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ANTHROPOMETRIC RESOURCES VERSUS CIVILIAN NEEDS, (U)
OCT 78 C E CLAUSER, J T MCCONVILLE
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CIVILIAN NEEDS,

John T. McConville PhD
Anthropology Research Project, Inc.
503 Xenia Avenue
Yellow Springs, Ohio 45387

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10 Charles E. Clauser
Aerospace Medical Research Laboratory
Human Engineering Division
Wright-Patterson Air Force Base, Ohio 45433

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ANTHROPOMETRIC RESOURCES vs. CIVILIAN NEEDS

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WHILE COUNTLESS MILES OF MEASURING TAPE HAVE BEEN WRAPPED AROUND THE HUMAN BODY IN AN EFFORT TO QUANTIFY AND CATEGORIZE ITS DIMENSIONS, MANKIND CONTINUES TO ELUDE DEFINITIVE ATTEMPTS TO PREDICT ITS COLLECTIVE SIZES AND SHAPES. MUCH USEFUL PROGRESS HAS BEEN MADE, OF COURSE, AND A GREAT DEAL OF ANTHROPOMETRIC DATA HAVE BEEN ASSEMBLED. IT WILL BE OUR PURPOSE IN THIS PAPER TO SUGGEST THAT AT THIS POINT IN THE ADVANCEMENT OF THE ART, ADDITIONAL GENERAL POPULATION SURVEYS MAY NO LONGER BE THE MOST EFFECTIVE MEANS OF MEETING THE NEEDS OF INDUSTRIAL OR MILITARY DESIGNERS.

THE EARLIEST LARGE-SCALE COLLECTIONS OF ANTHROPOMETRIC DATA DOCUMENTING BODY SIZE DIMENSIONS OF AN AMERICAN POPULATION WERE MADE AT THE CLOSE OF THE CIVIL WAR (GOULD 1869 AND BAXTER 1875). BOTH THESE STUDIES WERE CONDUCTED WITH A VIEW TOWARD IMPROVING THE HEALTH OF THE U.S. ARMY; THE FORMER REPORT WAS ASSEMBLED IN THE INTERESTS OF GENERAL MEDICAL AND PHYSIOLOGICAL RESEARCH AND THE LATTER IN AN EFFORT TO ESTABLISH STANDARDS FOR SELECTING HEALTHY RECRUITS. IT WAS NOT UNTIL WORLD WAR II, WITH ITS TREMENDOUS DEMANDS FOR MEN AND MATERIEL, THAT CONSIDERATIONS OF HUMAN ENGINEERING PROVIDED THE IMPETUS FOR SYSTEMATIC ANTHROPOMETRIC SURVEYS SPECIFICALLY AIMED AT IMPROVING THE FIT OF CLOTHING AND THE EFFECTIVENESS OF EQUIPMENT AND WORKSPACES.

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THE MAJORITY OF SUCH STUDIES HAVE OCCURRED IN THE ERA SINCE WORLD WAR II AND THEIR MAJOR EMPHASIS HAS BEEN ON VARIOUS MILITARY RATHER THAN CIVILIAN NEEDS.

THE FIRST LARGE-SCALE SURVEY OF THE U.S. CIVILIAN POPULATION WAS CONDUCTED IN 1962 BY THE NATIONAL CENTER FOR HEALTH STATISTICS (STOUDT ET AL., 1965) AND UPDATED IN 1974 (ABRAHAM ET AL., 1976). THERE HAVE BEEN, IN ADDITION, NUMEROUS SURVEYS OF SPECIALIZED POPULATIONS CONDUCTED AT VARIOUS TIMES IN THIS COUNTRY.

