

**THE PRECISION SCREW IN SCIENTIFIC  
INSTRUMENTS OF THE 17<sup>th</sup>-19<sup>th</sup> CENTURIES:  
WITH PARTICULAR REFERENCE TO ASTRONOMICAL,  
NAUTICAL AND SURVEYING INSTRUMENTS**



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Appendix A:  
Results of Charles Maddock's Research

The columns are: OD, TPI, Depth of Thread, Thread Angle, Radius of Crest/Root

Adams, George (Sr.) (1704-73)

Adams, George (Jr.) (1750-95)

--Sundial: Levelling Screws-brass, 3-off

0.275	37.3	0.014	36	.006/.007
0.277	32.2	0.013	65	.007/.008
0.199	37.2	0.013	66	.007/.008
<u>Averages:</u>	TPI 35.5		Th. Angle 55.67	

--Portable Equatorial: Levelling Screws-brass, 3-off

0.166	45.5	0.010	--	.006/.006
0.168	45.5	0.011	--	.006/.005
0.163	45.5	0.010	--	.006/.005
<u>Averages:</u>	TPI 45.5			

--Portable Equatorial: Levelling Screws-brass, 3-off

0.276	26.3	0.021	--	.008/.006
0.277	26.4	0.020	--	.006/.008
0.250	25.5	0.013	--	.010/.010
<u>Averages:</u>	TPI 26.1			

Bird, John (1709-76)

--Portable Equatorial: Levelling Screws-brass, 4-off

0.366	24.3	0.023	53	.006/.008
0.366	24.3	0.023	50	.007/.007
0.365	24.5	0.023	53	.007/.007
0.365	24.1	0.023	57	.004/.007
<u>Averages:</u>	TPI 24.3		Th. Angle 53.25	

--Quadrant (18"): Levelling Screws-brass, 4-off (= SML 1937-600)

0.530	16.5	0.041	55	.006/--
0.530	16.5	0.041	58.5	.008/.011
0.524	16.5	0.040	54	.007/.010
0.522	16.5	0.040	51.5	.008/.010
<u>Averages:</u>	TPI 16.5		Th. Angle 54.75	

(made about 1770)

--Quadrant (12"): Levelling Screws-brass, 4-off (= SML 1900-138)

0.364	24.25	0.028	50	.005/.009
0.372	24.25	0.025	53	.006/.008
0.369	24.25	0.025	52	.006/.008
0.363	24.25	0.029	--	--/.008
<u>Averages:</u>	TPI 24.25		Th. Angle 51.7	

(made about 1767)

**Dollond, John (1706-61)**  
**Dollond, Peter (1730-1820)**

--Portable Equatorial: Levelling Screws-brass, 3-off (= SML 1912-204)

0.394	24	0.031	50	.006/.005
0.393	24	0.030	--	.006/.007
0.389	24	0.033	47.5	.004/.006
<u>Averages:</u>	TPI 24		Th. Angle 48.8	

**Harris (fl 1733)**

--Portable Equatorial: Levelling Screws-brass, 3-off

0.350	23	0.028	65	--/.006
0.359	23	0.022	63	--/.006
0.358	23	0.025	60	--/.006
<u>Averages:</u>	TPI 23		Th. Angle 62.7	

**Heath, Thomas (fl 1729)**

--Double Telescopic Level and Compass-brass, 4-off

0.033	30	0.017	55	--/.006
0.033	30	0.018	--	--/.006
0.033	30	0.017	54	--/.066
0.033	30	0.020	--	--/.006
<u>Averages:</u>	TPI 30		Th. Angle 54.5	

**Heath and Wing (fl1758)**

--Plane Table: Levelling screws-brass, 4-off

0.205	37	0.017	--	--/--
0.205	38.5	0.007	106	.009/.003
0.210	37	0.016	44.5	.006/.004
0.238	35.7	0.017	50.5	.005/.004
<u>Averages:</u>	TPI 37.5		Th. Angle 67.0	

--Universal Sundial: Levelling Screws-brass, 3-off

0.326	29.9	0.014	52.5	.007/.007
0.321	29.4	0.013	87	.004/.008
0.313	29.9	0.013	--	--/--
<u>Averages:</u>	TPI 29.7		Th. Angle 69.9	

**Jones, William & Samuel (fl 1793-1831)**

--English Equatorial: Levelling Screws-brass, 3-off

0.441	14	0.041	62.5	.012/.012
0.443	14	0.041	62	.009/.009
0.442	14	0.041	60.5	.009/.009
<u>Averages:</u>	TPI 14		Th. Angle 61.7	

(Maddock noted these were near 7/16" Whitworth and "appear to be of later manufacture")

**Martin, Benjamin (1704-82) (= SML 1911-233)**

--Portable Reflector: Levelling Screws-brass, 3-off (1 missing)

0.236	20	0.023	74	.007/.010
0.235	20	0.023	--	.006/.010
<u>Average:</u>	TPI 20		Th. Angle 74	

**Ramsden, Jesse (1735-1800)**

--Portable Equatorial-brass, 3-off (= SML 1938-1329)

0.267	25.3	0.019	--	.004/--
0.283	27	0.024	47.5	.007/.006
0.276	23.8	--	--	--/.007
<u>Averages:</u>	TPI 25.4		Th. Angle 47.5	

--Portable Equatorial-brass, 3-off (= SML 1913-281)

0.513	19.6	0.045	--	.005/.007
0.522	19.6	0.045	--	.006/.006
0.516	19.2	0.043	--	--/--
<u>Averages:</u>	TPI 19.5			

**Sisson, Jonathan (fl 1747-ca.1788)**

--Quadrant (6")-brass, 4-off (1 missing) (= SML 1918-168)

0.180	41.6	0.020	40.5	.003/.003
0.180	41.6	0.019	42	.003/.002
0.177	41.6	0.020	45	.003/.002
<u>Averages:</u>	TPI 41.6		Th. Angle 42.5	

--Portable Equatorial-brass, 3-off

0.172	35.8	0.012	58	.006/.007
0.169	36.2	0.012	60	.006/.007
0.168	36.5	0.011	64	.007/.007
<u>Averages:</u>	TPI 36.2		Th. Angle 60.7	

**Troughton, Edward (1753-1835)**

--Sextant-steel, 4-off but one missing

0.187	30.5	0.011	70	.006/.010
0.187	29.8	0.011	73	.007/.010
0.184	31.2	0.011	76.5	--/.010
<u>Averages:</u>	TPI 30.5		Th. Angle 73.2	

(Made about 1800)

**Rowley, John**

--Surveyor's Level: Adjusting screw-iron with brass head

0.175"	29.4	0.010	91
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--Universal Sundial: Levelling screws-brass

0.250	34.5	0.015	68	0.004/0.004
0.249	34.5	0.015	62.75	0.006/0.005
0.249	35.7	0.015	63	0.006/0.005
<u>Averages:</u>	TPI 34.9		Th. Angle 64.6	

**Wright, Thomas (1711-86)**

--Gunter Quadrant: Levelling Screws-brass, 3-off (= SML 1920-430)

0.205	23	0.022	63	.006/.010
0.208	22.7	0.019	71.5	--/.008
0.209	23.2	0.021	69	.006/.007
<u>Averages:</u>	TPI 23.0		Th. Angle 67.8	

(Made about 1740?)



## Appendix B

The following are copies of the FORTRAN programs used for the analysis of the profiles and the micrometer data. The purpose of each and sequence of use is described in Chapter 5.

