

**THE IMPEDIMENTS TO TECHNOLOGY TRANSFER  
FROM THE HIGHER EDUCATION SECTOR**

**THE EDUCATION AND TRAINING  
REQUIREMENTS FOR THEIR REMOVAL**

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PREAMBLE

AT THE OUTSET I WOULD LIKE TO GIVE YOU A QUOTATION FROM A POEM BY EDNA ST. VINCENT MILLAY WHICH IS APROPOS TO THE PRESENT OPPORTUNITIES WHICH ARE AVAILABLE TO THE UNIVERSITY SECTOR AS A RESULT OF ITS RESEARCH FUNCTION AND WHICH IS ALSO PERTINENT TO THE THEME OF THIS WORKSHOP.

"UPON THIS GIFTED AGE, IN ITS DARK HOUR  
RAINS FROM THE SKY A METEORIC SHOWER  
OF FACTS-; THEY LIE UNQUESTIONED UNCOMBINED -  
WISDOM ENOUGH TO LEECH US OF OUR ILL  
IS DAILY SPUN, BUT THERE EXISTS NO LOOM  
TO WEAVE IT INTO FABRIC.

I SUGGEST THAT THE LOOM WHICH CAN BE THE INSTRUMENT FOR WEAVING INTO A SUBSTANTIVE FABRIC THE WISDOM DERIVED FROM THE CONDUCT OF RESEARCH CAN BE ENLIGHTENED COOPERATION BETWEEN THE UNIVERSITIES-INDUSTRY AND GOVERNMENT AND THE TRANSFER OF THE TECHNOLOGY GENERATED BY THAT RESEARCH TO THE PUBLIC FOR ITS USE AND BENEFIT.

IMPEDIMENTS TO TECHNOLOGY TRANSFER  
FROM THE HIGHER EDUCATION SECTOR  
THE EXPERIENCE IN THE UNITED STATES

THE CONCEPT THAT "INTELLECTUAL PROPERTY" -- THE PRODUCTS OF THE MIND -- HAD A VALUE AS PROPERTY AROSE DURING THE FRAMING OF THE UNITED STATES CONSTITUTION AND THE TECHNOLOGY TRANSFER FUNCTION IS BASED UPON THAT PROPERTY RIGHT. CONSEQUENTLY, IN GENERAL AND CERTAINLY FOR THE PURPOSES OF THIS PRESENTATION AND THE WORKSHOP, WHEN I SPEAK OF TECHNOLOGY TRANSFER I AM SPEAKING OF THE TRANSFER OF A PROPERTY RIGHT, THE TITLE TO WHICH IS VESTED IN AN INSTITUTION OF HIGHER EDUCATION, TO A THIRD PARTY, USUALLY FOR A CONSIDERATION.

OVERVIEW

IN THE UNITED STATES WE HAVE SEEN AN EVOLUTION IN BOTH THE INTEREST IN TECHNOLOGY TRANSFER FROM THE HIGHER EDUCATION SECTOR AND THE CAPABILITY OF THAT SECTOR TO PERFORM THE TECHNOLOGY TRANSFER FUNCTION. THAT EVOLUTION HAS BEEN PRECEDED INCREMENTALLY DURING ITS COURSE BY AN EVOLUTION IN THE OBSERVED IMPEDIMENTS TO TECHNOLOGY TRANSFER AS KNOWLEDGE INCREASED, AS THE COMPLEXITY OF SCIENCE INCREASED FUELED BY THAT NEW KNOWLEDGE, AS POLITICAL AWARENESS OF THE VALUE OF TECHNOLOGY INCREASED AND AS COMPETITIVENESS HAS INCREASED ON A GLOBAL SCALE.

WE HAVE BEEN TAUGHT THAT IF WE DO NOT HEED THE LESSONS OF HISTORY WE ARE BOUND TO REPEAT THE MISTAKES WHICH HAVE BEEN MADE.

FOR THAT REASON ALONE, IT SEEMS REASONABLE TO TRACE HISTORICALLY SOME OF THE CHANGES IN THE OBSERVED IMPEDIMENTS TO TECHNOLOGY TRANSFER IN THE UNITED STATES. SOME OF THOSE CHANGES HAVE DRASTICALLY ALTERED THE ROLE THAT UNIVERSITIES CAN HAVE IN THE TECHNOLOGY TRANSFER PROCESS WHILE OTHER IMPEDIMENTS, GENERALLY, THOSE FINDING A BASIS IN EMOTION OR ATTITUDE, REMAIN WITH US. THE MOST DRAMATIC CHANGES HAVE BEEN THE RESULT OF A CONTINUING EFFORT TO EDUCATE THE TECHNOLOGY CONTROLLING ENTITIES INVOLVED SUPPLEMENTED STRONGLY BY CHANGING ECONOMIC CONDITIONS.

### HISTORICAL

THE EVOLUTION OF TECHNOLOGY TRANSFER FROM THE UNIVERSITY SECTOR AND THE COLLATERAL MITIGATION OF SOME OF THE MAJOR IMPEDIMENTS TO THAT TRANSFER CAN BE CONVENIENTLY TRACED THROUGH DEFINITIVE TIME PERIODS.

1. PRE-WORLD WAR II
2. THE 1950'S & 1960'S
- ~~3. THE 1960'S~~
- 3 4. THE 1970'S
- ~~4.5. THE 1980'S~~

DURING THE PRE-WORLD WAR II ERA WHEN THE "IVORY TOWER" CONCEPT AT AND OF UNIVERSITIES WAS PREVALENT LITTLE THOUGHT OR IMPETUS WAS GIVEN TO THE TRANSFER OF THE RESULTS OF RESEARCH TO THE PUBLIC OTHER THAN THROUGH THE ACCEPTED AND ACCEPTABLE ROUTE OF PUBLICATION. IN FACT, UNDER THAT "IVORY TOWER" CONCEPT, A RESEARCHER WHO ACCEPTED A CORPORATE SUBSIDY AROUSED THE SUSPICION

THAT HE HAD BEEN DIVERTED FROM HIS BASIC RESEARCH AND HAD, IN EFFECT, BECOME A TOOL OF THE VESTED INTERESTS. HE HAD ACCEPTED "TAINTED MONEY." THE PURISTS, AT THE UNIVERSITY OF WISCONSIN, AND ELSEWHERE, APPLIED THIS SAME SORT OF REASONING WHEN IT WAS SUGGESTED THAT A PLAN BE DEVELOPED TO MAKE USE OF PATENTABLE IDEAS OF VARIOUS FACULTY MEMBERS THAT WOULD PROTECT THE INDIVIDUAL TAKING OUT THE PATENT, INSURE ITS PROPER USE, AND AT THE SAME TIME, BRING FINANCIAL HELP TO THE INSTITUTION TO FURTHER THE UNIVERSITY'S RESEARCH - A CONCEPT WHICH HAD LEAD TO THE FOUNDING OF WARF IN 1925. THERE WERE THOSE WHO THEN FEARED THAT ANY SUCH ARRANGEMENT WOULD DIVERT THE SCIENTIST FROM HIS BASIC RESEARCH AND INDUCE HIM TO WORK ON ONLY THOSE IDEAS WHICH HAD COMMERCIAL POTENTIAL. IN OTHER WORDS, IT WOULD CONVERT THE RESEARCH FUNCTION AT THE UNIVERSITY FROM ITS BASIC "IVORY TOWER" CHARACTER, THE SEEKING OF NEW KNOWLEDGE, TO AN APPLIED CHARACTER, I.E., THE ASSESSING OF CONCEPTS DISCOVERED IN BASIC RESEARCH TO DETERMINE WHETHER THEY CAN BE UTILIZED IN SOLVING PROBLEMS IN THE REAL WORLD, OR EVEN TO ACTUAL DEVELOPMENT I.E., THE PREPARATION OF PRODUCTS OR PROCESSES TO MARKET-READY CONDITION. <sup>↑</sup> TRULY, IMPEDIMENTS TO TECHNOLOGY TRANSFER.

