talking fast enough to fill up your mind.

"There is a little game you ought to play. If the lecturer is too slow, try to anticipate what he will say about the subject. If you do that, then the entire circle of perception is filled either with the lecturer's ideas or with the over-all pattern of the subject matter."

We give
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5 June 1955

Dear Mase,

I ran across the enclosed article in my collection of rubble. Have been saving it for three years. Perhaps it will help you a bit in solving your problem. This much I will say about women's lack of logic: The world of nature is not based on logic. Logic is a tool invented by man for manipulating categories. Categories do not exist in nature. They, too, are man-made tools invented to help man understand nature. If women can understand nature without resorting to the use of categories, then she has no need for logic. Indeed, logic is merely a crutch, and sometimes an impediment. As I said before, women are closer to nature than we are. By the use of logic and categories, we synthesize imitations of nature in our own minds, but these artificial images are rarely exact replicas. Mase, what I am trying to say is that man tends to moderate in his conclusions, whereas women deal in absolutes. When man is right, ~~it~~ it is often a 60% - 40% ratio of rightness to wrongness, whereas ~~when~~ women are more often either 100% right or 100% wrong. Right or wrong, they insist that they have a monopoly upon the truth.

I have been reading the "Generation of Vipers", and started on the chapter dealing with the Common Woman. Yep,

~~13. Ducas et~~

"Units"

e.g. packing; or writing thesis. Or administering? Org. ec?

Dampier

FOR MY STUDY OF DETERMINISM I NEED A CHRONOLOGY ON ALL SUBJECTS, SO HERE GOES.

DAMPIER'S SHORTER HISTORY OF SCIENCE. PURPOSE, AS IN ALL STUDIES, TO DETERMINE THE CAUSES AND EFFECTS OF THE VERY IMPORTANT PHENOMENA STUDIED. BUT FIRST SIMPLY TO RECORD THEM IN SEQUENCE.

DAMPIER WRONGLY GROUPS TOGETHER LANGUAGE, ECONOMICS, AND POLITICS AS HUMANISTIC, OPPOSED TO SCIENTIFIC.

FIRST EVIDENCE OF MAN, CHIPPED FLINT. EOLITHS. 1-10 MILLION YEARS AGO. NEOLITHIC MAN, POLISHED STONES. BRONZE, THEN I ON, THE DETERMINANT OF SUCCESS BEING MILITARY CHIEFLY. THIS FROM DISCOVERIES IN ENGLAND AND FRANCE. PALEOLITHIC MAN ENDED WITH THE BEGINNING OF THE LAST ICE AGE.

NEANDERTHAL MAN NOT CONSIDERED IN LINE OF HUMAN EVOLUTION.

NEOLITHIC MAN AFTER ICE AGE A TREMENDOUS IMPROVEMENT.

FRAZER, "THE GOLDEN BOUGH", ON ORIGIN OF CUSTOMS.

MAYBE MAGIC LED TO RELIGION AND SCIENCE, MAYBE TO RELIGION AND THEN SCIENCE LATTER SEEMS MORE PREVALENT, BUT TO ME IT IS DOUBTFUL THAT IMPORTANT SCIENCE SPRUNG FROM RELIGION; IT RATHER CAME WHEN MEN BEGAN TO QUESTION NATURE, IGNORING RELIGION. IT WAS ALWAYS MIXED IN WITH THE RELIGIONS OF ITS DAY, BUT NEVER DERIVED MUCH BENEFIT FROM THEM I SHOULD SAY.

MAGIC IS REALLY ANOTHER WORD FOR PRIMITIVE SCIENCE, IN THAT IT ASSUMES CAUSE AND EFFECT RELATIONSHIPS. SCIENCE IS BOTH AN ATTEMPT TO EXPLAIN, AND TO USE NATURE. THE BEST EXPLANATIONS PROBABLY WERE DERIVED FROM EXPLANATIONS OF THE USES OF NATURE MADE WITHOUT EXPLANATION, RATHER THAN FROM THE ORIGINAL ATTEMPT TO EXPLAIN. I'D SAY THAT WHERE SCIENCE DID GROW, IT WAS ON THE HEALTHY PRAIRIE OF IGNORANCE AND NOT IN THE FETID JUNGLE OF FALSEHOOD. THUS IT IS WITH ME AND ECONOMICS: BEING MOST IGNORANT, I CAN BECOME MOST WISE.

WE FOLLOW MANY CULTURE'S BY THEIR UNIQUE CUSTOMS, SUCH AS CREMATION. THESE "SIGNATURES" OF A CULTURE ARE ABSOLUTELY IRRELEVANT TO ITS SUCCESS. YET AN INTEGRAL PART.

EARLY RIVER VALLEY CIVILIZATIONS. EASIEST TO BEGIN CUSTIVATION, NOT NECESSARILY BEST AFTER CULTIVATION CULTUR IS WIDESPREAD.

3,000 B.C., EGYPTIAN "MENES" RULED A SEDENTARY CIVILIZATION. 1500 BC, BEST ADVANCES IN PRACTICAL ARTS. GREGORY XIII, 1582, AND ENGLAND IN 1752, DROP ONE LEAP YEAR 3 CENTURIES IN 5, FOR MORE ACCURACY.

GEOMETRY OF THE GREEKS WAS DERIVED FROM EGYPTIAN WORK IN SURVEYING. THEORY FOLLOWS PRACTICE HERE.

ANATOMY AND SURGERY AS EARLY AS 2500 B.C., PERHAPS DERIVED FROM EMBALMING DEAD. HERE IS RELIGION LEADING INTO SCIENCE.

MENTAL DISEASES NOT TREATED UNTIL LONG AFTER PHYSICAL, SUGGESTING THAT THE CLOSER SOMETHING IS TO THE HUMAN MIND, THE HARDER IT IS TO UNDERSTAND, DUE TO THE NATURE OF MAN.

IN EGYPT PURE SCIENCE WAS UNCOMMON, PRACTICAL ARTS BEING THE DESIDERATUM. GREEKS PREFERRED THE PURE, CARED LITTLE FOR PRACTICAL USE. IS IT GERMANE THAT THE GREEKS WERE TRADERS, THE EGYPTIANS FARMERS?

EGYPTIAN POLITICAL ORGANIZATION WAS FAR AHEAD OF FEUDAL EUROPE, BUT IN MATERIAL PROGRESS OF SOME KINDS, AND IN THE

ABILITY TO COMMUNICATE WITH GREATER AREAS, THE LATTER WAS AHEAD, AND PERHAPS IT WAS JUST THIS GREATER MATERIAL PROGRESS THAT WAS NECESSARY TO MAKE THE POLITICAL IMPROVEMENTS KEEP N WORKING.

ASSUMING THAT BEFORE MENES EGYPT HAD A FEUDAL PERIOD, WHICH IS PROBABLE.

400 B.C., CAMBYSES PERSIAN CRUSHED EGYPT; THEN IT WAS ALEXANDER, PTOLEMY, AND THEN ROME, 30 B.C , THEN BYZANTIUM, ARABS, TURKS, ENGLISH. EGYPT IS FORCED BY GEOGRAPHY TO BE TOO SMALL TO MAKE A SPLASH IN THE LATER WORLD. SHE MIGHT HAVE TURNED TO THE SEA, BUT I IMAGINE THE DELTA DISCOURAGED THAT. THUS IN SUCCESS AND CAUSATION OF VARIATIONS, GEOGRAPHY IS OF UTMOST IMPORTANCE.

ALWAYS IN EVERY CULTURE THERE ARE THOSE WHO SPECULATE ON WHAT THEY KNOW NOTHING OF, AND PRETEND TO KNOW ABOUT IT. ALL RELIGIONS ARE THAT WAY AND, BEFORE RECENTLY, MUCH THAT PASSED FOR SCIENCE. THESE PEOPLE ARE DANGEROUS AND USELESS, EXCEPT THAT IN MYSELF I FOUND A GREAT DEAL OF CURIOUSITY STIRRED UP BY THE VARIOUS THEORIES THROWN ABOUT. THEY PRESENTED A FALSE IDEA, BUT A FASCINATING ONE. NOW I FIND TRUTH MORE FASCINATING, FOR THE POWER THAT IS IN IT, BUT PERHAPS THE OTHER HELPS ONE GET HIS START, AND HELPS A CULTURE GET ITS START. PERHAPS NOT. AT ANY RATE IT IS, AND IT DOES HAVE THAT EFFECT IN SOME MEASURE.

BABYLONIA: 2000 B.C., ASTRONOMY. EGYPTIANS TOO KNEW ASTRONOMY , AS DID STONEHENGE BUILDERS AND OTHERS. EVERYWHERE ONE OF THE EARLIEST SCIENCES STUDIES.

CHALDEANS ORIGINATED ASTROLOGY (IN THE CULTURE OF THIS SUBJECT ONE SEES COMMONLY CIRCULATED REFERENCE GOES BACK TO THOSE CHALDEANS, TOO, SO MAYBE THIS IS ONE OF THOSE THINGS THAT DIDN'T SPRING UP INDEPENDENTLY ALL OVER)GAVE US OUR WEEK, MONTH HOUR AND MINUTE BASED ON 60 (5X 12, THE PERFECT NUMBER)4,000 B.C. 2500 BC, STANDARD MEASURES BY ROWYAL EDICT.BABYLONIAN IDEAS OF VIRTUES IN NUMBERS AND GEOMETRICAL PATTERNS. PERHAPS IT IS A MIXTURE OF SUCH STUFF AND THE PRACTICAL E GYPTIAN KNOWLEDGE THAT LEADS TO HONEST SPECULATION. CHXXX/87X

CHINA STARTED ABOUT 2000 BC. IRON LATER THAN EUROPE. 100 BC TRADE WITH PERSIA. IRRIGATION UNDER CHOU, 1100 BC. (IRRIGATION NOT TOO ADVANCED. IGOROTS, EARLY EGYPTIANS DO IT)

CONFUCIUS, BUDDHA, BOTH BEFORE CHRIST.

INDUS, 3,000 B.C., FIRST INDIAN.(THIS VALLEY IS NOW A PEST HOLE, PROBABLY CLIMATE CHANGED.) DECIMAL NUMBERS, 300 AD. IDEA OF DISCONTINUITY IN TIME. INTERESTING THAT MANY OF THE IDEAS WE TAK FOR GRANTED AS "SELF-EVIDENT" ARE NOT EVEN THAT, REALLY, BUT DATE FROM NEWTON, AND ARE BEING REPLACED SOMETIMES.

CRETE TRADED CONSTANTLY WITH EGYPT. 1400 B.C., EGYPT ATTACKED AND CRETE DESTROYED BY SEA BORNE RAIDERS., ACHEANS PERHAPS THEY CAME WITH HORSES AND IRON, MAY HAVE BEEN NORDIC RATHER THAN MEDITERRANEAN (AND ONE MIGHT THEN CONCLUDE THAT OVER SUCCEEDING CENTURIES NORDIC HAS BEEN BRED OUT OF GREECE THANX TO CLIMATE, AND THEY HAVE REVERTED TO MEDIOCRITY. DUBIOUS). THEN, 1100, DORIANS.

GREEK GODS WERE JOVIAL AND FRIENDLY, A COMMENT ON THE CHARACTER OF THOSE HAPPY PEOPLE. CONTRAST THIS WITH CALVIN, LUTHER. RITUAL IS OLDER THAN MYTHOLOGY, MORE SIGNIFICANT IN COMMON RELIGION.

PLATO, AESCHYLUS AND SOPHOCLES REPLACED POLYTHEISM WITH ALMIGHTY ZEUS

580 BC. TIME OF CONFUCIUS AND BUDDHA, THALES OF MILETUS AND THE

IONIAN SCHOOL OF THOUGHT, FIRST TO THINK OF SCIENTIFIC INQUIRY FOR RATIONAL EXPLANATIONS. THESE THEN WERE EXPLAINING RATHER THAN USING SCIENTISTS, THE FIRST RATIONAL EXPLAINERS. THALES. STARTED GEOMETRY FROM OBSERVING EGYTPIAN SURVEYORS.

IONIANS STARTED OFF THE THRACIAN ATOMISTS, AND ATHENIAN THINKERS, FIRST NON-MYSTIC PHILOSOPHY, BUT WITH ASSUMPTIONS. CALL THEM HOWEVER RATIONAL AND MATERIALISTIC, WHICH IS GOOD.

PYTHAGORUS WAS A MYSTIC, FOR ALL HIS MATH. PERHAPS IT WAS CURIOSITY INSTILLED BY THIS MYSTIC PHILOSOPHY THAT LED HIM TO ABSTRACT NUMBERS FROM THE OBJECTS ENUMERATED AND DEVELOP ARITHMETIC. DISCOVERY OF WHOLE NUMBER RATIOS IN TONES FROM STRINGS RELATED. ZENO OF ELEA INVENTED ACHILLES AND TORTOISE TO DISCREDIT PYTHAGORAS' THEORY OF NUMBERS. SEE, HOW IN THE VERY ELEMENTAL BEGINNINGS OF SOMETHING, THE DEEPEST MOST SEARCHING THOUGHTS MAY BE INSPIRED, WHEREAS ONE WHO SIMPLY ACCEPTS NUMBERS HAS A TOOL, BUT ELEMENTARY MISCONCEPTIONS IN ALL PROBABILITY.

HIPPOCRATES, 400 BC, NEVER TOUCHED AS MEDIC UNTIL MODERN TIMES.

SOCRATES AND PLATO, REACTING FROM ATOMISM, HELD THAT SENSATION "WAS THE ONLY REALITY". O, THIS STUPID METHOD OF DIALECTIC, THOUGHT AND COUNTERTHOUGHT, STATEMENT AND REACTION, COMBATIVE, PERSONALIZED THOUGHT. OBVIOUSLY THE TRUTH IS THAT ALL WE KNOW OF FACT COMES THRU THE SENSES AIDED BY INTELLECT, BUT TO ASK FURTHER "WHAT IS IT REALLY" ASIDE FROM WHAT OUR SENSES CAN TELL US MEANS NOTHING.

PLATO AND "REALISM", THE IDEA THAT CHARACTERISTICS ABSTRACTED FROM REALITY ARE "REAL", WHILE THE CONTAINERS OF THE CHARACTERISTICS ARE NOT. AN INTERESTING STUDY IN CROSS REFERENCING, WHOSE SIGNIFICANCE THEY QUITE MISINTERPRETED.

ARISTOTLE WAS THE GREAT COLLECTOR AND SYSTEMATIZER OF CURRENT THEORIES, FACTS AND ERRORS. 1250 TO 1650 ARISTOTLE'S REVIVED WORKS DOMINATED EUROPEAN THOUGHT, UNDER THOMAS AQUINAS. ARISTOTLE TRIED TO THINK IN UNSATISFACTORY CATEGORIES, SUCH AS SUBSTANCE, MATTER, FORM, QUANTITY, QUALITY----OBVIOUSLY NT MUTUALLY EXCLUSIVE, NOT A CONSISTENT SYSTEM.

ARISTOTLE "STARTED" NOMINALISM, WHICH SAID THAT THE CONTAINERS WERE "REAL" AND THE ABSTRACTED CHARACTERISTICS NOT. THIS FUTILE CONTROVERSY ACTUALLY MUST HAVE ABSORBED THE ATTENTIONS OF LEISURE CLASS MINDS FOR CENTUREIS. WHAT COULD HAVE KEPT THEM SO UP IN THE AIR EXCEPT THAT THEIR SOCIETY WAS HOPELESS, THERE WAS NO POINT IN STUDYING IT. THE ONLY OPENING FOR THINKERS WAS IN UTTERLY USELESS THINGS. IN CLOISTERS. THE CHANGE IN ECONOMIC LIFE AND OTHER NON-SPIRITUAL ITMS MUST THEN HAVE LEFT OPEN THE WAY FOR MINDS TO WORK, AT THIS TIME---12TH CENTERUY THAT IS.

FORMAL LOGIC FROM ARISTOTLE.

HE ~~STULTIFIED~~ stifled THOUGHT BY TURNING THE SEARCH TO ABSOLUT PREMISES RATHER THAN DEVELOPMENT OF WHAT IS KNOWN(A GOOD SUBJECT FOR STUDY, BUT THEY OVERDID IT AND ALSO MADE NO PROGRESS IN IT) AND PREMATURELY USING DEDUCTION.

MAY WE SAY HIS INFLUENCE TURNED ROMANS FROM ~~WHAT HAD BECOME~~ Science by making it a FUTILE INQUIRY, AND PREVENTED SCIENCE IN THAT EMPIRE?

IT IS DOUBTFUL IF THE INFLUENCE OF THE ONE MAN, ARISTOTLE, WAS DETERMINING, BUT IT IS POSSIBLE THAT GREEK THOUGHT JUST HAPPENED TO BE OF SUCH A NATURE AS TO LEAD INTO BLIND ALLEYS, BY BECOMING DEDUCTIVE TOO SOON, AND THIS IN GENERAL TURNED THE ROMANS AWAY FROM THOUGHT. POSSIBLE. PROBABLE?

ALEXANDER'S STAFF OF RESEARCH MEN. UNDER HIM, FAR REACHING INTERNATIONAL TRADE AND USE OF GREEK TONGUE. OVERTHROWING THE STERILE CLASSIC GREEK METHODS THE HELLENISTS MADE SOME PROGRESS IN STUDYING NATURE. (THIS NEGATES THE ABOVE SPECULATION) ALEXANDRIA, FOUNDED 332 B.C., CENTER OF LEARNING. HELLENISTIC SCIENCE CONSIDERED A GREAT ADVANCE OVER OLD GREEK BY THIS AUTHOR. PERHAPS PREVIOUS HISTORIES GAVE A DISTORTED VIEW. BABYLONIAN ASTROLOGY WAS THE FIRST DETERMINISTIC PHILOSOPHY. COMETS IT WAS HOPED WERE SIGNS OF FREE WILL. MANY MYSTERY RELIGIONS SPREAD FROM THE NEAR EAST, EACH ITH A GOD WHO HAD RISEN AGAIN! PREHISTORIC RITES OF COMMUNION AND INITIATION.

PHILOSOPHY: STOICISM, BY ZENO OF CITIUM, IN ATHENS, 300 B.C. PLATO EVIDENTLY, ALONG WITH HIS "REALISM" WAS AN "IDEALIST". THE 2 DELUSIONS DO SORT OF GO TOGETHER IN SOME WAYS. EPICURUS LED REACTION TO THIS, SAYING DEATH IS END OF LIFE; MAN'S SENSATION IS ONLY TEST OF REALITY. MY, THIS BATTLE RAGED FOR A LONG TIME. THALES VS. PYTHAGORAS, EPICURUS VS. PLATO, SCIENTISTS VS. EMERSON, ETC.