### Program JURK.FOR

```

C      SWINGLER'S MODIFIED JURKEVICH PERIODOGRAM PROGRAM
C      PROGRAM GIVES INDEX AS A FUNCTION OF FREQUENCY
C
C      NPNTS   = NUMBER OF DATA POINTS, N1,N2 ARE DUMMY VARIABLES
C      X       = ARRAY OF X VALUES
C      Y       = ARRAY OF Y VALUES
C      PHI     = PHASE OF EACH DATA POINT
C      FSTART  = INITIAL FREQUENCY
C      FDELTA  = SPCING BETWEEN TRIAL FREQUENCIES
C      NPRD    = NUMBER OF FREQUENCIES TO BE SEARCHED
C      RESULT  = ARRAY OF JURKEVICH INDEX FOR EACH TRIAL PERIOD
C      GAMMA   =
C      SUMRL   = Y COS(GAMMA)
C      SUMIM   = Y SIN(GAMMA)
C
      REAL PHI(500)
      DIMENSION ICOUNT(20),BINDEX(20),X(500),Y(500),RESULT(1000)
      COMMON XVALUE(20), YVALUE(20)
      LOGICAL*1 FILNAM(15),FILOUT(15),DATE(6),XNAME(10)
      TYPE*,NAME OF FILE TO BE READ?
      ACCEPT 15,FILNAM
15  FORMAT(15A1)
      FILNAM(15)=0
      OPEN (UNIT=2,NAME=FILNAM,TYPE='OLD',READONLY)
      READ (2,29) NPNTS,N1,N2
      READ (2,22) (X(K),Y(K),K=1,NPNTS)
29  FORMAT (I4,I1,I1)
22  FORMAT (D15.7,2X,D15.7)
C
C      TEST THAT FILE BEING CORRECTLY READ
C
C      TYPE 22,(X(K),Y(K),K=1,NPNTS)
C
      CLOSE (UNIT=2)
      PI=3.14159265
C      TYPE*,CODE OF INSTRUMENT'
C      ACCEPT 17,XNAME
C 17  FORMAT (10A1)
      TYPE*,THIS FILE CONTAINS ',NPNTS,' DATA POINTS'
      NPRD=250
C
C      NPRD IS LIMITED TO 250 POINTS BY DATAGRAPH
C      THE INDEX IS CALCULATED FOR EACH PERIOD
C
      TYPE*,INPUT FSTART AND FDELTA (FSTART > FEND)'
      ACCEPT*,FSTART,FDELTA
C
C      NER IS A DUMMY NUMBER USED FOR DATAGRAPH
C
      NER=0
      TYPE*,NAME OF FILE FOR DATA TO BE WRITTEN TO?
      ACCEPT 25,FILOUT

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```

25  FORMAT (15A1)
    FILOUT(15)=0
    OPEN (3,NAME=FILOUT,FORM='FORMATTED',STATUS='NEW')
    WRITE (3,26) NPRD,NER
26  FORMAT (I6,',1,',I4)
    DO 8 IA=1,NPRD
      FREQ=FSTART-FDELTA*FLOAT(IA-1)
      SUMIM=0.0
      SUMRL=0.0
      DO 5 IB=1,NPNTS
        PHI(IB)=AMOD(X(IB)*FREQ,1.0)
        IF (PHI(IB) .LT. 0.0) PHI(IB)=PHI(IB)+1.0
        GAMMA=PHI(IB)*2.0*PI
        TEMPR=Y(IB)*COS(GAMMA)
        TEMPI=Y(IB)*SIN(GAMMA)
        SUMRL=SUMRL+TEMPR
        SUMIM=SUMIM+TEMPI
5    CONTINUE
    RESULT(IA)=SUMRL**2+SUMIM**2
    RESULT(IA)=(2.0/NPNTS)**2*(RESULT(IA))
    WRITE (3,27) FREQ,RESULT(IA)
c   WRITE (6,27) FREQ,RESULT(IA)
27  FORMAT (D15.7,' ',D15.7)
8    CONTINUE
    CLOSE (3)
    CALL EXIT
    END

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### Program LSQ.FOR

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C    PROGRAM LSQ.FOR LAST MODIFIED 20 NOV 1986
C
C    PROGRAM TO CALCULATE LEAST SQUARES POLYNOMIAL FITS
C    WITH MAXIMUM OF 10 DEGREES WHICH IS READ AS FIRST NUMBER
C    OF THE DATA FILE (REF McCRACKIN & DORN P.262)
C    NUMBER = NUMBER OF DATA PAIRS
C    NDATA = NUMBER OF INPUT DATA PAIRS
C    ND1,ND2 ARE DUMMY VARIABLES TO MATCH DATA FILES W/JURK.FOR
C    NCURV = NUMBER OF POINTS TO BE CALCULATED FOR LSQ CURVE
C    M = DEGREE OF POLYNOMIAL; N = NUMBER OF EQUATIONS (M-1)
C    X,Y = DATA PAIRS
C    A = ARRAY OF SUMS (COEFFICIENTS OF THE UNKNOWN)
C    B = ARRAY OF CONSTANT TERMS
C    C = ARRAY FOR THE UNKNOWN IN THE POLYNOMIAL EQUATIONS
C    P = ARRAY FOR THE POWERS OF THE X(I) (1 TO 2M)
C
C    DIMENSION  X(2000),Y(2000),A(11,11),B(11),C(11),P(20),XN(2000),
C    1YN(2000),YTEMP1(11),YTEMP2(11),YDIFF(2000),YCAL(2000)
C    DOUBLE PRECISION A,B,C,P,XN,YN
C    LOGICAL*1  FILNAM(15),FILOUT(15)
C    TYPE*,NAME OF FILE TO BE READ?
C    ACCEPT 5,FILNAM
5  FORMAT (15A1)
    TYPE*,DEGREE OF POLYNOMIAL TO BE CALCULATED (1-10)'
    ACCEPT 6,M
6  FORMAT (I2)
    TYPE*,NO. OF PTS. TO BE CAL. FOR LSQ CURVE FIT--USUALLY 100'
    ACCEPT 7,NCURV

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7  FORMAT (I4)
   FILNAM(15)=0
   OPEN (2,NAME=FILNAM,FORM='FORMATTED',STATUS='OLD')
   READ (2,20) NDATA,ND1,ND2
20  FORMAT (I4,I1,I1)
   WRITE (6,24) M,NDATA,NCURV
24  FORMAT (' M = ',I2,' NO DATA POINTS',I4,' NO NCURV FOR CURVE = ',I4)
   DO 11 I=1,NDATA
       READ (2,10) X(I),Y(I)
10  FORMAT (E15.7,2X,E15.7)
C   WRITE (6,25) X(I),Y(I)
C 25  FORMAT (2X,E15.7,2X,E15.7)
11  CONTINUE
12  NUMBER=I-1
   MX2=M*2
   DO 13 I=1,MX2
       P(I)=0.0
       DO 13 J=1,NUMBER
13  P(I)=P(I) + X(J)**I
C
C   THE COEFFICIENTS AND CONSTANTS OF THE EQUATIONS ARE DEVELOPED
C
   N=M+1
   DO 30 I=1,N
       DO 30 J=1,N
           K=I+J-2
           IF (K) 29,29,28
28  A(I,J)=P(K)
C   WRITE (6,31) I,J,K,A(I,J),P(K),NUMBER
C 31  FORMAT (' CC-1 I= ',I3,'J= ',I3,'K= ',I3,'A= ',D10.4,'P= ',D10.4,
1     'NUM = ',I3)
       GOTO 30
29  A(1,1)=NUMBER
C   WRITE (6,32) I,J,K,A(I,J),P(K),NUMBER
C 32  FORMAT (' CC-2 I= ',I3,'J= ',I3,'K= ',I3,'A= ',D10.4,'P= ',D10.4,
1     'NUM= ',I3)
30  CONTINUE
   B(1)=0.0
   DO 21 J=1,NUMBER
21  B(1)=B(1)+Y(J)
   DO 22 I=2,N
       B(I)=0.0
       DO 22 J=1,NUMBER
22  B(I)= B(I) + Y(J)*X(J)**(I-1)
C 22  WRITE (6,42) I,B(I)
C 42  FORMAT (' I= ',I3,' B(I)= ',D10.4)
C
C   PIVOTAL CONDENSATION IS CARRIED OUT--BLOCK DIAGRAM 8.8 TO L500
C
   NM1=N-1
   DO 300 K=1,NM1
       KP1=K+1
       L=K
       DO 400 I=KP1,N
C           WRITE (6,408) I,K,L,A(I,K),A(L,K)
C 408  FORMAT (' PC I= ',I3,'K= ',I3,'L= ',I3,'AIK= ',D10.4,'ALK= ',D10.4)
           IF (DABS(A(I,K))-DABS(A(L,K))) 400,400,401
401  L=I
400  CONTINUE
           IF (L-K) 500,500,405
405  DO 410 J=K,N

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      TEMP=A(K,J)
      A(K,J)=A(L,J)
C      WRITE (6,409) J,K,L,A(K,J),A(L,J)
C 409   FORMAT (' PC[2] J= ',I3,'K= ',I3,'L= ',I3,' AKJ= ',D10.4,
      1   'ALJ= ',D10.4)
      A(L,J)=TEMP
      TEMP=B(K)
      B(K)=B(L)
      B(L)=TEMP
C
C   THE ELIMINATION AND BACK SOLUTIONS ARE CARRIED OUT
C
      500 DO 300 I=KP1,N
          FACTOR=A(I,K)/A(K,K)
C          WRITE (6,507) I,A(I,K),A(K,K)
C 507   FORMAT (' EL-1 I= ',I3,' AIK= ',D10.4,'AKK= ',D10.4)
          A(I,K)=0.0
          DO 301 J=KP1,N
      301  A(I,J)=A(I,J)-FACTOR*A(K,J)
C          WRITE (6,501) J,A(I,J),A(K,J)
C 501   FORMAT (' EL-2 J= ',I3,' AIJ= ',D10.4,' AKJ= ',D10.4)
C
C   BLOCK DIAGRAM 8.6 TO L901 (q.v. McCracken & Dorn)
C
      300 B(I)=B(I)-FACTOR*B(K)
C      WRITE (6,502) N,A(N,N)
C 502   FORMAT (' N= ',I3,' ANN= ',D10.4)
          C(N)=B(N)/A(N,N)
          I=NM1
      710 IP1=I+1
          SUM=0.0
          DO 700 J=IP1,N
      700   SUM=SUM+A(I,J)*C(J)
          C(I)=(B(I)-SUM)/A(I,I)
          I=I-1
          IF (I) 800,800,710
      800 DO 900 I=1,N
      900 WRITE (6,901) I,C(I)
      901 FORMAT (' I= ',I3,' C= ',D15.7)
C
C   CALCULATE NCURV POINTS ON THE POLYNOMIAL CURVE
C
      TYPE*, 'NAME OF OUTPUT DATA FILE (LSF???.DAT)'
      ACCEPT 915,FILOUT
      915 FORMAT (15A1)
          FILOUT(15)=0
          OPEN (3,NAME=FILOUT,FORM='FORMATTED',STATUS='NEW')
          WRITE (3,922) NCURV
      922 FORMAT (I4,',1,0')
          XDEC=(X(NUMBER)-X(1))/NCURV
          DO 950 I=1,NCURV
              IF (I .EQ. 1) GOTO 902
              IF (I .NE. 1) GOTO 903
      902   XN(1)=X(1)
              GOTO 904
      903   XN(I)=XN(I-1)+XDEC
      904   YN(I)=0.0
              DO 950 J=1,N
                  IF (J .EQ. 1) GOTO 907
                  IF (J .NE. 1) GOTO 908
      907   YTEMP1(1)=C(1)

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          GOTO 950
908      YTEMP1(J)=YTEMP1(J-1)+C(J)*XN(I)**(J-1)
          IF (J.EQ.N) GOTO 940
          IF (J.NE.N) GOTO 950
940      YN(I)=YTEMP1(N)
950      CONTINUE
          DO 970 I=1,NCURV
C          WRITE (6,921) I,XN(I),YN(I)
C 921      FORMAT (' I= ',I4,' XN(I)= ',E15.7,' YN(I)= ',E15.7)
          WRITE (3,960) XN(I),YN(I)
960      FORMAT (E15.7,' ',E15.7)
970      CONTINUE
C
C      THIS SECTION CALCULATES DIFFERENCE OF Y VALUES OF INPUT DATA
C      MINUS THE VALUE CALCULATED FROM THE POLYNOMIAL COEFFICIENTS AND
C      WRITES DATA TO DATAGRAF COMPATIBLE FILE.
C
          TYPE*, 'IS DATA-LSQ DIFFERENCE REQUIRED? YES = 1'
          ACCEPT 1014,ITEST
1014      FORMAT (I1)
          IF (ITEST.EQ.0) GOTO 1070
          TYPE*, 'FILENAME FOR LSQ DIFFERENCE DATA (LSD???.DAT)'
          ACCEPT 1015,FILOUT
1015      FORMAT (15A1)
          FILOUT (15)=0
          OPEN (4,NAME=FILOUT,FORM='FORMATTED',STATUS='NEW')
          WRITE (4,1016) NDATA
1016      FORMAT (I4,',1,0')
          DO 1050 I=1,NDATA
              DO 1050 J=1,N
                  IF (J.EQ.1) GOTO 1007
                  IF (J.NE.1) GOTO 1008
1007      YTEMP2(1)=C(1)
                  GOTO 1050
1008      YTEMP2(J)=YTEMP2(J-1) + C(J)*X(I)**(J-1)
                  IF (J.EQ.N) GOTO 1040
                  IF (J.NE.N) GOTO 1050
1040      YCAL(I) = YTEMP2(N)
1050      CONTINUE
          DO 1070 I=1,NDATA
              YDIFF(I)=Y(I)-YCAL(I)
C          WRITE (6,1061) I,X(I),Y(I),YDIFF(I)
C1061      FORMAT (' I= ',I4,' X(I)= ',D13.5,' Y(I)= ',D13.5,' YDIFF(I)= ',D15.7)
          WRITE (4,1062) X(I),YDIFF(I)
1062      FORMAT (E15.7,' ',E15.7)
1070      CONTINUE
          CLOSE (1)
          CLOSE (2)
          CLOSE (3)
          CLOSE (4)
          STOP
          END

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# Program: PROFIL1.FOR

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C      PROGRAM PROFILE.FOR LAST MODIFIED 17/01/1987
C      PROFIL1 READS INPUT DATA AS X,Y PROFIL2 AS Y,X BUT
C      OUTPUT FROM BOTH HAS X FIRST
C
C      PROGRAM TO CALCULATE 1) LINEAR LEAST SQUARES FIT FOR
C      THREAD PROFILES. IT THEN ROTATES DATA AND CALCULATES A
C      PHASE FOR EACH DATA POINT TO GIVE A MEAN PROFILE. THE
C      PROFILE IS THEN FITTED WITH A MEAN CURVE READY FOR
C      PROFILE MEASUREMENT AND PUTS DATA IN A FILE SUITABLE
C      FOR DATAGRAF WITH THREE OPTIONS: 0=PHASE POINTS, 1=
C      CURVE ONLY OR 2=BOTH. THE FIRST STAGE IS MODIFIED LSQ PROGRAM
C      WITH N=1
C      NUMBER = NUMBER OF DATA PAIRS
C      NDATA = NUMBER OF INPUT DATA PAIRS
C      ND1,ND2 ARE DUMMY VARIABLES TO MATCH DATA FILES W/JURK.FOR
C      NCURV = NUMBER OF POINTS TO BE CALCULATED FOR LSQ CURVE
C      M = DEGREE OF POLYNOMIAL; N = NUMBER OF EQUATIONS (M-1)
C      X,Y = DATA PAIRS
C      A = ARRAY OF SUMS (COEFFICIENTS OF THE UNKNOWNNS
C      B = ARRAY OF CONSTANT TERMS
C      C = ARRAY FOR THE UNKNOWNNS IN THE POLYNOMIAL EQUATIONS
C      P = ARRAY FOR THE POWERS OF THE X(I) (1 TO 2M)
C
      REAL PHI(2000)
      DIMENSION X(2000),Y(2000),A(11,11),B(11),C(11),P(20),XN(2000),
1YN(2000),YTEMP1(11),YTEMP2(11),YDIFF(2000),YCAL(2000),
2RESULT(2000),FREQ(2000),XP(2000),XM(2000),PERIOD(2000)
      COMMON XVALUE(20),YVALUE(20)
      DOUBLE PRECISION A,B,C,P,XN,YN,RESULT,XMAX,YMAX,PHI
1GAMMA,TEMPR,TEMPI,YDIFF,SUMRL,SUMIM,SUMIN,PERIOD
      LOGICAL*1 FILNAM(15),FILOUT3(15),FILOUT4(15),XNAME(10),
1FILOUT7(15)
      TYPE*,'>> NAME OF FILE TO BE READ?'
      ACCEPT 5,FILNAM
5  FORMAT (15A1)
6  FORMAT (I4,' 1 0')
7  FORMAT (D15.7,' ',D15.7)
      M=1
      NCURV=100
      FILNAM(15)=0
      OPEN (2,NAME=FILNAM,FORM='FORMATTED',STATUS='OLD')
      READ (2,20) NDATA,ND1,ND2
20  FORMAT (I4,I1,I1)
      WRITE (6,24) NDATA,NCURV
24  FORMAT (' NO DATA POINTS',I4,' NO NCURV FOR CURVE =',I4)
      DO 11 I=1,NDATA
          READ (2,10) X(I),Y(I)
10  FORMAT (E14.6,E14.6)
11  CONTINUE
      CLOSE (2)
12  NUMBER=I-1
      DO 13 I=1,2
          P(I)=0.0
          DO 13 J=1,NUMBER
13  P(I)=P(I) + X(J)**I
C
C      THE COEFFICIENTS AND CONSTANTS OF THE EQUATIONS ARE DEVELOPED
C
      DO 30 I=1,2

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        DO 30 J=1,2
            K=I+J-2
            IF (K) 29,29,28
28         A(I,J)=P(K)
            GOTO 30
29         A(1,1)=NUMBER
30     CONTINUE
        B(1)=0.0
        DO 21 J=1,NUMBER
21         B(1)=B(1)+Y(J)
        I=2
        B(I)=0.0
        DO 22 J=1,NUMBER
22         B(I)= B(I) + Y(J)*X(J)**(I-1)
C
C     PIVOTAL CONDENSATION IS CARRIED OUT--BLOCK DIAGRAM 8.8 TO L500
C
        K=1
        KP1=K+1
        L=K
        DO 400 I=KP1,2
            IF (DABS(A(I,K))-DABS(A(L,K))) 400,400,401
401         L=I
400     CONTINUE
        IF (L-K) 500,500,405
405     DO 410 J=K,2
            TEMP=A(K,J)
            A(K,J)=A(L,J)
410     A(L,J)=TEMP
        TEMP=B(K)
        B(K)=B(L)
        B(L)=TEMP
C
C     THE ELIMINATION AND BACK SOLUTIONS ARE CARRIED OUT
C
500     DO 300 I=KP1,2
        FACTOR=A(I,K)/A(K,K)
        A(I,K)=0.0
        DO 301 J=KP1,2
301         A(I,J)=A(I,J)-FACTOR*A(K,J)
300         B(I)=B(I)-FACTOR*B(K)
        C(2)=B(2)/A(2,2)
        I=1
710     IP1=I+1
        SUM=0.0
        DO 700 J=IP1,2
700         SUM=SUM+A(I,J)*C(J)
        C(I)=(B(I)-SUM)/A(I,I)
        I=I-1
        IF (I) 800,800,710
800     DO 900 I=1,2
900         WRITE (6,901) I,C(I)
901         FORMAT (' I= ',I3,' C= ',D15.7)
C
C     CALCULATE NCURV POINTS ON THE POLYNOMIAL CURVE
C
        XDEC=(X(NUMBER)-X(1))/NCURV
        DO 950 I=1,NCURV
            IF (I.EQ. 1) GOTO 902
            IF (I.NE. 1) GOTO 903
902         XN(1)=X(1)

