

REMARKS BY

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 CONTROL DATA

ACHIEVING EQUITABLE FLOWS OF TECHNOLOGY
AMERICAN CHAMBER OF COMMERCE JAPAN
NOVEMBER 12, 1986

I AM PLEASED AND HONORED TO BE HERE TODAY TO ADDRESS THE CRITICALLY IMPORTANT ISSUE OF ACHIEVING EQUITY IN THE FLOWS OF TECHNOLOGY BETWEEN THE UNITED STATES AND JAPAN.

CURRENTLY, THERE IS RELATIVELY LITTLE APPEARING IN THE NEWS IN THE U.S. ABOUT THE IMBALANCE IN TECHNOLOGY FLOWS BETWEEN OUR NATIONS. ATTENTION IS RIVETED ON OUR ENORMOUS AND DEEPENING TRADE DEFICIT IN COMMODITIES, GOODS AND SERVICES.

FRUSTRATION OVER LACK OF PROGRESS IN REDUCING THE DEFICIT IS GENERATING WIDESPREAD SENTIMENT FOR PROTECTIONIST MEASURES. IN FACT, THE THREAT OF PROTECTIONISM IS AT THE HIGHEST LEVEL SINCE 1930 WHEN THE SMOOT-HAWLEY TARIFF WAS ENACTED.

EVEN THOUGH THE HEADLINES DON'T DEAL MUCH WITH THE TRADE IN TECHNOLOGY, CONCERN IS GROWING IN THE UNITED STATES OVER THE ADVERSE EFFECTS ON OUR TRADE BALANCES WHICH HAVE AS A ROOT CAUSE INEQUITABLE ARRANGEMENTS ASSOCIATED WITH THE TECHNOLOGY FLOWS FROM THE U.S. TO JAPAN. A RECENT REPORT PREPARED FOR THE PRESIDENT'S COMMISSION ON INDUSTRIAL COMPETITIVENESS CONCLUDED THAT, "A GLARING ASYMMETRY" CHARACTERIZES THE INTERNATIONAL FLOW OF TECHNOLOGICAL KNOWLEDGE AND FINDS THAT THE FLOW HAS BEEN PREPONDERANTLY "OUT FROM THE UNITED STATES." IN SIGNIFICANT DEGREE, THIS IS BECAUSE THE SPECIFIC TECHNOLOGY TRANSFER ARRANGEMENTS ARE THEMSELVES INEQUITABLE, AS I WILL DISCUSS LATER.

BECAUSE TECHNOLOGY FLOWS SEEM TO BE A PRECURSOR OF TRADE IN THE OPPOSITE DIRECTION, ANY INEQUITIES IN SUCH FLOWS ADVERSELY AFFECT TRADE BALANCES, THAT IS A GAP IN TECHNOLOGY FLOW WITH JAPAN IN THE 70's UNDERLIES THE TRADE GAP IN THE 80's, AND A TECHNOLOGY GAP IN THE 80's WILL PERPETUATE THE GAP INTO THE 90's.

WITH RESPECT TO JAPAN, JAPANESE GOVERNMENT REPORTS INDICATE THAT BETWEEN 1980-1983, THE U.S. TRANSFERRED FIVE TIMES AS MUCH ELECTRONICS TECHNOLOGY AND SEVEN TIMES AS MUCH MACHINE TOOL TECHNOLOGY TO JAPAN AS IT ACQUIRED FROM JAPAN. DURING THE SAME PERIOD, 70% OF JAPAN'S WORLDWIDE TECHNOLOGY IMPORTS CAME FROM THE UNITED STATES. MORE RECENTLY, IN 1985, THE UNITED STATES EXPORTED TWO AND ONE-HALF TIMES AS MUCH TECHNOLOGY TO JAPAN AS IT IMPORTED FROM JAPAN. IN ELECTRONICS, THE IMBALANCE WAS ABOUT FOUR TO-ONE IN JAPAN'S FAVOR.

OBVIOUSLY, WHAT IS NEEDED IN VIEW OF THE VERY LARGE PAST AND CURRENT DISPARITIES IN U.S.-JAPAN TECHNOLOGY FLOWS ARE STEPS THAT MOVE US TOWARDS MUCH MORE EQUITABLE RELATIONSHIPS.