EUCLID WAS OF ALEXANDRIA, 300 B.C. ARCHIMEDES OF SYRACUSE, C. 250 B.C., FOUNDED MECHANICS AND HYDROSTATICS. (THIS GREEK EASTERN MEDITERRANEAN CIVILIZATION, ALTHO DISUNITED, WAS REALLY QUITE SOMETHING AFTER THE TIME OF ALEXANDER, WAS IT NOT? ARCHIMEDES AND THE LAW OF THE LEVER. HE TRIED TO DEDUCE IT FROM AXIOMS; NOW IT IS CONSIDERED THE RESULT OF EXPERIMENT THAT THE PROPORTIONS ARE JUST SO. (I RECALL BEING STRUCK WITH THIS QUESTION WHEN REVIEWING PHYSICS. ACTUALLY ONE CAN IN NO SUCH INSTANCE, THAT IS WORKING FROM "AXIOMS", PREDICT PHYSICAL PHENOMENA. IT IS ONLY AFTER YOU ONCE KNOW SOMETHING FROM INDUCTION THAT YOU CAN PROCEDE TO DEDUCE. "AXIOMS" CAN BE ONLY THE RESULTS OF OBSERVATION.

ARISTARCHUS OF SAMOS, C. 300 BC. HELIOCENTRIC ASTRONOMER, BUT "TOO FAR AHEAD OF HIS TIMES". LEONARDO, TOO, WAS "TOO FAR AHEAD". THE MAN WHO IS THAT HAS LITTLE INFLUENCE ON HIS OWN TIMES, AND TO LATER TIMES IS PROBABLY JUST A HERO, WITHOUT INFLUENCE. BUT IT IS POSSIBLE THAT ONE MIGHT WRITE A BOOK AHEAD OF ITS TIMES AND HAVE IT STIR PEOPLE UP AFTER HIS DEATH.

HIPPARCHUS OF NICEA, RHODES, ALEXANDRIA, 150 B.C. ASTRONOMY, TRIGONOMETRY. THEORY OF EPICYCLES, POPULARIZED BY PTOLEMY OF ALEXANDRIA, 150 AD.

EVIDENCE OF TRAMSMISSAL OF CULTURE IS IN THIS BABYLONIAN ASTROLOGY BUSINESS. I DO NOT BELIEVE THAT OTHER THAN WESTERN EUROPEAN CULTURES GO FOR IT. MANY CULTURAL ITEMS OF, SAY THE POLYNESIANS WITH THEIR TABOOS, ARE NOT KNOWN TO US. THIS LENDS STRONG CREDENCE TO MY THEORY OF ACCIDENTAL SOCIAL VARIATIONS, ABSOLUTELY THE SAME AS CHANGES IN INDIVIDUALS.

DESTRUCTION OF ALEXANDRIAN LIBRARY BY CHRISTIAN BISHIP THEOPHOLUS, 390 AD, TERRIBLE LOSS.

ALCHEMY ORIGINATE IN ALEXANDRIA ABOUT 1 AD, FLOURISHED IN ITS TOO-DEDUCTIVE NATURE, H D ITS VAILURES IN VERBIAGE, WAS PICKED UP BY ARABS AND THRU THEM TRANSFERRED TO EUROPE, TO LAST UNTIL BOYLE.

ROMANS WORKED AT APPLIED SCIENCE, IGNORED EXPERIMENTAL SCIENCE, PURE SCIENCE; AND THIS AUTHOR CLAIMS THAT BECAUSE THEY NEGLECTED

PURE

PURE SCIENCE APPLIED SCIENCE SOON LOST OUT. THIS I DOUBT STRONGLY. THE APPLIED SCIENCE OF THAT DAY DID NOT FOLLOW PUR SCIENCE, AS THE LATTER DEALT WITH FRUTLESS SPECULATION MOSTLY. IT WAS MORE LIKELY THE OVERCENTRALIZATION AND LATIFUNDIA OF ROMAN POLITICAL ECONOMY THAT ENDED ADVANCE. HERE WE SEE A SITUATION WHERE THE GREEKS, LEFT TO THEMSELVES, WOULD PROBABLY HAVE GONE ON ADVANCING SCIENTIFICALLY AND INTERMINABLY QUARRELLING. ALEXANDER CONQUERED THEM, UNITED THEM, BUT THEY IMMEDIATELY SPLIT UP AND HE HAD NO OPPORTUNITY TO IMPRESS OVERCENTRALIZATION AND CONCOMITANT EVILS. THE ROMANS, SIMILAR TO ALEXANDER BUT MORE SUCCESSFUL, IMPRESSED THE ENERVATING SYSTEM ON THE GREEKS AND EFFECTIVELY RUINED THEM. THE ROMAN NATURE COULD BUILD A UNIFIED COUNTRY AND KEEP IT GOING FOR A LONG TIME, BUT IN KEEPING IT GOING THEY GRADUALLY RUINED EVERYTHING IN IT. BY DRIVING PEOPLE OFF THE LAND THEY COULD BUILD GREAT ARMIES, BUT NOT A SATISFACTORY LIFE. OF COURSE THEY DID MANAGE TO MAINTAIN A COUPLE CENTURIES OF PEACE AND A SORT OF PROSPERITY WHILE THEY WERE DECLINING. PERHAPS THE U.S., NOW IN A ROUGHLY SIMILAR SITUATION IS IN FOR MAN YEARS OF PAX ROMANA. IF NOT, NOSTRADAMUS WAS WAY WRONG.

IN PERSONAL LIFE AS IN HISTORICAL PERSPECTIVE IT IS TRUE THAT THOSE WITH READY ACCESS TO THE LAND ARE INCLINED TO STICK TO THEMSELVES AND BE LESS SOCIABLE THAN THOSE DIVORCED FROM IT, AND THIS GIVES THEM A CERTAINPOWER THAT CIVILIZATIONS WITHOUT SUCH UNEMPLOYMENT DO NOT REALIZE. HOWEVER, WITH LVT, WHERE LAND IS NOT PRIVATELY OWNED AND ONE'S SOCIAL RELATIONS ARE ANNUALLY BROUGHT TO HIS ATTENTION IN REGARD TO THE VERY LAND HE LIVES ON, ONE IS NOT LIKELY TO RECLUSE. BUT IN HISTORY WE CAN EXPLAIN MANY GREAT ERUPTIVE CULTURES ON THE BASIS OF DIVORCING AN ENERGETIC TALENTED PEOPLE FROM THE LAND AND TURNING THEM TO WAR.

IN ROME'S 2 CENTURIES AD MEDICINE WAS THE ONLY SCIENCE TO ADVANCE, AS IT WAS OF MILITARY VALUE. REALIZE THAT ALL CURING THIS LATER PERIOD THE ROMAN GOVERNMENT WAS A VAST MILITARY MONSTER WHICH PROTECTED, UNIFIED ITS SUBJECTS AND THEREBY PREMITTED VAST TRADE AND MATERIAL ADVANCE, BUT SUCKED MORE AND MORE BLOOD FROM THE SUCCESSFUL ECONOMY IT HAD CREATED, WORE OUT THE LAND, UNTIL IT FLOPPED.

GALEN, C. 150 AD, INVENTED THEORY OF SPIRITS AND HUMORS WHICH STUCK TILL REVIVAL, OR REALLY COMMENCEMENT, OF ORIGINAL THINKING IN C. 1500.

ROMAN ACHEIVEMTNS WERE PUBLIC HEALTH, PUBLIC WORKS (AQUEDUCTS) MILITARY AND CIVIL ENGINEERING (THE LAST IS THE ONLY PRIVATE ENTERPRISE MENTIONED) ONE CAN SEE LITTLE CONTRIBUTION OF THE THEORIETICAL SPECULATION OF THE TIME TO THESE PRACTICAL ACHIEVEMTNS. WHICH MUST HAVE BEEN FIGURED OUT ON THE SPOT, A PRIORI. ENGINEERING IN OUR DAY USES IMMENSE GOBS OF THEORY, WITH STRESSES AND STRAINS, BUT ROMANS EVIDENTLY JUST FIGURED OUT ARCH, LEARNED PRACTICAL MASONRY. ROMAN PUBLIC PROJECTS, LIKE HER ARMIES, WERE SIGNS OF DECAYING POLITICAL ECONOMY. IN THOSE DAYS WMEN FREE ENTERPRISE WAS INCAPABLE OF ACCOMPLISHING GREAT WORKS DUE TO SLOW TRADE AND CREDIT FACILITIES PROBABLY, LACK OF SUCH DEVICES AS CORPORATIONS, WHY THEN PUBLIC WORKS WERE ABOUT THE ONLY SUBSTANTIAL STRUCTURES. TODAY PUBLIC WORKS ARE STILL THE LARGEST, BUT NOT THE MOSTEST NOR THE ONLY.

DIOPHANTUS OF ALEXANDRIA, C. 275 AD, FIRST ALGEBRAIST. HE WAS THE LAST GREAT ORIGINAL THINKER OF THOSE TIMES. AFTER THAT THEY JUST WROTE COMPENDIUMS. NOW IF MY P.E. DETERMINISTIC

IDEA IS CORRECT, THEN THE END OF ORIGINALITY WAS DUE TO THE GENERAL POVERTY, THE OVERCENTRALIZATION AND THEN ANARCHICAL BREAKDOWN OF GOVERNMENT, THE DESTRUCTION OF MIDDLE CLASSES AND CONDITIONS ENCOURAGING INDIVIDUAL INITIATIVE. IF SOME OUTSIDE CAUSE, AS CLIMATE, WAS DETERMINANT, THEN IT CAUSED BOTH THE POLITICAL AND THE INTELLECTUAL BREAKDOWNS. HOWEVER HUNTINGTON CLAIMS NOT THAT CLIMATE CHANGED SO RAPIDLY AS TO ACCOUNT FOR SUCH A PHENOMENON; THE MOST IT WOULD HAVE DONE IN THAT SHORT PERIOD WOULD BE TO DRIVE ENERGY SOMEWHAT TO THE NORTH, TO DESPOIL AFRICA. CONSIDERING THE ARABIAN OUTBURST OF THE 7TH CENTURY, THAT WAS PROBABLY WHEN THE SOUTHERN CLIMATE DEPRECIATED PAST THE POINT OF TOLERATIONS. WHEN DID ROMAN AFRICAN PROVINCES DRY UP?

PLATO'S SCHOOL AT ATHENS DEVELOPED NEO-PLATONISM WHICH WAS DOMINANT PHILOSOPHY ABOUT TIME CHRISTIANITY WAS BEING ACCEPTED, PROBABLY MIXED IN GREAT DEAL. DURING ALL THE PHILOSOPHIZING OF THE FAMOUS GREEKS THE OLD MYTH RELIGION WAS BELIEVED BY THE MASSES. TRULY RELIGION IS FOR THE MASSES, PHILOSOPHY AND SCIENCE FOR HE FEW.

MITHRAISM, PERSIAN CULT OF SOLDIER'S GOD. MANICHAEISM, WHICH FEATURED GOOD VS BAD GOD. THESE OF THE EASTERN MYSTERY RELIGIONS WITH THEIR MYSTIC RITES MOST INFLUENCED XIANITY. SATAN, I BELIEVE, IS A NEW TESTAMENT FABRICATION, PROBABLY CAME FROM MANICHAISM. ORIGEN, C. 200, LED SYNTHESIS OF XIANITY AND MYSTERIES. FEAR OF HELL AND CATASTROPHE REPLACE HAPPY GREEK AND STERNLY JOYOUS ROMAN PHILOSOPHIES. CHRISTIANS CAME TO CONDEMN ALL LEARNING AS PAGAN.

I'D SAY THE COMBINATION OF THEIR FEAR OF HELL AND ANTI-LEARNING ATTITUDES EFFECTIVELY STIFLED WHATEVER LIFE THERE WAS IN THE OLD BATTERED ROMAN EMPIRE, AND HELD DOWN THE SAVAGES FROM LEARNING FROM ROME AND FROM NATURE FOR 1200 YEARS. THAT EARLY CHRISTIANITY WAS AN UNUSUALLY TYRANNICAL AND REACTIONARY RELIGION I'D SAY. I'D NOT CREDIT IT WITH DESTROYING ROME, BUT WITH KEEPING THE BARBARIANS STUPID FOR A LONG TIME. THE ATTITUDE OF THE LATE ROMAN CHRISTIANS WAS TERRIBLE. THIS IS NOT TO BLAME IT ON CHRIST; PERHAPS WHATEVER RELIGION HAPPENED TO BE AROUND WHEN PEOPLE WERE FEELING AS THEY DID AT THAT TIME WOULD HAVE BECOME THE VEHICLE FOR SUCH STUPIDITYS. OR PERHAPS IT WAS THE INTERACTION OF XIANITY WITH THE TEMPER OF THE TIMES WHO KNOWS? PERHAPS IT IS CORRECT THAT IF THE INDIVIDUAL CHRIST HAD NOT LIVED THEN THERE WOULD HAVE BEEN NO DARK AGES; PERHAPS NOT., INDEED PROBABLY NOT, BUT HOW CAN I KNOW?

IN LATE ROMAN TIMES THE GOLD AND SILVER MINES OF GREECE AND SPAIN FAILED. THIS AUTHOR CLAIMS THAT THIS CAUSED A DECLINE OF PRICES WHICH SENT LAND OUT OF CULTIVATION. MY GOD, HOW LITTLE THESE STUDENTS OF DETERMINISM UNDERSTAND ECONOMICS. OF ALL THEIR WEAKNESSES I SHOULD SAY THAT WAS THE MOSTEST. BUT SINCE EVEN TODAY'S PROFESSIONAL ECONOMISTS MAKE THE SAME ERRORS THE DETERMINISTS ARE NOT TO BE BLAMED. NOW IT IS POSSIBLE THAT IN ROME THERE WAS SOME ARRANGEMENT WHEREBY THE PURCHASING POWER OF MANY PEOPLE WAS MAINTAINED BY GIVING THEM GOLD AND SILVER; PERHAPS IT WAS THE ROMAN PEOPLE THEMSELVES WHO THRU THIS MEDIUM EXPLOITED OTHERS. THERE WOULD THEN BE SOME SORT OF EFFECT WHEN THE MINES PETERED OUT, BUT ABSOLUTELY NOTHING FUNDAMENTAL. HAD THE ROMANS STILL THEIR OLD ENERGY THEY WOULD HAVE REPLACED THIS ADJUNCT TO THEIR SYSTEM WITH SOME OTHER.

LAND UNUSED ENCOURAGED MALARIA, WHICH TOOK OVER THE CAMPAGNA.

ONLY MEDICINE WAS STUDIED IN DARK AGES (AS IN DECLINE). SALERNO

Hypothesis: Arabs transmitted Roman culture in econ matters to W. Eur, as well as the things we usually hear about

CENTER OF TH S STUDY, WAS SECULAR. NEO-PLATONISM SEEMS TO HAVE BEEN A COMBINE OF ORIENTAL AND PLATONIC NONSENSE.

6TH AND 7TH CENTURIES, IRELAND SCOTLAND AND NORTH ENGLAND WERE MOST CULTURED. (PERHAPS BECAUSE THEY WERE NEAR ENOUGH TO ROME TO GET CULTURE STARTED AND FAR ENOUGH AWAY NOT TO HAVE BEEN RUINED AS WAS THE MOST OF THE EMPIRE BY POOR POLITICAL ECONOMY.) BEDE OF JARROW, ANGLO-SAXON MONK. (NOTE HE WAS NOT GAELIC)

IN THIS PERIOD ONE HEARS NOTHING OF THE CULTURE OF GERMANY, YET I VENTURE THERE WAS SOME, ELSE WHY SHOULD SO MUCH OF IMPORTANCE HAVE OCCURRED THERE SHORTLY AFTERWARDS? WHENCE CAME THE CULTURE OF SCANDINAVIA? THERE MUST HAVE BEEN INDEPENDENT DEVELOPMENTS UP THERE OF CONSIDERABLE MAGNITUDE.

CHARLEMAGNE AND ALFRED THE GREAT DID SOME CULTURE SPREADING?.

BYZANTIUM AND PERSIA MAINTAINED A CONSIDERABLE CULTURE. ARABS, C. 650, TOOK IT. THEY ADVANCED CHEMISTRY FOLLOWING ALEXANDRIAN ALCHEMY WHICH SPREAD TO EUROPE THRU SPAIN. JABIR, C. 775, GREAT CHEMIST. BUT THE VARIOUS NON-EXPERIMENTAL THEORIES DOMINATED UNTIL BOYLE.

10 CENTURY, ARABIAN SCIENCE AT HEIGHT. PHILOSOPHY, PHYSICS, MEDICINE, MATH. ARABIC WAS WHAT GREEK WAS BEFORE, THE LANGUAGE OF CULTURE. AVICENNA THE ARAB'S MEDICINE USED IN EUROPEAN UNIVERSITIES. C. 1050 OMAR KAYYHAM DID ALGEBRA. BUT ARABIC LEARNING DECLINED C. 1100. WHY? I KNOW LITTLE OR NOTHING OF THE POLITICAL ECONOMY OF ARABIAN EMPIRE. BUT I DO KNOW THAT AT PRESENT, ACCORDING TO WENDELL WILLKIE, THE WHOLE LEVANT AREA LABORS UNDER LATIFUNDIA, WHILE FRENCH ISLAM HAS ALSO MANY NOMADS OR HUNTERS AND ALSO MUCH CULTIVATED LAND..

THEOLOGIANS DENIED THE VALIDITY OF HUMAN REASON IN MATTERS OF FAITH. SPAIN WAS AHEAD OF EUROPE ALMOST A CENTURY BECAUSE OF THE ARABIAN CULTURE THERE. THIS SUGGESTS THAT THE ARABS, NOT THE MUCH PRAISED MONASTERIES, TRANSMITTED KNOWLEDGE OF GREECE TO EUROPE THRU SPAIN, AND IT WAS THE ARAB INFLUENCE THAT CAUSED SPAIN TO BLOSSOM FIRST; AND THE TIME SCHEDULE CAUSED SPAIN TO THEREFORE FADE FIRST, ASSUMING THAT THE P.E. ELEMENTS THAT CAUSE FLOURISH AND THEN DECLINE WENT WITH THE ARAB CULTURE. AND WE CERTAINLY KNOW THAT SPAIN TODAY IS HORRIBLY LATIFUNDIAD. IN FACT TODAY WE CAN PRETTY WELL MEASURE A COUNTRIES STRENGTH BY THE DISTRIBUTION OF ECONOMIC RENT. CAN IT BE THAT THE ROMAN SYSTEM WAS TRANSMITTED TO THE ARABS, AND THRU THEM TO ONE EUROPEAN COUNTY AFTER ANOTHER TO CAUSE A FLOURISH OF STRENGTH AND ULTIMATE DOWNFALL? PERHAPS IT MET AND GRADUALLY CONQUERED THE SYSTEM OF COMMUNAL LAND TENURE WHICH MUST HAVE BEEN TEUTONIC IN ORIGIN. OF COURSE THERE ARE MANY COMPLICATIONS, SUCH AS THE SUPERIMPOSITION OF FEUDALISM ON THE COMMUNAL LAND TENURE, AND OF CENTRALIZED MONARCHY ON FEUDALISM. BUT THESE MAY HAVE BEEN SIMPLY STEPS. AND EACH TRANSFER GOING NORTH AND THEN EAST WAS ALTERED BY THE CULTURES IT HAD ALREADY PASSED THRU, ESPECIALLY WHEN RUSSIA PICKED IT UP WITH KARL MARX.