CLEARLY, A LARGE QUANTITY OF ANTHROPOMETRIC DATA HAS BEEN COLLECTED IN THE PAST THREE DECADES; ACCESS TO MUCH OF THIS MATERIAL HAS BEEN PROBLEMATICAL, HOWEVER. SURVEYS HAVE BEEN REPORTED, COMPLETELY OR INCOMPLETELY, IN A NUMBER OF DIFFERENT FORMATS, AND IN A WIDE SELECTION OF PUBLICATIONS OFTEN OF LIMITED CIRCULATION. MEASUREMENT TECHNIQUES DIFFER FROM SURVEY TO SURVEY, AND SIMILAR TERMS DO NOT NECESSARILY DENOTE THE SAME POINTS ON THE BODY, AS FRUSTRATED INVESTIGATORS HAVE DISCOVERED IN TRYING TO ASCERTAIN WHY "HIP" OR "WAIST" MEASUREMENTS VARY SO PECULIARLY BETWEEN SURVEYS OF APPARENTLY SIMILAR POPULATIONS; DATA ARE REPORTED IN WIDELY DIFFERING FORMATS, AND OFTEN NOT IN A FORM USEABLE FOR A PARTICULAR PURPOSE.

THE NEED TO GAIN USEFUL ACCESS TO THE WEALTH OF EXTANT BODY SIZE INFORMATION PROMPTED THE ANTHROPOLOGY GROUP AT WRIGHT-

PATTERSON AIR FORCE BASE TO INITIATE, IN 1973, THE DEVELOPMENT OF THE AEROSPACE MEDICAL RESEARCH LABORATORY'S (AMRL) ANTHROPOMETRIC DATA BANK. THIS FACILITY WAS DESIGNED TO INCORPORATE IN COMPARABLE FORMAT, AND AT A SINGLE CENTER, THE RAW DATA FROM AS MANY ANTHROPOMETRIC SURVEYS AS ARE AVAILABLE, SO THAT THEY COULD BE RECALLED AND REANALYZED FOR SPECIFIC PURPOSES, AS NEEDED. IT WAS ALSO RECOGNIZED THAT SUCH A REPOSITORY WOULD SERVE AN IMPORTANT FUNCTION IN ASSURING THAT ANTHROPOMETRIC SURVEY DATA WOULD REMAIN AVAILABLE EVEN THOUGH THE PRINCIPAL INVESTIGATOR OR THE SPONSORING AGENCY MAY HAVE LOST INTEREST IN MAINTAINING THEM. OVER THE PAST FIVE YEARS THE DATA BANK HAS GROWN (AND CONTINUES TO GROW) SO THAT IT NOW COMPRISES A UNIQUELY COMPREHENSIVE SOURCE OF SUCH DATA.

THE CURRENT RESOURCES OF THE DATA BANK, AS SHOWN IN SLIDE #1, INCLUDE ALL THE MAJOR U.S. MILITARY SURVEYS. EACH OF THEM REPRESENTS A SOMEWHAT DIFFERENT SEGMENT OF THE U.S. MILITARY POPULATION: FLIGHT PERSONNEL, BASIC TRAINEES, GROUND PERSONNEL, OFFICERS, ENLISTEES, MALES, FEMALES, ETC. NOTE THAT THE SAMPLE SIZES VARY FROM 500 TO SEVERAL THOUSAND AND THAT THE NUMBER OF VARIABLES MEASURED RANGES FROM JUST UNDER 50 TO 190.

MANY OF THE FOREIGN SURVEYS (SLIDE #2) INCLUDED WERE EITHER BASED ON U.S. MILITARY ANTHROPOMETRIC SURVEYS OR GATHERED AND/OR ANALYZED UNDER THE GUIDANCE OF U.S. AIR FORCE OR U.S. ARMY ANTHROPOLOGISTS. THUS, THERE IS CONSIDERABLE COMPARABILITY IN LANDMARKS AND MEASUREMENT TECHNIQUES BETWEEN THESE SURVEYS AND MANY OF THE U.S. MILITARY SURVEYS.