REASONS FOR INEQUITIES

BEFORE PROPOSING SPECIFIC POLICIES OR ACTIONS TO ACCOMPLISH THIS, I WANT TO IDENTIFY A NUMBER OF THE REASONS FOR THE IMBALANCE:

- (1) A SIGNIFICANT PART OF JAPAN'S MEAGER BASIC RESEARCH IS CARRIED OUT IN GOVERNMENT LABORATORIES AND THROUGH COOPERATIVE PROJECTS INVOLVING THE GOVERNMENT AND PRIVATE COMPANIES. THESE ACTIVITIES ARE EFFECTIVELY CLOSED TO FOREIGNERS.
- (2) U.S. COMPANIES CANNOT PARTICIPATE IN R&D PROJECTS FUNDED BY THE JAPANESE GOVERNMENT WHICH HAVE EXPLICIT COMMERCIAL OBJECTIVES; NOR, FOR THE MOST PART, DO U.S. COMPANIES HAVE ACCESS TO PATENTS HELD BY THE JAPANESE GOVERNMENT.
- (3) JAPAN SENDS ITS BEST GRADUATE STUDENTS TO THE U.S. TO OBTAIN PH.D.'S. IN MANY INSTANCES, THE U.S. PROVIDES FINANCIAL, AS WELL AS INTELLECTUAL SUPPORT FOR THEM.
- 4) SMALL U.S. COMPANIES ARE A MAJOR SOURCE OF TECHNOLOGY FOR JAPAN. THE TECHNOLOGY IS OBTAINED THROUGH ONE OF THREE METHODS: LICENSING, EQUITY INVESTMENT IN OR ACQUISITION OF THE TOTAL COMPANY BY A JAPANESE FIRM. U.S. ENTERPRISES ARE NOT USUALLY AFFORDED RECIPROCAL OPPORTUNITIES IN JAPAN.
- (5) U.S. FIRMS HAVE NOT ACQUIRED THE RIGHTS TO TECHNOLOGIES DEVELOPED IN JAPAN ON THE BASIS OF U.S. SCIENCE.
- (6) BY WHATEVER MEASURES USED, JAPAN IS NOT PERFORMING ITS FAIR SHARE OF THE BASIC, SCIENTIFIC RESEARCH WHICH ADDS TO THE WORLD'S STORE OF KNOWLEDGE; YET JAPAN HAS VIRTUALLY UNLIMITED ACCESS TO U.S. RESEARCH.
- (7) LARGER U.S. CORPORATIONS HAVE NOT SOUGHT FOREIGN TECHNOLOGY AS DILIGENTLY AS THEY SHOULD HAVE.
- (8) UNCERTAINTY OVER U.S. GOVERNMENT INTERPRETATIONS OF NATIONAL SECURITY REGULATIONS WITH RESPECT TO TECHNOLOGY TRANSFER.

CORRECTIVE ACTIONS

WHAT ARE SOME OF THE STEPS WHICH CAN BE TAKEN TO REDRESS THE TECHNOLOGY FLOW IMBALANCE? FIRST, MOVES ARE UNDERWAY IN BOTH COUNTRIES TO ADDRESS THE OVERALL PROBLEM. IN JAPAN, FOR EXAMPLE, THE SCIENCE AND TECHNOLOGY AGENCY HAS RECOMMENDED LEGISLATION TO MAKE TECHNOLOGY DEVELOPED IN JAPANESE GOVERNMENT LABORATORIES MORE ACCESSIBLE TO FOREIGNERS. IF ENACTED AND IMPLEMENTED PROMPTLY, THIS COULD MAKE JAPANESE GOVERNMENT TECHNOLOGY MORE ACCESSIBLE TO OTHER COUNTRIES. BUT SUCH LEGISLATION IS INEFFECTIVE IF ALLOWED TO LANGUISH AND MUST BE UNDERGIRDDED BY AGGRESSIVE CHANGES IN JAPANESE POLICIES, PROGRAMS AND ATTITUDES WITH RESPECT TO SCIENCE AND TECHNOLOGY. THE JAPAN KEY TECHNOLOGY CENTER AND JAPAN INTERNATIONAL RESEARCH CORPORATION TRUST CAN BE IMPORTANT FIRST STEPS TOWARD A MORE OPEN AND COOPERATIVE JAPANESE POSITION.