```



```

      GOTO 904
903   XN(I)=XN(I-1)+XDEC
904   YN(I)=0.0
      DO 950 J=1,2
          IF (J.EQ. 1) GOTO 907
          IF (J.NE. 1) GOTO 908
907   YTEMP1(1)=C(1)
      GOTO 950
908   YTEMP1(J)=YTEMP1(J-1)+C(J)*XN(I)**(J-1)
          IF (J.EQ. 2) GOTO 940
          IF (J.NE. 2) GOTO 950
940   YN(I)=YTEMP1(2)
950  CONTINUE
C
C   THIS SECTION CALCULATES DIFFERENCE OF Y VALUES OF INPUT DATA
C   MINUS THE VALUE CALCULATED FROM THE POLYNOMIAL COEFFICIENTS AND
C   WRITES DATA TO DATAGRAF COMPATIBLE FILE.
C
      TYPE*, '>> WANT TO WRITE LSQ DIFF TO A FILE? 1 = YES'
      ACCEPT*, TEST2
      IF (TEST2.EQ. 0) GOTO 1016
      TYPE*, '>> FILNAME FOR LSQ DIFFERENCE DATA'
      ACCEPT 5, FILOUT4
      FILOUT4 (15)=0
      OPEN (4, NAME=FILOUT4, FORM='FORMATTED', STATUS='NEW')
1016  DO 1050 I=1, NDATA
      DO 1050 J=1, 2
          IF (J.EQ.1) GOTO 1007
          IF (J.NE.1) GOTO 1008
1007  YTEMP2(1)=C(1)
      GOTO 1050
1008  YTEMP2(J)=YTEMP2(J-1) + C(J)*X(I)**(J-1)
          IF (J.EQ.2) GOTO 1040
          IF (J.NE.2) GOTO 1050
1040  YCAL(I) = YTEMP2(2)
1050  CONTINUE
      DO 1070 I=1, NDATA
          YDIFF(I)=Y(I)-YCAL(I)
C          WRITE (6, 1061) I, X(I), Y(I), YDIFF(I)
C1061  FORMAT (' I= ', I4, ' X(I)= ', D13.5, ' Y(I)= ', D13.5, ' YDIFF(I)= ', D15.7)
1070  CONTINUE
      TEST=0
      NDATA2=250
      IF (NDATA.LT.250) NDATA2=NDATA
      DO 1100 I=1, NDATA
          IF (TEST) 1101, 1101, 1102
1101  WRITE (4, 6) NDATA2
1102  WRITE (4, 7) X(I), YDIFF(I)
          TEST=TEST+1
          IF (TEST.GT.249) TEST=0
          NDATA3=NDATA-I
C          WRITE (6, 1106) TEST, NDATA2, NDATA3
C1106  FORMAT (D10.3, 2X, I4, 2X, I4)
          IF (NDATA3.LT.250) NDATA2=NDATA3
1100  CONTINUE
      CLOSE (4)
C
C   SWINGLER'S MODIFIED JURKEVICH PERIODOGRAM PROGRAM.
C   PROGRAM GIVES INDEX AS A FUNCTION OF FREQUENCY.
C   FIRST TIME THROUGH: INPUT START AND END PERIODS--
C   SHOULD BE SMALL RANGE FOR SUFFICIENT RESOLUTION

```



```

C
  TYPE*, 'JURKEVICH PERIOD SEARCH SECTION'
  PI=3.14159265
  NPASS=0
  TYPE*, '>> INPUT PSTART AND PEND'
  ACCEPT*, PSTART, PEND
2000 FSTART=1/PSTART
  FDELTA=(1/PSTART-1/PEND)/500
  NDATA2=250

C
C  NDATA2 IS LIMITED TO 250 POINTS BY DATAGRAF BUT MAY
C  HAVE UP TO 7 DATA SETS EACH OF 250 PTS.
C  THE INDEX IS CALCULATED FOR EACH PERIOD
C
  TYPE*, '>> DO YOU WANT JURK DATA SAVED? YES = 1'
  ACCEPT*, TEST3
  IF (TEST3.EQ.0) GOTO 2027
  TYPE*, '>> NAME OF FILE FOR DATA TO BE WRITTEN TO?'
  ACCEPT 5, FILOUT3
  FILOUT3(15)=0
  OPEN (3, NAME=FILOUT3, FORM='FORMATTED', STATUS='NEW')
  WRITE (3,6) NDATA2
2027 TEST=0
  DO 2008 IA=1,500
    TEST=TEST+1
    IF (TEST-251) 2035,2030,2035
2030 WRITE (3,6) NDATA2
2035 FREQ(IA)=FSTART-FDELTA*FLOAT(IA-1)
    SUMIM=0.0
    SUMRL=0.0
    DO 2005 IB=1,NDATA
      PHI(IB)=AMOD(X(IB)*FREQ(IA),1.0)
      IF (PHI(IB) .LT. 0.0) PHI(IB)=PHI(IB)+1.0
      GAMMA=PHI(IB)*2.0*PI
      TEMPR=YDIFF(IB)*COS(GAMMA)
      TEMPI=YDIFF(IB)*SIN(GAMMA)
      SUMRL=SUMRL+TEMPR
      SUMIM=SUMIM+TEMPI
2005 CONTINUE
    RESULT(IA)=SUMRL**2+SUMIM**2
    RESULT(IA)=(2.0/NDATA)**2*(RESULT(IA))
    PERIOD(IA)=1/FREQ(IA)
    IF (TEST3.EQ.0) GOTO 2008
    WRITE (3,7) PERIOD(IA),RESULT(IA)
2008 CONTINUE
    CLOSE (3)

C
C  THIS SECTION FINDS MAXIMUM JURKEVICH VALUE.
C
  IF (NPASS .NE. 0) GOTO 3040
  YMAX=RESULT(1)
  XMAX=FREQ(1)
  DO 3005 IA=1,499
    IF (RESULT(IA+1).GT.YMAX) THEN
      YMAX=RESULT(IA+1)
      XMAX=FREQ(IA+1)
    ELSE
      CONTINUE
    ENDIF
3005 CONTINUE
  TPERIOD=1/XMAX

```

```

        WRITE (6,3008) TPERIOD
3008  FORMAT ('*****>> PERIOD = ',D12.7)
3040  TYPE*,>> RECALCULATE FOR ANOTHER PERIOD RANGE? YES=1'
        ACCEPT*,TEST6
        IF (TEST6.EQ.0) GOTO 3060
        NPASS=NPASS+1
        IF (NPASS .EQ. 2) GOTO 3050
C
C   THIS SECTION INCREMENTS THE PERIOD SEARCH RANGE FOR PROFILE
C   SEARCHES--FIRST TIME < PERIOD, SECOND > PERIOD AND STEPS OFF
C   SO THAT PRIMARY PEAK IS NOT INCLUDED IN PLOTS
C
        PSTART=0.09090909*TPERIOD
        PEND=0.85*TPERIOD
        GOTO 3051
3050  PSTART=1.2*TPERIOD
        PEND=11*TPERIOD
3051  IF (NPASS .NE.3) GOTO 2000
        TYPE*,*****>RESET NPASS; 0=RESTART; 1=LO PERIOD; 2=HI PERIOD'
        TYPE*,>> WHAT NEW VALUE OF NPASS? 0,1,2'
        ACCEPT*,NPASS
        GO TO 2000
C
C   THIS SECTION CALCULATES THE PHASES OF DIGITIZED PROFILE DATA
C   AND WRITES TO FILE OF FORM TEMPP1.DAT
C
3060  TYPE*,>> CALCULATE PHASE? YES=1'
        ACCEPT*,TEST4
        IF (TEST4.EQ.0) GOTO 9999
        TYPE*,>> NAME FOR PHASE DATA FILE? TEMPP*.DAT'
        ACCEPT 5,FILOUT7
        FILOUT7(15)=0
        OPEN (7,NAME=FILOUT7,FORM='FORMATTED',STATUS='NEW')
        TYPE*,>> WANT TO INCREMENT THE TRIAL PERIOD? YES = 1'
        ACCEPT*,TEST5
        IF (TEST5) 3010,3010,3011
3011  TYPE*,>> WHAT IS NEW PERIOD? (ENTER ACTUAL IN MM)'
        ACCEPT*,TPERIOD
3010  TEST=0
        NDATA2=250
        IF (NDATA.LT.250) NDATA2=NDATA
        DO 3100 I=1,NDATA
            XP(I)=X(I)/TPERIOD
            XM(I)=XP(I)-INT(XP(I))
C            WRITE (6,3096) X(I),XP(I),XM(I)
C3096  FORMAT (D15.7,2X,D15.7,2X,D15.7)
            IF (TEST) 3101,3101,3102
3101  WRITE (7,6) NDATA2
3102  WRITE (7,7) XM(I),YDIFF(I)
            TEST=TEST+1
            IF (TEST.GT.249) TEST=0
            NDATA3=NDATA-I
            IF (NDATA3.LT.250) NDATA2=NDATA3
3100  CONTINUE
        CLOSE (7)
9999  CONTINUE
        CALL EXIT
        END