AVERROES OF CORDOVA, C. 1150, ANTI-THEOLOGIANS, A RECOGNIZED AUTHORITY. THIS IS INDICATIVE OF CONSIDERABLE VIGOR I'D SAY. MAIMONIDES THE JEW TRIED TO RECONCILE JUDAISM WITH ARISTOTLE, AS AQUINAS DID XIANITY AND SOME ARAB ISLAM.

ENCOURAGEMENT OF LEARNING BY ALFRED AND CHARLEMAGNE STARTED REVIVAL OF SECULAR SCHOOLS, EVENTUALLY UNIVERSITIES, IN NORTH EUROPE.

BOLOGNA LAW SCHOOL, 1000. IN THIS SCHOOL THE STUDENTS WERE

OWNERS AND ADMINISTRATORS, TEACHERS HIRELINGS. BUT IN NORTH EUROPE, STARTING AT PARIS, TEACHERS RAN THEM. STUDENT GOVERNME T IS THEN NO INNOVATION. SCOTTISH SCHOOLS STILL USE IT.

NOMINALISM VS. REALISM WAS FULL OF THEOLOGICAL SIGNIFICANCE TO MEDIEVALISTS.

ABELARD SAID IT IS NECESSARY TO UNDERSTAND IN ORDER TO BELIEVE. A GLIMMER OF PROGRESS.

NONE OF THIS AIMLESS MEDIEVAL BICKERING, NOR ALCHEMY, CAN HAVE HAD MUCH EFFECT ON ANYONE'S THOUGHT OR ACTIONS. THE CUSTOMS OF THE TIMES ALLOWED ONLY SUCH USELESS TH OUGHT, WHICH IS ONLY WORTH CONSIDERATION AS AN EFFECT, NOT A CAUSE.

13TH CENT. INCREASING DESIRE FOR SECULAR KNOWLEDGE, WH ICH CAUSED REVIVAL IN SPAIN AND ITALY FIRST OF OLD GREEK BOOKS. THESE CAME THRU THE ARABS AND JEWS WHO HAD SCIENTIFIC HABITS UNLIKE THOSE POOR BENIGHTED CHRISTIANS OF NORTHERN EUROPE. ROLE OF ARABS IN TRANSFERRING ANCIENT CULTURE TO MODERN HAS BEEN VASTLY UNDEREST-IMATED, UNDEREMPHASIZED, ROLE OFMONASTERIES OVER. SPAIN C. 1200 WORKED HARD ON THIS REVIVAL, OF ARISTOTLE. HE HAD TO REPLACE MYSTIC NEO-PLATONISM AND WAS MORE CONDUCIVE TO SCIENCE THAN FORMER. THIS. FIRST DECLARED A HERETIC, THEN REVIVED AND IDOLIZED. ROGER BACON, ALBERTUS MAGNUS AND T. AQUINAS LED IN THIS REVIVAL, C. 1250. PREVIOUSLY NOMINALISTS HAD BELIEVED MORE IN USE OF REASON THAN HAD REALISTS. AQUINAS USED REASON OF A SORT, SUMMA THEOLOGICA, "RECONCILED" ARISTOTLE WITH BIBLE.SCHOLASTICISM. ACCEPTED GEOCENTRIC THEORY (PROBABLY WITHOUT EVER LOOKING AT A STAR!) HE, BEING A GREAT MAN AS MEN WENT IN THOSE DAYS, ACCEPTED IT ONLY AS A WORKING HYP-OTHESIS, BUT FOLLOWERS MADE IT DOGMA. (WHAT FOLLOWERS CAN DO TO THE HONEST IDEAS OF A LEADER IS PREPOSTEROUS. LOOK WHAT THEY DID TO VEBLEN. THIS EVEN SUGGESTS THAT GREAT MEN ARE SWEPT HELPLESSLY ALONG IN CURRENTS OF THE MASS MIND AND WHEN THEIR IDEAS VARY WITH WHAT THE MASS WANTS THEN THEY ARE EITHER IGNORED OR THE UNDESIRED IDEAS IGNORED. WHY TO READ CHASE'S INTRODUCTION TO VEBLEN YOU COULD SWEAR THE FORMER HAD NEVER READ VEBLEN. HE SAW IN HIM ALL HIS OWN IDEAS, LITTLE ELSE.)

ROGER BACON WAS THE JEWEL OF THE TIMES. HE INSISTED UPON LOOKING UP ORIGINAL TONGUES, NOT TRANSLATIONS; AND, MORE IMPORTANT, CLAIMED THAT EXPERI ENT GA VE BETTER ANSWERS THAN AUTHORITY. THUS THE FIGHT AGAINST CHRISTIAN SAVAGERY CAME FROM BOTH NORTH AND SOUTH, FROM THE UNTUTORED TEUTONS AND THE CULTURED ARABS. MATH AND ASTRONOMY WERE SCORNED BY CONVENTIONAL EUROPEANS BECAUSE THEY WERE PRACTICED BY JEWS AND ARABS.

THIS SORT OF REVIVAL SEEMS TO HAVE COME ABOUT THE YEAR 1200 WHILE THE ECONOMIC REVIVAL, GROWTH OF CITIES AND TOWNS, WAS THE PRECEDING TWO CENTURIES IN ITS BEGINNING I BELIEVE. IN THIS INSTANCE CULTURE WAS A RESULT MOSTLY, OF OTHER DETERMINANTS. ?

BACON, ANOTHER MAN AHEAD OF HIS TIMES, WAS IMPRISONED WHEN HIS PROTECTOR, A POPE CLEMENT IV, DIED.

THE REACTIONARY CHURCH GRABBED ON SCHOASTICISM, AFTER FIRST OPP-OSING IT, AND COMBINED IT WITH ENERVATING REALISM AS OFFICIAL CHURCH DOCTRINE. AS LATE AS 1879 IN LEO XIII' ENCYCLICA L SCHOLASTICISM WAS THE OFFICIAL DOCTRINE. RECALL HOW THE MANY MONASTIC MOVEMENTS THAT ORIGINALLY OPP OSED CHURCH DEGENERATION WERE TAKEN OVER BY THE CHURCH AND USED FOR ITS OWN LOW PURPOSES IN THIS PERIOD..

Pragmatism, real science, comes from periods of economic opportunity. Mysticism is an escape from unpleasant conditions, low opportunities.

IN ENGLAND PARTICULARY FREE MINDS, AS DUNS SCOTUS AND WILLIAM OF OCCAM, ACTED AGAINST THIS UNION OF PHILOSOPHY AND RELIGION WHICH EFFECTIVELY STIFLED PHILOSOPHY AND SCIENCE. PROBABLY IN SCANDINAVIA AND NORTH GERMANY THIS HAPPENED TOO, CONSIDERING THEIR REJECTION OF CATHOLICISM.

C. 1400 A NEW MYSTICISM GREW UP, ESPECIALLY IN GY., NICHOLAS OF CUSA PROMINENT. T IS IS MOST PROBABLY THE REPRESENTATION OF THE P.E. DECLINE OF THE TIMES WHICH WAS ENDED BY THE DEVELOPMENT OF SHIPS AND EXPLORATION AMONG THE SOUTHERN EUROPEANS.

ARISTOTLE, FOR ALL HIS FAULTS, HAD ENERGY, SYSTEM, AND PERSISTENCE ; THESE FEW VIRTUES ALONE SERVED TO MAKE HIM GREAT. THINK WHAT CAN BE DONE IH MORE VIRTUES.

I DARE SAY THE RENAISSANCE W ULD HAVE WORKED FROM GREECE THRU BALKANS TO RUSSIA JUST AS IT DID FURTHER WEST EXCEPT THAT THE TURNKS TOOK OVER ABOUT THIS TIME. THESE MONGOLAAN FIGHTS KEPT THIS PART OF THE WORLD DOWN FOR MANY CENTURIES.

THE MAGNETIC COMPASS, DISCOVERED IN CHINA IN 1050, GOT TO EUROPE C. 1150 AND PLAYED UNDOUBTEDLY A LARGE PA T IN FACILITATING NAVIGATION WHICH WAS SUCH AN IMPORTANT DETERMINANT SHORTLY AFTERWARDS. AFTER FIRE, SEED COLLECTING THIS WAS PROBABLY THE MOST SIGNIFICANT SCIENTIFIC DISCOVERY EVER (THAT I THINK OF AT THE MOMENT)(UP TO THAT TI E OF COURSE) (NOT COUNTING SKILL IN BUILDING, ETC, AS SCIENTIFIC DISCOVERIES WHICH IS QUESTIONABLE) OF COURSE THE VIKINGS DISCOVERED AMERICA WITHOUT THE COMPASS, BUT THEY WERE WILD SAVAGES GIVEN TO SUCH ROAMING, LIKE THE POLYNESIANS. IT IS DOUBTFUL IF CIVILIZED PEOPLE WOULD EVER HAVE DONE MUCH EXPLORING WITHOUT THE COMPASS. AND FOR EXPLORING TO BE SIGNIFICANT IT MUST BE DONE BY CIVILIZED PEOPLE, FOR SAVAGES CANNOT---WHAT I MEAN IS, THE VIKINGS WERE TOO SAVAGE TO MAINTAIN THE LONG OCEAN BRIDGE. OTHER SAVAGES HAVE MOVED OVER EASIER BRIDGES. WITH CIVILIZED PEOPLE THE NEW DISCOVERIES MEANT EXPANSION ROOM, JUST AS TO UNCIVILIZED, BUT HAD DIFFERENT EFFECTS ON HOME CIVILIZATION. ECONOMIC AND CULTURAL CONDITIONS HAD TO BE RIGHT BEFORE THE DISCOVERY OF AMERICA COULD BE SIGNIFICANT. LEIF ERICSON THEREFORE WAS ALSO AHEAD OF HIS TIME.

PHYSICAL REMNANTS OF ROMAN CULTURE, AS BUILDINGS, PROBABLY HAD A CERTAIN EFFECT IN RESTIMULATING THE MINDS OF THOSE WHO LIVED NEAR THEM. BUT PROBABLY THE PEOPLE WITH WHOM THEY CAME IN CONTACT HAD A GREATER INFLUENCE. PEOPLE STIMULATE FAR MORE THAN THINGS; IF IT WERE NOT SO THERE WOULD BE NO SUCH UNIFOMRITY OF IDEAS AS IS FOUND.

IN ITALY THE NOBLES LIVED IN TOWNS, IN THE NORTH ON THE COUNTRY. THIS WAS PARTLY BECAUSE THERE WERE MORE TOWNS IN ITALY I DARE SAY. ALSO BECAUSE THE TOWNS STARTED SOONER IN ITALY AND AT HE TIME MENTIONED GERMANS HAD NOT YET REACHED THE STAGE OF ALLIANCE OF NOBLLES AND TRADERS.

PETRARCH, C. 1350, TRIED TO REVIVE LIBERTY OF REASON.

C. 1450 INVENTION OF PRINTING, CERTAINLY THE MOST SIGNIFICANT CULTURAL ACHIEVEMENT OF MANY MILLENIA, AS FAR AS SPREADING THE THOUGHTS OF THE INTELLIGENT TO THE STUPID IS CONCERNED, AND EVEN TO OTHERS OF INTELLIGENCE. PERHAPS WHATEVER CAUSED THIS DISCOVERY ALSO CAUSED THE GENERAL REVIVAL OF SLIGHTLY LATER TIMES; OR PERHAPS THIS DISCOVERY ITSELF WAS A MAIN CAUSE OF THE REVIVAL. AND UNDOUBTEDLY BOTH OF THESE HAPPENED. THE DELICATE QUESTION IS, WHICH WAS MORE IMPORTANT? WHAT WERE THE OTHER ITEMS? THEY WILL NOT BE FOUND IN THIS HISTORY.

THIS IMPORTANT PRINTING DISCOVERY WAS MADE IN GERMANY, YET FOR ALL THE AUTHOR HAS GIVEN US TO UNDERSTAND GERMANY WAS BARREN OF CULTURE IN THESE YEARS.

LEONARDO, ABOUT 1500, LIVED WHEN THE PAPACY WAS FOR A SHORT PERIOD HUMANISTIC AND TOLERANT, HENCE HE COULD BE WHAT HE WAS. HE ENDED UP IN FRANCE UNDER FRANCIS I. BUT AFTER HIM THE CHURCH CLOSED IN AGAIN AND SO HIS INFLUENCE WAS NOTHING. FULL MANY A GEM OF PUREST RAY SERENE THE DARK UNFATHOMED CAVES OF OCEAN BEAR AND SO FORTH.

MULLER, C. 1450, PROMINENT IN CARRYING CULTURE FROM NORTH ITALY TO GERMANY. OBSERVATORY AT NURNBERG.

1527 VATICAN WAS CAPTURED BY "IMPERIAL TROOPS" AND ENDED THE LIBERAL CHURCH ATTITUDE.

COPERNICUS WAS INSPIRED BY LEARNING OF GREEKS WITH HELIOCENTRIC IDEAS, C 1525.

1616, GALILEO PERSECUTED, BUT HAS BEEN EXXAGGERATED. 1600, BRUNO BURNED AT STAKE, MORE FOR PANTHEISTIC IDEAS THAN ASTRONOMY. INQUISITION SWINGING RIGHT ALONG. TYCHO BRAHE OF DENMARK A NOBLE MAN, C. 1600. KEPLER, C. 1600, INSTILLED WITH PERFECT NUMBERS IDEA OF PYTHAGORAS LOOKED FOR WHOLE NUMBER RELATIONSHIPS BOTH WHERE THEY WERE AND WHERE THEY WERE NOT TO BE FOUND. THUS FROM THE MYSTERIES OF BABYLON WAS INSPIRED THE MIND THAT GAVE NEWTON HIS VALUABLE EVIDENCE.

1590 SYMBOLIC ALGEBRA ORIGINATED THANX TO VIETE.

IATRO-CHEMISTRY OR SPAGYRY WAS COMBINATION OF MEDICINE AND ALCHEMY. PYTHAGOREAN IDEA OF SULPHUR, SALT AND MERCURY AS PRIMARY ELEMENTS OR QUALITIES OF THINGS, RELATED TO REALISM PROBABLY. EACH HAS ITS ELEMENTS OF TRUTH OF COURSE; NO WIDESPREAD ERRORS HAVE BEEN WITHOUT THEIR ELEMENTS OF TRUTH.

SWISS VON HOHENHEIM, 1525, OR PARACELSUS, EXPERIMENTER WHO DEFIED AVICENNA AND GALEN, AUTHORITIES. VAN HELMONT OF BRUSSELS, C. 1625, AND HIS EXPERIMENTA WILLOW TREE. SANCTORIUS, 1600, USED THERMOMETER, AND SILVIUS (DUBOIS) HAD FIRST IDEA OF ORGANIC AND SALT CHEMISTRY WITH THEORY OF OPPOSITE SUBSTANCES COMBINING TO FORMA MILDER ONE, IN BODY, 1650.

VESALIUS, 1550, ANATOMIST WHO REITERATED DA VINCI BUT, UNLIKE LATTER, HAD INFLUENCE. DISSECTED, VIVISECTED. HARVEY, C. 1650, VIVISECTED. MALPIGHI OF BOLOGNA, C. 1660, USING MICROSCOPE, COMPLETED WORK ON CIRCULATION BY DISCOVERING CAPILLARIES. HARVEY HAD BELIEVED BLOOD JUST WORKS THRU FLESH. LEEUWENHOEK, SAYS DE KRUIF, WORKED ON MICROSCOPES ABOUT 1660, CORRESPONDED WITH ROYAL SOCIETY.

LEEUWENHOEK OBSERVED OF THE UNIVERSITY OF LEYDEN THAT "ALMOST ALL OF THE COURSES THEY TEACH THERE ARE FOR THE PURPOSE OF GETTING MONEY THRU KNOWLEDGE OR FOR GAINING THE RESPECT OF THE WORLD BY SHOWING PEOPLE HOW LEARNED YOU ARE." HERE WE SEE TWO EXTREMES AT WORK, EACH WITH ITS POINT. THERE IS NO POINT IN KNOWLEDGE EVENTUALLY EXCEPT TO HELP MATERIALLY (EXCEPT JUST FOR FUN OF CURIOUSITY) AND ON THE OTHER HAND SCIENCE, AND EVENTUALLY MATERIAL WELFARE, WOULD ADVANCE BETTER IF PEOPLE WERE NOT SO SHORT SIGHTED AND DID MORE WORK NOT FOR IMMEDIATE BENEFIT. BUT OF COURSE SOME SPECULATIONS WITHOUT VIEW TO BENEFITS GET SO FAR OFF THE TRACK AS TO BE COMPLETELY WORTHLESS. THERE IS AN OPTIMUM. THE MORE PEOPLE WORK AT THIS OPTIMUM, AND THE FEWER AT THE EXTREMES, THE BETTER.

1550, BOTANIC GARDENS AT PISA, BOLOGNA AND LEYDEN AND ELSEWHERE.

BOTANY WAS DELAYED BY CONNECTION WITH RELIGION: DOCTRINE OF SIGNATURES THAT THE COLOR OF THE FLOWER SHOWED THE USE FOR WHICH GOD DESIGNEDIT. 1540 VALERIUS CORDUS DREW PLANTS.

I SAID ONCE THAT RELIGIOUS DOGMA WAS MOST ASSOCIATED WITH WHAT IS MOST OBVIOUS TO MAN, AND HENCE THOSE SCIENCES MAKE SLOWEST PROGRESS. IT IS NOT ONLY RELIGIOUS, BUT ALL SORTS OF OTHER DOGMA THAT CAUSE THIS. HOWEVER ASTRONOMY SEEMS TO HAVE BEEN PRETTY OBVIOUS, ALWAYS A SUBJECT OF RELIGIOUS AND OTHER DOGMA, AND YET SCIENCE'S FIRST ADVANCES CAME IN ~~XXXXXXXX~~ ASTRONOMY. ONE MIGHT SAY THIS WAS BECAUSE FOR ALL THE SUBJECT'S SUPERFICIAL OBVIOUSITY ONCE THE SCIENTISTS GOT LOOKING AT STARS A BIT IT GOT PRETTY WELL INTO THE REALM OF THE UNKNOWN AND THE CHURCH WAS REBUFFED.