IN THE UNITED STATES, CONCERN ABOUT INEQUITIES IN TECHNOLOGY TRANSFER IS REFLECTED IN PENDING CONGRESSIONAL LEGISLATIVE ACTION TO ESTABLISH EQUITABLE TECHNOLOGY FLOW AS A PRIORITY NEGOTIATING OBJECTIVE IN BILATERAL AND MULTILATERAL TRADE NEGOTIATIONS. THE LEGISLATION HAS PASSED THE HOUSE OF REPRESENTATIVES AS PART OF THE OMNIBUS TRADE POLICY REFORM BILL AND HAS BEEN INTRODUCED IN THE SENATE. ~~THE RESPONSIBILITY FOR MONITORING TECHNOLOGY TRANSFERS UNDER THIS LEGISLATION WILL BE ASSIGNED JOINTLY TO THE UNITED STATES TRADE REPRESENTATIVE AND THE NATIONAL SCIENCE FOUNDATION.~~

ALSO LEGISLATION WAS RECENTLY ENACTED INTO LAW AMENDING THE STEVENSON-WYDLER TECHNOLOGY INNOVATION ACT OF 1980. THE REVISION GIVES THE DIRECTORS OF THE MYRIAD U.S. FEDERAL LABORATORIES DISCRETIONARY AUTHORITY TO DENY ACCESS TO U.S. RESEARCH BY ORGANIZATIONS OF ANY FOREIGN COUNTRY WHICH DO NOT GRANT SIMILAR PRIVILEGES TO AMERICAN ORGANIZATIONS.

FURTHER, THE U.S. IS COMMITTED TO REMOVING ARTIFICIAL DETERRENTS TO THE FREE FLOW OF SCIENTIFIC INFORMATION. PRESIDENT REAGAN RECENTLY SIGNED LEGISLATION TO AUTHORIZE ADDITIONAL RESOURCES FOR THE NATIONAL TECHNICAL INFORMATION SERVICE -- EXPLICITLY INCLUDING THE FUNDING OF ADDITIONAL TRANSLATORS -- TO FACILITATE THE AVAILABILITY OF JAPANESE SCIENCE AND ENGINEERING LITERATURE IN THE U.S.

WHILE THE FOREGOING ACTIONS ARE HELPFUL, MUCH REMAINS TO BE DONE TO ACHIEVE EQUITABLE TECHNOLOGY FLOWS. CULTURAL AND INSTITUTIONAL DIFFERENCES WILL MAKE ANY EFFORT DIFFICULT UNLESS BOTH SIDES MAKE DEDICATED AND CREATIVE EFFORTS TO OVERCOME THEM.

LET ME NOW REVIEW A NUMBER OF PROPOSALS WHICH, IF IMPLEMENTED, WILL BE IN THE MUTUAL INTERESTS OF BOTH COUNTRIES AND WILL FACILITATE OUR JOINT PROGRESS IN ECONOMIC, SOCIAL AND TECHNOLOGICAL TERMS.

TECHNOLOGICAL COOPERATION: ONE OF THE MOST IMPORTANT AND CRITICAL ACTIONS TO BE TAKEN IS A VAST EXPANSION IN TECHNOLOGICAL COOPERATION EMBRACING A WIDE RANGE OF SCIENCE AND ENGINEERING. SUCH A PROGRAM WOULD BOTH ADVANCE THE CONCEPT OF EQUITY IN AVAILABILITY OF TECHNOLOGY AS WELL AS ASSURE INCREASED EFFICIENCY IN CREATING IT.

ALTHOUGH IN RECENT YEARS THE NUMBER OF COOPERATIVE PROJECTS BETWEEN THE U.S. AND JAPAN HAS INCREASED, THE POTENTIAL IS FAR BEYOND THE PRESENT LEVEL OF SUCH ACTIVITY.

MTDI: IN RECOGNITION OF THE NEED FOR SUBSTANTIALLY MORE TECHNOLOGICAL COOPERATION WITH JAPAN AS WELL AS OTHER COUNTRIES, NINE MIDWEST STATES WHICH COMPRISE THE INDUSTRIAL HEARTLAND OF THE UNITED STATES HAVE FORMED THE MIDWEST TECHNOLOGY DEVELOPMENT INSTITUTE. MTDI, AS IT IS CALLED, HAS BEEN IN OPERATION FOR ONE YEAR. MEMBERS OF THE BOARD OF DIRECTORS ARE APPOINTED BY THE GOVERNOR OF EACH PARTICIPATING STATE.

THE MIDWEST TECHNOLOGY DEVELOPMENT INSTITUTE HAS THE THREEFOLD OBJECTIVE OF:

- o EXPANDING TECHNOLOGICAL COOPERATION AMONG UNIVERSITIES AND INDUSTRY TO INCREASE THE EFFICIENCY OF RESEARCH AND THE COMMERCIALIZATION OF THE RESULTS;
- o EXTENDING TECHNOLOGICAL COOPERATION TO INCLUDE UNIVERSITIES IN FOREIGN COUNTRIES;
- o FACILITATING THE TRANSFER OF TECHNOLOGY WITHIN THE MIDWEST AND HELPING TO ACHIEVE EQUITABLE TRANSFERS OF TECHNOLOGY BETWEEN THE U.S. AND OTHER COUNTRIES.