```

Sample of the prompts requested by PROFIL1.EXE:

```

$ RUN PROFIL1.EXE
>> NAME OF FILE TO BE READ?
PSMLC096
NO DATA POINTS 499 NO NCURV FOR CURVE = 100
I= 1 C= 0.1379694D+02
I= 2 C= -0.2197349D-01
>> WANT TO WRITE LSQ DIFF TO A FILE? 1 = YES
1
>> FILNAME FOR LSQ DIFFERENCE DATA
TEMP.DAT
JURKEVICH PERIOD SEARCH SECTION
>> INPUT PSTART AND PEND
2.95,3.05
>> DO YOU WANT JURK DATA SAVED? YES = 1
0
****>> PERIOD = .3003772D+01
>> RECALCULATE FOR ANOTHER PERIOD RANGE? YES=1
1
>> DO YOU WANT JURK DATA SAVED? YES = 1
1
>> NAME OF FILE FOR DATA TO BE WRITTEN TO?
TEMP1.DAT
>> RECALCULATE FOR ANOTHER PERIOD RANGE? YES=1
1
>> DO YOU WANT JURK DATA SAVED? YES = 1
1
>> NAME OF FILE FOR DATA TO BE WRITTEN TO?
TEMP2.DAT
>> RECALCULATE FOR ANOTHER PERIOD RANGE? YES=1
0
>> CALCULATE PHASE? YES=1
1
>> NAME FOR PHASE DATA FILE? TEMPP*.DAT
TEMPP1.DAT
>> WANT TO INCREMENT THE TRIAL PERIOD? YES = 1
0
$

```



## Program: CALBRAT.FOR

```

C      Program CALBRAT subtracts a calibration curve from micrometer data by
C      interpolation.
C      MX, MY are the micrometer data points
C      CX, CY are the calibration data points
C      Y is the micrometer (data - calibration) value
C      FRAC is the interpolation factor
C      This program is compatable with programs LSQ, PROFIL* and JURK
C
      REAL MX,MY
      DIMENSION
CX1(2000),CX(2000),CY(2000),MX(2000),MY(2000),Y(2000)
      LOGICAL*1  FILNAM(15),FILOUT(15),FILEIN(15)
      TYPE*,>>  WHAT WAS THE DIAL INDICATOR ZERO READING?
      ACCEPT 3,ZERO
      WRITE (6,7) ZERO
      TYPE*,>>  NAME OF CALIBRATION DATA FILE?
      ACCEPT 15, FILEIN
      FILEIN(15)=0
      OPEN (2,NAME=FILEIN,FORM='FORMATTED',STATUS='OLD')
      READ (2,5) NCDATA,ND1,ND2
      DO 11 N=1,NCDATA
          READ (2,4) CX1(N),CY(N)
          CX(N)=CX1(N)-ZERO
C          WRITE (6,4) CX(N),CY(N)
11  CONTINUE
      CLOSE (2)
      3  FORMAT (F8.4)
      4  FORMAT (D15.7,' ',D15.7)
      5  FORMAT (I4,I1,I1)
      6  FORMAT (D15.7,' ',D15.7)
      7  FORMAT ('<< ZERO IS =',F8.4)
14  FORMAT (E10.4)
15  FORMAT (15A1)
      TYPE*,>>  NAME OF MICROMETER DATA TO BE READ?
      ACCEPT 15, FILNAM
      TYPE*,>>  NAME OF FILE FOR DATA TO BE WRITTEN TO?
      ACCEPT 15, FILOUT
      FILNAM(15)=0
      FILOUT(15)=0
      OPEN (3,NAME=FILNAM,FORM='FORMATTED',STATUS='OLD')
      OPEN (4,NAME=FILOUT,FORM='FORMATTED',STATUS='NEW')
      TYPE*,>>  IS DIAL INDICATOR DATA FIRST=1 OR SECOND=0 IN DATA
1 FILE?
      ACCEPT*,TEST
      READ (3,5) NDATA,ND1,ND2
      IF (TEST.EQ.1) GOTO 19
      DO 17 I=1,NDATA
          READ (3,6) MX(I),MY(I)
17  CONTINUE
      GOTO 20
19  DO 20 I=1,NDATA
      READ (3,6) MY(I),MX(I)
20  CONTINUE
      WRITE (6,16) NDATA,NCDATA
16  FORMAT (' NUMBER OF MICROMETER DATA PTS = ',I4,' NUMBER OF
1 CALIBRATION PTS = ',I5)
      SUMYI=0.0
      DO 31 I=1,NDATA
          DO 21 N=1,NCDATA

```



```

                IF (MX(I)-CX(N) .EQ. 0.0) GOTO 22
                IF (MX(I)-CX(N) .LT. 0.0) GOTO 23
21      CONTINUE
22      Y(I)=MY(I)-CY(N)
        GOTO 30
23      FRAC=(MX(I)-CX(N-1))/(CX(N)-CX(N-1))
        Y(I)=MY(I)-((CY(N-1)-CY(N))*FRAC+CY(N))
30      SUMYI=SUMYI+Y(I)**2
31      CONTINUE
        STDDEV=(SUMYI/NDATA)**0.5
        WRITE (6,32) STDDEV
32      FORMAT (' RECORD THIS NUMBER AS STANDARD DEVIATION ',F9.5,' <<<<<')
        DO 41 I=1,NDATA
41      WRITE (4,26) MX(I)
26      FORMAT (F9.4)
        DO 51 I=1,NDATA
51      WRITE (4,27) Y(I)
27      FORMAT (F10.6)
        WRITE (6,36) NDATA,FILOUT
36      FORMAT (I5,' DATA POINTS HAVE BEEN WRITTEN TO ',15A1)
        CLOSE (3)
        CLOSE (4)
        CALL EXIT
        END

```

# Appendix C

## Summary of Known Dividing and Ruling Engines:

- \* Indicates engine has been described and illustrated in this work (usually Chapter 4)
- \* \* Indicates an illustration of this engine is given in the reference.

Date	Maker	Type/Location	References	Notes
*ca.1738/9	Hindley	CDE	Smeaton: 1786	
*1762	Chaulnes	CDE (IMSS-1)		
1762?	Chaulnes	LDE (IMSS-2)		
*1765	Chaulnes	CDE	Chaulnes: 1765	
18 <sup>th</sup> c	Chaulnes?	LDE? (IMSS-4)		
1766	Ramsden	CDE,LDE		
*1768	Chaulnes	CDE	Chaulnes: 1768	
1771	Pattier	2--types	Histoire de l'Academie des Sciences: 1771, p.95.	Location unknown.
1772	James Watt	LDE	Muirhead: 1858, p.225	
*1774/5	Ramsden	CDE (SI)	Ramsden: 1777	
<1777	P. Dollond		Daumas: p.202	
<1780	Mégnié		Daumas: p.203	
*1778	John Troughton	CDE(SML-36)	Ed. Troughton: 1809, Stimson: 1985, p.113	
1778	Wm. Harrison/ Peter Atherton		U.K. Patent 1179	
1778	Fortin	LDE	Daumas: p.203	
ca.1783	Lenoir	CDE	Daumas: p.202	Had 15" error in 60°
ca.1788	John Stancliffe		Anbronn: p.427	
<1793	Richer	LDE	Daumas: p.203	
<1793	Richer	CDE (CNAM-6589)	Daumas: p.203	
<1793	Jecker	LDE (CNAM-8796)	Daumas: p.203	Employed a treadle driven screw as in Ramsden's. Also made a screw-cutting machine.
*1793	Ed. Troughton	(SML)	Troughton: 1809, Stimson: 1985, p.113	
?	Samuel Rhee	(CNAM-1102)	Daumas: p.204	
>1799	Fortin	CDE (CNAM-8796)	Daumas: p.203	
*1800	Reichenbach	CDE	Anbronn: p.428-9	
*1803	Reichenbach	CDE	Anbronn: p.428-9	
1803	Hornblower		Hornblower: 1803	
1809	James Allan	CDE (SML)	Allan: 1812; Stancliffe: 1812; Anbronn, p.427, Stimson: 1985, p.113	
1811	Thomas Jones	CDE	UK Pat. 3446	Sectograph.

*1814	Kater	CDE	Kater: 1814	
ca.1815	Fraunhofer	RE		
ca.1820	Gambey	CDE (CNAM-8323)	Anbronn: p.427; Payen: 1985, 160 Derry/Williams, p.12	Gambey's method for making the Paris Obs. 2m mural circle (1840) is found in History of Technology, ed. by Singer, et al., vol.4, p.394/5.
*1822	Barton/Maudslay?	RE (SML-34)		
1 <sup>st</sup> q 19th c	NS	CDE (≈72cm dia)	See Sotheby's Cat. "Humphrey", 12 June, 1984. Now owned by H. Dawes, B'ham.	
1826,1828	Donkin	LDE	Holtzapffel: 1854, p.652	Appears that the first CDE was modified with error compensating bar in 1828.
ca.1825	Amici	CDE (IMSS-3)		
*1830	Ross	CDE	Anbronn: p.427	
ca.1830-92+	Repsold	CDE	Brashear: p.414	Brashear says was still operating in 1892 and had divided more instruments than perhaps any other DE. It was accurate to 1.6" in 1892 having been continually improved by three generations of Repsolds.
1842	Donkin	LDE	Holtzapffel: p.652-3	One of Donkin's DE's is in the Science Museum.
e.1840's	Joseph Saxton	RE	Warner: 1986, p.126	
*1843	Simms	CDE	Simms: 1846; Anbronn: p.438-40	
*<1845	Nobert	RE	Turner: 1967	
1850	Joseph R. Brown	LDE	Roe: 1914, p.202	First automatic machine built in US; firm later became Brown & Sharpe.
**ca.1850	Oertling	CDE	Anbronn: p.429-38	Limb divided to 1'.
**ca.1850	Sécretan	CDE	Anbronn: p.440-43	Circles are 115cm in diameter and are divided to 1/3°. He used bisection to 5'.
1852	Samuel Darling	LDE	Roe: 1914, p.203	From Bangor, Maine.
**1852/72	John H. Temple	CDE	Anbronn: p.445	This engine went to Buff & Berger in 1877 and to C.L. Berger & Sons in 1898.
<1854	Wurdeman (Washington)	CDE	Brashear: p.414;	This machine had 4320 divisions having been copied from the Troughton & Simms Machine made by Simms.
1855	Perreaux	CDE (ITT-1)	Roe: 1914, p.206.1854	LDE, CDE purchased at Paris Exposition-1855
1855	Perreaux	LDE (ITT-2)	Diameter--14.1cm	
**ca.1852-7	E. & G.W. Blunt	CDE	Bowditch: 1857, ads p.2	
1859	Joseph R. Brown	LDE	Roe: 1914, p.203	
ca.1863-72	Lewis Rutherford	RE	Warner: 1986, p.126	
ca.1860's	J. Sprenger	CDE	Anbronn: p.444	
*1860/70	Waterhouse	RE (RMS)	Turner: 1988	
ca.1870	Rayleigh	RE	Rayleigh: 1874	