*These fears were,*

THE FEARS PROPOUNDED BY THE PURISTS THEN DID NOT MATERIALIZE. THERE WAS NO GREAT RUSH TO PATENTS: THERE WAS NO EVIDENT MOVEMENT TO PRODUCT ORIENTATION BY THE SCIENTISTS AT THE UNIVERSITY: AND THERE WAS NO OBSERVABLE CHANGE IN THE RESEARCH SCIENTIST'S ATTITUDE. IN FACT, ~~AND EXCEPT FOR THE MORE SPECIFIC CONTRACTUAL ARRANGEMENTS WITH GOVERNMENT AGENCIES IN MORE RECENT YEARS,~~ THE

NATURE OF ~~THE~~ UNIVERSITY RESEARCH HAS REMAINED ESSENTIALLY BASIC. ✓  
THE GENERATION OF INVENTIONS IS ALMOST NEVER THE MAIN OBJECTIVE OF  
SUCH RESEARCH. IF INVENTIONS DO FLOW FROM THE RESEARCH ACTIVITY,  
IT IS A LARGELY FORTUITOUS HAPPENING THAT TAKES PLACE BECAUSE THE  
SCIENTIST-INVENTOR HAS THE ABILITY TO SEE SOME SPECIAL RELATIONSHIP  
BETWEEN HIS SCHOLARLY WORK PRODUCT AND THE PUBLIC NEED. IT IS THE  
RECOGNITION OF THIS CONNECTION WHICH CAN CONVERT A DISCOVERY OR  
INVENTION INTO PATENTABLE INVENTION AND FROM WHICH INNOVATION  
ARISES.

IT IS, INDEED, INTERESTING THAT WARF'S FOUNDING WAS THE RESULT  
OF PERCEIVED IMPEDIMENTS TO THE TRANSFER OF TECHNOLOGY FROM A  
UNIVERSITY.

AND THEN CAME THE GOVERNMENT!!!

DURING THE EARLY HISTORY OF THE UNITED STATES, VERY LITTLE TECHNICAL DEVELOPMENT WORK WAS DONE BY THE GOVERNMENT AND, THEREFORE, AS A PRACTICAL MATTER, THE QUESTION OF THE GOVERNMENT OWNING A PATENT NEVER AROSE. ~~GRADUALLY, FEDERAL AGENCIES BEGAN TO UNDERTAKE THE PRACTICAL KIND OF DEVELOPMENT WORK WHICH LED TO INVENTIONS.~~ SINCE, PRIOR TO WORLD WAR II, ALMOST ALL GOVERNMENT-FINANCED RESEARCH AND DEVELOPMENT WORK WAS CONDUCTED IN FEDERAL LABORATORIES BY FULL-TIME GOVERNMENT EMPLOYEES, THERE WAS A SMALL BUT RECURRING PROBLEM OF WHAT TO DO WITH INVENTIONS RESULTING FROM SUCH WORK - INVENTIONS WHICH, IF MADE BY PRIVATE PARTIES, WOULD HAVE BECOME THE SUBJECT OF PATENT APPLICATIONS.

THIS SITUATION CHANGED RAPIDLY DURING AND AFTER WORLD WAR II WHEN THE TECHNOLOGICAL REQUIREMENTS IMPOSED BY MORE AND MORE SOPHISTICATED MILITARY REQUIREMENTS AS WELL AS THE INCREASING COMPLEXITY OF SUPPORT SERVICES MADE IT QUICKLY EVIDENT THAT THERE WERE NOT SUFFICIENT RESOURCES WITHIN THE GOVERNMENT TO UNDERTAKE ALL THE SCIENTIFIC PROJECTS NECESSARY TO A WINNING WAR EFFORT. THE ABSOLUTE NECESSITY TO UTILIZE THE BEST TECHNICAL ABILITY AVAILABLE, REGARDLESS OF ITS LOCUS, SPAWNED A RAPID PROLIFERATION OF GOVERNMENT-SPONSORED-AND-FUNDED RESEARCH AND DEVELOPMENT CONTRACTS.

THE PROPER DISPOSITION OF RIGHTS TO PATENTS RESULTING FROM THIS WORK WAS THEORETICALLY AS IMPORTANT THEN AS NOW BUT WAS NEVER SERIOUSLY ADDRESSED AS A MAJOR PROBLEM BECAUSE OF THE EXIGENCIES OF WARTIME NEEDS.

POST WORLD WAR II, THE RAPID TECHNOLOGICAL STRIDES MADE UNDER THE IMPETUS OF A WARTIME FOOTING, AND THE OBVIOUS NECESSITY FOR CONTINUED TECHNOLOGICAL SUPERIORITY, AT LEAST IN DEFENSE-ORIENTED EFFORTS, MADE IT IMPERATIVE TO CONTINUE TO PROVIDE PUBLIC SUPPORT FOR SCIENCE. NOR WAS THIS SUPPORT LIMITED TO THE MILITARY. FOR EXAMPLE, IN 1950 CONGRESS FINALLY PROVIDED AN ANNUAL BUDGET LIMIT OF \$15 MILLION FOR THE NATIONAL SCIENCE FOUNDATION TO CONDUCT BASIC SCIENTIFIC RESEARCH AT UNIVERSITIES.

DURING THIS SAME PERIOD, HUNDREDS OF MILLIONS OF DOLLARS WERE APPROPRIATED BY THE GOVERNMENT IN THE AREA OF MEDICAL RESEARCH IN THE BEGINNINGS OF AN ALL-OUT ATTACK ON DISEASE.

WITH THE RAPID EXPANSION OF SCIENTIFIC PROJECTS BEING UNDERTAKEN AND SUPPORTED BY THE GOVERNMENT, THE SAME SHORTAGE OF TECHNICAL ABILITY AND FACILITIES CONTINUED TO PREVAIL AS ~~IT HAD~~ ✓  
~~DONE~~ UNDER THE PRESSURES OF WORLD WAR II. SINCE THE GOVERNMENT COULD NOT DO ALL THE NECESSARY WORK IN ITS OWN FACILITIES, QUALIFIED PRIVATE COMPANIES, UNIVERSITIES AND NONPROFIT ORGANIZATIONS WERE SOUGHT OUT TO PERFORM MANY OF THE PROGRAMS VIA CONTRACTUAL ARRANGEMENTS. AND THE SAME OLD PROBLEM OF OWNERSHIP OF PATENT RIGHTS EXISTED IN EVERY ONE OF THE CONTRACTS. HOWEVER, SINCE FEW UNIVERSITIES WERE ENGAGED IN TECHNOLOGY TRANSFER ACTIVITIES, THE PREVAILING ATTITUDE AMONG THEM SEEMED TO BE "TAKE THE MONEY AND RUN."

SINCE THERE WAS NO SINGLE OR OVERRIDING PATENT POLICY WHICH THE GOVERNMENT HAD TO RELY UPON, EACH GOVERNMENTAL AGENCY WHICH



SUPPORTED A RESEARCH AND/OR DEVELOPMENT EFFORT, ~~THROUGH EITHER OR~~  
~~BOTH OF CONTRACTUAL OR GRANT ARRANGEMENTS~~, DEVELOPED ITS OWN  
POLICY. THE ULTIMATE RESULT WAS THAT SOME 26 DIFFERENT -AGENCY-  
POLICIES EVOLVED WHICH PROSPECTIVELY HAD TO BE CONSIDERED IF AN  
EFFORT WAS TO BE MADE TO TRANSFER TECHNOLOGY WHICH HAD BEEN  
GENERATED WITH THE USE OF FEDERAL FUNDS. FOR THE MOST PART THE  
AGENCY POLICIES WERE "TITLE" POLICIES, I.E., THE GOVERNMENT TOOK  
TITLE TO AND OWNED ALL INVENTIONS MADE WITH GOVERNMENT FUNDS. THE  
DEVASTATING EFFECT THAT POLICY HAD WAS CLEARLY EVIDENT AT WARF.  
THE NORMAL IN-PUT OF INVENTION DISCLOSURES DURING THE 1950'S AND  
WELL INTO THE 1960'S SHRANK FROM ABOUT 40-50 PER YEAR TO ABOUT 15.  
MOREOVER, THOSE 15 DISCLOSURES WERE OF INVENTIONS THAT HELD LITTLE  
POSSIBILITY FOR TRANSFERRING THE TECHNOLOGY THEY REPRESENTED  
THROUGH LICENSING. IT APPEARED THAT THE UNIVERSITY-WARF TECHNOLOGY  
TRANSFER FUNCTION WAS COMING TO A HALT. THIS BECAUSE OF THE MAJOR  
IMPEDIMENT WHICH THE <sup>TITLE</sup> POLICIES OF THE GOVERNMENT AGENCIES  
REPRESENTED. NOR DID THE AGENCIES HAVE AN ACTIVE TECHNOLOGY  
TRANSFER EFFORT. DURING THAT PERIOD THE GOVERNMENT, THROUGH ITS  
AGENCIES ACQUIRED SOME 28-30,000 PATENTS WITH LESS THAN 5% OF THEM  
BEING LICENSED TO INDUSTRY AND WITH EVEN FEWER OF THEM REPRESENTING  
PRODUCTS IN THE MARKET.