AS IS READILY APPARENT (SLIDE #3), CIVILIAN ANTHROPOMETRIC DATA ARE LESS WELL REPRESENTED IN THE DATA BANK, NOT BY INTENT, BUT DUE TO THEIR SCARCITY. ALTHOUGH LARGE-SCALE CIVILIAN SURVEYS ARE CURRENT AND BASED ON NATION-WIDE PROBABILITY SAMPLES, THEY LACK A SIGNIFICANT NUMBER OF BODY DIMENSIONS FOR MOST DESIGN PROBLEMS. THE HEALTH EXAMINATION SURVEY (HES) DATA CONTAIN ONLY 18 VARIABLES (PRIMARILY WORKSPACE DIMENSIONS) AND THE MORE RECENT HEALTH AND NUTRITIONAL EXAMINATION SURVEY (HANES) SOME 12 COMPARABLE DIMENSIONS. THE THREE OCCUPATIONAL SUBGROUPS (AIR TRAFFIC CONTROLLERS, LAW ENFORCEMENT OFFICERS, AND AIRLINE STEWARDESSES) INCLUDE CONSIDERABLY MORE DIMENSIONAL DATA BUT, AS WE SHALL SEE, TWO OF THESE ARE ATYPICAL OF THE U.S. POPULATION AS A WHOLE.

FROM THESE TABULATIONS, IT IS APPARENT WITH REGARD TO THE U.S. POPULATION, THAT THERE IS A WEALTH OF DETAILED ANTHROPOMETRY FOR THE VARIOUS MALE MILITARY POPULATIONS AND SOMEWHAT MORE LIMITED BUT ALSO DETAILED DATA FOR FEMALE MILITARY POPULATIONS. IN GENERAL, IT IS ALSO FAIRLY CLEAR THAT THE CIVILIAN ANTHROPOMETRIC DATA NOW AVAILABLE PROVIDE INSUFFICIENT INFORMATION FOR MOST DESIGNERS AND DESIGN PROBLEMS.

IT HAS BEEN SUGGESTED, WITH INCREASING URGENCY, THAT A NATION-WIDE ANTHROPOMETRIC SURVEY OF THE CIVILIAN POPULATION IS NEEDED IN ORDER TO PROVIDE ADEQUATE BODY SIZE DATA FOR INDUSTRIAL DESIGN PURPOSES. SUCH A PROPOSED EFFORT IS A

BECAUSE OF THE HIGHLY SELECT NATURE OF THE MILITARY SAMPLES, WHILE IT IS TRUE THAT AGE, HEIGHT, WEIGHT AND MEDICAL STANDARDS EXIST FOR ENTRY INTO THE SERVICES, A STUDY OF THE DATA INDICATES THAT, WITH ONE EXCEPTION, SUCH RESTRICTIONS DO NOT, IN FACT, RESULT IN A PARTICULARLY DISTINCTIVE POPULATION.

SLIDES #4 AND #5 SHOW A GROUP OF BAR GRAPHS DEPICTING THE FIRST TO 99TH PERCENTILE VALUES OF STATURE AND WEIGHT FOR FOUR CIVILIAN AND FOUR MILITARY GROUPS. THE MEAN VALUE FOR EACH GROUP IS DESIGNATED BY THE VERTICAL LINE ON EACH BAR. THE CIVILIAN SURVEYS DESIGNATED AS HES AND HANES REPRESENT THE TWO MAJOR U.S. GOVERNMENT STUDIES OF CIVILIAN MEN AND WOMEN, AGES 18 THROUGH 79, MENTIONED ABOVE; USA'66 (WHITE AND CHURCHILL, 1971) REPRESENTS A SURVEY OF MALE ARMY PERSONNEL, AND USAF'67 (CHURCHILL ET AL., 1977) DESIGNATES DATA OBTAINED FROM AIR FORCE FLYERS. LARGE-SCALE MILITARY WOMEN'S SURVEYS WERE MADE IN 1968 (CLAUSER ET AL., 1972) AND 1977 (CHURCHILL ET AL., 1977). LAW'74 DENOTES A NATION-WIDE SURVEY OF CIVILIAN LAW ENFORCEMENT OFFICERS (MARTIN ET AL., 1975), AND STEWARDESSES'71 (SNOW ET AL., 1975) A STUDY OF REPRESENTATIVE AIRLINE STEWARDESS TRAINEES.

LEAVING THE LATTER TWO OCCUPATIONAL GROUPS ASIDE, FOR THE MOMENT, AN EXAMINATION OF THESE GRAPHS SHOWS THAT, IN GENERAL, MILITARY POPULATIONS ARE A GOOD REFLECTION OF THE RANGE OF BODY SIZE VARIABILITY FOUND IN THE GENERAL U.S. POPULATION WITH ONE

NOTABLE EXCEPTION; THE HEAVIEST 10-20 PERCENT OF THE CIVILIAN WOMEN ARE NOT REPRESENTED IN THE MILITARY POPULATION.