1872	Frederick Cooke	CDE (SML-37)	
**<1874	M. Salleron	LDE	Spon: 1874, p.1803
**<1874	M. Salleron	CDE	Spon: 1874, p.1805
ca.1874	Buff & Berger	CDE	Rogers: 1884
See J.H. Temple above. B&B also made one for Rogers who then modified it in 1878 to have a free nut. See also Warner: 1986.			
**>1875?	G.N. Saegmüller (Fauth & Co.)	CDE	Anbronn: p.445-8
**>1875?	Heyde	CDE	Anbronn: p.452-3
**>1875?	Obertheil	CDE	Anbronn: p.451-2
**>1875?	Max Ott	CDE	Anbronn: p.451
**>1875?	Th. Wegener	CDE	Anbronn: p.449-50
1878	van Woerd/Ballou	RE	Rogers: p.225
<1879	Desmoulins-Froment	LDE	Rogers: p.221
<1879	Brunner Frères	LDE	Rogers: pp.221,222
ca.1870-80's	Ertel & Sohn	RE	Warner: 1986, p.129
?	Thomas Grubb	RE	Warner: 1986, p.129
*1879/81	Mallock/Munro	RE	Mallock: 1882
ca.1880	Ballou	RE	Rogers: p.225
1882	Rowland	RE	Rowland: 1882
<1884	Hoe	CDE	Rogers: p.255
ca.1880's?	Charles Fasoldt	RE (SI)	Warner: 1986, p.127
*1887-8	Adam Hilger (Blythswood)	RE (SML-33)	Scoble: 1912
1880-90's	Albert A. Michelson	RE	Warner: 1986, p.129
1889	Rowland	RE	Warner: Strong: 1986
1894	Rowland	RE	Warner: Strong: 1986
*1897	Smith	RE	Smith: 1897
**ca.1904	E.R. Watts & Son	CDE	McCaw: p.226-8
nd	Pistor & Martin	CDE	Brashear: p.414
nd	Bamberg	CDE	Brashear: p.414
nd	Gautier	CDE	Brashear: p.414
nd	Warner & Swasey	CDE	Brashear: p.414
			Errors measured by Prof. Morley to be <1".
Made for Prof. Wm. Anthony of Cornell Univ.			
Circle 1m in diameter and divided to 5'.			
Circle 1m diameter.			
Circle 1m diameter.			
Made for Rogers at Waltham Watch Comp.			



# Appendix D: U.K. Patents for Screws and Related Tools to 1852

Source: Woodcroft: 1854

No.	Date	Patentee	Short Description of the Patent
306	2/12/1692	Joseph Williams	Engine consisting of screws, wheels and wrenches for drawing and raising great weights; useful in raising minerals, buildings and merchant's goods; loading/unloading ships, etc.
751	14/05/1760	Job/Wm. Wyatt	Cutting screws of iron, called wood-screws.
1179	5/02/1778	William Harrison	Making screws and machines for dividing of Peter Atherton instruments from said screws.
1381	29/07/1783	Wm. Forbes	Manufacturing bolts and other ships' fastenings.
1388	2/10/1783	Wm. Collins	Making and preparing bolts to fasten ships' timbers together.
1408	17/12/1783	Wm. Playfair	Cutting or dividing pieces of metal and giving them a cylindrical or other uniform shape through their whole length, or making them taper regularly, for the formation of bars, bolts, rods, wire...
1536	4/03/1786	John Butler	Making ships' bolts and rods, from iron, copper, brass or iron shearings.
1691	7/07/1789	Thomas Todd	Machine for making screws and nuts and boxes for screws.
2482	17/02/1801	John Bennoch	Machine for making nails, bolts, rods, watch springs and metal plates.
3428	1/04/1811	Thomas Wm. Sturgeon	Micrometers.
3860	10/12/1814	Ed. Glover	Apparatus for drawing or extruding bolts, nails, etc. and/or various other purposes.
4060	15/08/1816	Anthony Gilchrist	Machine for making nails and screws and for working all metallic substances.
4117	13/05/1817	James Gerard Colbert	Making screws of iron, brass, steel or other metals for use in woodwork.
4258	7/05/1818	Wm. Church	Machinery for making nails and spikes and also wire and screws of iron, copper, brass. or other metal
4303	10/11/1818	Ed. Woolley	Machinery to make wood-screw forgings.
4554	1/05/1821	Alex. Law	Formation of bolts and nails for ships and other fastenings.

4571	17/07/1821	Alex. Law	Formation of bolts and nails for ships and other fastenings.
5703	18/10/1828	Lennuel Wellman Wright	Machinery for making screws.
5929	24/04/1830	Samuel Brown	Making bolts and chains.
6200	22/12/1831	Wm. Jones, Dan. Ledsam	Machinery for making pins, rivots, wood screws and nails.
6558	19/02/1834	Miles Berry	Machinery for shaping metal into bolts, rivots, nails and other articles...partly applicable to other purposes.
6566	27/02/1834	Joseph Whitworth	Machinery for cutting screws.
6571	6/03/1834	Thomas John Fuller	Shape of nails, spikes and bolts.
6576	18/03/1834	James Jamieson Cordes	Machinery for making rivots and screw blanks and bolts.
6599	24/04/1834	John Bethell	Machinery for making metal screws, pins, bolts and rivots.
6687	8/08/1834	James Jamieson Cordes	Machinery for making rivots and screw blanks and bolts.
6850	11/06/1835	Joseph Whitworth	Tools or apparatus for turning, boring, planing and cutting metals and other materials.
6956	16/12/1835	Robert Griffiths	Machinery for making rivot screw-blanks and bolts.
7203	6/10/1836	Miles Berry	Machinery for making metal screws.
7237	29/1836	Henry Downing	Manufacturing rivots, screw-blanks and other articles.
7271	11/01.1837	Sam. Evers, Robert Griffiths	Manufacturing of bars and nuts for screws.
7291	28/01/1837	Miles Berry	Machinery for making metal screws: applicable to shaping metal for other purposes.
7332	28/03/1837	Joseph Whitworth	Tools or apparatus for turning, boring, planing and cutting other materials.
7441	5/10/1837	Joseph Whitworth	Tools or apparatus for turning, boring, planing and cutting other materials.
7862	8/11/1838	Thomas Mayos Woodyalt, Sam. Harrison	Manufacture of wood screws.
7953	29/01/1839	John Hillard	Machinery for making screws.
7999	12/03/1839	Job Cutler	Constructing chains for suspension bridge cables, mining and other purposes; making the bars, links and bolts thereof.
8005	11/03/1839	Thomas Henry Ryland	Manufacture of screws for wood, in iron, brass, copper or mixed metal. "Wood Screws".
8048	23/04/1839	James & Wm. Edmonson	Machinery for manufacture of wood screws and screw-bolts.

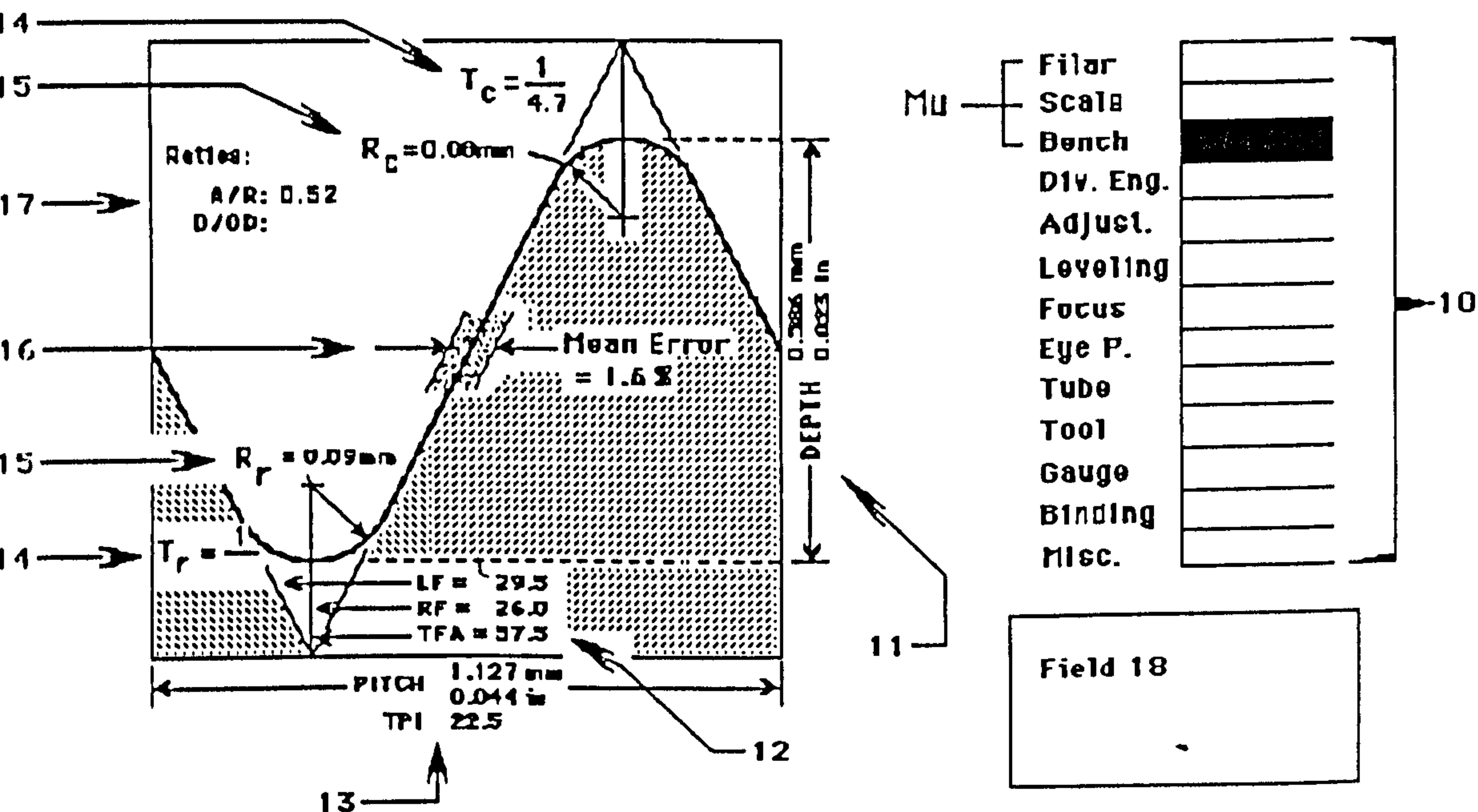


8064	8/05/1839	Richard Prosser	Machinery for making nails and screws.
8188	7/08/1839	Joseph Whitworth	Tools or apparatus for planing, boring and cutting metals or other substances.
8246	24/10/1839	William Newton	Machinery for manufacturing screws.
8269	12/11/1839	Moses Poole	Making nails, bolts and spikes.
8438	19/03/1840	John Jackson	Manufacture of nails, nuts, bolts and rivots.
8705	17/11/1840	Joe Whitworth, John Spear	Tools or apparatus for planing, boring and cutting metals or other substances.
8720	25/11/1840	Nathaniel Bartho	Tools or apparatus for planing, boring and cutting metals or other substances.
8764	31/12/1840	Joseph Stubbs	Construction of screw-wrenches and spanners, for screwing and unscrewing nuts and bolts
8822	30/01/1841	Ezra Jenks Coates	Forging bolts, spikes and nuts.
8835	8/02/1841	Wm. Ryder	Apparatus for forging, drawing, moulding or forming spindles, rollers, bolts and various other like articles in metal.
9042	4/12/1841	James Warren	Machine for making screws.
9155	11/11/1841	John Onions	Manufacturing nails, screws and chains.
9210	24/12/1841	Benjamin Wakefield	An improved bolt for building and other purposes.
9641	21/02/1843	Bn. Brunton Blackwell	Coating iron nails, screws, nuts, bolts and other articles made of iron, with certain other metals.
10065	21/02/1844	Ezra Jenks Coates	Forging bolts, spikes and nails.
10324	19/09/1844	Wm. Newton	Machinery to be employed in manufacturing nails, rivots, screws and pins.
10457	11/01/1845	Robert Griffiths	Manufacture of bolts, railway-pins, spikes and rivots.
10800	4/08/1845	Chas. Henry Joe Forret	Archimedian screw called "Davaines screw".
10839	26/09/1845	Vincent Alfred	Machinery for manufacturing screws.
10840	26/09/1845	Vincent Alfred	Machinery for manufacturing metal pipes or screws.
10987	10/12/1845	Thomas Williams	Wrenches or spanners.
11196	5/05/1846	Alfred Vincent Newton	Machinery for manufacturing screws.
11363	31/08/1846	James Warren	Manufacture of cast-screws.