ZOOLOGICAL GARDENS, AT LISBON, IN THIS VIGOROUS LATER 16TH CENTURY. STUDY FROM NATURE, INSTEAD OF COPYING PLINY THE ELDER.

C. 1600, WILLIAM GILBERT ON MAGNETISM

COMPASS, INCIDENTALLY, CAME FROM CHINA TO EUROPE VIA MUSLIM SAILORS

C. 1600 FRANCIS BACON REALLY KNOCKED THE SPOTS OFF ARISTOTLE NONSENSE WITH NOVUM ORGANUM. HE EVEN OVERDID THE INDUCTIVE METHOD, NOT APPRECIATING USE OF DEDUCTION.

DESCARTES, C. 1640, FRANCE. COORDIATES, IDEA OF SPACE AS A PLENUM (OPPOSITE OF VACUUM, AND I'M INCLINED TO AGREE) DEISM, COGITO ERGO SUM, THEORY OF VORTICES.

HOBBES, C. 1660, SAID ONLY REALITY WAS MATTER IN MOTION---TRULY A STROKE, BUT CONTAINS AN UNPROVEN ASSUMPTION ABOUT NATURE OF MIND

IN LATE MIDDLE AGES MANICHAISM REVIVED WITH THE DEVIL AS THE HERO, THE REPRESENTATIVE OF THE DISPOSSESSED! C. 1500 THE CHURCH AUTHORIZED BELIEF IN MAGIC AND STARTED BURNING WITCHES AS PART OF THE INQUISITION. IN ENGLAND, BECAUSE TORTURE WAS NOT ALLOWED IN THE COURTS, WITHCES NEVER CONFESSED. ON CONTINENT THEY WERE TORTURED. THIS MUST HAVE LASTED 2 CENTURIES, FOR IN 1675 NEW ENGLAND WAS BURNING WITCHES.

C. 1600, GALILEO. HE OBSERVED, INDUCED, DEDUCED WITH MATH, AND TESTED DEDUCTIONS BY EXPERIMENT. FIRST SCIENTIEST TO DO ALL THIS, WHICH IS THE METHOD BY WHICH MODERN WORK IS CARRIED FORWARD. EMPIRICAL IN ORIGINS THIS SCIENCE; ANY CONCORDANCE WOULD HAVE TO COME AFTER THE INDIVIDUAL FACTS HAD BEEN GLEANED, AND OF COURSE COME IT DID AND STIL IS. GEORGE HAD THAT BIG TROUBLE THAT AT TIMES, WITH HIS BELIEF IN NATURAL LAW HE SAW A PREORDAINED SYS TEM SHAPING UP. HE LEFT OFF HIS ORIGINAL "FOLLOW TRUTH WHEREVER IT MAY LEAD" TOO SOON. HE SHOULD HAVE WORKED ON HIS SYSTEM MORE.

FIRST LENS AND SCOPE WORK WAS DUTCH IT SEEMS, C. 1600. THIS AND RINTING SEEM TO HAVE BEEN THE ONLY NORTH EUROPEAN INVENTIONS SO FAR.

GALILEO WORKED WITH PENDULA AFTER HIS ASTRONOMICAL OBSERVATIONS

A MAN MAY FIGURE EVERYTHING OUT AND YET MAKE NO I PRESSION ON H S TIMES, PERHAPS BECAUSE HIS THOUGHTS ARE TOO ADVANCED FOR HIS TIMES, PERHAPS BECAUSE HE IS UNABLE TO EXPRESS THEM. BUT WHEN THE IGHT TIME COMES, THERE MUST ALSO BE THE MAN TO TAKE ADVANTAGE OF IT. AND PERHAPS ANY TIME IS THE RIGHT TIME FOR THE MAN WHO STUDIES HOW TO CONTROL HUMANS. GALILEO AND BACON ADMITTED WHEN THEY DID NO KNOW.

HOBBES WAS CRITICIZED, AND RIGHTLY, FOR HIS ASSUMPTIONS ABOUT MIND.

HIS CRITICS, THE CAMPBRIDGE PLATONISTS, APOTHEOSIZED SPACE; WHICH LED TO NEWTON'S IDEA OF ABSOLUTE SPACE AND TIME THIS FELLOW SAYS, BUT THAT IS BEING PRETTY MODERN. I'D SAY THE IDEA OF ABSOLUTE SPACE AND TIME WAS INTUITIVE. AND EVEN MODERN THEORIES DENYING IT ARE TAKING LIBERTIES WITH THE WORDS. THE IMPACT OF EINSTEIN ON MODERN PHILOSOPHERS HAS BEEN QUITE DIFFERENT FROM THE ACTUAL IDEAS OF EINSTEIN. MOST WHO REFER TO HIM JUST HAVE SOME HAZY NOTION THAT TIME AND SPACE ARE NO LONGER ABSOLUTE, WHAT O EVER THAT IS SUPPOSED TO MEAN THEY DO NOT KNOW.

BOYLE, C. 1660, GOT CHEMISTRY GOING STRAIGHT. GAS LAW, AND PHILOSOPHY.

PASCAL, C. 1650. ORIGINATED THEORY OF PROBABILITY. THEOLOGIAN AND PHYSICIST.

HUYGENS, C. 1680. CONSERVATION OF ENERGY. CENTER OF OSCILLATIO N. MECHANICS

STARTING SLOWLY AROUND 1550 AND SPEEDING UP TOWARDS 1650 SCIENTIFIC SOCIETIES WERE FORMED, FIRST IN ITALY (SPAIN TOO?) AND THEN IN ENGLAND, WITH ROYAL SOCIETY. (RECALL THE DUTCHMAN LEEUWENHOEK PREFERRED TO CORRESPOND WITH LONDON'S ROYAL SOCIETY THAN ANYTHING AT HOME)ROYAL SOCIETY BEGAN BEFORE THE DAY OF CHARLES II BUT WAS INCORPORATED UNDER HIM, 1662.

NEWTON SPENT PROBABLY MORE TIME WORKING AT CHEMISTRY THAN AT PHYSICS, ALTHO HE CONTRIBUTED NOTHING TO THE FORMER SCIENCE. THIS IS PARTLY A COMMENT ON NEWTON, AND PARTLY ON "RELATIVE INTELLECTUAL DIFFICULTY" WHEREBY THE SIMPLEST FACTS OF CHEMISTRY MAY BE MORE DIFFICULT FOR THE HUMAN MIND TO GRASP THAN NEWTON'S PHYSICS AND CALCULUS.

FIRST SCIENTISTS, SUCH AS NEWTON, DID NOT ARGUE WITH RELIGION. THEY WERE WISE: SAVED TROUBLE. 1642- 1727, NEWTON. 1665, PLAGUE AT CAMBRIDGE. NEWTON WAS NOT ANXIOUS TO PUBLISH HIS SPECULATIONS. WONDER WHERE HE GOT THE DOUGH. THE MEN WHO EXERT MOST INFLUENCE ARE OFTEN THOSE SCIENTISTS WITH NO DESIRE TO PUBLISH, WHO ARE JUST CURIOUS. I MUST CULTIVATE THIS ATTITUDE, AND WOULD DO SO MORE IF I DID NOT HAVE TO MAKE A LIVING.

NEWTON CLAIMED THAT AT THE AGE OF 23 HE WAS IN THE PRIME OF HIS AGE FOR INVENTION AND THOUGHT, AND THOUGHT MORE THAN AT ANY TIME SINCE. THIS MAY BE A WARNING TO ME TO DO ALL MY THINKING EARLY, OR IT MAY BE NOTHING AT ALL. GENERAL RUN OF GENIUS IS NOT NECESSARILY TO WORK EARLY, AS PSYCHOLOGY BOOK INDICATES.

LEIBNIZ PERFECTED, OR ORIGINATED, THE DX/DY TERMINOLOGY; NEWTON EVIDENTLY DID NOT NEED IT, SAW EVERYTHING IN HIS HEAD.

FORCE IS A SIXTH SENSE SURELY, THE SENSE BEING IN OUR MUSCLES.

1621, SNELL DISCOVERED THE LAW OF REFLECTION BY GLASS.

GREEKS HAD ORIGINATED IDEA OF ETHER, WHICH HAS SOMETHING TO IT AS I PREVIOUSLY HAVE SPECULATED.

MANY OF THE GREEKS' FAMOUS FIRSTS WERE ACHIEVED NOT BY ACTUALLY FINDING ANYTHING OUT BUT BY DEVELOPING A THEORY WHERE THEY DID NOT KNOW THE TRUE EXPLANATIONS. THIS, YOU MUST ADMIT, IS AN ADVANCE OVER RELIGIOUS EXPLANATIONS. A TRUE HISTORY OF SCIENCE WOULD HAVE TO DIG OUT MANY MORE UNKNOWNS WHO MADE INDUCTIVE OBSERVATIONS BUT WROTE NO BOOKS. AGAIN THE POWER OF THE PEN IS DEMONSTRATED. THOSE WHO

WROTE, THO THEY DID NOT KNOW WHAT THEY WERE WRITING ABOUT, EXERTED MORE INFLUENCE THAN THOSE WHO ACTUALLY MADE THE PROGRESS. NOW IF THE TWO VIRTUES WERE COMBINED.....

PER DELIQUIUM???

NEWTON PHRASED HIS INQUIRIES "HOW" DO THINGS HAPPEN, NOT "WHY". THIS IS JUST SAYING THAT HE LOOKED FIRST FOR PROXIMATE CAUSES AND DID NOT BOTHER WITH LONG TERM CAUSATION ABOUT HICH HE COULD KNOW NOTHING BUT COULD ONLY FIGHT THE CHURCH.

A MATERIALIST ANTI-CLERICAL PHILOSOPHY GREW UP C. 1750, VOLTAIRE PROMINENT, AND IT USED OF COURSE THE GREAT ADVANCES OF SCIENCE AND WAS NO DOUBT IN SOME DEGREE INSPIRED BY THEM. PROBABLY ALSO BY OTHER THINGS. 17TH CENTURY THINKERS DID NOT FIGHT RELIGION BUT DID CONSTRUCTIVE THEORIETICAL WORK. 18TH CENTURY FOUGHT THE CHURCH AND BEGAN INDUSTRIAL REVOLUTION AND OTHER GREAT CHANGES FOR MASSES. OFFHAND IT DOES NOT SEEM TO ME THAT THERE WAS AS MUCH THEORIETICAL ADVANCE IN 18TH CENTURY.

NEWTON PROMINENT IN FIGHTING JAMES II'S ATTACK ON UNIVERSITY. NERVOUS BREAKDOWN; NERVOUSLY INTOLERANT OF OPPOSITION OR CRITICISM. ABLE ADMINISTRATOR, AND TOOK OVER ROYAL SOCIETY AS PRESIDENT FOR MANY YEARS UNTIL DEATH. REMINDS ONE OF JOSEPH HENRY WHO TOOK OVER THE SMITHSONIAN.

LORD KEYNES OWNED NEWTON'S PERSONAL PAPERS FOR MANY YEARS.

PHYSICIAN JOHN LOCKE, C. 1665, OPPOSED SCHOLASTICISM IN MEDICINE FOR INDUCTION. ESSAY ON HUMAN UNDERSTANDING, FORST PSYCHOLOGY AND THEORY THAT MIND REQUIRES EXTERNAL STIMULATION.

BERKELY, BISHOP OF CLOYNE, SAID THAT WHAT WE SEE IS NOT "REAL" BUT JUST A PICTURE. OBVIOUSLY THIS MEANS NOTHING. C. 1740, IRISH.

HUME, C. 1760, DENIED MIND AS WELL AS MATTER IS REAL, LEFT A SERIES OF IMPRESSIONS OR SOMETHING.

KANT, C. 1780, WAS "SKEPTICAL" OF THE POSSIBILITY OF KNOWING "REALITY", (SINCE OBVIOUSLY WE HAVE NO GUARANTEE THAT THE SENSES TELL US EVERYTHING. WHEN I WAS YOUNG, SAY 12 AND THEREABOUTS, I GOT TO THINKING THAT PERHAPS EVERYTHING THAT APPEARED TO ME WAS A STAGE JOB, THAT ACTUALLY THE WORLD WAS NOT AS I HAD BEEN LED TO BELIEVE BUT THAT THE OTHER PEOPLE IN IT WERE PLAY ACTORS WHO WERE WATCHING MY PSYCHOLOGICAL REACTIONS WITH A SUPERIOR HUMOR. IT WAS, I BELIEVE, AFTER THE UNPLEASANT ENCOUNTER WITH TED SMITHERS THAT THESE IDEAS DEVELOPED.) LEIBNIZ THOUGHT THAT "PURE REASON" COULD UNFOLD ETERNAL TRUTH, AND KANT WORKED ON THIS, ENDED UP BY SAYING THAT "THE MORAL SENSE" (WHATEVER THE HELL THAT IS) REVEALS ETERNAL TRUTH, DIVORCED FROM REALITY.

LAPLACE, IN WITH VOLTAIRE, CONCEIVED THE SAME SORT OF DETERMINISM THAT I ONCE WORKED UP---WHICH, IN FACT, I HAVE MADE AN INTEGRAL PART, OR AT LEAST A PART, OF MY PHILOSOPHY. LAPLACE, HOWEVER, SAID THAT A SUPER MIND WOULD EMERGE IN MAN, ABLE TO ACCOUNT FOR THE INFINITE FACTORS AND PREDICT FOREVER EVERYTHING. MODERN PHYSICS, SAYS THE AUTHOR, HAS ADAPTED A PRINCIPLE OF INDETERMINACY. I HAVE HEARD INKLINGS OF THIS BEFORE, BUT OBVIOUSLY IT DOES NOT EXPLAIN THE HUMAN MIND, WHICH IS THE BIGGEST INDETERMINANT WE HAVE TO CONTEND WITH.

18TH CENTURY FRANCE WORKED UP THIS ANTAGONISM OF SCIENCE AND RELIGION, THIS VOLTAIRE MATERIAL DETERMINISM. ENGLAND DID NOT HAVE SUCH A FIGHT UNTIL 19TH CENTURY, BECAUSE 18TH CENTURY ENGLISH CHURCH WAS TOLERANT (???)

AS HERB HAS POINTED OUT, IT IS FOLLY TO HAVE THEORIES ON THESE

SUBJECTS WHEN SO LITTLE IS ACTUALLY KNOWN FROM EXPERIMENT.

19TH CENTURY GERMANY HAD MATERIALISM, TOO.

AFTER NEWTON THE MATH LEAD PASSED TO CONTINENT, WITH BERNOULLI AND EULER; A FIGHT BETWEEN ENGLISH AND CONTINENTALS OVER PRIORITY OF NEWTON OR LEIBNIZ INVOLVED. TAYLOR AND MACLAURIN IN ENGLAND CONTRIBUTED.

MAUPERTUIS, VOLTAIRE, LAGRANGE (C. 1800)(DIFFERENTIAL EQUATIONS) LAPLACE EXTENDED LAGRANGE AND WORKED NEBULAR HYPOTHESIS. HE WAS A SHREWD FELLOW WHO GOT TO BE A MARQUIS IN THE FRENCH RESTORATION.

CAVENDISH, C. 1800, DETERMINED "G".

C. 1700, HOMBERG MADE FIRST STUDIES OF SALTS, FOLLOWING SILVIUS. EARLY CHEMISTRY REVOLVED AROUND FIRE. PHLOGISTON THEORY, BY PRUSSIAN STAHL, C. 1700. 18TH CENTURY SAW MANY CHEMICAL ADVANCES, AS IN PRIESTLY, LAVOISIER, BLACK(CO_2) SCHEELE (CHLORINE), CAVENDISH.

BOYLE, HOOKE, LOWER AND MAYOW HAD DISCOVERED WHAT BREATHING IS, BUT LAVOISIER HAD TO REDISCOVER IT.

STAHLE, IN ADDITION TO THE PHLOGISTON CONFUSION, WAS A VITALIST WHO VERY DEFINITELY MADE STATEMENTS ON SUBJECTS OF WHICH HE KNEW NOTHING.

1718, INNOCULATION FOR SMALLPOX INTRODUCED FROM CONSTANTINO LE BY LADY MONTAGU.

BOERHAVE, 1708, AND VAN HALLER, 1757, GREAT COMPENDIA OF PHYSIOLOGICAL AND MEDICAL KNOWLEDGE.

INCREASE IN MENAGERIES ABOUT THIS TIME; BUFFON, C. 1770, THE "ZOOLOGIST".

SPALLANZANI, C. 1780, PROVED BOILING KILLS MICROBLES. C. 1660 MALPIGHI AND GREW USED MICROSCOPE ON PLANTS, DISCOVERING ELEMENTS OF STRUCTURE, AS STAMENS AS MALE ORGANS.

RAY, C. 1700, MONOCOTS VS. DICOTS.

FROM AUGUSTINE TO LUTHER THE IDEA RECURS THAT STUDY OF NATURE IS A WASTE OF TIME A SORT OF PLEASURE OF THE FLESH. LUTHER, AFTER ALL, WAS ONLY FIGHTING RELIGION WITH RELIGION: THE REVOLT AGAINST ALL RELIGION HAD TO WAIT.

LINNAEUS, C. 1770, SYSTEM BASED ON SEX ORGANS. MODERN SYSTEM, RETURNING TO RAY, TAKES ALL CHARACTERISTICS INTO ACCOUNT TO FOLLOW EVOLUTIONARY ORIGINS.

ODDLY, IN THE PERIOD BEFORE DARWIN, COMMERCIAL BREEDERS WERE FAMILIAR WITH VARIATIONS, AND USED THEM; BUT "SCIENCE" HARDLY KNEW ABOUT THEM AT ALL.

1670 RICHER, SUBSIDIZED BY COLBERT, MADE ASTRONOMICAL OBSERVATIONS AT CAYENNE TO AID NAVIGATION, DISCOVERED ENORMITY OF SOLAR SYSTEM.

17TH CENTURY EXPLORERS DID TRAVEL LITERATURE, POPULARIZED NOBLE SAVAGE IDEA WHICH STIMULATED ANTHROPOLOGY.

COOK, C. 1770, SENT TO EXPLORE BY ROYAL SOCIETY. GEOGRAPHICAL AND VITAMIN DISCOVERIES.

1728, WOODWARD'S FOSSIL COLLECTION STIMULATED THOUGHT.