DURING THE PERIOD FROM 1963-1971 EFFORTS WERE BEING MADE,  
THROUGH TEST CASES AND NEGOTIATION TO PERSUADE SEVERAL FEDERAL  
AGENCIES, SPECIFICALLY, THE NATIONAL INSTITUTES OF HEALTH AND ITS  
PARENT AGENCY, THE DEPARTMENT OF HEALTH, EDUCATION AND WELFARE, AS  
WELL AS THE NATIONAL SCIENCE FOUNDATION TO ENTER INTO INSTITUTIONAL

PATENT AGREEMENTS (THE I.P.A.). THE POLICIES OF BOTH OF THESE AGENCIES <sup>HAD</sup> PERMITTED A WAIVER OF RIGHTS TO THE INVENTIONS MADE WITH THEIR FUNDS BUT ON THE VERY FEW OCCASIONS WHERE A WAIVER WAS GRANTED, IT <sup>was so restrictive in its</sup> ~~CONTAINED SO MANY RESTRICTIVE~~ PROVISIONS THAT IT PRESENTED AN UNWORKABLE BASIS FOR TRANSFERRING TECHNOLOGY. NO COMMERCIAL FIRM WOULD ACCEPT THE CONDITIONS WHICH WERE IMPOSED BY THE WAIVER.

THEN, AFTER 5 YEARS OF EFFORT, THE DHEW IN 1968, ISSUED ITS FIRST NEW INSTITUTIONAL PATENT AGREEMENT TO THE UNIVERSITY OF WISCONSIN. THIS WAS FOLLOWED IN 1973, AGAIN AFTER MANY YEARS OF EFFORT, BY THE ISSUANCE TO THE UNIVERSITY OF WISCONSIN OF THE FIRST INSTITUTIONAL PATENT AGREEMENT TO BE ISSUED BY THE NATIONAL SCIENCE FOUNDATION.

THE AVAILABILITY OF AN IPA WITH THOSE TWO AGENCIES PROVIDED AN IMPETUS TO UNIVERSITIES TO ENGAGE IN THE TECHNOLOGY TRANSFER BUSINESS EVEN THOUGH OTHER FEDERAL AGENCIES STILL CLUNG TENACIOUSLY TO THE POLICY OF TAKING TITLE TO ALL INVENTIONS MADE WITH THE FUNDS THEY SUPPLIED. MOREOVER, BECAUSE UNDER THESE AGREEMENTS THE UNIVERSITIES WERE AFFORDED A CERTAINTY OF TITLE TO THE INVENTIONS MADE IT WAS A SPUR TO THE COMMITMENT OF FUNDS IN SUPPORT OF RESEARCH TO THE UNIVERSITIES BY INDUSTRY.

THE IPA'S WERE ADDITIONALLY VERY IMPORTANT SINCE MANY OF THEIR NEGOTIATED TERMS AND PROVISIONS CARRIED OVER INTO AND SET THE TONE FOR THE LEGISLATIVE EFFORT WHICH CULMINATED IN THE PASSAGE OF PL96-517, THE PATENT AND TRADEMARK LAW AMENDMENTS ACT IN 1980.

WHY WAS THAT SINGLE PIECE OF LEGISLATION SO IMPORTANT TO THE

UNIVERSITY SECTOR?

1. IT CHANGED THE PRESUMPTION OF TITLE IN THE GOVERNMENT OF ANY INVENTION MADE WITH FEDERAL FUNDS AT UNIVERSITIES AND SMALL BUSINESSES TO THE PRESUMPTION OF TITLE IN THE CONTRACTOR-GRANTEE<sub>x</sub> - THE UNIVERSITY.
2. IT ALLOWED UNIVERSITIES, NONPROFIT ORGANIZATIONS AND SMALL BUSINESS FIRMS TO ELECT TO RETAIN TITLE TO INVENTIONS MADE BY THEM DURING THE COURSE OF FEDERALLY SPONSORED RESEARCH.
3. IT ELIMINATED <sup>A</sup>~~THE~~ ) DISTINCTION BETWEEN CONTRACTS AND GRANTS <sup>WHICH</sup> IN <sub>AFFECTED</sub> THE DISPOSITION OF RIGHTS TO INTELLECTUAL PROPERTY PRODUCED WITH FEDERAL FUNDS.
4. IT ELIMINATED APPROXIMATELY 26 DIFFERENT AND OFTEN CONFLICTING AND CONFUSING GOVERNMENT AGENCY PATENT POLICIES.
5. IT WAS A RECOGNITION BY CONGRESS OF THE VALUE OF THE PATENT SYSTEM, AS A WHOLE, TO EFFECTUATE THE TRANSFER OF GOVERNMENT-FUNDED INVENTIONS TO THE PUBLIC.
6. IT WAS A RECOGNITION BY CONGRESS THAT THE ABILITY OF THE GOVERNMENT TO TRANSFER TECHNOLOGY HAD BEEN SINGULARLY UNSUCCESSFUL AND INEFFECTIVE.
7. IT WAS THE FIRST TIME CONGRESS CLEARLY DELINEATED A UNIFORM LICENSING POLICY FOR THE TRANSFER OF GOVERNMENT-OWNED TECHNOLOGY.

THUS  
THROUGH ITS PROVISIONS IT <sub>1</sub> REMOVED THE MAJOR IMPEDIMENT TO

THE ~~RIGHT~~ RIGHT IN THE  
GOVERNMENT TO TAKE TITLE  
TO ALL INVENTIONS CONCEIVED  
OR MADE WITH  
GOVERNMENT FUNDS

TECHNOLOGY TRANSFER FROM THE UNIVERSITY SECTOR, - AN IMPEDIMENT  
WHICH HAD PREVAILED FOR A PERIOD OF ALMOST 30 YEARS. AT THE TIME  
THE LAW BECAME EFFECTIVE IN 1981 UNIVERSITY R&D SPENDING WAS ABOUT  
\$6.6 BILLION, OF WHICH \$4.385 BILLION WAS FOR BASIC RESEARCH. OF  
THAT \$6.6 BILLION, \$4.4 BILLION WAS SUPPLIED BY THE GOVERNMENT.  
IN CONTRAST ONLY \$260 MILLION WAS OBTAINED FROM INDUSTRY.

THE POTENTIAL EFFECT ON INNOVATION OPPORTUNITIES AFFORDED BY  
A \$4.4 BILLION EXPENDITURE FOR BASIC RESEARCH WAS READILY APPARENT.

WITH THE PASSAGE OF PL96-517 AND, IN THE SAME YEAR, THE  
DECISION OF THE UNITED STATES SUPREME COURT IN THE CHAKRABARTY  
CASE, WHICH HELD THAT MERELY BECAUSE SOMETHING WAS ALIVE ~~IT WAS~~ NOT  
PRECLUDE IT FROM BEING PATENTED, ALONG WITH THE EVOLUTION OF  
GENETIC ENGINEERING CONCEPTS, THE UNIVERSITIES WERE ALMOST  
LITERALLY PROPELLED INTO AN AWARENESS OF THE POTENTIAL ECONOMIC  
VALUE OF TECHNOLOGY THEY WERE GENERATING.

ALTHOUGH THESE CIRCUMSTANCES MADE THE UNIVERSITY SECTOR AWARE  
OF THE POSSIBILITIES FOR TECHNOLOGY TRANSFER NOW AVAILABLE, MANY  
INDIVIDUAL UNIVERSITIES WERE NEITHER EXPERIENCED NOR HAD THE  
CAPABILITY, IN TERMS OF PERSONNEL OR AN OFFICE, TO CARRY OUT THAT  
FUNCTION, NOR, OF PRIMARY IMPORTANCE, THE AVAILABLE MONEY TO ENGAGE  
IN IT.

THE LACK OF FUNDS CAN STRONGLY AFFECT THE TECHNOLOGY TRANSFER  
FUNCTION SINCE IT IS INSTRUMENTAL IN ESTABLISHING AN ADEQUATE  
PATENT BASE. ONE MUST HAVE ADEQUATE FUNDS TO ENGAGE THE NECESSARY

PROFESSIONAL HELP TO ASSESS THE VALUE OF AN INVENTION THROUGH MARKET RESEARCH, TO ESTABLISH AND MAINTAIN AN ADEQUATE PATENT BASE ON A WORLDWIDE BASIS AND LAST, BUT NOT LEAST, TO ENGAGE IN INTER PARTES ACTS TO BOTH ASSERT AND DEFEND THE PATENTS OBTAINED. THE FEAR OF LITIGATION AND ITS HUGE ATTENDANT EXPENSES IS AN EVER PRESENT DANGER IN THE MINDS OF THOSE WHO HAVE THE RESPONSIBILITY FOR A TECHNOLOGY TRANSFER PROGRAM AT A GIVEN UNIVERSITY.