11620	10/03/1847	Louis Nicolos DeMeckenheim	Machinery for making nails, screw blanks, rivots, bolts and pins.
11741	12/06/1847	James Johnson	Machinery for the manufacture of rivots, railway or other pins, bolts, nuts and spikes.
11791	12/07/1847	Wm. Edward Newton	Manufacture of screws.
12907	19/12/1849	Joseph Whitworth	Machinery for cutting metals.
13089	1/06/1850	Ezra Jenks Coates	Manufacture of bolts, spikes and nails.
13187	23/07/1850	Leonard Bower, Thomas Fortune	Machinery for manufacturing screws, bolts, rivots and nails.
13247	5/09/1850	Frederick Woodbridge	Machinery for manufacturing rivots, bolts and screw-blanks.
13557	15/03/1851	Richard Archibald Brooman	Manufacturing screws.
13654	3/06/1851	Cornelius Alfred Jaquin	Manufacture of nails, pins, tacks, screws and other similar articles.
13773	16/10/1851	Wm. Onions	Manufacture of nuts and bolts; of bearings...; mills and dies for engravers; of bells, lathe and other spindles.
13915	24/01/1852	John Hinks	Machinery to be used in the manufacture of nails, rivets, bolts or pins and screw blanks.
13957	9/02/1852	Jeremiah Driver, John Feather	Screws.
14084	22/04/1852	Alfred Vincent Newton	Manufacturing wood-screws; machinery used therein; partly applicable to arranging and feeding pins; sorting screws, pins and other articles or various sizes.
14213	6/06/1852	John Ramsden	Machinery for cutting screws.
14298	18/09/1852	Bernard Peard Walker, James Warren	Manufacture of screws and screw-keys, etc.



<p><b>Characteristics:</b></p> <p>1 → Screw <input checked="" type="checkbox"/> Nut <input type="checkbox"/></p> <p>2 → Long: 1.50" / 1.063"</p> <p>3 → Diameter: 0.313"</p> <p>4 → <input checked="" type="checkbox"/> Steel <input type="checkbox"/> Brass <input type="checkbox"/></p> <p>Other: _____</p>	<p><b>Instrument Identification:</b></p> <p>Study Code: SML-19a</p> <p>Instrument: MicroMeter</p> <p>Maker: Siemens Bros.</p> <p>Date: 1881</p> <p>Ser./Acq. No. 1929-001; #152</p>
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### E.1 Parameters and fields used on the profile figures

## Appendix E

### Compilation of the Graphic Results

This appendix comprises the shadowgraphs for each screw sample and an accompanying figure with the relevant measured parameters. These are described below with reference to Fig. E.1. Within each classification of screw, e.g. 'filar', the shadowgraphs are ordered by the 'study code'. One is referred to Tables 6.1 or 6.2 for a listing by study code or date (resp.) and if one is looking for instruments by a specific maker or for a specific classification, this is the best method to locate desired instruments. Perusal of the various sections of Table 6.2 will locate related screws, i.e. ones from the same instrument but of different function. The Jurkevich/Swingler period searching graphs for each micrometer screw is shown facing the digitized profiles. Although these were plotted for all samples, it would not be useful to include those for lower precision classes. Samples of results are found in Chapter 6 and their use as a discriminating method is discussed there.

Acetate overlays are provided in the back pocket for the shadowgrams and for the periodograms. For the shadowgrams, one can compare a given screw profile with that of various standards. The overlays for the periodograms will help identify the fraction of the primary peak which is not included. As was described in §6.7, broad peaks at the right of the upper periodogram have little significance; the level of significance can be checked by remembering that the maximum travel of the dial indicator was  $\approx 20\text{mm}$ . Spurious periods result in the range above  $\approx 1/2$  the full travel of the dial indicator (which may be less than 20mm).

For the various classes of micrometers and dividing engines, data and graphs generated from the dial indicator method of investigation will also be found facing the digitized profiles. The Jurkevich/Swingler periodograms for these measurements are--in most cases--found below those generated from the shadowgrams. The exceptions are those where, for space reasons, one periodogram is placed below its compliment, but these may be identified by the sample code at the top of the figure.

#### Characteristics:

- 1 ) **Screw/Nut:** Black box indicates whether the sample was a screw or nut. For gauges, samples intended for testing nuts are indicated as screws while samples for testing screws are indicated as nuts.
- 2 ) **Length:** Given for the screw &/or nut and appears under the appropriate box. The length given is for the threaded portion only.



3 ) **Diameter:** Given for the OD of the screw. Since no means was at hand to measure the internal diameter of nuts, the OD of the screw is usually the nominal value used. Where four significant figures are given, the measurement was made with a bench micrometer (accuracy  $\approx \pm 0.002$ -3mm). Those with fewer digits were measured with a precise ruler and for those nuts where the thread is in a blind hole, the length was estimated by 'feeling' the threads with a fine pointed tool.

4 ) **Material:** Most instruments tested were either steel or brass. A few were iron or wrought iron. No attempt was made to more precisely determine the metallurgical content of the material of the samples.

### Instrument Identification:

5 ) **Study code:** See §5.1.2. Note that instruments followed by a lower case letter indicate that more than one sample was acquired from the instrument. Comparison should be made to others on the same instrument which may appear under any of the different classes noted in 10).

6 ) **Instrument:** The common name used for the type of the instrument.

7 ) **Maker:** This gives the signed name but should not be interpreted as the definitive maker since many instruments of the period investigated were made wholesale and sold to the trade. Indeed, subcontracting meant that components for a single instrument originated from various sources particularly as the 19<sup>th</sup> c progressed. For samples with maker's names such as Ramsden, any one of his journeymen or apprentices could have made the particular sample. However, for micrometer and dividing engine samples, it may be assumed that only the most competent workmen would have made and finished the precision screws.

8 ) **Date:** Few of the instruments studied were engraved with the date of manufacture. Thus the date given is based on information known of its origin by the museum, on design characteristics (including illustrations of such instruments from contemporary sources) or on the dates a maker was known to be in business. Interpretations: ca.1860  $\approx 1860 \pm 5$ -10yrs.; 1860's indicates there is reason to believe that an instrument was made in a particular decade; 3<sup>rd</sup> q 19<sup>th</sup> c  $\approx 1850$ -1875 and 2<sup>nd</sup> h 19<sup>th</sup> c  $\approx 1850$ -1900 are used when a maker or firm was in business for a long period but no information permits narrowing the date more precisely--these are most commonly used for simpler forms of instruments since design details of more complex instruments usually confine the period to some extent. For plotting purposes, a 'best guess' was necessary and in most cases is the largest source of error.

9 ) **Acquisition &/or serial number:** Gives a museum acquisition number when known. If the instrument carries a serial number that is given as well.

**10) Screw class** (more than one may be indicated where it assists in specifying the use):

**Micrometers:**

- **Filar:** includes both filar and bifilar micrometers usually intended for astronomical use with an eyepiece,
- **Scale:** micrometers intended for reading subdivisions of instrument scales,
- **Bench:** micrometers intended for use as tools or as part of tools to determine size of objects.
- **Dividing Engines:** Screws found on such instruments for scale division, ruling spectral gratings or related artifacts, e.g. Barton's buttons.
- **Adjusting:** Screws used to adjust the position of instrument components but excluding leveling screws used on the mounting of astronomical or surveying instruments. Screws used to adjust the alignment of tubes of transits or theodolites are included as adjusting screws.
- **Leveling:** Used on the feet of astronomical or surveying instruments.
- **Focusing:** Used for focusing the lenses of telescopes, microscopes etc.
- **Eyepiece:** Any thread found on a telescope or microscope eyepiece for attaching the eyepiece to the parent instrument or a filter to an eyepiece.
- **Tube:** Any thread used for assembly of an eyepiece or for attaching one section of a tube to another including an objective lens cell to a tube.
- **Tool:** Threads found on instruments whose primary purpose is as a workman's tool rather than for making scientific measurements.
- **Gauge:** Threads or 'quasi'-threads intended for testing the profile of screws.
- **Binding:** Screws whose purpose is simply to hold or fix two components together.
- **Miscellaneous:** Threads which do not clearly fall under any of the above categories. A description of the use is generally given in Field 18.

**1 1 ) Depth:** Gives the thread depth as measured from the digitized profile of the thread. In general, the metric value is given to three decimal places but the accuracy is dependent on the quality of the digitized profile and the number of points in the profile. The accuracy in most cases is better than 0.01mm. The metric value was converted to English units because the majority of screw samples were made in English workshops where English measuring instruments would have been employed.

**1 2 ) Flank angles:** Left, right and full flank angles are given and were measured with respect to a line running parallel to the mean line of the profile. See §5.2.5 for estimates of the accuracy.

**1 3 ) Pitch:** Also determined in metric units and then converted to English units and to TPI for convenience only. Reference should be made for comparison purposes to the metric values. As was the case for the thread depth, the accuracy of the pitch is profile dependent, being greater for those threads with more digitized points (hence of higher TPI) and of more consistent form. The accuracy in the majority of cases is at least 0.005mm.

**1 4 ) Truncation (for both the root and crest):** Determined by extending the flanks to their intersection point and measuring the distance to the mean crest or root line and dividing by the overall untruncated profile. Truncation measurements are not good



discriminators, particularly in older samples, due to the uncertainty in fixing the top or bottom of the crest or root and to the intrusion of errors in the flank angles.

**1 5 ) Rounding** (for both the root and crest): Determined by using a circle template and scaling the radius appropriately. Can be reasonably accurate despite large scatter of digitized points especially in samples where one run of digitized points may be measured and compared with other runs for individual thread profiles.

**1 6 ) Mean Error:** The scatter of the points on both left and right flanks were measured and averaged. Taken as an indication of the screw's precision. Measurements were made at approximately the mid-line between root and crest although in many cases this would not have been the point of contact between the screw and nut. However, not having samples of all nuts so that the profiles could be compared with the screw to determine the point of contact, the centre line is the most appropriate choice and provides some consistency. In most cases this is a small point since the scatter does not vary widely along each flank.

**1 7 ) Ratios:**

- **A/R (Aspect Ratio):** Ratio of the thread depth to pitch. This is useful to discriminate between use and date. In general a smaller aspect ratio indicates older threads.

