

COMMITTEE NO. 6 - X-RAY AND "NEAR PICTURE MEASUREMENT"

- IT IS THE INTENTION TO DEAL WITH THE FOLLOWING SUBJECTS IN COMMITTEE 6:
- (A) APPLICATION OF PHOTOGRAMMETRY FOR MEDICAL PURPOSES. (HERE EVERYTHING WILL BE DEALT WITH CONCERNING PHOTOGRAMMETRIC USES OF X-RAY AND PHOTOGRAPHY)
 - (B) APPLICATION OF PHOTOGRAMMETRY FOR HYGIENIC PURPOSES AND FOR THE DEVELOPMENT OF THE BODY (SPORT); SUPERVISION OF BODY DEVELOPMENT; CONTROL OF BODY DEVELOPMENT AND APPEARANCE OF FATIGUE (FOR CHILDREN IN SCHOOL, IN COLLEGE, IN SPORT, SOLDIERS, SAILORS, AVIATION, COLONIES, ETC.)
 - (C) CRIMINAL PHOTOGRAMMETRY; PHOTOGRAPHY AT SCENE OF CRIME, SERVICE OF DETECTION.
 - (D) PHOTOGRAMMETRY OF ANIMALS AND PLANTS, CONTROL OF IMPROVEMENTS THROUGH HEREDITY, MEASUREMENTS OF BREEDING ANIMALS, ESTABLISHMENT OF GROWTH OF PLANTS.
 - (E) "NEAR PHOTOGRAMMETRY" FOR OTHER PURPOSES (RESEARCHES OF MATERIALS, ETC)

CONSIDER THE FOLLOWING QUESTIONS:

1. WHAT PERSONS (EXACT ADDRESS DESIRED) DO SCIENTIFIC OR PRACTICAL WORK IN YOUR COUNTRY ALONG THE LINES OF THE PRECEDING HEADINGS?
2. UPON WHAT PARTICULAR POINTS CAN THIS PERSON GIVE ADVICE AND UPON WHAT WILL HE REPORT TO THE CONGRESS?
3. UNTIL WHAT TIME CAN THE REPORTS OR OTHER ENCLOSURES BE SENT IN ORDER THAT THEY MAY BE GIVEN CONSIDERATION BY COMMITTEE 6 IN ADVANCE OF THE CONGRESS?

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DETERMINATION OF FIELD AREAS FROM PHOTOGRAPHS THRU WEIGHING CELLULOID TEMPLATES

A NOVEL METHOD OF ASCERTAINING ACREAGES OF CROPS AND OTHER VEGETATION, BY USING AERIAL MAPS, WAS EMPLOYED BY THE BUREAU OF AGRICULTURAL ENGINEERING IN SURVEYING THE BASIN OF THE RIO GRANDE IN COLORADO, NEW MEXICO AND WESTERN TEXAS FOR THE NATIONAL RESOURCES COMMITTEE. A TOTAL AREA OF MORE THAN 2,000,000 ACRES WAS MAPPED IN 18 CLASSIFICATIONS IN A SINGLE SEASON, WITH ONLY A SMALL FORCE AND LIMITED FUNDS.

PRACTICALLY ALL THE BASIN WAS MAPPED ON AERIAL PHOTOSTATIC PRINTS HAVING A SCALE OF TWO INCHES TO THE MILE IN THE MORE OPEN COUNTRY AND FOUR INCHES IN THE MORE CONGESTED AREAS IN NEW MEXICO. ON THESE PRINTS THE FIELDS WERE READILY IDENTIFIED AND NUMBERED OR COLORED ACCORDING TO THE CLASSIFICATION SCHEME.

TO OBTAIN TOTALS OF AREAS SO IDENTIFIED THE FIELD MAPS WERE TRACED ON CLEAR CELLULOID SHEETS, WHICH WERE THEN CUT UP ALONG BOUNDARY LINES. THE PIECES FOR EACH CLASSIFICATION WERE WEIGHED, IN GROUPS, ON LABORATORY BALANCE-SCALES. THESE WEIGHTS WERE CONVERTED INTO ACREAGES BY COMPARISON WITH PREVIOUSLY ASCERTAINED WEIGHTS OF TEMPLATES OR ACCURATELY DIMENSIONED UNIT SAMPLES OF THE CELLULOID.

A PATTERN SHEET CONSISTING OF A TEMPLATE OF HEAVY CELLULOID, REPRESENTING 1,000 ACRES AT THE TWO-INCH SCALE AND 250 ACRES AT THE FOUR-INCH SCALE, WAS CUT OUT AND CAREFULLY TRIMMED TO EXACTNESS WITH A FILE, FINE DRAFTING SCALES BEING USED TO DETERMINE DIMENSIONS. ONE OF THESE TEST BLOCKS WAS CUT FOR EACH FIELD SHEET.

TWO PROCESSES WERE DEVELOPED, ONE THE "SINGLE SHEET" AND THE OTHER THE "DOUBLE SHEET" METHOD.

THE "SINGLE SHEET" METHOD

IN THE SINGLE SHEET METHOD A PIECE OF CELLULOID, 0.01 INCH THICK, WAS LAID OVER THE FIELD SHEET AND FASTENED WITH THUMB TACKS. ALL THE BOUNDARIES

OF AREAS OF THE VARIOUS CLASSES - SHOWN ON THE FIELD SHEET; BY COLORED CRAYONS OR BY CLASS NUMBERS OR BOTH - WERE TRACED WITH A SHARP STYLUS WHICH CUT NEARLY THROUGH THE CELLULOID. IF HELD AT AN ACUTE ANGLE THE STYLUS MADE A GROOVE WITHOUT REMOVING SHAVINGS. THE CLASS NUMBER WAS SCRATCHED IN THE AREA. WHEN ALL THE BOUNDARIES HAD BEEN TRACED IN THIS WAY THE SHEETS WERE BROKEN DOWN. DEEPLY CUT BY THE STYLUS, THE PIECES BROKE READILY UNDER SLIGHT BENDING.