HUTTON'S UNIFORMITARIAN THEORY, THAT PROCESSES KNOWN TODAY EXPLAIN THE GREAT CHANGES OF GEOLOGIC HISTORY.1785

WM. SMITH ASSIGNED RELATIVE AGES THRU FOSSILS, AND CUVIER RECONSTRUCTED FOSSILS.C. 1800

STEAM ENGINE STARTED IN 18TH, APPLIED IN 19TH. EMPIRICALLY BUILT, NOT USING SCIENTIFIC KNOWLEDGE.(HOW ABOUT BOYLE'S AND CHARLES' LAWS? PERHAPS THESE DID NOT CONTRIBUTE TO THE INVENTORS, BUT THEY COULD HAVE. 1777, WATT WITH CRANKSHAFT AND COOLING

CYLINDERS MADE EXISTING STEAM ENGINES PRACTICABLE.

WEAVING MACHINERY, DYING TECHNIQUE, STRENGTH OF MATERIALS MEASUREMENTS ALL IMPROVED.

CHANGE IN AGRICULTURAL METHODS ASSOCIATED WITH INCLOSURES. ROTATION OF CROPS. PLOUGHS GREATLY IMPROVED, CF. FAULKNER.

IN 19TH CENTURY SCIENCE BECOMES MORE USEFUL, MORE OF A DETERMINANT. PREVIOUSLY IT HAD SIMPLY EXPLAINED, BOTH NATURE AND WORKS OF MAN. ELECTRIC KNOWLEDGE LED TO TELEGRAPH, FARADY TO DYNAMOS, MAXWELL (EVENTUALLY) TO RADIO. ALL THRU THE CENTURY IT WAS ASSUMED THAT MAIN BASIC PROPOSITIONS HAD BEENLAID DOWN AND WE WERE SIMPLY EXPANDING THEM. THIS IS USEFUL ATTITUDE FOR MUCH PRACTICAL WORK, AND EVEN TODAY ALL THIS OLD STUFF IS TAUGHT AS FUNDAMENTAL BEFORE ONE GETS UP TO EINSTEAN AND THE BORDERLINES OF KNOWLEDGE.

T IS BRITISH AUTHOR MAKES NO MENTION OF FRANKLIN: DEBINITELY OVERPLAYS ENGLISH MEN. AFTER 1895 XRAYS, QUANTA, RADIUM, RELATIVITY: REAL ADVANCE.

JOSEPH BLACK, C. 1 80 DISTINGUISHED HEAT FROM TEMPERATURE. STRANGELY ENOUGH THE THEORY OF CALORIC, THAT HEAT WAS AN UNSEEN "FLUID", ~~WAS~~ CONDITIONED THE MIND TO ACCEPT THE IDEA OF HEAT AS A QUANTITY WHEREAS THE CORRECT EXPLANATION, AS AN AGITATION OF PARTICLES, WOULD NOT. SO CO RRECT THOUGHT MAY AT TIMES BE QUICKER ADVANCED BY INCORRECT THEORIES; JUST AS THE ULTIMATELY DESIRABLE P.E. SYSTEM MIGHT BE BETTER APPROACHED, IN SOME INSTANCES, B WAY OF CERTAIN FALSEHOODS THAT WOULD PROPERLY CONDITION MINDS TO ACCEPT FURTHER ADVANC .

BENJ THOMSON LORD RUMFORD SHOWED HEAT PROPORTIONAL TO WORK DONE, BUT HIS WORK IGNORED. C. 1840 JOULE, HELMHOLTZ, MAYER, GROVE, RANKINE AND LORD KELVIN SHOWED IDENTITY OF HEAT AND ENERGY.

IT WAS OBVIOUSLY AN ERROR TO BASE METAPHYSICAL AND PHILOSOPHICAL SPECULATION ON IDEA OF INDESTRUCTABILITY OF MATTER, AND ON ANY WORK IN SCIENCE WHICH MUST ALWAYS BE CHANGING. PHILOSOPHERS MUST GRASP WHAT IS PERMANENT, OR EXPLAIN THAT THEIR IDEAS HO D GOO ONL FOR LIMITED ASSUMPTIONS.

CLAUSIUS (ENTROPY OR UNAVAILABLE THERMODYNAMIC ENERGY) AND WILLARD GIBBS(THERMODYNAMIC POTENTIAL). C. 1877.

SPECTRUM ANALYSIS, MAXWELL ON LITE, ETC.

ABOUT HIS PERIOD SCIENCE HAS BECOME SO WIDESPREAD AND USEFUL THATTHERE ARE SO MANY STIMULANTS RUNNING AROUND THAT WE NO LONGER NEED TO ASK HOW DID THIS INDIVIDUAL BECOME STIMULATED, BUT RATHER HOW DID THIS NATION COME THRU WITH MORE SCIENTISTS THAN THAT? AND OF COURSE THE EFFECT OF SCIENTIFIC THOUGHT ON P.E. THOUGHT.

ELECTRICITY BORN IN LATE 18TH, DEVELOPED IN 19TH. GALVANI, VOLTA, WOLLASTON,. DAVY, FARADAY, OERSTED, AMPERE, OHM, MAXWELL, HERTZ.

DALTON C. 18 O, GAY-LUSSAC, AVOGADRO, CANNIZZARO, ATOMIC THEORY. VALENCY. MENDELEJEFF, C. 1880.

ORGANIC CHEMISTRY. WOHLER SYNTHESIZED UREA, OTHERS DONE LATER, BUT ALWAYS DIFFICULT. BERZELIUS REPLACES EMPIRICAL WITH CONSTITUTIONAL FORMULAE. AFTER 1860 GREAT ORGANIC CHEM IN GERMANY, ESP. AFTER ANILINE DISCOVERED IN COAL TAR. INDIGO DRIVEN OFF MARKET, 1897.

Optical properties of some sugars are only found in the natural, not the synthetic products.

Liebig classified all organic products as proteins, fats, or carbohydrates. Proteins contain nitrogen, fats carbon, carbohydrates H20. c. 1880.

Thermodynamic reasoning applied to osmosis by Van't Hoff.

1887, Arrhenius and ionization theory.

1850 Graham distinguished crystalloids from colloids, which will not crystallize. Important in agricultural science.

Up to 1800 astronomy most affected minds of ordinary men of all the sciences. (Odd that this most useless of sciences should have been the first developed. But it is easy to grasp, its quite uncomplicated by friction and myriads of interplays and stars are easy to see so it is natural I guess) 19th century accepted astronomy and biology became the battle ground with religion.

(Strange is it not that Christianity and successful civilizations go together over the world. Japan is an exception, andthere are unsuccessful Christian countries. This is probably pure coincidence, and certainly nothi g mystical, but it is possible that the Christian attributes are important components of successful civilizati ns. Well, there is no doubt that they are, the doubt arises over whether Christianity as we know it thru the churches contributes to those virtues.

Mach said science but creates a model of what our senses tell us about the uni erse.

Evolution was an old concept, but natural selection (inspired by Malthus of all things) was Darwins contribution and the clincher. Significan that such a simple thing was produced about the same time as so complex a product of thought as Maxwell's equations, showing once again that it is easier for men to follow the proportionalities of physical science far from the realm of everyday experience while the simplest observations concerning that most complex of all things, life, are difficult. This may be explained simply as a quality of the human mind, source accidental like all other qualities.

c. 1800, vitalism in biology.(a sort of religiousescape from research. The necessity to explain everything immediatelybefore all the facts were available. A weakness of the human mind. This, indeed, is what makes biology so unsuccessful. One cannot explain everything immediately without resorting to Gods and such)

Dumas and Boussingault demonstrated carbon cycl: plants build up complex organic substance, animals break it down. (b t in so doing animals synthesize water which plants need. Also plants need to have thecomplex substances the synthesize broken down. Can we say that energy is required to synthesize and released by analysis? Certainly the opposite is true of oxidation. Why worry: you are an economist)

Animals synthesize glycogen and starch in the liver.

Schleiden in plants, Schwann in animals, the cell theory.

Dampier says that Virchow originated phagocyte theory while de Kruif says it was Metchmikoff. Who?

1838 de la Tour and Schwann discovered cells in yeast.

Virgil in his Georgics advised farmers to grow legumes before wheat; the reason discovered in 1888 Hellriegel and Willfarth di scover the nitrogen cycle and bacte ia, both in the ground and in nodules.

The fact that Mendel's work was forgotten indicates Germany at that time was not in receptive mood. World War Cy seems to have been at its scientific height. England led 19th cent. science.

Economics ahead of normal scientific -- v. below.

Over

Gilbert and Lawes of Rothamstead introduced use of artifuical fertilizer. I gather c. 1880

1784 accurate surveying begun in England by Ordnance Dept. Good maps made.

1830, Lyell's principles of Geology.

Glaciatinn evidence, 1840.

Herbert Spencer was preaching evoluti n before Darwin published. Now what does this prove? Spencer was a famous man, and why did he not raise a storm as Darwin did? Was it perhaps because Darwin really studied the matter and came thru with incontrovertible evidence? If so it is a strong argument for Darwin's way of life. But again, one must have an income.

Wallace, like Darwin, was inspired by reading Malthus.

All that was needed was some positive doctrine to serve as alternative explanation for that of creation. Criticism is more effective when backed with an alternative, even if there is no logical necessity for it to destroy the old doctrine.

Weisman, "soma" vs. germ cells.

1900 Mendel's forgotten work rediscovered. However this is not connected with mutation as the author seems to think. A mutation is a characteristic absolutely new, not just one long recessive and brought out by the proper union. A freak can have normal brothers.

Huxley measured human skulls for new evidence, started good anthropolpgy. He was "Darwin's Bulldog". The fighters work for the thinkers.

1835 Belgian Quetelet studied biologic statistics and drew probability curves. Similar to probability curves for molecular collisions mathematically arrived at, suggesting a similar origin of the production of characteristics.

Francis Galton, Darwin's cousin, applied same method to mentality, same results.

Up to Kant philosophers had followed physical science but Hegel (I suppose we may call him and Goethe, his ally, the first of the "Romantic" school of Germans) built up a scheme that seemed to scientists fantastic.

Note that in the 19th century German names become prominent in science, previously they were not so much so. This may be historian's bias or fact.//Jevons and Spencer, Boole and Clifford wrote on the philosophy of science but were little heeded by scientists. (reading the Scientific Monthly today one finds considerable attention to the philosphy of science)Jevons will be worth reading, as will Spencer.

Laws of conservation of mass and energy led some to believe in them as "ultimate realities" and develope "materialistic" philosophies. Whatever that may mean it is a good working hypothesis for it thinks that all can be logica ly explained. Germans were "materialists" in the 19th century. No doubt they and the Romantics fought.

The genius of England was in getting masses of people into things, bringing out the genius in them. There are many variations which are such as to succeed for a while and then destroy themselves; many biologic variations have done this. We may well imagine a social variation doing it.

Example of above: with great love of man for man we bring out the best in the lower classes and then they outbreed us and after a century or so we are destroyed.

Materialism in manycountries was suppressed by the churchuntil 1848, but never in Germany.

English religion was not affected(perhaps because it had always been taken with salt) by great effects on everyday life of scientist, but

"logical France and metaphysical Germany" were shaken.

Darwin in German especially was used to back materialist political philosophies such as Marx. (The connection of materialism, Darwin, and Marx is strictly accidental in time as none of the 3 have any necessary connection. I meant communism instead of Marx. It is in Marx that the 3 are combined, and shal ow thinkers always connect one with the other.

Again Dampier takes credit from the Germans. He says that empirical and physiological psychology was being studied early in 19th century in England and France but in Germany it was combined with theology. According to my book Wundt is the father of psychology. Who is prejudiced?

Mendel would never have been rediscovered after 40 years had he not left writings. More evidence of the power of the pen. Think of all the practical horticulturalists who doubtless made the same observations but never recorded them

Mendel's laws come from probabilities among many chance meetings. When half germs from each strain have the recessive, ¼ meetings will be allreces ive, or something.

Number of chromosomes in a cell, the "haploid" number. 24 in man. There are polyploid plants, some characteristics that must always come in pairs (genetically then they are only one characteristic)(a true gestalt) (Is it possible that there are social characteristics that can only come in pairs, one bad and one good, so that my careful analysis is fruitless? Heaven forbid)

Biometricians are t ose I presume who use methods of probability calculation in biology. They fought the Mendelians for a while but were reconciled. Here is a fertile field for applied mathematics in biology.

Correlation coefficients of most hereditary characteristics is 0.5.

1870 Dampier takes as about the year when landowne s, professionals, and other high skilled labor lowered its birthrate and unskilled labor increasedor maintained its. This in a country which has had no immigration rather destroys Herbs thesis that excitement from immigration causes the changed rates.

"Death dues" are "destroying"the old landed families. These families, says Dampier, have done work in Government underpaid. If so then the ec. rent the people lose to them is not entirely wasted, but are they underpaid? *Reveals Dampier's prejudice.*

"Vernalization" a process whereby growing seeds are cooled for a time and the season of fruiting controlled. I should soak all seeds before planting I'd say, a process of vernalization. Experiment.

Ecology, the study of relations of plants and animals with each other and with their inorganic enviroment.

Savage minds, Rivers discovered, are incapable of generalization. You do not ask "Can you marry your sister" but "Can you marry that girl? who is she?" Nigerians do not understand abstract numbers I recall from Atlantic article.

There is more to be gai ed from chap. 10, "The new physics and chemistry". Later.

Flesch, Rudolf, "The Art of Clear Thinking".

Thinking is the manipulation of memories, memories derived from experience. Original experiences are either accidentally encountered or taught.

Machines that "think" really just store up memories, & apply them when called on. Many think human thinking involves more than that, the mysterious moment of sudden inspiration, when something is seen that was not stored in memory. But experiments with primates suggest that those who are inspired are really just remembering; if nothing in past experience applies to present situation, they don't remember get inspired. Except maybe some can think new things thru on their own merits.

(Thought: convicted murderers, etc., should not be just killed. Their live bodies should be devoted to science for vivisection studies)

Pre-frontal lobe of brain, seat of responsibility, planning, initiative -- & some insanity, Pre-frontal lobotomy takes away insanity, & higher forms of responsibility. Person can continue to act like a machine, loses rest -- including personal feeling for family.

Francis Galton discovered scientists & abstract thinkers have very few mental images -- e.g. actually carry vivid pictures of things they try to think of -- cf. to other people. About 1/30 men, & 1/15 women, are "visualizers" -- i.e. have these actual photographs of situations in their minds, regularly. Most people repress the faculty -- abstract thinkers presumably to get rid of irrelevant details. (true -- I visualize very bone- bare diagrams, just lines. Occasionally, rarely, I can stir up a photograph of someone I know very well)

Brains at rest produce alpha waves. When they try to think or remember they produce kappa waves, stop producing alpha waves. Some hypothesize the alpha waves are like scanner of radar. As new impressions are taken in, alpha waves continually go over what brain has in store, to match with old impressions. (Perhaps that is why one can solve problems by resting? Give alpha waves time to search deep?)

(My thinking in economics is diagrammatic. I picture quantities, & flows. The quantities wax & wane. I picture exchangeratios of quantities. Others obviously think diagrammatically, too, for they put diagrams in their books -- pictures of circuits, etc.

Graphs are diagrams, but I don't naturally think that way. Rather than a demand curve, I see a whole market, which I picture as a contoured hillside, with supply an ocean flooding up, into the various inlets, along the contour, filling demands up to that level of intensity. Since minds see things this way more naturally, it is probably better to explain them that way.

Sometimes my mind manipulates graphs. Sometimes it manipulates algebra. But this comes much harder than diagrams, is much more a product of training. Diagrams are the first things.

So in writing popular stuff, fill it with diagrams. Avoid graphs & figures & algebra. (Condensed: In popular writing, use diagrams; avoid graphs, figures, algebra.

When taking notes, practise brevity. Make it a habit. Excise surplus words, and awkward phrases. Eliminate phrases which, tho short, ~~dx~~ lack force, such as "excise surplus words". "Eliminate", tho a longer word, hits harder.

Use "non-sentences" occasionally. They are conversational, forceful, clear.

With reformation, idea of "success" developed -- i.e. idea that a person should strive to rise in the world. Previously, church had decried worldly ambition. (at least in NW Eur.)

Concepts are not things, but qualities a number of things have in common. Concepts we use today largely originated in quite recent times, Renaissance times. He traces back corporation, sovereignty, opera, novel, progress, success, gravity, to 16th-17th. Romantic love to troubadours of 12th.

This is overdoing it.

(Diagrams are translatable; clearer than words, Words subject to misinterpretation, connotations. No one can even pretend to know what you've said, when you speak by diagram, unless he forms that diagram image in his mind, traces it thru -- diagrams force people to think, while words may just lull them to a hypnotic trance. Those who think will follow your diagrams. Those who just throw words around will not, and you will be spared the trouble of their company in the future.)

(Another good writing device: use quotations freely, where apt. Lends authority, provides variety of style, relief)

Would test arguments by two rejoinders: So what? and Specify.

Symbolic logic is not a system of thought, nor proof; but of argument. Is a method of forcing others to agree with you, formally. Of little value for thinking.

In reading, look for islands of concrete words, thus get gist of thought. He overdoes this.

Two rules: Remember that all people, including yourself, have only their past experience to think with -- because thinking is primarily manipulating memories.

Detach your ideas from your words -- i.e. translate.

This a very good exposition principle. Repetition is powerful. Repeat same idea in different words; or in diagrams, algebra, graphs, and various sets of words. Use analogies from experience lavishly. Inform reader you are doing this, tell him to choose the ones that suit his own mental habits.

He doesn't stress "think in different categories". But "translation" verges on that.

Always translate into concrete. This, he incidentally illustrates, can be very amusing, & brighten up the prose.

Memories are usually distorted, according to what rememberor thinks they should have been. Even observation is so distorted.

Incidental thoughts on thinking process. Mentally, I collect myself, make an effort, force out extraneous thoughts, and visualize a diagram -- not a clear, comprehensive one, I only see one part operating at a time, must remember what other parts are doing. After observing each operation, I must verbalize it mentally, to remember it. This is slower & heavier than the thoughts that follow the actual process. They are lightning quick, and come into action when I have prepared the field by setting up the assumptions & forcing out irrelevancies.

Having followed a process around, I still would forget it immediately if I did not go over it twice or three times to memorize it. Typeing down the beginning, or the conclusion, would drive out the rest of it. So I force myself to memorize it before writing it down. Then I write what I have memorized -- not what I actually am thinking at the moment.

Dunsany Writes Fast But Seldom

The permanent presence of the wolf at the door just to keep everybody on his toes was roundly advocated last week by a 74-year-old writer, jaunty as a teen-ager.

Edward John Moreton Drax Plunkett, Lord Dunsany, wiggled his white Van Dyke, adjusted the rose in his lapel, and told a group of Mills College girls:



Lord Dunsany

"If we aren't living with a great sense of peril, we don't live up to our best."

The 18th Baron Dunsany (the title dates to 1436), playwright of the Dublin Abbey Theater, writer of fantasies, short stories and romantic poetry, has spent 97 per cent of his time not writing at all.

He has sought the permanent wolf by being a soldier in the Boer War, the World War and an inveterate hunter and sportsman between times.