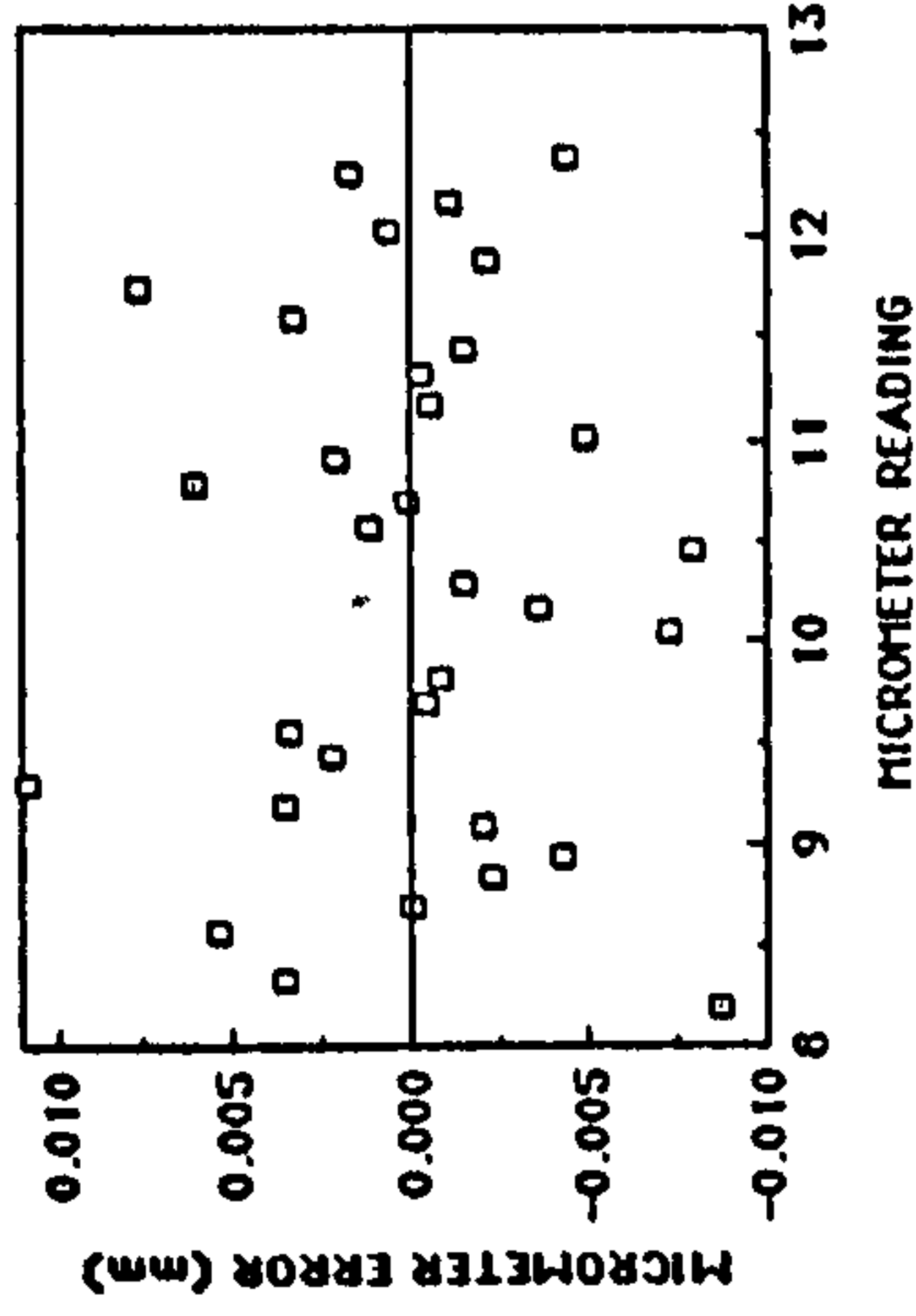
- **D/OD:** Ratio of the depth of the thread to the overall diameter of the screw or internal diameter of nuts. In precision screws this is not an important factor since very little stress is encountered. In binding or leveling screws the stress may be considerable and lower values will be encountered.

**1 8 ) Notes:** Any relevant information on the identification of the thread or instrument, its maker, date, classification, etc. will be found in this area.

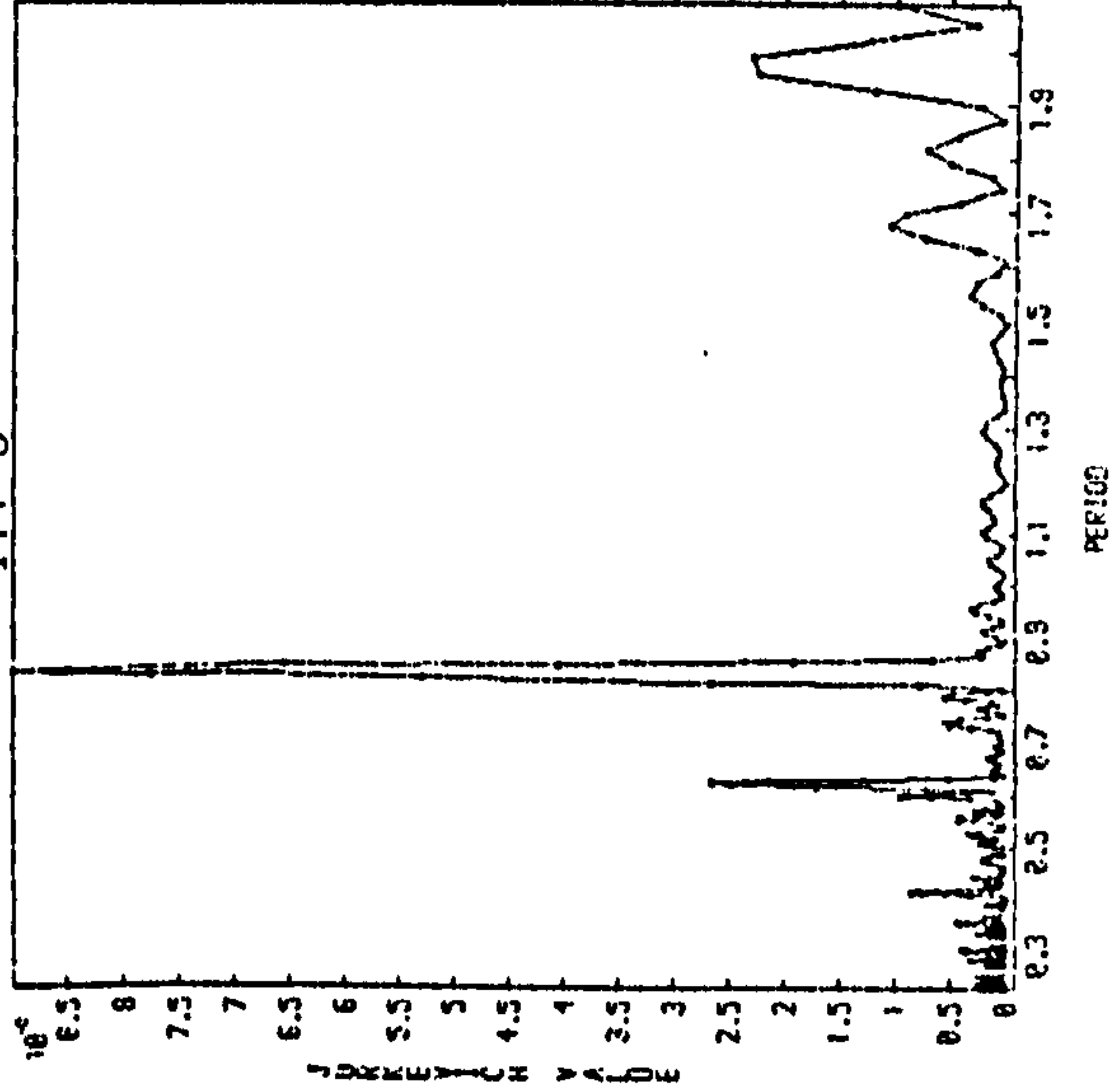
ITT-6 (run 1)



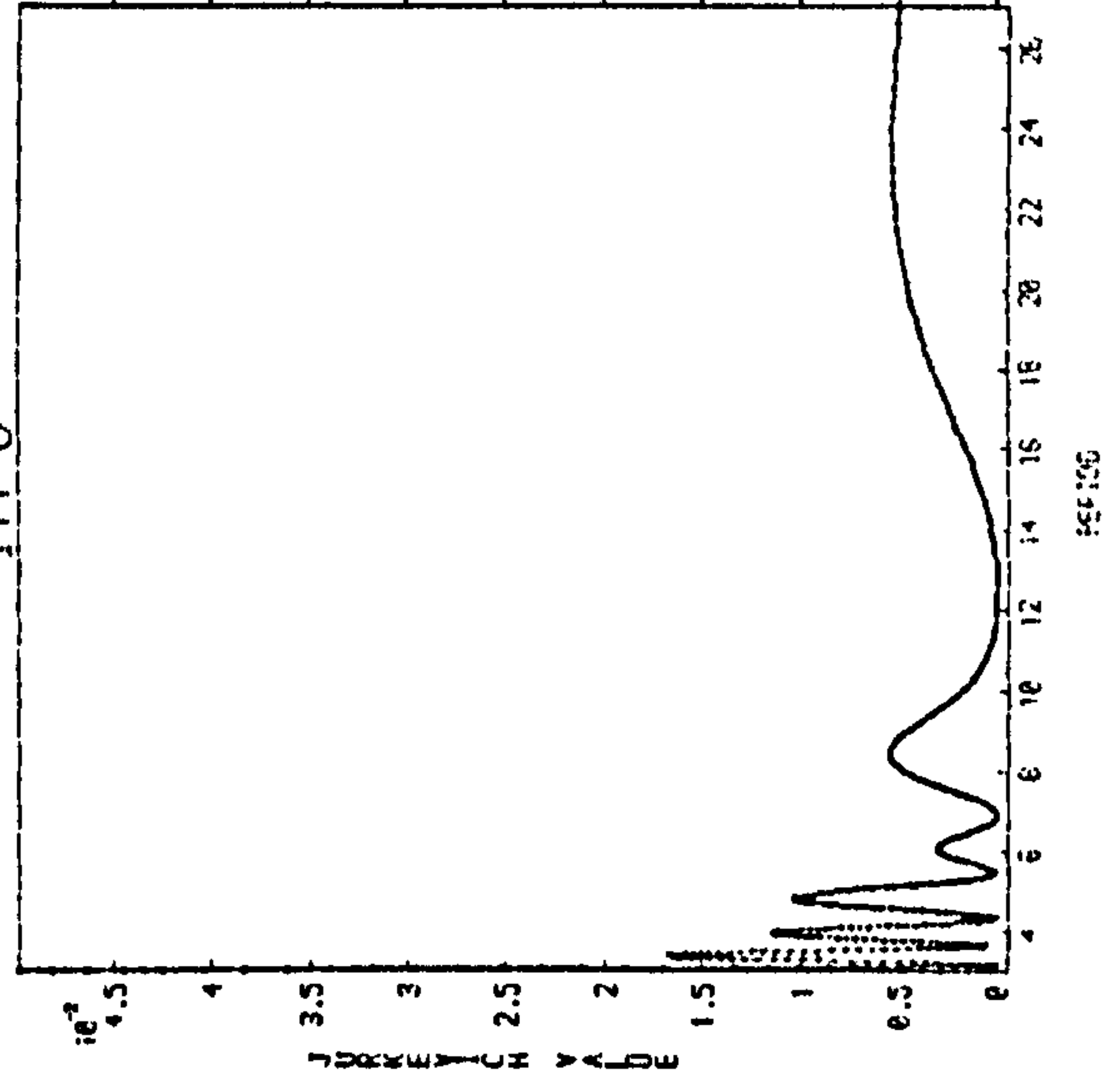
ITT-6 (run 2)