WHILE THERE HAS ALREADY BEEN SOME COOPERATION AMONG U.S. UNIVERSITIES IN SELECTED RESEARCH AREAS, IT IS NOT NEARLY AT THE LEVEL REQUIRED. ALSO, SUCH INTER-UNIVERSITY COOPERATION MUST BE TAKEN ONE STEP FURTHER -- TO TECHNOLOGY. MTDI WILL PROMOTE COOPERATIVE TECHNOLOGY DEVELOPMENT THROUGH THE ESTABLISHMENT OF A SERIES OF CONSORTIA, EACH FOCUSING ON A SINGLE AREA OF TECHNOLOGY WHICH IS SIGNIFICANT TO THE MIDWEST, BUILDS ON THE STRENGTHS OF THE PARTICIPANTS, AND HAS HIGH POTENTIAL FOR COMMERCIALIZATION OF RESULTS. THESE CONSORTIA WILL MAKE AVAILABLE TO THE PARTICIPANTS -- THROUGH COOPERATION --

RESOURCES THAT ARE NOT WITHIN A SINGLE INSTITUTION'S ABILITY TO PROVIDE. THEY WILL ALSO ESTABLISH COOPERATIVE TECHNOLOGY DEVELOPMENT PROGRAMS WITH INSTITUTIONS OVERSEAS TO EVEN FURTHER LEVERAGE THE RESOURCES COMMITTED AND ASSURE BROADER AND QUICKER DIFFUSION OF THE TECHNOLOGIES.

PLANNING IS UNDERWAY FOR TECHNOLOGY DEVELOPMENT CONSORTIA IN FOUR FIELDS:

ADVANCED ENGINEERING POLYMERS
CERAMICS
ADVANCED MANUFACTURING
TECHNOLOGY FOR VIABLE MEDIUM-SIZED AND SMALL FAMILY FARMS

MTDI IS SEEKING PARTICIPATION BY JAPANESE ORGANIZATIONS IN THESE COOPERATIVE PROGRAMS AND OTHERS WHICH WILL BE ESTABLISHED IN THE FUTURE.

MTDI ALSO SOLICITS THE COOPERATION OF APPROPRIATE JAPANESE ORGANIZATIONS TO HELP ACHIEVE AN EQUITABLE FLOW OF TECHNOLOGY IN STILL OTHER WAYS. ONE ACTION ALREADY TAKEN IN THIS REGARD IS THE CONSUMMATION OF AN AGREEMENT BETWEEN MTDI AND THE JAPANESE TECHNICAL INFORMATION SERVICE WHEREBY ACCESS TO THAT SERVICE WILL BE MADE AVAILABLE TO SMALL AND MID-SIZED MIDWESTERN COMPANIES THROUGH MTDI.

Data Base: ANOTHER AREA FOR COOPERATION RELATES TO MEASURING TECHNOLOGY FLOWS. THIS IS DIFFICULT, AND IT IS NOT POSSIBLE TO MEASURE IT WITH PRECISION. BUT IT CAN BE APPROXIMATED WELL ENOUGH TO DETERMINE WHETHER EQUITY IS BEING APPROACHED AND TO PROVIDE GENERAL PERSPECTIVE FOR GOVERNMENT POLICY-MAKERS AND CORPORATE MANAGERS ALIKE.

JAPAN CURRENTLY HAS THE BEST STATISTICS ON TECHNOLOGY FLOWS; HOWEVER, MUCH MORE DATA IS NEEDED. MTDI SOON WILL BE STARTING WORK ON CONCEPTUALIZING A COMPREHENSIVE TECHNOLOGY FLOW MEASUREMENT SYSTEM WHICH WILL INCLUDE METHODS FOR INVENTORYING AND TRACKING TECHNOLOGY. COOPERATION IN THAT EFFORT WITH AN ORGANIZATION IN JAPAN IS HIGHLY DESIRABLE.

INCREASE U.S. TECHNOLOGISTS IN JAPAN: INCREASING THE NUMBER OF U.S. SCIENTISTS AND ENGINEERS RESIDENT IN JAPAN IS ANOTHER OBVIOUS WAY TO INCREASE THE FLOW OF TECHNOLOGY TO THE U.S. CULTURAL AND OTHER BARRIERS MAY MAKE IT DIFFICULT FOR THE U.S. TO SEND TO JAPAN A NUMBER APPROACHING THE 7,000 JAPANESE GRADUATE STUDENTS AND PART-TIME DOCTORAL FELLOWS NOW STUDYING SCIENCE AND ENGINEERING IN THE U.S., MUCH LESS TO ACHIEVE A NUMBER IN PROPORTION TO OUR RESPECTIVE POPULATIONS OF THE TWO NATIONS. HOWEVER, EVEN SMALL INCREMENTS IN THE NUMBER OF U.S.