Fox hunting, Lord Dunsany believes, helps keep him inspired with great ideas.

"It keeps me away from the ink pot. A writer who writes every day can't expect to make all his writing great. In writing too often, he sees nothing of life.

"And if a theme is not great, it has no interest for me," he said. "I work only every few weeks. Great ideas don't come every day."

But when he does write, it is rapidly and prolifically, he said. He does a short story every two weeks, and can toss off poetry with speed also.

With the enthusiasm of a Romantic, he launched a series of darts against modern mechanization and modern art and verse.

Modern civilization: "It's like being driven down a dark road in a racing car driven by a 4-year-old child."

Modern poetry and art: "They are born of ignorance and despair and the deadly heresy that poetry does not have to have a meaning."

Lord Dunsany is making his first trip to California. He lectured at Mills, at the Browning Society in San Francisco, then left for Palos Verdes, where he is visiting friends.

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destroyed during the same period. This campaign was carried on by agents of the Mexican Public Health Department and the Attorney General's office, with the active co-operation of the Mexican Army and the Mexican Air Force.

A special and vigorous campaign against the drug traffic is being carried on by agents of different departments in Tijuana and other places of Baja California, while in Mexico City a special committee has been formed to co-ordinate the anti-drug campaign throughout the nation and to take new measures, in conjunction with American. authorities, to combat the illegal traffic in narcotics across the international line.

Mexico's efforts in the fight against the drug traffic, in fulfillment of its international obligations, has been highly commended by the Narcotics Commission of the United Nations, and in recognition thereof Mexico's delegate, Dr. Oscar Rabasa, has just been elected chairman of said commission for a second term.

EDMUNDO GONZALEZ,
Consul General of Mexico.
San Francisco.

Lighting the Cross

Editor — The beauty of the cross on Mt. Davidson when lighted during this Easter season was an inspiration to San Francisco residents and visitors alike. The question is: Why is this cross not lighted every night of the year?

It does not seem possible that a city with the standard of living of San Francisco (one of the

Einstein's New Book

Top Physicist Thinks He's Found Laws Governing Entire Cosmos

By WM. L. LAURENCE

Exclusive to The Chronicle
From the New York Times

NEW YORK, March 30—Dr. Alfred Einstein returned this week from three years of study with a new set of laws for the cosmos.

Dr. Einstein believes these laws, embodied in a few mathematical formulas, will reduce the complex manifestations of the physical universe into one intellectual synthesis.

He calls this concept, which he has been seeking for more than half of his 74 years a Unified Field Theory. He hopes it will provide the master key to the physical universe.

Dr. Einstein's latest concepts of the fundamental laws governing the cosmos have been published by the Princeton University Press as an appendix to the fourth edition of his book "The Meaning of Relativity," which originally was published in 1922. The appendix, titled "Generalization of Gravitation Theory," is a radically revised version of an appendix to the third edition of the book published in 1950.

SIMPLE PRINCIPLES

In his quest for a new understanding of the cosmos, Dr. Einstein has searched for simple unifying principles underlying the many phenomena in which the material universe manifests itself. In his special and general theories of relativity, published in 1915 and 1916, respectively, which brought about the greatest intellectual revolution since Newton, he united matter and energy, space and time, gravitation and inertia, all considered as individual and unrelated entities, into one all-embracing cosmic concept.

This synthesis, wrote Bertrand Russell, British philosopher, in 1924, "is probably the greatest synthetic achievement of the human intellect up to the present time."

However, having achieved the intellectual synthesis of matter and energy, space and time, gravitation and inertia, Dr. Einstein was confronted with two concepts that defied unification. The material universe, as the theory of relativity conceives it, is composed of two major fields—gravitation and electro-magnetism.

It is a synthesis of these two that Dr. Einstein has been seeking. Three years ago, he had it almost within his grasp, having overcome all the obstacles but one. He now is convinced that he finally has overcome this last obstacle.

"The solution of the problem," Dr. Einstein writes, "appears to me to be highly convincing, although, due to mathematical difficulties, I have not yet found a practical way to confront the results of the theory with experimental evidence."

YEARS OF WORK

It took years before the Einstein synthesis of matter and energy as fundamentally two different manifestations of a single cosmic entity could be demonstrated experimentally on a large scale. This was done on the desert of New Mexico on the morning of July 16, 1945, with the explosion of the first atomic bomb.

Behind Dr. Einstein's quest for a unified field theiry, which most physicists regard as unattainable, lies one of the greatest intellectual controversies in the history of science. Dr. Einstein believes the physical universe is one continuous field, like an endless stream. The majority of modern day physicists, on the other hand, champion the quantum theory, which holds that the universe is discontinuous, made up of particles and quanta (atoms) of energy.

Dr. Einstein alone has stood against all these concepts of the quantum theory. Admitting that it has had brilliant successes in explaining many of the mysteries of the atom and the phenomena of radiation, which no other theory has succeeded in explaining, he contends that the theory of discontinuity and uncertainty, of the duality of particle and wave, and of a universe not governed by cause and effect, is an incomplete theory, and that eventually laws will be found showing a continuous, non-dualistic universe, governed by immutable laws in which individual events are predictable.

"I cannot believe," he says, "that God plays dice with the cosmos!"

800 AFL Steel Workers Strike In 18 Bay Shops

Eight hundred AFL steel workers went on strike yesterday over administration of a welfare fund for employees in 17 shops in San Francisco and Oakland and one plant in San Jose.

The strike is by members of Local 491 of the International Association of Bridge, Structural and Ornamental Iron Workers.

The union wants joint control of the welfare fund with employers. A spokesman for the Iron Worker Employers Association of Northern California said the group is willing to pay the entire cost of the fund but is unwilling to share in its administration.

The strike, if it continues, may affect a considerable share of local industrial construction but not all of it, the employers' spokesman said.

Five-Cent Muni Fare Is Rejected

Five-cent Municipal Railway fares, proposed as a shopper's bargain during off-peak hours, were rejected yesterday by the San Francisco Public Utilities Commission.

The Commission concluded that a 10-cent reduction for non-rush hour riders would "throw the Muni back into deficit operation" with a potential annual loss of more than $3,000,000.

Rejection of the plan to cut fares between 10 a. m. and 3 p. m. Monday through Saturday was unanimous. It was the Commission's answer to a resolution by the Board of Supervisors asking for a report on the possibility of lower fares during slack traffic periods.

Supervisor Francis McCarty proposed the 5-cent fare as an economical convenience for housewives and as an aid in easing downtown congestion at peak hours.

The commissioners criticized the plan, noting that Muni would incur a "terrific loss" even if it were instituted on only a trial basis.

By voting to prohibit a fare reduction, the Commission upheld the recommendations of C. D. Miller, general manager of Municipal Railway, and Marmion D. Mills, transit consultant.

"The records of the American Transit Association," Mills reported, "clearly indicate the fallacy of any such form of reduced fares as a means of inducing greater use of the transit system."

Miller's survey said the plan would slightly increase the numbers of "short haul riders" but that the additional passengers would be "far short" of the number needed to provide the present revenues.

"In the current fiscal year," Miller stated, "the railway is operating without tax support from its cash revenues and is showing a small surplus."

S. F. Marine Colonel Killed in Korea

A San Francisco Marine officer was listed as killed in action in Korea in a Department of Defense casualty list issued yesterday.

He was identified as Lieutenant Colonel Barnette Robinson, whose wife lives at 330 Buckingham way.

Three other Northern California servicemen were listed as wounded in action. They are:

Army Sergeant Joseph W. Campanella, Paso Robles; Marine PFC Sidney F. Leon, 2116 East 14th street, Oakland; Marine PFC Joseph Lewis Jr., Gridley.

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AUCTION TODAY
TUESDAY at 11 A. M.

Nice assortment of Fine and Medium Grade Home Furnishings, including Sets and Odd Pieces, all sorts of Occasional Furn., Desks, China Cabinets, Divans, Love Seats, Provincial Dining Room Set, late style General Apt. Size Comb. Stove and Refrigerator; Dishes, Glassware, Ornaments, Linens, Lamps, Mirrors, Pictures, Stoves, Refrigerators, Washing Machines, Rugs and Medium Grade Furniture and Household Goods.

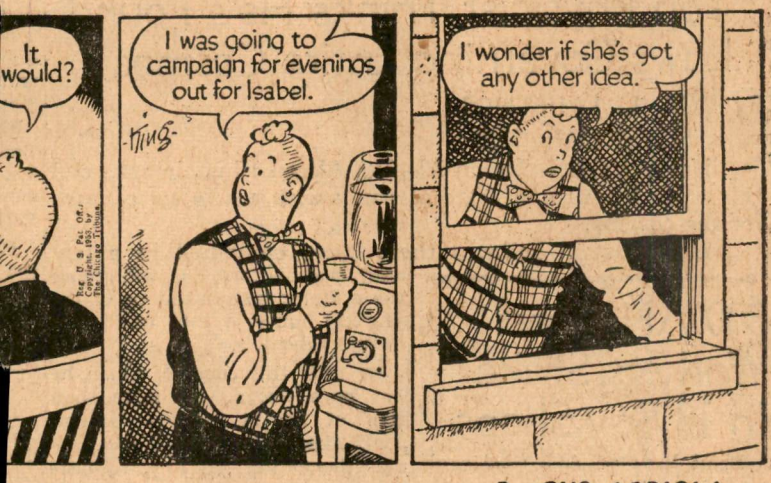
JOSEPH HARBAND, Auctioneer



Dora was down—menstrual pain—but Midol brought quick comfort. A million women depend on Midol for relief every month.

MIDOL RELIEVES
CRAMPS-HEADACHE-"BLUES"

By KING



By GUS ARRIOLA



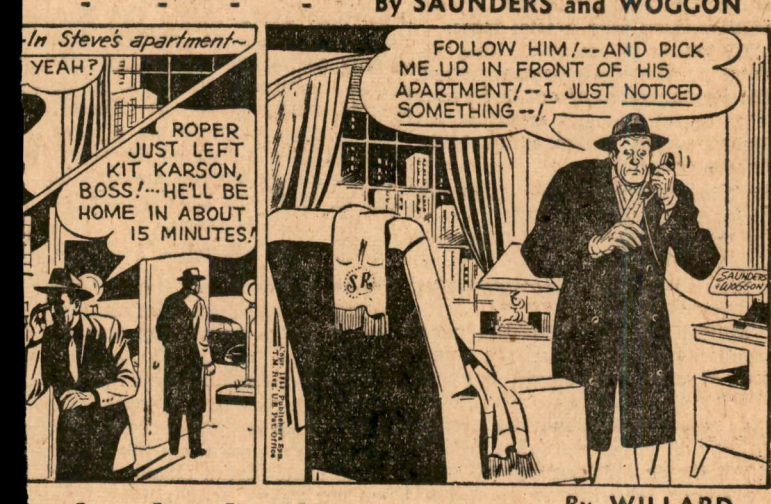
By DICK BROOKS



By GEORGE WUNDER



By SAUNDERS and WOGGON



By WILLARD



By MIK



Where Do Those Bright Ideas Come From?

Lancelot Law Whyte

. . . as imagination bodies forth
The forms of things unknown. . . .
A Midsummer Night's Dream

THERE are few experiences quite so satisfactory as getting a good idea. You've had a problem, you've thought about it till you were tired, forgotten it and perhaps slept on it, and then flash! when you weren't thinking about it suddenly the answer has come to you, as a gift from the gods. You're pleased with it, and feel good. It may not be right, but at least you can try it out.

Of course all ideas don't come like that, but the interesting thing is that so many do, particularly the most important ones. They burst into the mind, glowing with the heat of creation. How they do it is a mystery. Psychology does not yet understand even the ordinary processes of conscious thought, but the emergence of new ideas by a "leap in thought," as Dewey put it, is particularly intriguing, because they must have come from somewhere. For the moment let us assume that they come from the "unconscious." This is reasonable, for the psychologists use this term to describe mental processes which are unknown to the subject, and creative thought consists precisely in what was unknown becoming known.

We have all experienced this sudden arrival of a happy idea, but it is easiest to examine it in the great creative figures, many of whom experienced it in an intensified form and have put it on record in their memoirs and letters. One can draw examples from genius in any realm, from religious mysticism, philosophy, and literature to art and music, and even in mathematics, science, and technical invention, though these are often thought to rest solely on logic and experiment. It seems that all truly creative activity depends in some degree on these signals from the unconscious, and the more highly intuitive the person, the sharper and more dramatic the signals become.

Here, for example, is Richard Wagner conceiving the prelude to "Rhinegold," as told by Wagner himself and recounted by Newman in his biography. Wagner had been occupied with the general idea of the "Ring" for several years, and for many weary months had been struggling to make a start with the actual composition. On September 4, 1863, he reached Spezia sick with dysentery, crawled to a hotel, could not sleep for noise without and fever within, took a long walk the next day, and in the afternoon flung himself on a couch intending

Mr. Whyte is an efficient generator of new ideas in several fields—from theoretical physics to the development of power jets. His books, Everyman Looks Forward *and* The Next Development in Man, *aim at the unification of science.*

to sleep. And then at last the miracle happened for which his subconscious mind had been crying out for so many months. Falling into a trance-like state, he suddenly felt, he says, as though he were sinking in a mighty flood of water:

> The rush and roar soon took musical shape within my brain as the chord of E-flat major, surging incessantly in broken chords. . . . Yet the pure triad of E-flat major never changed, but seemed by its steady persistence to impart infinite significance to the element in which I was sinking. I awoke from my half-sleep in terror, feeling as though the waves were rushing high above my head. I at once recognized that the orchestral prelude to the "Rhinegold," which for a long time I must have carried about within me, yet had never been able to fix definitely, had at last come to being within me; and I quickly understood the very essence of my own nature: the stream of life was not to flow to me from without, but from within.

In this example, which is exceptional only in the violence of the emotions, the conscious mind at the moment of creation knew nothing of the actual processes by which the solution was found. As a contrast we may take a famous story: the discovery by Henri Poincaré, the great French mathematician, of a new mathematical method called the Fuchsian functions. For here we see the conscious mind, in a person of the highest ability, actually watching the unconscious at work, if that paradox may be allowed. Poincaré describes how he came to write his first treatise on these functions.

> For a fortnight I had been attempting to prove that there could not be any function analogous to what I have since called the Fuchsian functions. I was at that time very ignorant. Every day I sat down at my table and spent an hour or two trying a great number of combinations, and I arrived at no result. One night I took some black coffee, contrary to my custom, and was unable to sleep. A host of ideas kept surging in my head; I could almost feel them jostling one another, until two of them coalesced, so to speak, to form a stable combination. When morning came, I had established the existence of one class of Fuchsian functions. . . . I had only to verify the results, which took only a few hours.

While the Wagner story illustrates the sudden explosion of a new conception into consciousness, in this one we see the conscious mind observing the new combinations being formed in that part of the mind whose operations are normally beyond the range of conscious attention. A third type of creative experience is exemplified by the dreams which came to Descartes at the age of twenty-three and determined the path he was to follow for the rest of his life. Descartes tells how he had vainly searched for certainty, first in the world of books, and then in the world of men, and how in a triple dream on November 10, 1619, he made the crucial discovery that he could only find certainty in his own thoughts, *cogito ergo sum*. This dream filled him with intense religious enthusiasm, because it had brought to him the "simple and fertile idea, all sparkling with angelic luster" (Maritain), which provided the foundation of the "admirable science" which it was his mission to create. Freud classified this dream as one of those whose content is very close to conscious thought.

Wagner's, Poincaré's, and Descartes' experiences are representative of countless others in every realm of culture. The unconscious is certainly the source of instinctive activity and therefore sometimes of conflict with the demands of reason, as Freud emphasized. But in creative thought the unconscious is responsible, not for conflict, but for the production of new organized forms from relatively disorganized elements.

II

The processes of creative activity display several striking features. One of the most frequent is the occurrence of flashes of insight outside the hours of regular work, during periods of physical activity or at odd moments of reverie or relaxation when the mind is day-dreaming. Poincaré tells how the further steps of his discovery of the Fuchsian functions came to him, with a sense of absolute certainty, "just as I put my foot on the step" (of a wagonette), and again, "as I was crossing the street." Similar examples

are endless, and give comforting glimpses of the ordinary daily life of genius. Mozart got the idea for the melody of the "Magic Flute" quintet while playing billiards, Berlioz found himself humming a musical phrase he had long sought in vain as he rose from a dive while bathing in the Tiber, Sir Wilhelm Hamilton, a great mathematical physicist, thought of quaternions (a new mathematical method) while strolling with his wife in the streets of Dublin, and the chemist Kekulé saw the atoms dancing in midair and so conceived his theory of atomic groupings while riding on the top of a London bus.

So familiar is this phenomenon that many have taken advantage of it and have developed techniques to woo their shy genius. The prolific Haydn, with 125 symphonies and hundreds of other compositions to his credit, says, "When my work does not advance I retire into the oratory with my rosary, and say an Ave; immediately ideas come to me." Many, like Hamilton, have found that walking encourages the appearance of ideas. Thus Mozart tells how "taking a drive or walking after a good meal, or in the night when I cannot sleep, thoughts crowd into my mind as easily as you could wish"; James Watt saw how the waste of heat in a steam engine could be avoided by condensing steam, in a flash of inspiration on a walk to the golf house; Helmholtz, the German scientist and philosopher, records how "happy ideas . . . come particularly readily during the slow ascent of hills on a sunny day"; and many persons devoted to creative work have carried scraps of paper with them everywhere so that nothing of the precious flashes of revelation shall be lost.

"Sleeping on it" also produces good results. Sir Walter Scott used to say to himself, "Never mind, I shall have it at seven o'clock tomorrow morning." Gauss, one of the greatest mathematicians, put as heading to his paper on the "Law of Induction" the note: "Found 23rd January 1835—7.0 A. M. before rising." And Helmholtz says, "Often they come as soon as one wakes up in the morning."

The suddenness with which ideas come is often stressed. "You feel a little electric shock striking you in the head . . . that is the moment of genius"; so Buffon, the French biologist. In the "Hymn to Intellectual Beauty". Shelley writes:

> Sudden, thy shadow fell on me:
> I shrieked, and clasped my hands in ecstasy.

In Chopin, according to George Sand who knew him intimately, "creation was spontaneous, miraculous . . . it would come sudden, sublime."

THINKERS, artists, and scientists have all described the sense of precision and inevitabilily, the loss of freedom of choice, or feeling of possession by an impersonal force which accompanies the creative moment. Blake declares, "I have written the poem . . . without premeditation, and even against my will," and Jacob Boehme, the German mystic of the early seventeenth century, says: "Before God I do not know how the thing arises in me, without the participation of my will. I do not even know that which I must write." Van Gogh describes how he had "a terrible lucidity at moments, when nature is so glorious. In those days, I am hardly conscious of myself and the picture comes to me like a dream." Walt Whitman says that the "fruition of beauty is no chance of hit or miss—it is as inevitable as life—it is as exact and plumb as gravitation." Russel Wallace, who published the theory of natural selection simultaneously with Darwin, expresses the view of many thinkers in saying, "Ideas and beliefs are not voluntary acts."