THOSE ARE MERELY SOME OF THE PRACTICAL IMPEDIMENTS FROM THE UNIVERSITY VIEWPOINT WHICH CAN ADVERSELY AFFECT THE TECHNOLOGY TRANSFER FUNCTION. THERE ARE OTHER IMPEDIMENTS WHICH LIE IN EMOTION OR ATTITUDE BOTH WITH THE UNIVERSITY AND/OR ITS PERSONNEL AS THE TRANSFEROR AND WITH THE THIRD PARTY TRANSFEREE, USUALLY A COMMERCIAL ENTERPRISE. NUMBERED AMONG THOSE IMPEDIMENTS CAN BE: UNIVERSITY POLICIES, OR COMPANY POLICIES; THE NOT-INVENTED-HERE AND "IVORY TOWER" SYNDROMES; THE ATTITUDE IN CERTAIN COMPANIES THAT THE UNIVERSITY AND ITS POOL OF TALENT IS FOR HIRE AS AN EXTENDED RESEARCH AND DEVELOPMENT ARM OF THE COMPANY; UNWILLINGNESS OF THE INVESTIGATOR-INVENTOR TO PARTICIPATE IN THE TECHNOLOGY TRANSFER PROCESS; THE QUESTION OF CLASSIFIED RESEARCH I.E. RESEARCH WHICH IS ESSENTIALLY CONDUCTED WITH NO INTENT TO PUBLISH THE RESULTS (TRADE SECRETS ARE CONSIDERED INAPPROPRIATE FOR UNIVERSITIES IN GENERAL AND, IN PARTICULAR, FOR PUBLIC UNIVERSITIES; AND EVEN PERSONALITY CONFLICTS WHICH CAN OCCUR AS LONG AS ENVY AND JEALOUSY ARE A PART OF THE HUMAN CONDITION.

IN THE FACE OF ALL OF THESE IMPEDIMENTS WHY HAS THE NUMBER OF UNIVERSITIES ENGAGING <sup>IN</sup> ~~ITS~~ TECHNOLOGY TRANSFER INCREASED SO DRAMATICALLY SINCE 1980-81 AND WHY HAVE THE UNIVERSITIES BEEN SO SUCCESSFUL IN TRANSFERRING THE PRODUCTS OF THEIR RESEARCH FUNCTIONS TO THE PUBLIC?

DESPITE ALL OF THE DIFFICULTIES ATTENDANT UPON TECHNOLOGY TRANSFER, UNIVERSITIES ARE IN A UNIQUE POSITION TO OBJECTIVELY SEEK THE BEST QUALIFIED INDUSTRIAL DEVELOPER <sup>AS A LICENSEE</sup> AND, UNDER APPROPRIATE LICENSING ARRANGEMENTS, TO MONITOR THE DILIGENCE OF THE DEVELOPMENT EFFORTS BY THE LICENSEE <sup>- DEVELOPER</sup> SUCH ARRANGEMENTS CAN, OF COURSE, BE MADE ONLY IF THE UNIVERSITY CAN FURNISH SOME INCENTIVE TO THE INDUSTRIAL DEVELOPER, USUALLY IN THE FORM OF A LIMITED EXCLUSIVE LICENSE UNDER APPROPRIATE PATENT COVERAGE. IT IS FOR THAT REASON THAT UNIVERSITIES THAT HAVE ESTABLISHED TECHNOLOGY TRANSFER CAPABILITIES ALSO HAVE ESTABLISHED PATENT POLICIES SINCE A SOUND PATENT BASE IS THE HEART OF A SUCCESSFUL TECHNOLOGY TRANSFER PROGRAM. IF A UNIVERSITY HAS A SOUND PATENT POLICY, THROUGH JUDICIOUS PATENTING IT CAN, WITHOUT EXCESSIVE EXPENDITURES, PLACE ITSELF IN A POSITION THAT IF A COMMERCIALY VALUABLE DISCOVERY IS MADE IN ITS LABORATORIES, IT WILL HAVE THE CAPABILITY TO CAUSE THE DISCOVERY TO BE BROUGHT INTO PUBLIC USE.

SINCE INVENTION WITHOUT INNOVATION IS OF LITTLE ECONOMIC VALUE AND HOLDS LITTLE HOPE FOR GENERATING REVENUES WHICH WILL AID THE UNIVERSITIES IN SUPPORTING RESEARCH, THE RESEARCH FUNCTION MUST BE COUPLED WITH A CREATIVE TECHNOLOGY TRANSFER <sup>PROGRAM</sup> ~~FUNCTION~~.

EDUCATIONAL INSTITUTIONS ARE, OF COURSE, NOT ORGANIZED TO

EITHER MANUFACTURE OR TO PRODUCE AND MARKET <sup>PRODUCTS</sup> ~~PATENTABLE INVENTIONS~~.  
CONSEQUENTLY, IF UNIVERSITY GENERATED INVENTIONS ARE TO BE USED,  
THE INSTITUTIONS WILL HAVE TO SEEK TO INTEREST SOMEONE IN THE  
INDUSTRIAL SECTOR, AN INDUSTRIAL PARTNER, WHO HAS THE COMMERCIAL  
CAPABILITY AND WILLINGNESS TO TAKE THE <sup>USUALLY</sup> EMBRYONIC <sup>UNIVERSITY-GENERATED</sup> INVENTIONS THROUGH  
APPLIED RESEARCH AND DEVELOPMENT AND, BEYOND THAT, THROUGH MARKET  
DEVELOPMENT. HOWEVER, THE PARTNERS IN SUCH SITUATION EMBRACE VERY  
DIFFERENT PHILOSOPHIES.

INDUSTRY'S BASIC GOAL IS TO MAKE A PROFIT AND IT IS,  
THEREFORE, DRIVEN BY VARIOUS PRESSURES TO DO WHAT MAY BE REQUIRED  
TO MAXIMIZE ITS PROFITABILITY WHILE MINIMIZING ITS RISKS. HENCE,  
INDUSTRY TENDS TO BE PRODUCT ORIENTED AND INTERESTED IN SHORT-TERM  
RESEARCH AND DEVELOPMENT TO THAT END.

UNIVERSITIES, ON THE OTHER HAND, VIEW THEIR PRIMARY OBJECTIVE  
TO BE THE CREATION OF KNOWLEDGE AND THE DISSEMINATION OF THAT  
KNOWLEDGE THROUGH FREE AND OPEN OPERATION. AS A CONSEQUENCE,  
UNIVERSITIES SEEK THE FREEDOM TO EXPLORE MUCH BROADER SUBJECT  
MATTER AREAS OVER THE LONGER TERM AND TEND, THEREFORE, TO LOOK WITH  
DISFAVOR UPON ANY EFFORT TO HAVE THEIR RESOURCES DIVERTED INTO  
SHORT-TERM PROPRIETARY ACTIVITIES.

THERE HAS BEEN A TENDENCY TO SIMPLISTICALLY CATEGORIZE THESE  
TWO FUNDAMENTALLY DIFFERENT APPROACHES BY CALLING THE UNIVERSITY  
ACTIVITY "BASIC RESEARCH" AND THE INDUSTRY ACTIVITY "APPLIED  
RESEARCH." WITH THE LEVELS OF COMPLEXITY THAT HAVE EVOLVED IN SOME  
INDUSTRIES RELATIVE TO PRODUCT AND PROCESS IMPROVEMENTS, THE LINES  
BETWEEN THE TWO HAVE BECOME INCREASINGLY BLURRED ~~OVER THE YEARS~~.

AND, TODAY, WITH THE ADVENT OF GENETIC ENGINEERING, WHERE THE RESULTS OF "BASIC RESEARCH" CAN HAVE ALMOST IMMEDIATE COMMERCIAL POTENTIAL, THERE IS AT TIMES ALMOST NO DISTINCTION BETWEEN THE TWO.

AS WOULD BE EXPECTED, BECAUSE OF THE DIFFERENT PHILOSOPHIES AND MOTIVATIONS OF INDUSTRY AND ACADEMIA, THE ISSUE OF OWNERSHIP OF THE PATENT RIGHT CAN BE DIVISIVE AND THAT ISSUE IS A PRINCIPAL POINT OF FOCUS IN MANY OF THE RESEARCH AGREEMENTS BETWEEN INDUSTRY AND THE UNIVERSITIES AND HAS PROVEN TO BE ONE OF THE MOST TIME CONSUMING PROVISIONS IN THE NEGOTIATION OF SUCH AGREEMENT.

MOREOVER, THE ISSUE ARISES NOW WITH GREATER FREQUENCY BECAUSE: (1) OF THE INCREASE IN FUNDS BEING SOUGHT BY UNIVERSITIES FROM PRIVATE INDUSTRIAL SOURCES AS THE GOVERNMENT SUPPORT FOR RESEARCH DECREASES, AND (2) BECAUSE MORE UNIVERSITIES HAVE DEVELOPED POLICIES FOR TECHNOLOGY TRANSFER.