STUDENTS IN JAPAN WOULD BE HELPFUL. YOUNG AMERICAN SCIENTISTS AT THE POST-DOCTORAL LEVEL FREQUENTLY SPEND ONE OR MORE YEARS PURSUING RESEARCH OF INTEREST IN A VARIETY OF SETTINGS. A FORMAL PROGRAM TO ATTRACT AND PLACE POST-DOCTORAL FELLOWS IN JAPANESE LABORATORIES WOULD BENEFIT BOTH COUNTRIES.

PAYMENT FOR GRADUATE STUDENTS: BECAUSE THERE IS NO PRACTICAL WAY TO ACHIEVE AN APPROPRIATE RELATIONSHIP BETWEEN THE NUMBER OF GRADUATE STUDENTS AND POST-DOCTORAL FELLOWS IN OUR TWO COUNTRIES, AT LEAST FOR MANY YEARS, ~~THE U.S. AND JAPANESE GOVERNMENTS SHOULD NEGOTIATE AN AGREEMENT THROUGH WHICH THE JAPANESE GOVERNMENT WILL PAY \$10,000 ANNUALLY, IN ADDITION TO TUITION, TO EACH UNIVERSITY FOR EVERY JAPANESE NATIONAL STUDYING IN U.S. UNIVERSITIES. IN ADDITION, SEVERAL THOUSAND DOLLARS CREDIT WOULD BE GIVEN BY THE JAPANESE GOVERNMENT FOR EACH U.S. GRADUATE STUDENT OR POST-DOCTORAL FELLOW AT A UNIVERSITY IN JAPAN.~~

THE NET AMOUNT OF ADDITIONAL INCREASE TO U.S. UNIVERSITIES WOULD BE APPROXIMATELY 70 MILLION DOLLARS PER YEAR. THIS AMOUNT, ALTHOUGH RELATIVELY SMALL IN COMPARISON TO THE TOTAL ANNUAL EXPENDITURES FOR BASIC RESEARCH, WOULD BE VERY HELPFUL TO U.S. UNIVERSITIES IN SOLVING THREE CRITICAL PROBLEMS IN SCIENCE AND ENGINEERING EDUCATION: *helping research facilities up-to-date and*

- o *helping* DIFFICULTY IN ATTRACTING GOOD U.S. STUDENTS INTO GRADUATE PROGRAMS, PARTICULARLY IN ENGINEERING, BECAUSE GRADUATES WITH BACHELOR DEGREES CAN OBTAIN JOBS IN INDUSTRY AT BEGINNING SALARIES OF BETWEEN 1 1/2 AND 2 TIMES AS MUCH AS A GRADUATE RESEARCH ASSISTANT OR TEACHING FELLOW.
- o FILLING ALL JUNIOR UNIVERSITY FACULTY POSITIONS BECAUSE OF THE GAP BETWEEN INDUSTRY SALARIES AND STARTING FACULTY SALARIES.
- o KEEPING UNIVERSITY RESEARCH FACILITIES UP-TO-DATE.

SMALL BUSINESS: NEXT, I WILL BRIEFLY REVIEW A PROPOSAL RELATING TO U.S. SMALL BUSINESS, WHICH IS A MAJOR SOURCE OF INNOVATION FOR BOTH THE U.S. AND JAPAN. IT WOULD BE BENEFICIAL TO BOTH COUNTRIES -- AS WELL AS A POSITIVE STEP TOWARDS A MORE BALANCED TECHNOLOGY FLOW -- IF A LARGE SCALE PROGRAM WERE ESTABLISHED TO TRANSFER JAPANESE TECHNOLOGY TO THE U.S. THROUGH JOINT VENTURES WITH U.S. FIRMS AND ENTREPRENEURS IN THE UNITED STATES. FREQUENTLY THE PARTNER WILL BE A SMALL ENTERPRISE BECAUSE THIS SECTOR OF THE U.S. ECONOMY HAS PROVED TIME AND AGAIN TO BE THE HOTBED OF TECHNOLOGICAL DEVELOPMENT AND INNOVATION.