WHAT IS PERHAPS MOST DRAMATICALLY APPARENT FROM THE GRAPHS IS THAT LAW ENFORCEMENT OFFICERS AND STEWARDESSES ARE ATYPICAL OF BOTH CIVILIAN AND MILITARY POPULATIONS AS A WHOLE. IT IS WELL KNOWN, OF COURSE, THAT AIRLINE STEWARDESSES ARE SELECTED ON THE BASIS OF VERY STRINGENT PHYSICAL REQUIREMENTS. MORE SURPRISING IS THE FACT THAT LAW ENFORCEMENT OFFICERS -- POLICE, SHERIFF'S DEPUTIES, HIGHWAY PATROLMEN AND PRISON GUARDS -- EXCEED ALL OTHER MEASURED POPULATIONS, NOT ONLY IN AVERAGE HEIGHT AND WEIGHT BUT IN MOST MEASURED VARIABLES AS WELL.

IN A BROADER OVERVIEW OF PHYSICAL DIFFERENCES FOUND BETWEEN OCCUPATIONAL GROUPS, DAMON AND MCFARLAND (1955) REVIEWED THE U.S. AND FOREIGN LITERATURE AND CONCLUDED THAT "WORKERS IN CERTAIN OCCUPATIONS DIFFER CONSISTENTLY IN PHYSIQUE FROM OTHER WORKERS (E.G. SMITHS AND BUTCHERS VS. BARBERS AND TAILORS), THE DIFFERENCES OFTEN, BUT NOT ALWAYS, CORRESPONDING TO THE EXERTION REQUIRED." ONE NEED ONLY CREATE AN IMAGE OF THE TYPICAL PROFESSIONAL BASKETBALL PLAYER, JOCKEY OR FOOTBALL LINEBACKER TO VISUALIZE THE RANGE OF BODY SIZE THAT EXISTS IN VARIOUS OCCUPATIONAL SUBGROUPS WITHIN THE U.S. CIVILIAN POPULATION -- ALTHOUGH THESE ARE THE EXTREMES, TO BE SURE.

WHAT WE HAVE IS NOT A DESIGN POPULATION THAT CAN BE CONVENIENTLY LABELLED, "U.S. CIVILIANS," BUT A SERIES OF

COMBINATIONS, OFTEN OF WIDELY DIFFERENT SIZES AND SHAPES, THAT CONSTITUTE A NUMBER OF ACTUAL DESIGN POPULATIONS FOR SPECIFIC DESIGN PROBLEMS.

OF WHAT USE CAN THE AMRL ANTHROPOMETRIC DATA BANK BE TO INDUSTRIAL DESIGNERS AND ERGONOMISTS FACED WITH THIS COMPLEX CHALLENGE?

WE BELIEVE THAT, COMBINED WITH THE EXISTING CIVILIAN DATA, THE BROADLY BASED ANTHROPOMETRIC DATA SECURED FROM MILITARY POPULATIONS WHICH NOW EXIST IN FUNCTIONAL FORM IN THE AMRL DATA BANK CAN BE SUCCESSFULLY APPLIED TO A GREAT NUMBER OF NON-MILITARY DESIGN PROBLEMS. BY DRAWING SAMPLES FROM THE DATA BANK MATCHED TO SPECIFIC BODY SIZE CHARACTERISTICS OF THE CIVILIAN POPULATION, AS REVEALED BY THE HES AND HANES SURVEYS, THE DISTRIBUTION OF VALUES FOR VARIOUS ANTHROPOMETRIC VARIABLES REQUIRED TO SOLVE MANY ERGONOMIC PROBLEMS CAN BE RELIABLY DETERMINED. IN ADDITION, WITH BUT LIMITED DATA ON MOST CIVILIAN DESIGN SAMPLES, REGRESSION TECHNIQUES PERMIT US TO ESTIMATE WITH KNOWN LEVELS OF CONFIDENCE THE PROBABLE DISTRIBUTION OF VALUES FOR MOST BODY SIZE VARIABLES OF INTEREST.