UNDER THE IMPETUS OF THE "NEW BIOLOGY" AND THE MEDIA BLITZ ACCOMPANYING IT, IT IS WELL UNDERSTOOD IN UNIVERSITY CIRCLES, BY THE SCHOOLS THEMSELVES AS WELL AS ACADEMIC ENTREPRENEURS, THAT BIG MONEY IS TO BE HAD. IT IS ALSO WELL UNDERSTOOD BY THE CORPORATE COMMUNITY THAT BIG MONEY CAN BE <sup>HAD</sup> ~~MAD~~ THROUGH ACCESS TO THE BRIGHT POOL OF TALENT THAT RESIDES IN THE RESEARCH UNIVERSITIES. THE COMMON DENOMINATOR TO ACHIEVING THE GOAL OF BIG MONEY IS THE OWNERSHIP OR CONTROL OF THE PERTINENT INTELLECTUAL PROPERTY - FOR THE UNIVERSITIES, TO PERMIT LICENSING WITH THE ATTENDANT GENERATION



OF INCOME, AND FOR INDUSTRY, TO EXCLUDE OTHERS FROM ACCESS TO THE PROPERTY TO MAXIMIZE THE OPPORTUNITY FOR FINANCIAL RETURN AND MINIMIZE THE RISKS VIS A VIS THIRD PARTY COMPETITORS. PATENT OWNERSHIP AND CONTROL IS, THEREFORE, A KEY ELEMENT TO THE REALIZATION OF THOSE RESPECTIVE GOALS.

EACH OF UNIVERSITY AND INDUSTRY CAN PRESENT ITS OWN RATIONALE FOR RETAINING TITLE TO PATENTS ON INVENTIONS ARISING FROM SPONSORED RESEARCH. KEEP IN MIND, HOWEVER, THE INDUSTRY RATIONALE CAN VARY FROM INDUSTRY TO INDUSTRY AND, MORE <sup>FREQUENTLY,</sup> ~~RECENTLY,~~ FROM COMPANY TO COMPANY, SINCE THE ROLE OF PATENTS CAN VARY WITH THE NATURE OF THE WORK TO BE CONDUCTED UNDER A RESEARCH AGREEMENT AS WELL AS WITH THE POSITION OF THE COMPANY IN ITS COMPETITIVE FIELD, ITS SIZE AND ITS PRODUCT LINES. THE RATIONALE OF THE UNIVERSITY COMMUNITY CAN VARY FROM UNIVERSITY TO UNIVERSITY DEPENDING UPON SUCH THINGS AS STATUTORY CONTROL, UNIVERSITY POLICY, RESEARCH CAPABILITIES AND STRENGTHS, UNIVERSITY FINANCIAL NEEDS AND EVEN TRADITION.

AS AN EXAMPLE OF AN INDIVIDUAL COMPANY'S RATIONALE (PERHAPS ATTITUDE WOULD BE THE MORE APPROPRIATE WORD), I HEARD AN INDUSTRY REPRESENTATIVE, ~~WHO WAS CONNECTED WITH A MAJOR ELECTRONICS AND INFORMATION PROCESSING FIRM,~~ AND WHO, INCIDENTALLY, WAS ESPOUSING THE UNIVERSITY-INDUSTRY RELATIONSHIP, SAY THAT "IT WAS UNDERSTANDABLE THAT UNIVERSITIES HAVE A NATURAL DESIRE TO ENHANCE THEIR REPUTATION BY GAINING FULL CREDIT FOR INVENTIONS OF FACULTY AND STAFF, BUT WHAT WAS NOT SO UNDERSTANDABLE WAS THE APPARENT GROWING FEELING AMONG COLLEGE ADMINISTRATORS THAT RESEARCH PRESENTS THE PROSPECT FOR FILLING DEPLETED COFFERS WITH FAT ROYALTIES FROM

LICENSING THOSE INVENTIONS; THAT MANY OF THE RESEARCHERS FEEL THAT SINCE IT IS THEIR BRAIN POWER, THEY SHOULD HAVE MORE THAN RECOGNITION; THAT BUSINESS WANTS FAIR VALUE IN RETURN FOR ITS INVESTMENT BUT ALSO WANTS THE ABILITY TO USE THE RESULTS OF THAT RESEARCH IN THE CONDUCT OF ITS BUSINESS WITHOUT HAVING TO PAY A SECOND TIME FOR THE PRIVILEGE; AND, THAT BUSINESS HAS DIFFICULTY RECONCILING THE ROLE OF A UNIVERSITY AS A PUBLIC AGENT WITH ITS DESIRE TO TAKE PROPRIETARY POSITIONS."

THE UNIVERSITIES, IN RESPONSE TO THOSE COMMENTS SAY "THAT IT IS SELDOM THAT THE RESEARCH WHICH LEADS TO AN INVENTION IS COMPLETELY AND FULLY PAID FOR BY A SINGLE SPONSOR BECAUSE OF THE COMMINGLING OF FUNDS, INCLUDING THE UNIVERSITIES' OWN, WHICH CONTRIBUTED TO THAT RESEARCH OR EARLIER RESEARCH WHICH LED TO THE INVENTION: THAT, IF THE PUBLIC IS TO TRULY BENEFIT FROM THE RESULTS OF RESEARCH, THE UNIVERSITIES MUST ENGAGE IN A CONTROLLED TECHNOLOGY TRANSFER EFFORT WHICH WILL TEND TO INSURE THAT INNOVATION WILL FOLLOW INVENTION; THAT A ROYALTY-BEARING LICENSE IS NOT NECESSARILY 'PAYING A SECOND TIME', BUT CAN BE CONSIDERED REIMBURSEMENT FOR THE EQUITIES OF OTHERS IN THE RESEARCH RESULTS, AGAIN INCLUDING THE UNIVERSITIES THEMSELVES, BECAUSE OF EARLIER OR CONCURRENT SUPPORT; AND, THAT THE PROSPECT OF 'FAT' ROYALTIES OR, FOR THAT MATTER ANY ROYALTIES, IS JUST THAT, A MERE PROSPECT AND A REMOTE ONE AT THAT, GIVEN THE ODDS AGAINST AN INVENTION BEING COMMERCIALIZED, AND THE PRACTICAL CONSIDERATIONS WHICH MUST ACCOMPANY ANY TECHNOLOGY TRANSFER EFFORT IF IT IS TO SUCCEED."

AS FOR THE UNIVERSITY TAKING A PROPRIETARY POSITION - MANY

HAVE DONE SO FOR MANY YEARS AND HAVE BEEN SINGULARLY SUCCESSFUL IN TRANSFERRING THE RESULTS OF "BASIC" RESEARCH TO THE PUBLIC FOR ITS USE AND BENEFIT BY UTILIZING THE PATENT SYSTEM, WHILE TURNING THE INCOME DERIVED FROM THAT EFFORT TO THE SUPPORT OF ADDITIONAL RESEARCH. THE ARGUMENT THAT THE RESULTS OF UNIVERSITY RESEARCH SHOULD BE MADE FREELY AVAILABLE TO ALL WAS FINALLY RECOGNIZED BY THE CONGRESS OF THE UNITED STATES IN THE PASSAGE OF PL96-517, AS BEING ANTI-INNOVATIVE AND A FACTOR IN PLACING THE UNITED STATES IN ECONOMIC PERIL.

LAST BUT NOT LEAST, INDUSTRY SHOULD NOT ATTITUDINALLY CONSTRUE THE RELATIONSHIP WITH THE UNIVERSITIES AS AN EMPLOYER-EMPLOYEE OR PRINCIPAL-AGENT RELATIONSHIP, IN THE SENSE THAT THE UNIVERSITIES MERELY PRESENT A READILY AVAILABLE AND CONVENIENT SOURCE OF BRAIN POWER, WHICH WILL FUNCTION INEXPENSIVELY AS A MERE EXTENSION OF THE DEVELOPMENT ARM OF INDUSTRY TO DO A JOB INDUSTRY CANNOT OR CHOOSES NOT TO DO. IN OTHER WORDS, INDUSTRY SHOULD NOT COME TO THE UNIVERSITY WITH THE ATTITUDE THAT THE UNIVERSITY, ITS POOL OF TALENT AND ITS PHYSICAL FACILITIES ARE FOR SALE.

THE CERTAINTY OF TITLE TO AN INVENTION MADE WITH FEDERAL FUNDS <sup>NOW AVAILABLE</sup> ~~WHICH IS CONVEYED~~ TO UNIVERSITIES UNDER <sup>STATUTORY AUTHORITY</sup> ~~PL96-517, NOW~~ (35 USC 200 ET SEQ.) HAS, I BELIEVE, SUPPLIED A MAJOR IMPETUS TO UNIVERSITY-INDUSTRY RELATIONSHIPS AND, IN FACT, BECAUSE OF CERTAIN OTHER OF ITS PROVISIONS, TO UNIVERSITY-INDUSTRY-GOVERNMENT RELATIONSHIPS.