INNOVATION NETWORKS: SUCH A PROGRAM CAN BE FACILITATED BY A NEW INSTITUTION BEING ESTABLISHED IN A NUMBER OF STATES AT THE

COMMUNITY LEVEL. USUALLY THESE ARE REFERRED TO AS "INNOVATION NETWORKS." AN INNOVATION NETWORK CONSISTS OF THREE MAJOR ELEMENTS: A COOPERATION OFFICE, A SEED CAPITAL FUND AND A BUSINESS AND TECHNOLOGY CENTER. LET ME DESCRIBE HOW EACH FUNCTIONS TO PROVIDE ASSISTANCE TO SMALL COMPANIES AS THEY GET STARTED AND BEGIN TO OPERATE PROFITABLY AND HOW THEY CAN ASSIST IN ESTABLISHING JOINT VENTURES BETWEEN SMALL COMPANIES IN THE U.S. AND COUNTERPARTS IN JAPAN (AND OTHER COUNTRIES).

COOPERATION OFFICE: THE COOPERATION OFFICE IS THE PIVOTAL ELEMENT OF THE NETWORK. IT IS A NON-PROFIT ORGANIZATION FINANCED BY STATE AND LOCAL GOVERNMENTS, PRIVATE CONTRIBUTIONS, CLIENT FEES AND FUNDS GENERATED BY INVESTMENTS MADE IN CLIENT COMPANIES. A COOPERATION OFFICE'S BOARD OF DIRECTORS CONSISTS OF LOCAL LEADERS FROM MAJOR SECTORS OF SOCIETY.

THE APPROACH IS SIMPLE FOR ASSISTING THE ENTREPRENEUR WITH AN IDEA FOR A NEW PRODUCT OR SERVICE WHO WANTS TO START A COMPANY. THE COOPERATION OFFICE FIRST HELPS SHAPE A BUSINESS PLAN AND ASSISTS IN THE ENTREPRENEUR'S USING IT TO OBTAIN FINANCING.

THE PERMANENT STAFF OF A COOPERATION OFFICE IS SMALL, IN PART BECAUSE THE COOPERATION OFFICE DRAWS ON A VOLUNTEER ADVISORY PANEL OF SCIENTISTS, ENGINEERS, MARKETING SPECIALISTS AND EXECUTIVES FOR THE SPECIFIC EXPERTISE REQUIRED TO HELP PREPARE AND EVALUATE BUSINESS PLANS. SINCE THESE PLANS ARE EXPERTLY CONCEIVED, THE CHANCES OF RECEIVING ADEQUATE FINANCING AND ACHIEVING ECONOMIC VIABILITY ARE SUBSTANTIALLY INCREASED.

SEED CAPITAL: EQUITY FINANCING IS OFTEN NOT AVAILABLE FOR NEW COMPANIES DURING THEIR INITIAL FORMATION AND EARLIEST DEVELOPMENT STAGES, BANKS, OTHER CONVENTIONAL SOURCES AND EVEN VENTURE CAPITAL FUNDS SHY AWAY BECAUSE OF THE HIGHER RISKS INVOLVED. THEREFORE, A SOURCE OF SEED CAPITAL IS NEEDED.

BTC: A BUSINESS AND TECHNOLOGY CENTER OFFERS VARIOUS COMBINATIONS OF CONSULTING SERVICES, SHARED LABORATORY, MANUFACTURING AND OFFICE FACILITIES AND PROVIDES OTHER SERVICES TO FACILITATE THE STARTUP AND GROWTH OF SMALL BUSINESSES. ECONOMIES OF SCALE MAKE IT POSSIBLE TO FURNISH OCCUPANTS OF THE CENTER WITH NEEDED FACILITIES OF MUCH HIGHER QUALITY AT CONSIDERABLY LOWER COST THAN ANY WOULD BE CAPABLE OF OBTAINING ON ITS OWN. THIS IS TRUE EVEN THOUGH BTC'S THEMSELVES ARE BUSINESSES AND, AS SUCH, ARE OPERATED AT A PROFIT.

REPLICATION: AN INNOVATION NETWORK CONSISTING OF THE THREE ELEMENTS I'VE JUST DESCRIBED ARE BEING WIDELY REPLICATED AND MANY PLACES ARE CONSIDERING THE ESTABLISHMENT OF A NETWORK.

THE LARGEST AND MOST AGGRESSIVE PROGRAMS AT PRESENT ARE IN THE STATES OF ILLINOIS, SOUTH CAROLINA AND MINNESOTA. ALSO CANADA HAS BEGUN A SIMILAR PROGRAM. ILLINOIS IS IN THE PROCESS OF IMPLEMENTING EIGHT NETWORKS, WHILE SOUTH CAROLINA AND MINNESOTA ARE EACH ESTABLISHING SEVEN.