THE AMRL BANK DOES NOT, AT THIS TIME, INCLUDE LARGE NUMBERS OF SUBJECTS WHO ARE YOUNGER THAN 18 OR OLDER THAN 45, BUT SURVEYS OF THESE AGE GROUPS HAVE BEEN CONDUCTED AND THERE IS NO FUNDAMENTAL OBSTACLE TO INCORPORATING THEM INTO THE DATA BANK. SUCH SURVEYS INCLUDE AN ANTHROPOMETRIC STUDY OF VETERANS

OF THE SPANISH AMERICAN WAR AVERAGING 82 YEARS OLD (DAMON AND STOUT, 1963). AT THE OTHER END OF THE AGE SPECTRUM IS A LARGE BODY OF CHILDREN'S DATA. OVER 7,000 CHILDREN, AGES ONE - 17, WERE MEASURED IN THE HES SURVEY AND A COMPARABLE NUMBER MEASURED IN THE MORE RECENT HANES STUDY. IN ADDITION, TWO STUDIES CONDUCTED BY THE HIGHWAY SAFETY RESEARCH INSTITUTE (SNYDER 1975 AND 1977) COVERED LARGE SAMPLES OF CHILDREN FROM BIRTH TO 18 YEARS OF AGE FOR A LARGE NUMBER OF BODY DIMENSIONS.

THERE ARE OBVIOUSLY OTHER SEGMENTS OF THE POPULATION, NOT ONLY MISSING FROM THE DATA BANK, BUT FOR WHOM DATA REQUIRED BY DESIGNERS HAVE NOT BEEN OBTAINED AT ALL. WHEN SIGNIFICANT GAPS ARE IDENTIFIED IT IS OUR SUGGESTION THAT THEY BE FILLED BY CONDUCTING RELATIVELY SMALL, INEXPENSIVE STUDIES OF CAREFULLY CHOSEN SUBJECTS. THE RATIONALE AND METHODOLOGY FOR SELECTED SAMPLING STRATEGIES, TAILORED TO MEET SPECIFIC DESIGN NEEDS, HAVE BEEN DESCRIBED BY CHURCHILL AND McCONVILLE (1976).

IN THE CIVILIAN SECTOR, TECHNOLOGICAL PROGRESS HAS BEEN MATCHED BY NUMEROUS SOCIAL ADVANCES, RANGING FROM THE MULTIPLICATION OF FEDERAL HEALTH AND SAFETY REGULATIONS IN A VARIETY OF INDUSTRIAL SETTINGS TO THE EVER-INCREASING PRESENCE OF WOMEN IN JOBS WHICH HERETOFORE REQUIRED EQUIPMENT AND PROTECTIVE GEAR DESIGNED ONLY FOR MEN. AS A RESULT, MUCH OF THE PRESENT AND FUTURE CHALLENGE LIES IN DESIGN PROBLEMS GEARED TO THE NEEDS OF SPECIALIZED TASKS OR DISTINCTIVE POPULATION SEGMENTS.

THERE REMAINS ONE GAP TO BE BRIDGED IF COMMERCIAL DESIGNERS AND ENGINEERS ARE TO GAIN USEFUL ACCESS TO THE WEALTH OF MATERIAL STORED IN THE AMRL DATA BANK AND TO THE QUANTITIES OF MATERIAL, AS YET UNINCORPORATED, WHICH LIE WAITING IN THE WINGS. STILL NEEDED IS A POINT OF CONTACT, WHICH IS CURRENTLY AVAILABLE TO THE MILITARY SERVICES AND SELECTED GROUPS SUCH AS THE AEROSPACE AGENCIES, BUT NOT TO THE CIVILIAN SECTOR AS A WHOLE. SUCH AN INTERFACE HAS BEEN PROPOSED IN THE FORM OF AN ANTHROPOMETRIC DESIGN CENTER WITH ACCESS TO THE RAW MATERIAL IN THE BANK THROUGH THE NECESSARY COMPUTERS AND SOFTWARE ROUTINES. STAFF OF SUCH A FACILITY WOULD HELP THE INDUSTRIAL DESIGNER ANALYZE HIS PROBLEM IN TERMS OF THE DATA MOST SUITED TO MEET HIS NEED, ASCERTAIN WHETHER THE RELEVANT INFORMATION EXISTS OR COULD BE INTERPOLATED FROM EXISTING DATA, AND INTERPRET THE RESULTING OUTPUT FOR SPECIFIC DESIGN APPLICATIONS. IN THE ABSENCE OF ANY APPLICABLE INFORMATION, THE DESIGN CENTER STAFF COULD RECOMMEND OR DESIGN A STATISTICALLY VALID LIMITED SURVEY TAILORED TO MEET THE SPECIFIC NEED.