IT CANNOT, HOWEVER, ADDRESS THE EMOTIONAL IMPEDIMENTS WHICH CAN AND DO EXIST AGAINST SUCH COLLABORATIONS AND IT MAY NOT BE THE SOLUTION PERCEIVED BY CERTAIN SEGMENTS OF INDUSTRY WHERE THE RIGHT

TO EXCLUDE UNDER A PATENT PROPERTY MAY NOT BE A TRULY SIGNIFICANT FACTOR IN THE MARKETPLACE.

THE EMOTIONAL IMPEDIMENT IS NOT UNCOMMON AND IS CERTAINLY GENERATED, IN PART, BY THE PRODUCT ORIENTED THRUST OF INDUSTRY. PERHAPS THIS IMPEDIMENT CAN BE SUBSTANTIALLY MITIGATED IF COMPANIES WOULD SIMPLY NOT USE UNIVERSITIES FOR SHORT OR NEAR TERM PROPRIETARY PROJECTS OR FOR ACTUAL PRODUCT DEVELOPMENT. ~~AGAIN, AS WITH THE DEMARCATION OF "BASIC" AND "APPLIED" RESEARCH, THE LINES ARE NOT ALWAYS CLEAR AND EXPLORATORY CAUTION IS ADVISED.~~

THE EXCLUSIONARY RIGHT CONVEYED BY A PATENT MAY NOT ALWAYS BE CONSIDERED SIGNIFICANT AND ESSENTIAL TO A COMPANY'S CONTINUING OPERATION, AS, FOR EXAMPLE, APPEARS TO BE THE CASE IN THE ELECTRONICS AND INFORMATION PROCESSING INDUSTRY.

<sup>A</sup>THE LOW INTEREST IN OWNERSHIP OF A PATENT ARISING FROM A RESEARCH AGREEMENT BY SOME OF THE INDIVIDUAL COMPANIES IN THAT INDUSTRY CAN PROBABLY BE ATTRIBUTED TO: THE RAPID RATE OF OBSOLESCENCE OF PRODUCTS IN THAT INDUSTRY, WHERE WHOLE NEW PRODUCTS WHICH MAY LEND THEMSELVES TO COVERAGE BY A SINGLE OR SMALL NUMBER OF PATENTS ARE THE EXCEPTION; THE UNAVAILABILITY OF SIGNIFICANT PROTECTION FOR NEW DEVELOPMENTS IN THE INFORMATION PROCESSING FIELD, E.G. SOFTWARE; AND LAST, BUT CERTAINLY NOT LEAST, THE MERE SIZE OF AN INDIVIDUAL COMPANY, WHERE ECONOMIES OF SCALE AND OVERWHELMING FINANCIAL AND OTHER RESOURCES CAN CONTINUE TO INSURE A MARKET POSITION. THE SIZE FACTOR IS, OF COURSE, NOT PECULIAR ONLY TO COMPANIES IN THAT PARTICULAR SEGMENT OF INDUSTRY.

IT HAS BEEN THE EXPERIENCE OF UNIVERSITIES THAT WITH COMPANIES

AND THE ATTENDANT ECONOMIES OF SCALE AND ECONOMIC POWER

WHICH ARE DOMINANT IN THEIR PARTICULAR FIELDS OWNERSHIP OF INVENTIONS AND PATENTS ARISING DURING THE COURSE OF RESEARCH CONDUCTED UNDER A RESEARCH AGREEMENT MAY NOT BE AN ISSUE. MANY SUCH COMPANIES MERELY SEEK A NONEXCLUSIVE, ROYALTY-FREE LICENSE UNDER ANY SUCH INVENTIONS AND PATENTS WITH A RIGHT TO SUBLICENSE. FROM THE UNIVERSITY VIEWPOINT THIS CAN BE ONE OF THE MOST INSIDIOUS PROVISIONS IN A RESEARCH AGREEMENT AND A SERIOUS DETERRENT TO TECHNOLOGY TRANSFER. FOR EXAMPLE, LET US ASSUME THAT THERE ARE COMMINGLED INDUSTRIAL AND FEDERAL FUNDS -- AN ASSUMPTION WHICH IS LEGITIMATE GIVEN THE PERVASIVENESS OF FEDERAL FUNDS IN THE UNIVERSITIES. WITH FEDERAL FUNDS INVOLVED THERE IS AN OBLIGATION IN THE UNIVERSITY TO TRANSFER THE TECHNOLOGY WHICH EVOLVES FROM THE USE OF THOSE FUNDS TO THE PUBLIC FOR ITS BENEFIT. LET US ALSO ASSUME THAT A MAJOR CORPORATION THAT HAS SUPPLIED SOME OF THE RESEARCH SUPPORT HAS RESERVED FOR ITSELF A NONEXCLUSIVE, ROYALTY-FREE LICENSE WITH THE RIGHT TO SUBLICENSE BUT, DOES NOT WANT TO DEVELOP AN INVENTION WHICH IS GENERATED BY THAT RESEARCH. THE OPPORTUNITY FOR THE UNIVERSITY TO FULFILL ITS OBLIGATION AND HAVE ANOTHER COMPANY, UNDER A LICENSING ARRANGEMENT, DEVELOP THAT INVENTION TO THE POINT OF MARKETING IS PRACTICALLY NON-EXISTENT. LOGICALLY, HOW CAN ONE PERSUADE THE MANAGEMENT OF SUCH OTHER COMPANY TO SPEND MONEY TO DEVELOP A PRODUCT ~~IF~~ <sup>WHEN</sup> IT IS AWARE THAT A GIANT IN THE INDUSTRY IS SITTING ON THE SIDELINES WITH THE RIGHT CONVEYED BY THE ROYALTY-FREE LICENSE TO MAKE, USE AND SELL THE PATENTED PRODUCT, AND CAN, AFTER SUCH OTHER COMPANY HAS DEVELOPED BOTH A VIABLE PRODUCT AND A MARKET FOR THAT PRODUCT, MOVE IN AS A

COMPETITOR WITH THE FINANCIAL ADVANTAGE OF HAVING TO PAY NO ROYALTIES AND WITH THE ECONOMIES OF SCALE ON ITS SIDE. ALTERNATIVELY, THERE IS THE RISK TO THE DEVELOPER-LICENSEE THAT ANOTHER MAY OBTAIN A SUBLICENSE FROM THAT MAJOR COMPANY UNDER MORE FAVORABLE CONDITIONS THAT WOULD BE AVAILABLE FROM THE UNIVERSITY AND AGAIN, THE DEVELOPER-LICENSEE WOULD ~~BE~~ <sup>FIND ITSELF</sup> IN A DISADVANTAGEOUS POSITION.

THUS, IN LOOKING AT THE RIGHTS OF THE PARTIES UNDER A RESEARCH AGREEMENT ONE MUST CONSIDER MORE THAN THE IMMEDIATE FINANCIAL SUPPORT FOR THE SPECIFIC RESEARCH PROJECT. THIS IS TRUE EVEN WHERE UNIVERSITIES, AS A MATTER OF POLICY, ARE WILLING TO ASSIGN TITLE TO INDUSTRIAL SPONSORS. ONE MUST CONSIDER:

- (A) THE PAST OR FUTURE POSSIBILITY OF COMMINGLES<sup>D</sup> FUNDS, THAT IS, WHETHER THE PROPOSED RESEARCH IS SO CLOSELY RELATED TO OTHER SUPPORTED PROJECTS THAT RIGHTS TO INVENTIONS COULD BE CLAIMED BY ANOTHER PARTY;
- (B) WHETHER THE UNIVERSITY HAS AN EXISTING PATENT POSITION IN THE TECHNOLOGICAL AREAS OF THE RESEARCH AGREEMENT;
- (C) WHETHER INVENTIONS THAT MAY ARISE DURING THE COURSE OF THE RESEARCH ARE LIKELY TO HAVE APPLICATIONS OUTSIDE OF THE SPONSOR'S FIELD OF INTEREST.

IN UNIVERSITY-INDUSTRY RELATIONSHIPS, WHERE PATENTS ARE A CONSIDERATION, WHICH IS IN THE GREAT MAJORITY OF THE CASES, AN

ANCILLARY CONSIDERATION IS THE DISSEMINATION, GENERALLY THROUGH PUBLICATION, OF RESEARCH RESULTS. SINCE TOO EARLY DISSEMINATION CAN ADVERSELY AFFECT OR EVEN DESTROY THE PATENT RIGHT, AGREEMENT BETWEEN THE PRINCIPALS ON PUBLICATION OR OTHER DISSEMINATION SHOULD BE REACHED DURING THE NEGOTIATIONS. UNIVERSITIES WILL GENERALLY ALWAYS RESERVE THE RIGHT TO PUBLISH, BUT PUBLICATION CAN BE DELAYED UPON AGREEMENT OF THE PARTIES, INCLUDING THE PRINCIPAL INVESTIGATOR, FOR A REASONABLE TIME TO PERMIT AN APPROPRIATE PATENT APPLICATION TO BE FILED.