INDIVIDUAL FIELDS OF ALFALFA, FOR INSTANCE, NUMBERED "2" WERE PLACED IN THE "No. 2" COMPARTMENT OF A 12-CUP PAN. THESE SMALL PIECES WERE WEIGHED ON A SET OF ACCURATE BALANCES. A TEST BLOCK WAS CUT FROM SOME PART OF THE SHEET NOT COVERED BY MAPPED AREA, THE WEIGHT OF WHICH BECAME THE CRITERION FOR THE WEIGHTS OF THE SMALL PIECES OF CELLULOID IN THE 12 COMPARTMENTS.

A DIRECT CHECK ON THE WEIGHING AND THUS ON THE SUMMATION OF AREAS WAS MADE FOR EACH FIELD SHEET. BEFORE BEING DIVIDED, THE PIECE OF CELLULOID COVERING THE FIELD SHEET WAS CAREFULLY WEIGHED. WHEN ALL THE AREAS AND THE TEST BLOCK HAD BEEN BROKEN OUT THE FRAGMENTS REMAINING ALSO WERE CAREFULLY WEIGHED.

THE SUM OF THE WEIGHTS OF SCRAPS, PLUS THE GROUP-PIECES, PLUS THE TEST BLOCK, HAD TO EQUAL THE WEIGHT OF THE ORIGINAL PIECE OF CELLULOID. A TOLERANCE OF ONE PART IN 1,000 WAS ADOPTED. IF THE LACK OF AGREEMENT EXCEEDED THAT RATIO, WEIGHINGS WERE REPEATED UNTIL THE DISCREPANCY WAS FOUND.

THE "DOUBLE SHEET" METHOD

WHERE THE FARMS WERE IRREGULAR IN SHAPE, THE DOUBLE SHEET METHOD WAS USED. THE TYPE CLASSES WERE OUTLINED ON TRACING CLOTH LAID OVER THE FIELD MAP, AND THE TRACING STAPLED SECURELY BETWEEN TWO PIECES OF CELLULOID, EACH OF NOMINAL 0.0075 INCH THICKNESS. STAPLES WERE SET EVERY $3/4$ INCH COMPLETELY AROUND THE OUTSIDE OF THE MAPPED AREA.

THIS WHOLE ASSEMBLY WAS THEN CAREFULLY WEIGHED AND RECORDED. THE BLOCKS WERE CUT OUT OF THE ASSEMBLY WITH SMALL SCISSORS. AS EACH LOCAL AREA WAS CUT OUT, THE OPPOSITE PIECES OF CELLULOID WERE DROPPED INTO THEIR PROPER COMPARTMENT AND THE PIECE OF TRACING LINEN WAS ENCLOSED IN A SMALL ENVELOPE. WHEN THE MAPPED AREA HAD ALL BEEN CUT APART, THE SUM OF THE WEIGHTS FOR THE CLASSIFIED AREAS PLUS THE WEIGHTS OF THE SCRAPS AND THE TEST BLOCKS (ONE FROM EACH SIDE THE ASSEMBLY) PLUS THE REMAINING PIECES OF TRACING LINEN, HAD TO EQUAL (APPROXIMATELY) THE WEIGHT OF THE WHOLE ASSEMBLY BEFORE THE CUTTING COMMENCED.

THE BUREAU OF AGRICULTURAL ENGINEERING STATES THAT THE METHOD OF DETERMINING AREAS BY WEIGHING CELLULOID IS RAPID, NON-FATIGUING AND PARTICULARLY ADAPTED TO LAND-USE CLASSIFICATION.

MAPPING TEXAS

BY

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THERE ARE MANY SECTIONS OF TEXAS WHICH HAVE NEVER BEEN FULLY MAPPED AND THERE ARE NUMEROUS OTHER SECTIONS WHICH HAVEN'T BEEN MAPPED SINCE THE DAYS WHEN THE SURVEYORS, WITH CRUDE INSTRUMENTS, TOOK THEIR SIGHTS ON GIANT TREES WHICH ARE NO LONGER WITH US.

IT IS SAFE TO SAY THAT THERE IS NOT IN EXISTENCE TODAY A COMPLETE AND ACCURATE BASE MAP OF TEXAS. A BASE MAP IS THE MAP ON WHICH ALL OTHER MAPS ARE BUILT OR BASED. AN ACCURATE BASE MAP OF TEXAS WOULD BE INVALUABLE TO THE STATE AND TO ITS NUMEROUS POLITICAL SUB-DIVISIONS, AND MANY SERIOUS PROBLEMS NOW CONFRONTING THE STATE COULD EASILY BE SOLVED THROUGH SUCH A MAP.

THE PREPARATION OF SUCH A MAP WOULD HAVE BEEN A GIGANTIC UNDERTAKING A FEW YEARS AGO. BUT SCIENCE HAS MADE RAPID STRIDES IN THE LAST FEW YEARS AND IF THE FUNDS WERE AVAILABLE A BASE MAP OF THE ENTIRE STATE COULD BE PREPARED IN A COMPARATIVELY SHORT TIME THROUGH UTILIZATION OF THE AERIAL SURVEY.

THIS METHOD OF MAPPING HAS PROVED A SATISFACTORY SUBSTITUTE FOR THE