IN CONCLUSION, IT IS NOT LIKELY THAT ADDITIONAL DATA WILL BE REQUIRED TO DEFINE THE THOROUGHLY-STUDIED 29-YEAR-OLD PILOT ALTHOUGH WE KNOW, OF COURSE, THAT NOT EVERYBODY IS A 29-YEAR-OLD PILOT. BUT IT IS WORTH NOTING THAT A MALE 29-YEAR-OLD CIVILIAN BEARS A RATHER STARTLING RESEMBLANCE TO HIS MILITARY COUNTERPART, STATISTICALLY SPEAKING. THE AVERAGE PILOT IS 69.8 INCHES TALL AND THE AVERAGE CIVILIAN IN THE 25-34 YEAR OLD

AGE RANGE IS 69.6 INCHES TALL. MEAN WEIGHT FOR OUR PILOT IS 173.5 POUNDS WHILE THE AVERAGE CIVILIAN IN THE SAME AGE GROUP WEIGHS A SCANT 2 1/2 POUNDS MORE. IF WE ARE SEEKING A GROUP WHICH DIFFERS SIGNIFICANTLY FROM THE 29-YEAR-OLD PILOT, WE DON'T HAVE FAR TO LOOK. HIS MILITARY FORERUNNER, THE 19-YEAR-OLD USAF TRAINEE IS AN INCH SHORTER (68.9) AND MORE THAN 20 POUNDS LIGHTER (151.5 LBS) -- DIMENSIONS WHICH, ONCE AGAIN, BEAR A CLOSE RESEMBLANCE TO THOSE OF CIVILIAN YOUTHS OF 18 WHO AVERAGE 69.1 INCHES IN STATURE AND WEIGHT 148.2 POUNDS.

THE FACT OF THE MATTER IS THAT DIMENSIONS OF THE 29-YEAR-OLD PILOT, JUDICIOUSLY APPLIED, MAY WELL PROVIDE MORE USEFUL INFORMATION TO THE INDUSTRIAL DESIGNER THAN THE "AVERAGE" U.S. CIVILIAN TEN YEARS OLDER OR YOUNGER. NOT EVERYONE IS A 42-YEAR-OLD HOUSEWIFE EITHER.

Slide 1

CURRENT RESOURCES
OF THE
AMRL ANTHROPOMETRIC DATA BANK

U.S. MILITARY POPULATIONS

<u>SURVEY DATE</u>	<u>SURVEY</u>	<u>SAMPLE SIZE</u>	<u>No. OF VARIABLES</u>
MEN			
1950	U.S. AIR FORCE PILOTS	4,000	146
1957	U.S. AIR FORCE PHOTOMETRIC	2,176	107
1959	U.S. ARMY AVIATORS	500	46
1964	U.S. NAVY AVIATORS	1,529	98
1965	U.S. AIR FORCE GROUND PERSONNEL	3,869	161
1966	U.S. ARMY GROUND PERSONNEL	6,682	73
1966	U.S. NAVY ENLISTED	4,095	73
1966	U.S. MARINES ENLISTED	2,008	73
1967	U.S. AIR FORCE FLYERS	2,420	189
1970	U.S. ARMY FLYERS	1,482	88
WOMEN			
1946	U.S. WOMEN'S ARMY CORPS	7,563	65
1968	U.S. AIR FORCE WOMEN	1,905	139
1977	U.S. ARMY WOMEN	1,331	151