~~AS WOULD BE EXPECTED, BECAUSE OF THE DIFFERENT PHILOSOPHIES AND MOTIVATIONS OF INDUSTRY AND ACADEMIA, THE ISSUE OF OWNERSHIP OF THE PATENT RIGHT CAN BE DIVISIVE. IT IS MY UNDERSTANDING THAT THE RESULTS OF A RECENT BUT STILL UNPUBLISHED STUDY INDICATED THAT FROM THE INDUSTRY VIEWPOINT UNIVERSITY PATENT POLICIES ARE ONLY A MARGINAL PROBLEM, WHILE FROM THE UNIVERSITY VIEWPOINT INDUSTRY PATENT POLICIES WERE RELATIVELY HIGH ON THE LIST OF IMPEDIMENTS TO A UNIVERSITY-INDUSTRY AGREEMENT. ON THE OTHER HAND, INDUSTRY CONSIDERED FEDERAL LAWS GOVERNING INNOVATIONS AND PATENTS ARISING OUT OF GOVERNMENT-SPONSORED WORK AS ONE OF THE MOST SIGNIFICANT IMPEDIMENTS TO SUCH RELATIONSHIP, WHILE UNIVERSITIES LOOKED TO THE RECENT CHANGES IN THE LAW UNDER PL96-517 AS OFFERING AN OPPORTUNITY TO ENGAGE IN A LICENSING RELATIONSHIP WITH INDUSTRY.~~

IF A UNIVERSITY-INDUSTRY RESEARCH ARRANGEMENT IS TO SUCCEED THE PARTIES MUST FIRST RECOGNIZE THAT THEIR RESPECTIVE ROLES ARE DIFFERENT AND THAT, THEREFORE, THE PECULIAR NEEDS OF EACH MUST BE RESPECTED. CONSEQUENTLY, IT WOULD SEEM INADVISABLE FOR EITHER OR

BOTH OF THE PARTIES TO HAVE A SINGLE, RIGID PATENT POLICY SINCE THE ROLE WHICH PATENTS CAN PLAY DOES VARY WITH THE PARTICULAR SEGMENT OF INDUSTRY AS WELL AS WITH THE NATURE OF THE WORK. A TRULY COLLABORATIVE UNIVERSITY-INDUSTRY RESEARCH RELATIONSHIP WILL REQUIRE A WILLINGNESS BY EACH TO CONSIDER THE OTHERS' PHILOSOPHIES, MOTIVATIONS AND LIMITATIONS AND TO REMAIN FLEXIBLE TO COMPROMISE SO THAT THE RELATIONSHIP WILL WORK TO THEIR MUTUAL BENEFIT. THE BENEFITS TO BOTH PARTIES WHICH CAN BE DERIVED FROM SUCH A RELATIONSHIP CAN BE ENORMOUS.

TO ACHIEVE THE GOAL OF TRANSFERRING THE RESULTS OF RESEARCH TO THE PUBLIC THE UNIVERSITY SECTOR MUST ENGAGE IN A CONTINUING EFFORT TO MAKE ITS RESEARCH STAFF AND FACULTY, AS WELL AS KEY PERSONNEL IN THE ADMINISTRATION, AWARE OF THE OPPORTUNITIES WHICH EXIST FOR TECHNOLOGY TRANSFER AND OF THE BENEFITS WHICH CAN FLOW FROM THAT FUNCTION TO THE INVESTIGATOR-INVENTOR, TO THE UNIVERSITY AND TO THE PUBLIC. FUNDAMENTAL TO THAT EFFORT IS AN UNDERSTANDING OF THE PURPOSE AND INTENT OF THE PATENT SYSTEM AND A DISSOLUTION OF THE MYTHS AND MISCONCEPTIONS SURROUNDING IT. AS CHIEF JUDGE MARKEY OF THE UNITED STATES COURT OF APPEALS FOR THE FEDERAL CIRCUIT HAS SAID, "NO INSTITUTION HAS DONE SO MUCH FOR SO MANY WITH SO LITTLE PUBLIC AND JUDICIAL UNDERSTANDING AS HAS THE AMERICAN PATENT SYSTEMS."

IN ADDITION, THE UNIVERSITIES MUST EMPLOY, EITHER INTERNALLY OR EXTERNALLY, EXPERIENCED PATENT PRACTITIONERS WHO ARE KNOWLEDGEABLE NOT ONLY IN THE FIELD IN WHICH A GIVEN INVENTION MAY LIE BUT ARE ALSO KNOWLEDGEABLE ABOUT THE NEEDS OF A UNIVERSITY, AS



A POTENTIAL LICENSOR OF THE TECHNOLOGY WHICH IS BEING SOUGHT TO BE PATENTED. THESE PRACTITIONERS MAY THEMSELVES HAVE TO BE EDUCATED AS TO THE GOALS OF THE UNIVERSITY AND INDUCED TO ENGAGE IN CREATIVE APPLICATION DRAFTING TO PROVIDE THE BROADEST POSSIBLE SCOPE IN A GIVEN APPLICATION COMMENSURATE WITH THE KNOWLEDGE IN THE GIVEN ART. IF THEY CAN BE INVOLVED ON A FREQUENT BASIS IN <sup>AN ADVISORY ROLE IN</sup> THE RESEARCH PROCESS ITSELF ~~AS IT PROGRESSES~~ THE OPPORTUNITIES FOR SIGNIFICANT PATENT COVERAGE CAN MARKEDLY INCREASE.

THE SHARING AMONG UNIVERSITY TECHNOLOGY MANAGERS, AS WELL AS INVESTIGATOR-INVENTORS, OF EXPERIENCES WHICH THEY THEMSELVES HAVE ENCOUNTERED AND THE EXPERIENCE OF EXPERTS IN PERTINENT PROBLEM AREAS. <sup>SUCH SHARING</sup> WILL PERMIT THE AVOIDANCE OF PITFALLS, WILL INCREASE THE SOPHISTICATED OF THE TECHNOLOGY MANAGER IN ADDRESSING IMPEDIMENTS WHETHER PRACTICAL, EMOTIONAL OR ATTITUDINAL AND WILL LEAD TO CREATIVE TECHNOLOGY <sup>G</sup> TRANSFER.

ALSO OF GREAT IMPORTANCE

## COMMENTARY

THERE IS A TENDENCY, ESPECIALLY IN TODAY'S TECHNOLOGICAL AND ECONOMIC CLIMATE, TO MEASURE THE VALUE OF TECHNOLOGY TRANSFER ONLY BY THE AMOUNT OF ROYALTIES WHICH THAT FUNCTION WILL GENERATE. WITH UNIVERSITIES BEING CHRONICALLY SHORT OF FUNDS THE GENERATION OF ROYALTIES IS INDEED A TEMPTING GOAL. IT IS, HOWEVER, ONLY ONE MEASURE OF A SUCCESSFUL TECHNOLOGY TRANSFER EFFORT. MORE IMPORTANT, ALTHOUGH MORE DIFFICULT TO ASSESS, TO WHAT EXTENT HAS THE PUBLIC BENEFITTED FROM THE TECHNOLOGY TRANSFERRED? THAT IS, OF COURSE, THE ULTIMATE GOAL WHERE FEDERAL MONIES HAVE SUPPORTED THE RESEARCH THAT LED TO THE INVENTION, SINCE THE FUNDAMENTAL PREMISE ACCOMPANYING THE APPROPRIATION AND EXPENDITURE OF GOVERNMENT FUNDS FOR RESEARCH IS THAT THE PUBLIC WILL ULTIMATELY BENEFIT FROM THE FINDINGS MADE.

LET ME TAKE THE LIBERTY OF GIVING YOU SOME EXAMPLES OF INVENTIONS <sup>WERE MADE AT THE UNIVERSITY OF WISCONSIN WHICH</sup> ~~THAT~~ WERE BOTH PROFITABLE WITH RESPECT TO THE ROYALTIES THEY PRODUCED WHEN LICENSED TO INDUSTRY, BUT WHICH ALSO GREATLY BENEFITTED THE PUBLIC.