IT WORKS: MUCH MORE CAN BE SAID ABOUT AN INNOVATION NETWORK, HOWEVER, I WILL ONLY ADD THAT IF THE DEDICATION REQUIRED IS THERE, EVEN THOUGH IT IS NOT EASY TO IMPLEMENT, AN INNOVATION NETWORK EFFECTIVELY ASSISTS SMALL BUSINESSES TO FORM, DEVELOP AND PROSPER. IN OTHER WORDS, IT IS A CONCEPT THAT WORKS.

MCO: THE RECORD OF THE MINNESOTA COOPERATION OFFICE ATTESTS TO THAT. SINCE IT WAS FORMED SEVEN YEARS AGO, THE MCO HAS HELPED LAUNCH 24 COMPANIES WHICH PRESENTLY HAVE DIRECT EMPLOYMENT TOTAL OF 490 PEOPLE.

FURTHERMORE, WHILE THE U.S. NATIONAL AVERAGE OF COMPANIES THAT FAIL DURING THEIR FIRST FIVE YEARS OF OPERATION IS 80%, MCO'S GOAL WAS TO SEE 80% OF THE COMPANIES IT ASSISTED REMAIN ALIVE AND THRIVING AFTER FIVE YEARS. THE CURRENT PERCENTAGE OF 86% EXCEEDS EXPECTATION, ALTHOUGH NOT ALL OF THE FIRMS HELPED THUS FAR HAVE BEEN IN BUSINESS FIVE YEARS.

JOINT VENTURES: THE PROCESS OF ESTABLISHING A JOINT VENTURE BETWEEN A SMALL U.S. FIRM AND A COMPANY IN ANOTHER NATION CAN ALSO BE FACILITATED BY THE INNOVATION NETWORK. SUCH JOINT VENTURES ARE ESPECIALLY ATTRACTIVE MEANS OF TRANSFERRING OR EXCHANGING TECHNOLOGY FOR SEVERAL REASONS. FIRST, IF PROPERLY STRUCTURED, BOTH PARTIES ARE REASONABLY ASSURED OF EQUITABLE COMPENSATION FOR THE TECHNOLOGY MADE AVAILABLE TO THE JOINT VENTURE. SECOND, SUCH ARRANGEMENTS SPREAD THE RISK INVOLVED OVER AT LEAST TWO MARKETS AND TWO FIRMS. THIRD, SINCE THE PARTNER'S RETURNS ARE ACHIEVED THROUGH THE SUCCESS OF THE JOINT VENTURE, IT IS THE MARKETPLACE WHICH TRULY DETERMINES THE VALUE OF THE TECHNOLOGY INVOLVED -- JUST AS IT SHOULD BE. FINALLY, A JOINT VENTURE PROVIDES BOTH FIRMS WITH A MEANS OF DIRECT AND ENDURING PARTICIPATION IN ONE (OR MORE) FOREIGN MARKETS AS REFLECTED IN THE PROFITS EARNED AND IN CONTINUING KNOWLEDGE OF THE REQUIREMENTS OF SUCH MARKETS. SUCH EXPERIENCE WILL, IN TURN, GUIDE APPROPRIATE CHANGES AND IMPROVEMENTS IN THE TECHNOLOGY AT THE HEART OF THE JOINT VENTURE'S OUTPUT.

GRANT BACK: NEXT TO REVIEW IS THE MATTER OF U.S. FIRMS NOT ACQUIRING RIGHTS TO TECHNOLOGY DEVELOPED IN JAPAN BASED ON THE RESULTS OF U.S. SCIENCE AND TECHNOLOGY. IN THE SPIRIT OF ADVANCING ALONG THE PATH TOWARDS GREATER EQUITY IN TECHNOLOGY FLOWS, IT IS PROPOSED, AS A MATTER OF COURSE, THAT TECHNOLOGY TRANSFER AGREEMENTS BETWEEN U.S. AND JAPAN FIRMS ROUTINELY INCORPORATE GRANT-BACK PROVISIONS.

GRANT-BACKS TAKE MANY FORMS, BUT THE ESSENCE OF THE MATTER IS THAT THE STAGE CAN BE SET QUICKLY FOR MAKING TECHNOLOGY TRANSFERS MORE EQUITABLE IN WAYS THAT BENEFIT EACH NATION'S PRIVATE AND PUBLIC SECTORS THROUGH ACCEPTING THE PRINCIPLE THAT IN THE GENERAL CASE, A TECHNOLOGY TRANSFER AGREEMENT THAT DOES NOT INCORPORATE GRANT-BACK PROVISIONS IS UNLIKELY TO PRODUCE EQUITABLE RESULTS. BASICALLY, SUCH PROVISIONS GRANT-BACK TO THE ORIGINAL SOURCE OF THE TECHNOLOGY RIGHTS TO EXPLOIT IMPROVEMENTS OR VARIATIONS OF SUCH TECHNOLOGY AS MAY EMERGE FROM ITS FURTHER DEVELOPMENT BY THE PARTY TO WHOM IT WAS MADE AVAILABLE THROUGH THE INITIAL TRANSFER.