Moreover the new ideas come before they can be justified or applied. Thus Bernard Shaw's Joan of Arc says, "The voices come first, and I find the reasons after." This feature is most remarkable in the realm of science and of mathematics. Sir Isaac Newton wrote of a geometrical theorem: "It is plain to me by the fountain I draw it from, though I will not undertake to prove it to others." Like most intuitive mathematicians, he usually got the result before he could prove it; indeed one discovery of his (on the roots of equations) was only proved two hundred years later. Gauss says of one of his mathematical discoveries:

> At last I succeeded, not by painful effort, but so to speak by the grace of God. As a sudden flash of truth the enigma was solved. For my part I am not in a position to point to the thread which joins what I knew previously to what I have succeeded in doing.

In the field of applied mathematics intuitive guessing sometimes proves superior to ordinary calculation. Edison says:

> In all the work connected with the building of the first Central Station, the greatest bugbears I had to contend with were the mathematicians. I found after a while that I could guess a good deal closer than they could figure, so I went on guessing.

A similar example is to be found in the design of complex electric valves, where practical, intuitive knowledge has played a major role, and one of the best living valve engineers is said to use only the multiplication table! The genius of many great experimenters, such as Faraday and Rutherford, lay in an exceptionally powerful intuition resulting from a passionate and sustained interest in a definite field of inquiry.

III

Owing to the heightened interest in psychology many studies of creative thought have been made recently, and the majority of these trace the creative element to the unconscious in the individual mind. This interpretation is supported by the recorded views of many creative personalities. Schiller held that "poetry sets out from the unconscious," and since the middle of the nineteenth century countless others have ascribed their inspiration to the workings of the unconscious. But this must not be interpreted in a one-sided manner, for all thought depends on the co-operation of conscious and unconscious. The supreme type of creative thought, in certain realms at least, appears to depend on an intimate blending of unconscious and conscious processes, when both work in harmony.

A few writers, disliking the conception of the unconscious, have held that all true mental work is conscious, that new ideas arise by the chance association of previously formed ideas, and that "inspiration" is a romantic fiction. But this view is scarcely tenable, for an important part of all mental activity takes place behind the scenes. The working of memory and association normally lies outside the field of conscious attention, and it is only their results which flash into our awareness.

Graham Wallas, an English sociologist, divided the process of creative thought into four stages: conscious *Preparation,* unconscious *Incubation,* the flash of *Illumination,* and the conscious *Verification* (or application). There is as yet no accepted psychological or physiological theory of the operations of the unconscious which lead to the creation of new patterns during the period of incubation, perhaps because the sharp separation of "physical" and "mental" processes in our dualistic language has delayed the advance of a science of thought. But it seems clear that no mere rearrangement of unchanged elements can account for what happens in the unconscious creative processes. The conscious mind performs such mechanical rearrangements all the time. But the creative imagination does more: it actually changes the character of the separate elements given to it, in course of molding them into a new unity.

Hadamard, a French mathematician now in the United States, suggests that mathematical invention is choice guided by the aesthetic sense. That is not wide enough to cover all creation, which sometimes involves not merely choice, but in addition the molding of the elements so that they can combine to form a new whole. The coalescence, or growing together, of elements into a new unit may *change* them. This creative reshaping is evident in all branches of culture. The new unity grows out of the old and is as different from the elements that were used to make it, as the living organism is from the foodstuffs which it absorbs and assimilates. Indeed the creative processes of the mind share many features with the synthetic processes which occur throughout all living organisms.

It is therefore natural that the analogy of growth has often been used for creative thought. Keats liked the symbol of plant growth: "Let us open our leaves like a flower and be passive and receptive—budding patiently under the eye of Apollo." Tchaikovsky speaks of the

> germ of a future composition [coming] suddenly. . . . If the soil is ready . . . it takes root with extraordinary force and rapidity, shoots up through the earth, puts forth branches, leaves, and finally blossoms.

I cannot describe the creative process in any other way than by this simile.

But growth requires a seed, and the heart of the creative process lies in the production of the original fertile nucleus from which growth can proceed. This initial step in all creation consists in the establishment of a new unity from disparate elements, of order out of disorder, of shape from what was formless. The mind achieves this by the plastic reshaping, so as to form a new unit, of a selection of the separate elements derived from experience and stored in memory. Intuitions arise from richly unified experience. Henry James spoke of the "deep well of unconscious cerebration," and Coleridge of the "inward creatrix" which "establishes a center, as it were, a sort of nucleus in this reservoir of the soul."

Professor Lowes, in *The Road to Xanadu,* a superb study of the ways of the poetic imagination, speaks of the "incredible facility with which in the wonder-working depths of the unconscious the fragments which sink incessantly below the surface fuse and assimilate and coalesce."

This process of the establishment of new forms must occur in patterns of nervous activity in the brain, lying below the threshold of consciousness, which interact and combine to form more comprehensive patterns. Experimental physiology has not yet identified this process, for its methods are as yet insufficiently refined, but it may be significant that a quarter of the total bodily consumption of energy during sleep goes to the brain, even when the sense organs are at rest, to maintain the activity of ten thousand million brain cells. These cells, acting together as a single organ, achieve the miracle of the production of new patterns of thought. No calculating machine can do that, for such machines can "only do what we know how to design them to do," and these formative brain processes obey laws which are still unknown.

IV

Can any practical conclusions be drawn from the experience of genius? Is there an art of thought for the ordinary person? Certainly there is no single road to success; in the world of the imagination each has to find his own way to use his own gifts. Yet a study of those who have been successful suggests some elementary hints towards a hygiene of the unconscious mind.

A wide range of interests is an advantage, since valuable clues may be drawn from unexpected fields. High specialism may lead to sterility.

When a particular task makes no progress, one can go on with something else and return to the first later on. It may pay to keep several jobs running in parallel.

Periods of relaxation are important, such as an hour or two alone, when no definite task is undertaken and the time is kept free for pondering over anything that comes into one's mind.

Finally, the less haste the better. New ideas come less easily when the mind is strained by anxiety or tense with impatience to achieve a definite result. The new grows at its own pace—"as inevitable as life."

The Case of the Radioactive Snail

Bruce Bliven

Not long ago, a group of American archaeologists were excavating some ancient ruins in the desert in northeastern Iraq, at a place called Jarmo. As they went below the surface, they discovered very ancient ruins indeed; but it was impossible from any geologic evidence to make more than a wild guess as to the age of the artifacts that were unearthed—bits of pottery, the remains of walls, charred debris left from household fires.

Then a quite new branch of science was called into play. Fragments of snail shells from these ruins were sent to the Institute for Nuclear Studies, at the University of Chicago, snail shells which had been found lying in a position indicating they were contemporaneous with the debris left by human beings. Shortly the answer came back: this village was

Every square yard of the earth's surface is bombarded every second with these minute particles of radioactivity, of tremendous energy—billions of electron-volts. There is a sharp dispute among scientists as to whether they come from the sun, from outer space, or both; but there is no dispute as to their importance. It is possible that these cosmic rays, striking the genes in living organisms, may cause mutations and thus become a primary source of the process of evolution. They are also under suspicion as a possible cause of some forms of cancer, and tests are now in progress seeking to prove or disprove this theory.

When these rays reach the earth's atmosphere, they smash vast quantities of the atoms of several substances in the air, breaking them down into atomic debris—neutrons, protons,

Dr. S. I. Hayakawa Here, Tells of General Semantics

By KEVIN WALLACE

"When you're at the end of your rope, trying to get a point across to somebody who just won't listen, what can you do?"



Dr. Hayakawa

The question was advanced at a press conference at the San Francisco State College yesterday by Dr. S. (for Samuel) I. (Don) Hayakawa, who proceeded to answer the question:

"What you can do is to listen to the other fellow."

He explained:

"We don't suspect the degree to which we misinterpret each other's statements, not to mention our own statements. Ordinarily, we get a quick impression of a sketchy remark. Instead of listening—to help the speaker grope around for a better expression of what he's feeling—we make a quick reply, amounting to an attack.

"The speaker promptly defends his badly formulated remark, and the battle is on, between parent and child, between nations—wherever misunderstanding occurs.

"If we learn to listen, we remove our threatening aggression, reducing the other's defensive response, and we open the way to using words as instruments of communication, not as bludgeons."

The example was offered as a kind of prospectus for the University of Chicago lecturer's summer session here—two courses at San Francisco State, public lectures on July 16, 24 and 30, and seminar work from August 4 to 10 at the YMCA.

Dr. Hayakawa's subject is general semantics, most widely known of the numerous semantics schools, which he defined as "the study of health and pathology of communicative processes." A reporter from one paper complained that such a quotation would lead to pathology in communicative processes with his subscribers, so Hayakawa translated jauntily:

"General Semantics is the study of what it is that goes haywire when people misunderstand each other—or themselves—and what to do about it."

Dr. Hayakawa, 48, is the Vancouver-born son of a celebrated Japanese poet who was once a San Francisco houseboy. He took up general semantics when he was a professor of freshman English and "wanted something useful to teach instead of grammar and punctuation."

(He regards grammar and punctuation as "incidentals, which can properly be learned only incidentally, in the course of learning to perceive things to be communicated, and enjoying the process of getting them across.")

He studied under the late Count Alfred Korzybski, popularized parts of the latter's abstruse system in his own best-selling "Language in Action," and presently inherited Count Korzybski's leadership of America's 4000 paid-up General Semanticists—represented by courses in 25 colleges—and became editor of their quarterly magazine, "ETC."

"Language in Action," which had earlier been translated into Swedish, has lately been translated into Japanese. Japanese is one language that Dr. Hayakawa has no acquaintance with, beyond a childhood memory of "most of the words and music of Gilbert and Sullivan's 'The Mikado.'"

One also wonders if Mr. Osborne realizes that the Arab refugees are kept where they are by the feudal landlords and politicians of those countries not of necessity, but for political purposes of their own. MYRON HUBERT.

San Francisco.

Moral Training

Editor—I wish to express appreciation to you for your editorial concerning tax exemption from nonprofit organizations.

Our children are attending a parochial school and we appreciate the moral training possible in such a school.

It is a pleasure to realize that an outstanding paper such as yours would endorse such a program. MRS. A. E. FALCO.

San Francisco.

Rhee

Editor—After publishing a number of reports from Korean correspondents demonstrating the dictatorial policies of President Syngman Rhee there, your editorial goes through some excruciating intellectual contortions to argue that Rhee is really a democrat. If Rhee merely wants to change the Korean Constitution to have elections of the President by popular vote instead of by the Assembly, why doesn't he work for this change through constitutional means, i. e., get out and campaign on the issue in the next election? . . .

The U. N. is supposed to be in Korea to defend the democratic will of the people against aggression, a worthy cause which I

bers. I, on the contrary, want the numbers so that if interested I can get hold of the bill and see all that it says. Most people's interest attaches to only one or a few subjects out of the many that are dealt with by legislation. We cannot with reason ask the newspapers to print the texts of any bills except those of overwhelming importance to everybody. We can't even expect you to print a title, or description, every time a pending measure is referred to So my vote is to designate the bills by number and let those who are interested enough, look them up in the records that papers can't possibly find room to print.

FRED HORTON.

San Francisco.

Taxes

Editor—President Truman says that taxes should be raised. Both Taft and Eisenhower favor lower taxes. Higher taxes may stem today's inflationary tendencies, although the last tax raise did not have such an effect. The more we hand to the Government the more it insists on spending. The Democratic Administration demands that all Americans pare their living expenses to the bone. If there is one thing the Democrats of the New Deal type fear, the name of it is "economy." "Give us your money. Do not ask us how we spend it for that is unpatriotic and 'isolationist'." This will continue as long as the New Dealers remain in power. Perhaps, not overly long at that W. R. ARRINGTON.

San Francisco.

The cost of living as it climbs
Is no fit subject for
These rhymes.

—edb

Thoughts re Salter ch. 3

Purpose. Must know what you're about, have a purpose. ~~Rang's~~ All kinds will do. Might be to present all facts on given topic, simply to record them.

Is very common to have policy in back of mind, as ultimate goal, in ~~colls~~ motivat'g study. & several hr. asked what I was leadg up to — a fair qn.

Dangers in hvg policy motive.
1. Twist thg to lead to desired policy. Keynes
2. Even w/o particular policy in mind, cuts out important kinds of pure research devoted purely to understandg — research which we know from math. etc often leads ultimately to most imp-tnt practical conclusions.
3. Limit thoughts to what is immed. pol.y feasible.

Other hand, dangers in not hvg policy motive: aimless meandrg research, waste of time & M. Strain at gnat & swallow camel. Fail to group data so as to answer qns they cd answer.

In gnrl, neither method better in itself; but depends on operator. Need all: facts, gathered for own sake; thy, developed for understandg; policy, both public & pvt., dev. for practical ends.

Gatherg facts very ticklish, hard to be indep. For facts are infinite. Must gather in categories: select units, regions, etc. So gathering facts, ~~are~~ is after exploratory behavior, one is

Prepare for oral.

Research method.

Is no formal scheme universally ff.d. – no "scientific method". Except appeal to reason & observation as vs. vested authority.

Is no magic to stat.

Sml method:

a, Wish to explain, understand, fix something

Unified field theory – abstract essentials, show diverse phenomena obey same laws. Is aim of science. Unify. (1 unified 3 frontiers; & 3 problems. Integrated l.s. w. ee. thy.)

Give some play to individuality, new outlooks, as go along, & conjecture freely. Don't be stiff, fearful. conjecture as accurately as can, then look for confirmation or rebuttal, in spirit of seeking truth.

Don't disdain the fleet; inspiration etc. – don't over formalize. Grasp spirit of research for truth, then give self some play.

In human affairs, is room for Freudian approach, as vs experimental approach. Can't set up controlled exps, must not ∴ feel guilty about all conclusions.

testing hypotheses - explanatory, or just as to what facts will be found; & as to effects of policies.

My hypoth., work'g hyp. i.e., before exposition, was that existence of unused land suggested ~~alt not verb~~ forces in land mkt that kept land from highest yield'g use, & that these wd hv other manifestations. So I studied motives for hld'g idle, hit upon diff. i.r.s; dise'g futures, as reason. Orig. thought ok re antic. inc., not SP. Discarded, saw was same for all - & there was my expl-n. Ptd. to 2 other gnrl kinds of problems: separation of ownership from mgmt; & odd sizes.

(Probly shd reorganize, put ch 1, ch 4, ch. 6, ch 2, 3, 5.)

Hypothesis & testing, consecutive. That is process, of research (tho not expos-n). Even in exposition is some rep-n, as method of research left mark on final expos-n.

Stat. is "informal" in sense of not gett'g regression =ns, & degrees of freedom, bec those not nec. - I just want to show is a correl-n, & that is obvious from data, further operations wd. be either a, impossible, or, b, unnec., mere ostentation

Method of hypoth: boil down, put finger on essential matters, find ways of msr'g these essential concepts. MP of land, from M&P & MCC

Avoid prison of ff. conventional procedures in toto. Capture essence, use what need. E.g. re the regression fallacy, guarded vs it w. other categories; re value of large & small, again did what ? cd in terms of available data, showed awareness of effects of diff. groupgs.

Cannot put methodology in a straight jacket. Can't thus inspire good research from drone. But can confine good man in needless limitations.

Pearson:

1. Classify facts
2. Reduce facts to brief formula or relationship
3. (Have others check).

Classific-n & formulation, P's 2 basic processes. P tells nothing of purpose, nor what facts to classify.

Darwin, true Baconian, collected facts, on no theory, wholesale. (I do too, preliminary. Collect facts, & ideas too ? I collected much on land settlement, spec-n, systems of tenure — just found out all I could)

Policy motiv-n ? Ultimately, that is in me. But hv't settled on any before start. Probly diff. policy for ea type of resource ? more than one feasible. Present aim to analyze peculiarities of resource, define what is good & identify obstacles to achievg it.

Methods:
1. Statistical
2. Experimental
3. Informal stat.
4. Case (psycho-analysis)
5. Analogy

(Before collect'g data, know what y're doing it for, but not what conclusion you want to reach. But is good to test a hyp

---

My method of research: 1, Baconian or Darwinian, gather material that bears on subject. From many viewpts, freeing mind from preconceptions, let it range far & wide. Seek explanations of certain phenomena, find out what the phenomena are. Thus I gathered material on am't of idle land, & relative values; on am't & trend of tncy

2. Formulate hyp.

3. Test hyp. – not nec. in Salter-Dewey sense of social experiment, but observ-n of exist'g conditions, us'g stat. The "controlled exp." is perhaps peculiarly inappn.. to social qns. For very qn is, what happens to people when not controlled. Or that is often big part of qn. E.g. size of fm. – exp.s w. machinery wdn't tell whole story, but stat. pick up all, dim. m.a. of assets.

These take place simul.

My method of exposition:
1. Establish existence of facts to be explained
2. ~~Exp~~ Present hypothesis
   Formulate hypothesis

Weeks says express an ideal of research method, admit deviations; history of my research is good

Join thy & pn. Use thy to interp. world, avoid completely introspective, a priori approach. Use thy to org. chaos of reality. Must have ideas to collect facts, etc – derive the ideas logically, & test empirically.

3. allow flexibility for reformulatg, amending — ch. 5
allow room for conclusions not nec. identical w what first antic. (My conclusion summed up neatly. If had to do all over, wd probly begin w. that, let empirical data be testing hypoth. Because discovered, in process of presentg evidence, had practically to develop hypoth. internally to org. it. Esp. ch. 3. That was something I didn't anticipate)

A man may adopt consecutively several attitudes: knowledge for its own sake; knowledge to guide action; etc. The more he does, the more complete a scientist he probly is. Specializ-n has its costs: if one specializes in gatherg facts, another in concepts, polcy, etc., is much labor & loss in xfrg results; also, they don't labor to same ends. E.g. those who specialize in fact gatherg hv not gotten what I need.

Orderliness in human affairs. Can look for it w/o assuming its existence. It is there, when you hit nail on head — find those aspects in respect to which behavior is orderly

Dewey says aim soc. sci. at problem-solvg, not just findg brief resumés of orderliness in data

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Evolution: Bacon rebellg from sterile philosophizg on clouds, descended from Greeks, who were originally skeptics, aim to inspire thought by raising doubts.

Newton, combining two, took observed facts & put into brief summaries of orderliness.

Pearson, probability formulas.