1. THE WARFARIN RODENTICIDES - THE MOST WIDELY USED RODENTICIDES EVEN TODAY, AND WHICH HAVE SAVED COUNTLESS OF THOUSANDS OF DOLLARS THROUGH THE CONTROL OF RODENTICIDE POPULATIONS AND THE DEPREDATIONS CAUSED BY THESE PESTS;

2. THE WARFARIN ANTICOAGULANT DRUGS - TODAY ARE THE MOST WIDELY USED OF THE ANTICOAGULANT DRUGS AND WHICH ARE CREDITED WITH EXTENDING AND SAVING COUNTLESS HUMAN LIVES;
3. A UREA-DEXTROSE PREPARATION UTILIZED TO REDUCE INTRACRANIAL PRESSURE IN CASES OF TRAUMA AND SURGERY - ANOTHER LIFE SAVING DRUG;
4. SEVERAL INSECTICIDES WITH THEIR OBVIOUS BENEFITS;
5. NEW SPARK SOURCES FOR SPECTROSCOPIC MEASUREMENTS PERMITTING MORE COMPLETE AND ACCURATE DIAGNOSES OF METAL SAMPLES AND THE SAVINGS ASSOCIATED WITH AND RESULTING FROM SUCH MORE ACCURATE MEASUREMENTS;
6. AN ION-VACUUM PUMP WHICH PERMITTED THE REALIZATION OF EXTREMELY HIGH VACUUM SYSTEMS WHICH DEPENDED UPON SUCH CONDITIONS FOR OPERABILITY, DEPENDABILITY AND SERVICEABILITY;
7. DIGITAL IMAGING TECHNIQUES WITH THEIR OBVIOUS BENEFITS IN CARDIOVASCULAR AND OTHER MEDICAL APPLICATIONS;
8. THE EARLY VITAMIN D INVENTIONS WHICH PERMITTED THE FORTIFICATION OF FOODS AND PARTICULARLY MILK, AND SERVED TO LITERALLY ELIMINATE RICKETS AS A CHILDHOOD DISEASE;

, MORE ~~OR~~ CURRENTLY,

9. AND ~~HOW~~, THE VITAMIN D DERIVATIVES WHICH PROMISE TO PROVIDE PROPHYLACTIC AND CURATIVE TREATMENTS FOR MANY DISEASE STATES INVOLVING CALCIUM-PHOSPHOROUS IMBALANCE IN THE MAMMALIAN ANIMAL FOREMOST AMONG THEM, POST-MENOPAUSAL AND SENILE OSTEOPOROSIS, ALTHOUGH ALSO USEFUL IN VETERINARY APPLICATIONS.

THE BENEFITS WHICH THE PUBLIC HAS DERIVED FROM THE TRANSFER OF JUST THIS SAMPLING OF THE TECHNOLOGY TRANSFERRED IN WARF'S 50 YEAR HISTORY IS OBVIOUSLY INCALCULABLE.

IN ALL CASES, EFFORT IS FUNDAMENTAL TO THE TRANSFER OF TECHNOLOGY TO THE MARKETPLACE AND WHEREVER EFFORT IS NEEDED INCENTIVE IS REQUIRED. INCENTIVE IS SUPPLIED TO THE DEVELOPER OF A GIVEN PIECE OF TECHNOLOGY BY REDUCING THE LIKELIHOOD OF COMPETITION THROUGH THE RIGHT TO EXCLUDE OTHERS AFFORDED BY A PATENT POSITION. CONSEQUENTLY, WE BELIEVE, AS A BASIC PREMISE, THAT THE EXISTENCE OF A LICENSABLE PATENT RIGHT IS A PRIMARY FACTOR IN THE SUCCESSFUL TRANSFER OF A UNIVERSITY INVENTION TO INDUSTRY AND THE MARKET FOR THE PUBLIC BENEFIT. A FAILURE TO ESTABLISH SUCH RIGHT OR TO PROTECT THE ABILITY TO ESTABLISH SUCH RIGHT, MAY FATALLY AFFECT THE TRANSFER OF THE TECHNOLOGY.

CURRENT CLIMATE

I BELIEVE THAT TODAY IN THE UNITED STATES THERE EXISTS A VIABLE AND DYNAMIC TECHNOLOGY TRANSFER FUNCTION, THAT SOME OF THE MYTHS AND MISCONCEPTIONS ATTENDANT UPON THAT FUNCTION HAVE BEEN DISPELLED, THAT THERE HAS BEEN AND IS A GROWING UNDERSTANDING AND ACCEPTANCE OF THAT FUNCTION IN INDUSTRY, IN THE UNIVERSITY SECTOR AND IN THE POLITICAL ARENA AND THAT THROUGH THE EVOLUTIONARY PROCESS THE IMPEDIMENTS TO THAT FUNCTION HAVE DIMINISHED.

THAT IS NOT TO SAY THAT THAT FUNCTION WILL CONTINUE TO IMPROVE OR EVEN THAT THE PRESENT STATUS WILL BE A PERMANENT CONDITION. I FIRMLY BELIEVE THAT THE FUNCTION IS STILL AND WILL CONTINUE TO BE IN A STATE OF EVOLUTION AS NEW AND YET UNDISCERNIBLE FORCES EXERT THEIR VARIOUS INFLUENCES. THERE MUST BE CONTINUING EFFORTS TO FIRST DETECT AND THEN ASSESS THOSE INFLUENCES TO INSURE THAT THERE IS NO REGRESSION IN THE PROGRESS MADE AND TO CONTINUE TO PERSISTENTLY AND PATIENTLY MITIGATE THE IMPEDIMENTS TO TECHNOLOGY TRANSFER HOWEVER THEY MIGHT ARISE.

TO QUOTE RALPH WALDO EMERSON:

"WHAT LIES BEHIND US  
AND WHAT LIES BEFORE US  
ARE TINY MATTERS COMPARED  
TO WHAT LIES WITHIN US."

CMS:LONDON.TLK

A P P E N D I X

THE IMPEDIMENTS TO TECHNOLOGY TRANSFER  
FROM INSTITUTIONS OF HIGHER EDUCATION

I. PRACTICAL IMPEDIMENTS

A. UNIVERSITY PATENT POSITION

1. MONEY
2. POLICY
3. FEAR OF LITIGATION
4. LACK OF BROAD PATENT COVERAGE  
(DEPENDENT UPON 1.)
5. PUBLICATION OF RESEARCH RESULTS  
(EFFECT ON FOREIGN FILING AND THEREFOR AN INTEREST  
OF MULTI-NATIONAL COMPANIES)
6. INEXPERIENCE
7. ABSENCE OF TECHNOLOGY TRANSFER GROUP OR FUNCTION

B. NATURE OF INVENTION

1. SPECULATIVE PRACTICAL APPLICATIONS
2. UNKNOWN APPLICATION (UTILITY)
3. COMMERCIAL STATE OF ART LAGS RESEARCH  
(DEPENDENT UPON A.1)

C. INEXPERIENCE OF INVENTOR GROUP

1. LACK OF KNOWLEDGE OF PATENT SYSTEM
1. LACK OF RECOGNITION OF INVENTION

D. ENTREPRENEURIAL INTEREST OF INVESTIGATOR-INVENTOR

- E. FUNDING COMMITMENT
  - 1. FEDERAL FUNDING
- F. CONSULTING COMMITMENT
- G. OWNERSHIP OF INVENTION
- H. UNIVERSITY'S (OR DEPARTMENT OR INDIVIDUAL'S) NEED FOR MONEY TO CARRY ON RESEARCH EFFORT.

## II. ATTITUDINAL IMPEDIMENTS

- A. UNIVERSITY POLICY
- B. NIH SYNDROME
- C. INDUSTRY APPROACH
  - 1. COMPANY APPROACH
- D. "IVORY TOWER" SYNDROME
- E. UNIVERSITY FOR HIRE
- F. REFUSAL TO LICENSE FROM GOVERNMENT AGENCY
- G. CLASSIFIED RESEARCH
  - 1. TRADE SECRET NOT APPROPRIATE FOR PUBLIC INSTITUTIONS

## III. EMOTIONAL IMPEDIMENTS

- A. UNWILLINGNESS TO DEAL WITH CERTAIN COMPANIES (COUNTRIES)
- B. PERSONALITY CONFLICTS
  - 1. INVENTOR - COMPANY SCIENTIST
  - 2. NEGOTIATOR - COMPANY LAW DEPARTMENT
- C. UNWILLING PARTICIPATION BY INVENTOR (II.D)

- D. ENVY AND JEALOUSLY
  - 1. INVENTORS ENTITLED TO ROYALTY INCOME
- E. INSUFFICIENT RECOGNITION OF INVENTOR IN RETURN FROM LICENSING INVENTION
- F. APPROPRIATION OF INVENTION BY COMMERCIAL INTERESTS
- G. WHAT GOVERNMENT PAYS FOR IT SHOULD OWN, I.E. RESEARCH RESULTS
- H. FRUSTRATION AND DISCOURAGEMENT FROM PATENTING PROCESS