Slide 2

CURRENT RESOURCES
OF THE
AMRL ANTHROPOMETRIC DATA BANK

FOREIGN MILITARY POPULATIONS

<u>SURVEY</u> <u>DATE</u>	<u>SURVEY</u>	<u>SAMPLE</u> <u>SIZE</u>	<u>No. OF</u> <u>VARIABLES</u>
	MEN		
1960	TURKISH ARMED FORCES	912	151
1961	GREEK ARMED FORCES	1,071	151
1961	ITALIAN ARMED FORCES	1,342	151
1961	KOREAN MILITARY FLYERS	264	132
1964	VIETNAMESE MILITARY FORCES	2,129	51
1967	GERMAN AIR FORCE	1,466	152
1969	IRANIAN MILITARY	9,414	74
1970	ROYAL AIR FORCE AIRCREW	2,000	64
1972	ROYAL AIR FORCE HEAD STUDY	500	46
1972	ROYAL AUSTRALIAN AIR FORCE	482	18
1974	ROYAL NEW ZEALAND AF AIRCREW	238	63
1974	CANADIAN MILITARY FORCES	565	33
1970	LATIN-AMERICAN ARMED FORCES	1,985	76

Slide 3

CURRENT RESOURCES
OF THE
AMRL ANTHROPOMETRIC DATA BANK

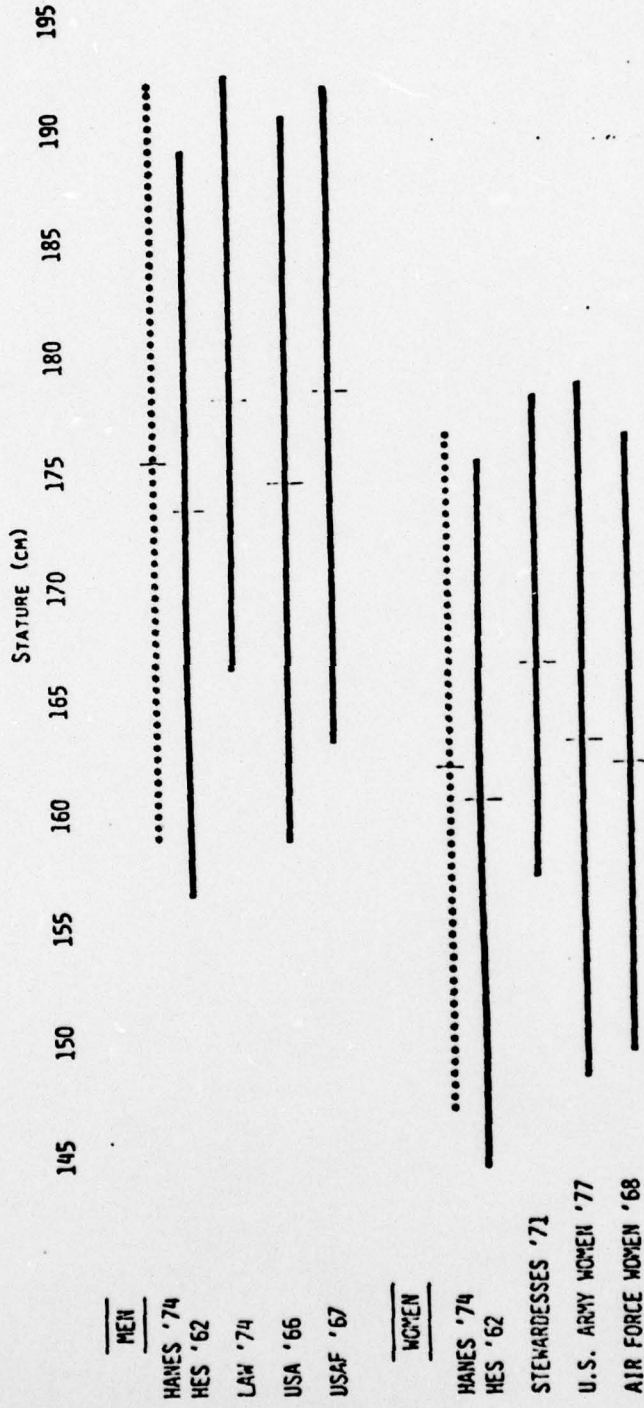
U.S. CIVILIAN POPULATIONS