Ginzburg, "Science"; in Encycl. SS. Cohen, Morris, Method, Scientific, En. SS. 6

Leg. Robinson, Mind in Making; ~~Five Kinds of Waits~~; Look for some ec. stuff on subject.

Dewey Quest for Certainty; Logic: the thy of Inquiry.

Dewey adds experiment as mark of modern science. Galileo

Experiment is integ-n of thy & practice. Use ideas to direct action, & results modify ideas.

Use several experiments, recombining elements, to distinguish incidental from essential (thus Lvt has bn used under all kinds of political ~~systems~~, local & nat., dem. & total., honest & compt – & worked)

Salter criticizes most for not knowing what they want to do. 1st first step: state purpose (& assumptions). He says "problem".

Now he jumps to hyp; "if ... then" form, as to results of action. I wd allow freedom.

Dewey said social science, to be science, must be experimental, calls for social planning. Salter says just observe results of experiments that are made for other purposes. Lundberg offers stat. as sub. for experiment. (I agree) Lundberg, G.A. Social Research (1929)

In '30s it was discovered very difficult to transfer from extant research to social action, & became issue. (Probly ~~meant~~ a good deal of trouble was bec the research was not informative; also, of course, was not oriented to action; also, was probly distorted by usual problem of ~~sct~~ science: fear of vested interests; mysticism re homo sap, race egotism, fear of determinist philosophy, concealing of evidence, etc etc. Immediate policy implications, fear of.

Science vs art, or policy.

To Dewey, scientific method is control over warranted assertions of belief.

Greeks: intellectual certainty estab. by perfect design & org. of concepts.

(Astronomy, no experiment; meteorology, ~~no~~ errors of prediction)

Is no "sci. method". Grows out of subject matter, reflects it – rather than imposing ~~the~~ observer's mind on subject

Key factors in research:

1. Purpose – but flexibility, as new evidence or interp makes desirable.
2. Wide survey of evidence
3. ~~Reconcile apparent discrepancies~~ formulate ideas independently. Later, reconcile w. like Poincaré. in familiar terms. ~~Keep tradition & authority in back ground, try to grasp~~ authority, I seem to speak
4. ~~Combine ideas from diff sources~~ brief summaries of underlines, or repetition – e.g. frontiers
3. Look for patterns. Informally formulate & test many hypotheses, – most reject quickly.
4. Combine ideas from different sources. Combine & recombine facts & ideas in many ways, using many diff. categories or systems of coordinates. Experiment, muse, revery. Look for inspiration from analogy, while engaged in other work or thoughts – never carry work straight thru w/o break
5. Reconcile all apparent discrepancies. Translate. (Syndromes?)

Most important. Tackle head-on, do not run away.

6. Select best method of exposition, from above alternatives. Leave flexibility in plans, as long as possible, for new discoveries.

6. Pose hypothesis. ~~you can test~~

Pose it in various ways, experiment around, thus formulate it.

7. Test hypoth. if possible — & try to formulate it so it can be

Salter wants purpose, policy probly. p.62. Emphasizes formulat'g problem, not just assumg it. Derides aimless surveys.

(Social sci. not experimental? Fluoridation, medical science takes adjacent towns, cfs. results, is valid control. Similarly, 2 towns similar but differ in tax policy. Use stat., get control.)

Research method:

1. Purpose – but w. flexibility. Formulate purpose tentatively – don't just assume it. Limit subject, w. assumptions
2. Wide survey of evidence & literature, from variety of sources. Avoid like poison becoming wedded early to a standard interp. Is temptation, bec all is much easier to org. if fits into ready made org. of thought. & if are truly satisfied, is ok – but then research hardly nec., for it springs from discontent w. gmly received opinions

3. Look for patterns, brief summaries of orderliness. – abstract from mass of data, find aspects that are orderly (& of course relevant to purpose). But do not let these jell – keep tentative

4. Combine ideas & data from diff. sources. Translate diff. languages (each set of categories is a diff. language) into ea. other. Look for new combos of ideas & facts.

5. Reconcile discrepancies. Conquer "double-think" tendencies. Diff. lines of thought lead to diff. conclusions. Diff. sources present conflicting data. Leads to new concepts, new generalizations. Very important, & greatest temptation to shirk. Only after this

6. Pose hypotheses, then attack them, then reconstruct, etc etc. Over considerable time.

Finally formulate hyp. Circulate it, invite criticism.

Reformulate it, in light of criticism. Get it out of yr. pvt language into another tongue most widely used among yr. likely audience. Shape it for communication.

Circulate again, reformulate for accuracy.

7. Test hyp. Reformulate, if nec., for easiest testing. As result of tests, be ready to change hyp. again.

8. Expound. Prepare to go thru all ~~the process~~ 7 steps in process. But do not throw them all on reader. In exposition, hvg settled on hyp., present reasons why, not history of evolution of ideas.

Probly better to expound ~~deductively~~ w. conclusions first, not as I did. Since mass of data must be tied together.

Art of thinking

Proximate or mediate causes, w. many ~~mediate~~ remote causes behind them. as in Reed thesis.

Subsuming.

Another lesson: the remarkable mental confusions surrounding an accident. Indeed, this accident was much different from my preceding ones, in that I was unconscious momentarily, long enough to have a dream life that seemed very vivid at the time, and I was sufficiently un-acute in my conscious mind for some time afterwards that I dreamed as I went along and was not strictly aware of details of the environment, to the usual extent. I was particularly confused about the passage of time, being amazed to discover how late it was in the afternoon. A form of shock, I guess.

The accident really came upon me unawares. I was a little sleepier than I realized, no doubt, and my reactions slower. Then, coming around the curve, I suddenly realized that I wasn't going to make it. --too late, as it seems, to prevent the crash, but I recall a strange inhibition to leaning further to turn, a decision that it had to happen, an impact -- just that, I have no specific memory of what hit where, or what my course was, just an impact -- and then I was sitting under the bicycle and Isaid "My God, I'm lucky to be alive", then I had them look for blood, & then I started to remember a dream, which at first I thought must have come from the night before, but presently decided must have happened during the crash, or just after -- truly a moment of unconsciousness, semi-voluntary. I was very interesta in tracing the dream back, remembering just what itwas, and tried hard to concentrate on that, got only impressions. Then I was off base for some time, and tried hard to remember all this past, it seemed a necessary precedent to getting on base again, & I was for some time -- until we got to main road -- having little fantaxies, & suddenly consciously realizing that I wasn't quite all there, that my inner dream life was for some time as real as my conscious life, & my memory had trouble ~~xxxx~~ disentangling the two. Time sequence in memory also became blurred.

Life is controlled for me by a series of little obligations often, and it was particularly frustrating to have a train of thought, think of an obligation at the end of it, get the feeling of having one, and sometime---I've no idea how long --- after, remembering having thought of an obligation, but be unable to remember what it was, whether it was in the dream or real world. over

Query: is it because so much has heppened during an accident, that the memory of it is so vivid that it blots out others, and the mind is frustrated because it tries to get back before the accident and reestablish contacts with life? Or is it just the physical disturbance, the loss of blood from the head, etc? Both no doubt. It is like getting back to work after a vacation -- some reflexes, such as "Where is my file on ....." are slowed.

✓ Thinking is like loving and dying. Each of us must do it for himself.

Josiah Royce

Thought &

"Exposition consists in continually reorganizing, recombining info, ~~facts~~ ideas, adapting them to new applications.

So the mind must be busy cross-classifying.

Might a mind be trained to this?

If social science takes up these battles on behalf of the new agrarianism, its struggle will be uphill. College professors and "Harvard farmers" are in disrepute. There is a feeling that before a man can qualify as an expert in agricultural economics he should be able to make a calf drink out of a bucket. The campaign against social science is similar to the anger and ridicule once heaped on the "book farmers" of the physical sciences. Farmers who a generation ago objected to the inbreeding of livestock, on the ground that it was incestuous, were scarcely less indignant than are some farmers today when they are confronted with economic doctrine. Teaching zeal overcame the old prejudices and finally earned the respect of farmers. It can do the same for the social scientists.

An invitation to the social scientists does not mean that the new agrarianism would approve a scholarly form of statism to rule over farms and farmers. Its influence would be in the opposite direction.

"I don't need a book on scientific agriculture," d the old farmer to the salesman. "Right now I farm as good as I know how." The farmer

have to be an artist to make lovely things," sh
concluded.

"Now, shall we have the hospital committee
report?" Martha said, when Mrs. Brookhart s
down. "As most of you know, a volunteer com
mittee from the Wives' Club visits Army wives in
the hospital each week." She looked around for the
committee. A small, pretty Southern girl spoke
timidly from one corner of the room.

"I guess I was the hospital committee last week,"
she drawled.

"Will you tell us about it?" Martha prompted.

"Well, I went to the hospital on Saturday," the
hospital committee said, "and found that there was
only one soldier's wife there. I bought her a potted
plant and took it over to her Monday morning, but
she had already gone when I got there." The group
chortled and the hospital committee blushed. "I
know it sounds funny," the girl said, embarrassed,
"but what am I going to do with the plant?"

360, by The New York Times Square, New Yo

Student I. Q.'s Rise In California Tests

By FRED M. HECHINGER

Evidence that applied human intelligence can be dramatically increased has been offered by an experiment conducted by a California professor after twenty-five years of research.

The results of the test, administered at Whittier College, may offer the key to the release of native but unused brain power in the majority of persons.

Dr. Albert Upton, Professor of English and director of General Studies at Whittier, after subjecting 280 freshmen to a special "system" of instruction for eight months, reports that the measured intelligence, or I. Q., of the group had been raised by an average of 10.5 points, with individual gains ranging up to thirty-two points. He em-

Continued on Page 19, Column 2

I. [illegible] OF STUDENTS INCREASE IN TEST

Continued From Page 1, Col. 2

phasized that the test in itself, as well as the score, was only a by-product of the students' increased ability to use their minds and to solve problems.

Dormant Powers

The success of the experimental method appears to be the result of the awakening and mobilization of dormant analytical powers. These powers normally trained mainly in scientific work, may apparently be released by the application of scientific method to language and general thought processes. They then appear to transfer themselves to the general area of solving intellectual problems. The ability to solve problems is generally considered a major measure of that only vaguely defined concept of "intelligence."

Dr. Upton's experiment may be of special significance to education exactly because it does not involve special individual work with each pupil but rather shows itself successful with a large group. It may offer a new means of tackling one aspect of the problem of people considered "underachievers." In the past their achievement below their ability has generally been attributed to lack of interest.

Dr. Upton has been developing his ideas for many years with the guidance and encouragement of Dr. Ivor Armstrong Richards of Harvard University.

Gains in Test

Last October the Whittier students were given a standard I. Q. test. Their average score was 109.5. During the seven months [illegible] followed the freshmen were [illegible]d to Dr. Upton's "Graded [illegible]s in Analysis," de[illegible] improve basic analyti[illegible]s. Re-tested in May, [illegible]' average score was [illegible]res of many stu[illegible]; were raised by [illegible]s or more, with [illegible] gaining thirty-two [illegible] Upton believes that [illegible]ensive training might [illegible]n greater improvement.

[illegible] "system," says Dr. Up[illegible], teaches the relationship be[illegible]ween "words and things." It applies the scientific method to language and communications and thereby to thinking and understanding. Dr. Upton says that this method has been properly applied to science for hundreds of years. By applying it to language and thought, he says, "there is every reason to believe that the average American I. Q. can be raised significantly in a short period of time."

In nontechnical terms, Dr. Upton tries to teach the student to understand that ideas and words which are new to him resemble ideas and words he already understands. He points to what he calls scientific metaphor of the "wave," which originally related only to water but was subsequently used to describe and explain phenomena of sound, in acoustics and in light. In this way, he says, the metaphor itself turns out to be the pattern of analytical thought, leading both to discovery of something new and its comprehension by means of familiar terms.

He aims at the expansion of the human capacity to see an analogy between an idea, a word or a metaphor he knows and an idea he wants to understand. Once the student understands this, he has learned how his tools of thought work, Dr. Upton said.

Dr. Upton hopes to follow up the students' performance in other academic work.

"We don't know whether 'native intelligence" may be increased, because we don't know what it is," he said. "But we can train people to solve problems they could not solve before."

Wide

Your choice of

Take your pick. The quiet,
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5:50, 7:40, 9:30, 11:20

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at Rugoff & Becker The

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P
58t

"You'll have a fine time
Peter Sellers and Rob
'BATTLE OF THE SE
12:30, 2:40, 4:50, 6:30, 8:20, 10:
MURRAY HILL
34th St. E. of Lex. Ave

"Fascinating, intriguing."—Her. Trib.
Ingmar Bergman's
"DREAMS"
1:00, 2:45, 4:30, 6:20, 8:10, 10:00
5th AVE. CINEMA
Near 12th Street

Last days
"ROSEMARY"
12:00, 2:10, 4:10, 6:10, 8:10, 10:10
BEEKMAN
65th St. at 2nd Ave.

"Mark it at the top of your list."-Post
"EXPRESSO BONGO"
Laurence Harvey
12:00, 2:00, 4:00, 6:00 8:00, 10:00
SUTTON
57th St. at 3rd Ave.

Last 2 days
'THE CRANES ARE FLYING'
1:10, 3:00, 4:45, 6:35, 8:25, 10:15
ART
East 8th Street

Alec Guinness • Noel Coward
"OUR MAN IN HAVANA"
12:05, 2:10, 4:15, 6:10, 8:05, 10:00
GRAMERCY GR 5-1660
23rd St. near Lex. Ave.

Dostoyevsky's
"THE IDIOT"
Kerouac's
"PULL MY DAISY"
8th ST. GR 7-7874
8th St. W. of 5th Ave.

Jimmy Stewart
'ANATOMY of a MURDER'
"BONJOUR TRISTESSE"
Deborah Kerr

Boulding on Systems

Invention of the periodic table organized knowledge in chem. — showed where holes were. Ec. needs something comparable?

1. Static frameworks
   map, benzene ring, anatomy

2. Simple mechanics
   clockworks, solar system
   a. eg. ~~(Thermostasis)~~
   b. Dynamic
   c. stochastic

3. Control systems. (Thermost., homeostasis)
   Cybernetics

~~Bob~~ Boulding, p. 2

4. Open systems (Living cell)
Rivers. Soil. ~~(balanced aquarium?).~~ System remains, by component material keeps changing.

5. Div. of labor system

6. Aware systems

7 Self conscious systems (man)

8. Social systems

9. Transcendental systems

R.G. LeTOURNEAU talks about

STUDY

IN MY LAST ARTICLE I talked a little about the necessity of initiative when it comes to getting an education. I want to add a further note and say that in order to really learn, one must get interested in the subject he is studying. They say I break all the rules of public speaking on the platform. One man said I wouldn't know homiletics if I saw it coming in the door, but if I can get a few thoughts over that's all I'm interested in.

I've always been accused of breaking all precedents in the building of machinery. Now we are breaking all precedents by building a huge factory on one side of the street and a school on the other side to give the boys a day in the factory and a day in school. But I'm wondering if another precedent couldn't be broken in education. Instead of spending an hour studying English, then an hour studying mathematics, then an hour studying chemistry, then physics or economics, my proposition is that when a fellow gets interested in mathematics he should put his whole time into that for six months or maybe a year. Then maybe he would pick up chemistry and spend six months or a year on it. And the same with physics and economics, etc. It's all right to talk about a well-rounded education, but when

(continued on address page)

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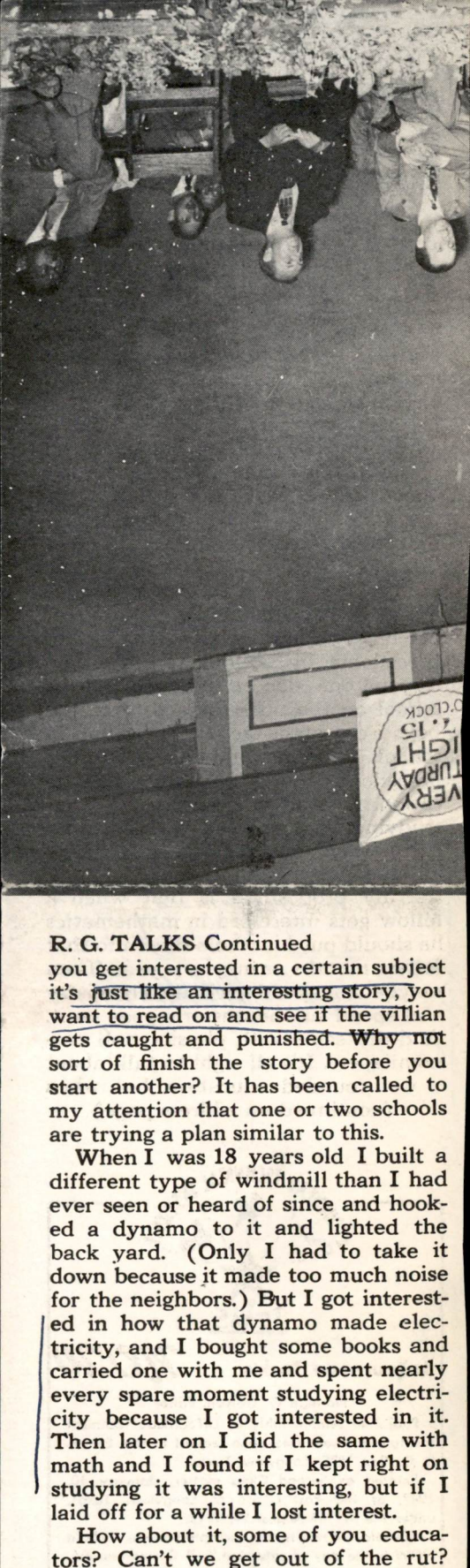
Norman O. Galyon, Editor

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"Behold NOW is the accepted time: behold NOW is the day of salvation."—II Corinthians 6:2.

LeTourneau Technical Institute is an officially recognized degree granting college, specializing in teaching christian service, industrial leadership and mechanical science. Full information can be had by writing to the Registrar, P. O. Box 2307 Longview, Texas.



R. G. TALKS Continued

you get interested in a certain subject it's just like an interesting story, you want to read on and see if the villian gets caught and punished. Why not sort of finish the story before you start another? It has been called to my attention that one or two schools are trying a plan similar to this.

When I was 18 years old I built a different type of windmill than I had ever seen or heard of since and hooked a dynamo to it and lighted the back yard. (Only I had to take it down because it made too much noise for the neighbors.) But I got interested in how that dynamo made electricity, and I bought some books and carried one with me and spent nearly every spare moment studying electricity because I got interested in it. Then later on I did the same with math and I found if I kept right on studying it was interesting, but if I laid off for a while I lost interest.

How about it, some of you educators? Can't we get out of the rut? Meanwhile, we should "Study to shew thyself approved unto God, a workman that needeth not to be ashamed, rightly dividing the word of truth". (II Timothy 2:15)