THE DETAILED TERMS AND CONDITIONS OF ANY GRANT-BACK PROVISIONS ARE THEMSELVES A PRODUCT OF THE NEGOTIATIONS THROUGH WHICH THE TECHNOLOGY IS INITIALLY TRANSFERRED. ALSO, THE NATURE AND SCOPE OF THE GRANT-BACK ISSUES ARE VERY SIMILAR TO THOSE INFLUENCING THE INITIAL TRANSFER. THAT IS, GRANT-BACKS, AS WELL AS ORIGINAL TRANSFERS, MUST BE SPECIFIC IN SUCH DIMENSIONS AS --

- o TECHNOLOGY (AND/OR IMPROVEMENTS, ADVANCES);
- o GEOGRAPHICAL TERRITORY;
- o TIME;
- o DEGREE OF EXCLUSIVITY;
- o END USES;
- o ROYALTY OR OTHER COMPENSATION (IF ANY).

MANY OF THESE MATTERS WILL BE RESOLVED IN A MANNER CONGRUENT WITH THE ORIGINAL TECHNOLOGY TRANSFER ARRANGEMENT, BUT THIS NEED NOT BE THE CASE.

AN IMPORTANT FINAL POINT ABOUT THE GRANT-BACK PROPOSAL IS THAT FULL IMPLEMENTATION WILL REQUIRE A MODIFICATION OF THE POLICIES OF THE JAPANESE FAIR TRADE COMMISSION WHICH NOW INHIBIT GRANT-BACK AGREEMENTS.

BASIC RESEARCH: FINALLY, JAPAN MUST PROVIDE ITS FAIR SHARE OF SUPPORT IN THE NEAR FUTURE FOR BASIC SCIENTIFIC RESEARCH. AT PRESENT, JAPAN HAS RELATIVELY FEW RESEARCH UNIVERSITIES AND A HIGH PERCENTAGE OF JAPANESE RESEARCH OCCURS IN INDUSTRY, WHICH MEANS THAT THE RESULTS ARE NOT FREELY ACCESSIBLE. CONSEQUENTLY, ONE WAY FOR JAPAN TO MEET A FAIR-SHARE OBJECTIVE ON A CURRENT BASIS WOULD BE TO PROVIDE AN APPROPRIATE LEVEL OF FUNDING FOR BASIC RESEARCH TO BE DONE IN THE U.S. AND WHICH WOULD BE ADMINISTERED BY THE U.S. NATIONAL SCIENCE FOUNDATION. RESULTS OF THE RESEARCH WOULD BE MADE BROADLY AVAILABLE AS ARE THE RESULTS OF OTHER NSF FUNDED RESEARCH.

CONCLUSION

THERE REMAIN STILL OTHER MEANS FOR REDUCING THE HISTORIC IMBALANCE IN THE FLOW OF TECHNOLOGY BETWEEN OUR TWO INTERCONNECTED SOCIETIES, HOWEVER, IT'S TIME TO CONCLUDE.

LET ME NOTE THAT REGARDLESS OF THE METHODS EMPLOYED, CLOSE COOPERATION BETWEEN THE PUBLIC AND PRIVATE SECTORS IN BOTH NATIONS IS REQUIRED. PROPERLY ORCHESTRATED, EQUITABLE TECHNOLOGY TRANSFER ARRANGEMENTS WILL FURTHER STIMULATE FLOWS OF TECHNOLOGY IN BOTH DIRECTIONS. UNDER SUCH CONDITIONS, THE PEOPLE OF JAPAN AND THE U.S. CAN REALIZE SUBSTANTIAL AND MUTAL BENEFITS.

CONSEQUENTLY, THE U.S. AND JAPAN MUST QUICKLY GET ON WITH THE JOB OF ESTABLISHING AN INTERNATIONAL CLIMATE IN WHICH TECHNOLOGY TRANSFER AND TRACKING ARE ENCOURAGED AND FACILITATED. THE BEST COURSE, THEN, IS TO ENSURE THAT FAIR RETURNS ARE REALIZED BY SUPPLIERS OF TECHNOLOGY. A GOOD PLACE TO START IS TO ESTABLISH THE DATA BASES REQUIRED TO MONITOR SUCH TRANSACTIONS ALONG WITH POLICIES THAT ENCOURAGE EQUITABLE TECHNOLOGY FLOWS.