<u>SURVEY DATE</u>	<u>SURVEY</u>	<u>SAMPLE SIZE</u>	<u>No. OF VARIABLES</u>
MEN			
1962	HEALTH EXAMINATION SURVEY (HES)	3,091	18
1961	AIR TRAFFIC CONTROLLERS	678	65
1974	LAW ENFORCEMENT OFFICERS	2,989	23
1974	*HEALTH AND NUTRITION EXAM- INATION SURVEY (HANES)	5,190	11
WOMEN			
1962	HEALTH EXAMINATION SURVEY (HES)	3,581	18
1971	AIRLINE STEWARDESSES	423	73
1974	*HEALTH AND NUTRITION EXAM- INATION SURVEY (HANES)	8,315	11

* IN PROCESS OF INCLUSION.

Slide 4

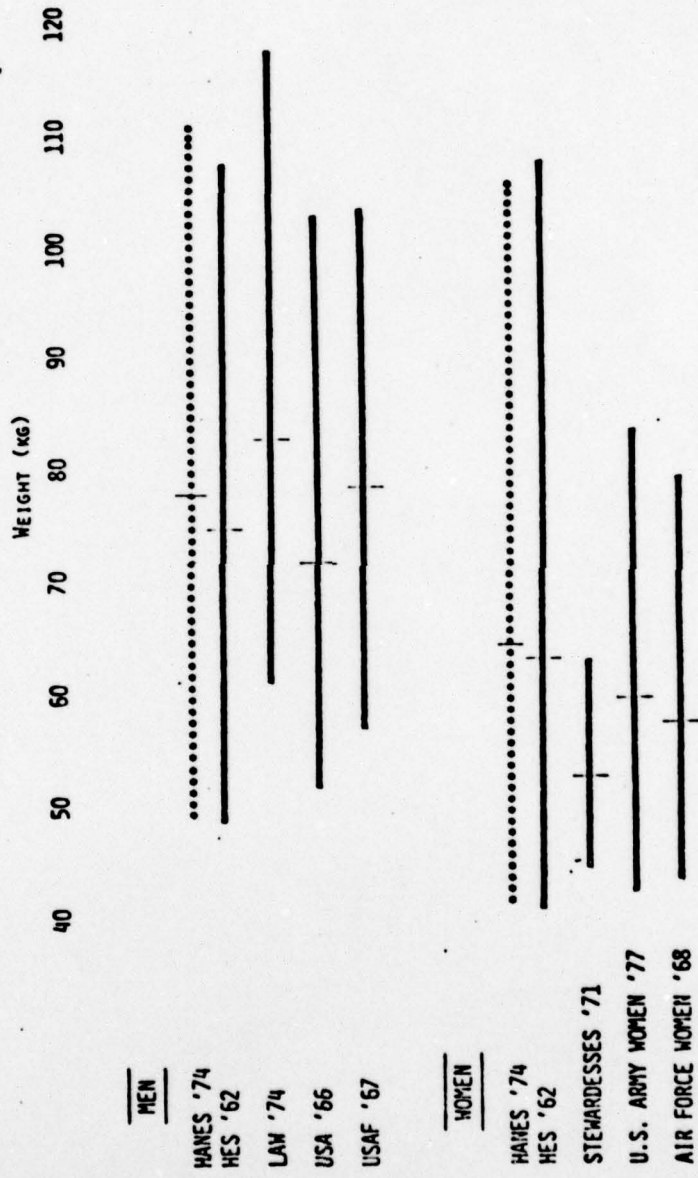
STATURES OF REPRESENTATIVE U. S. POPULATIONS*



*FIRST TO NINETY-NINTH PERCENTILES WITH MEAN AT VERTICAL LINE.

Slide 5

WEIGHTS OF REPRESENTATIVE U. S. POPULATIONS*



*FIRST TO NINETY-NINTH PERCENTILES WITH MEAN AT VERTICAL LINE.

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