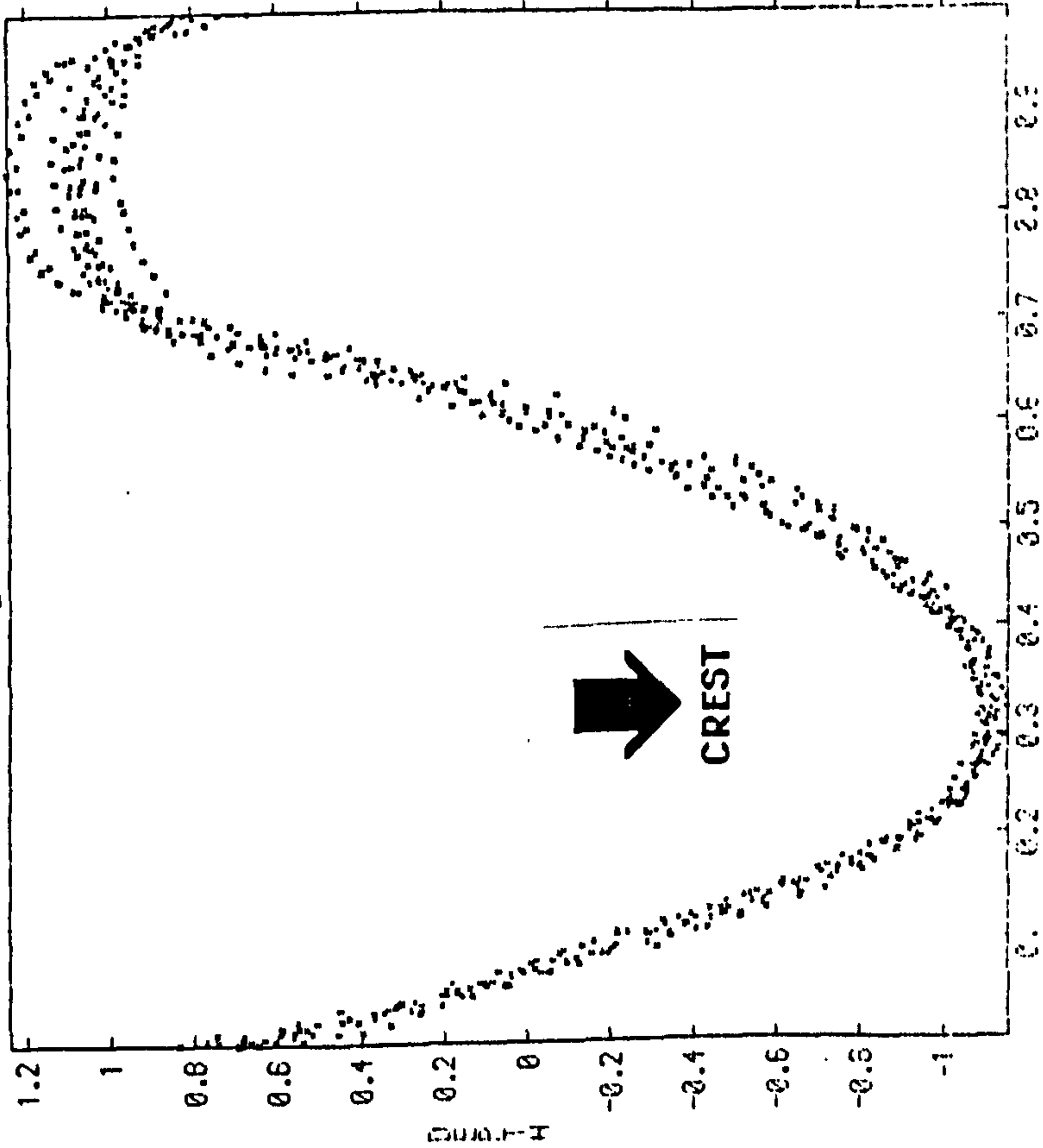
ITT-6



ITT-6



ITT-6



Characteristics:

Screw ☒ Nut ☐

Leng: 1.55cm / 0.60cm

Diameter: 0.4107cm

Steel ☒ Brass ☐

Other:

Instrument Identification:

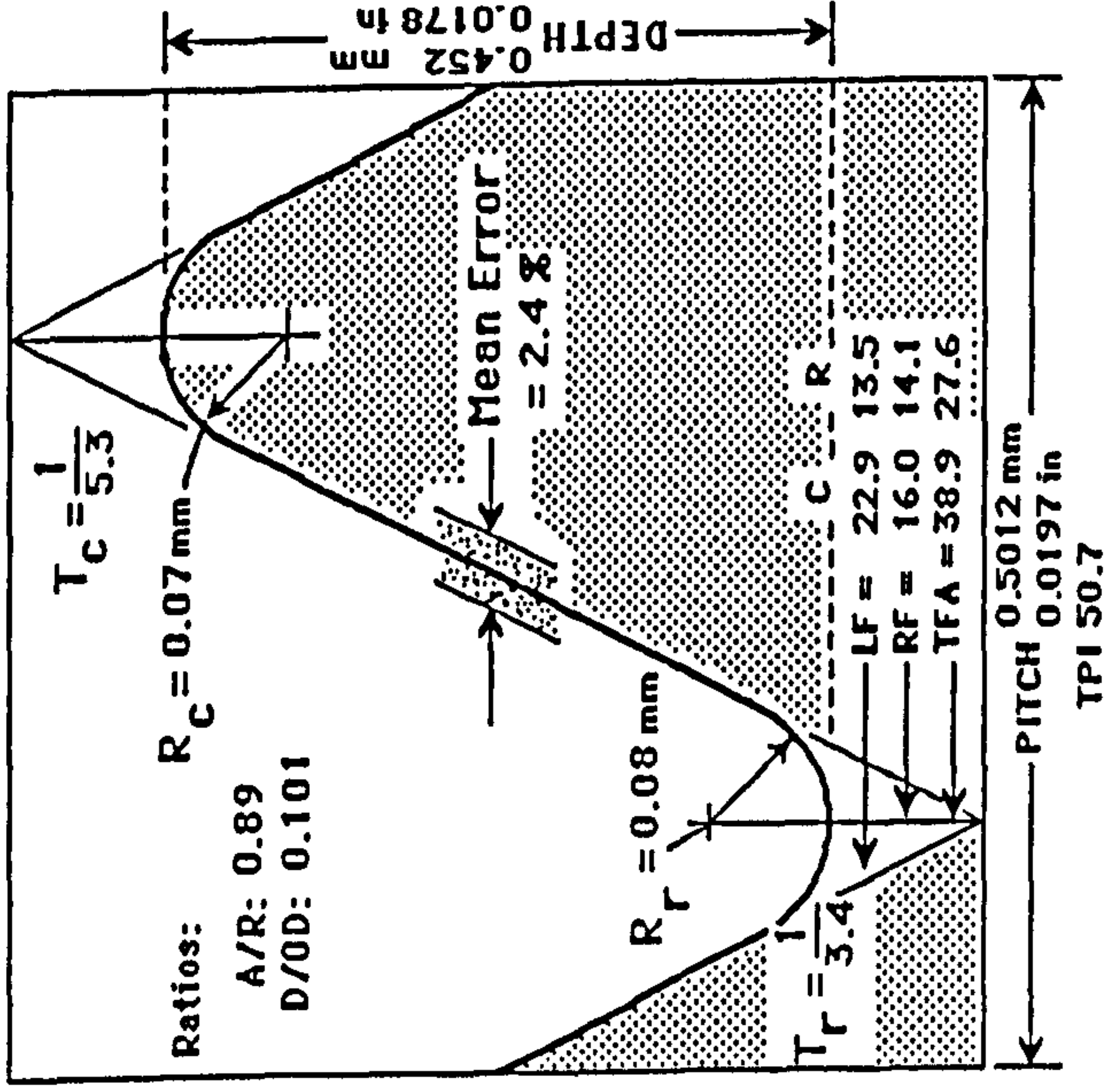
Study Code: ITT-6

Instrument: Microscope Micrometer

Maker: possibly Fuesz or Koristka

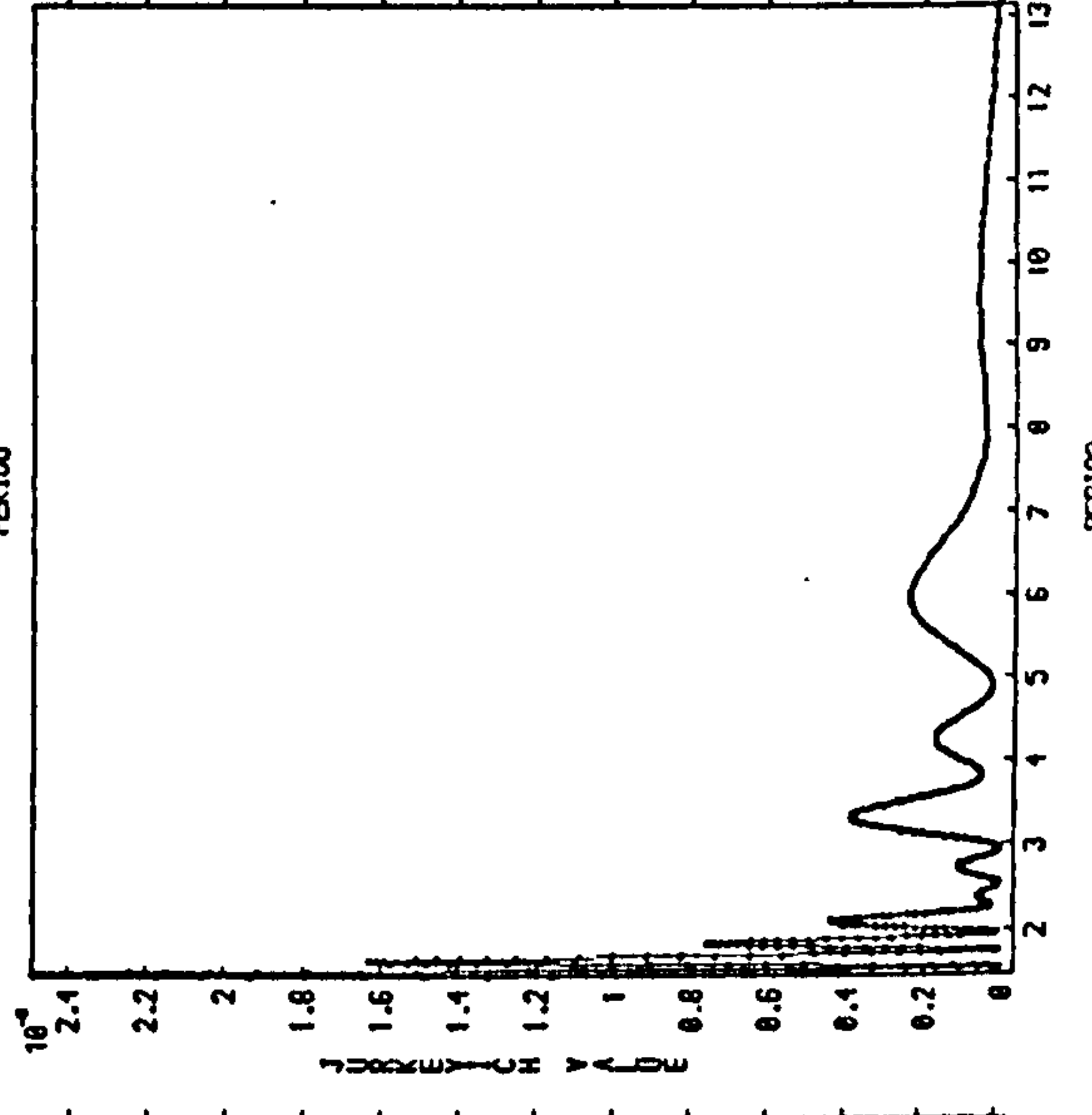
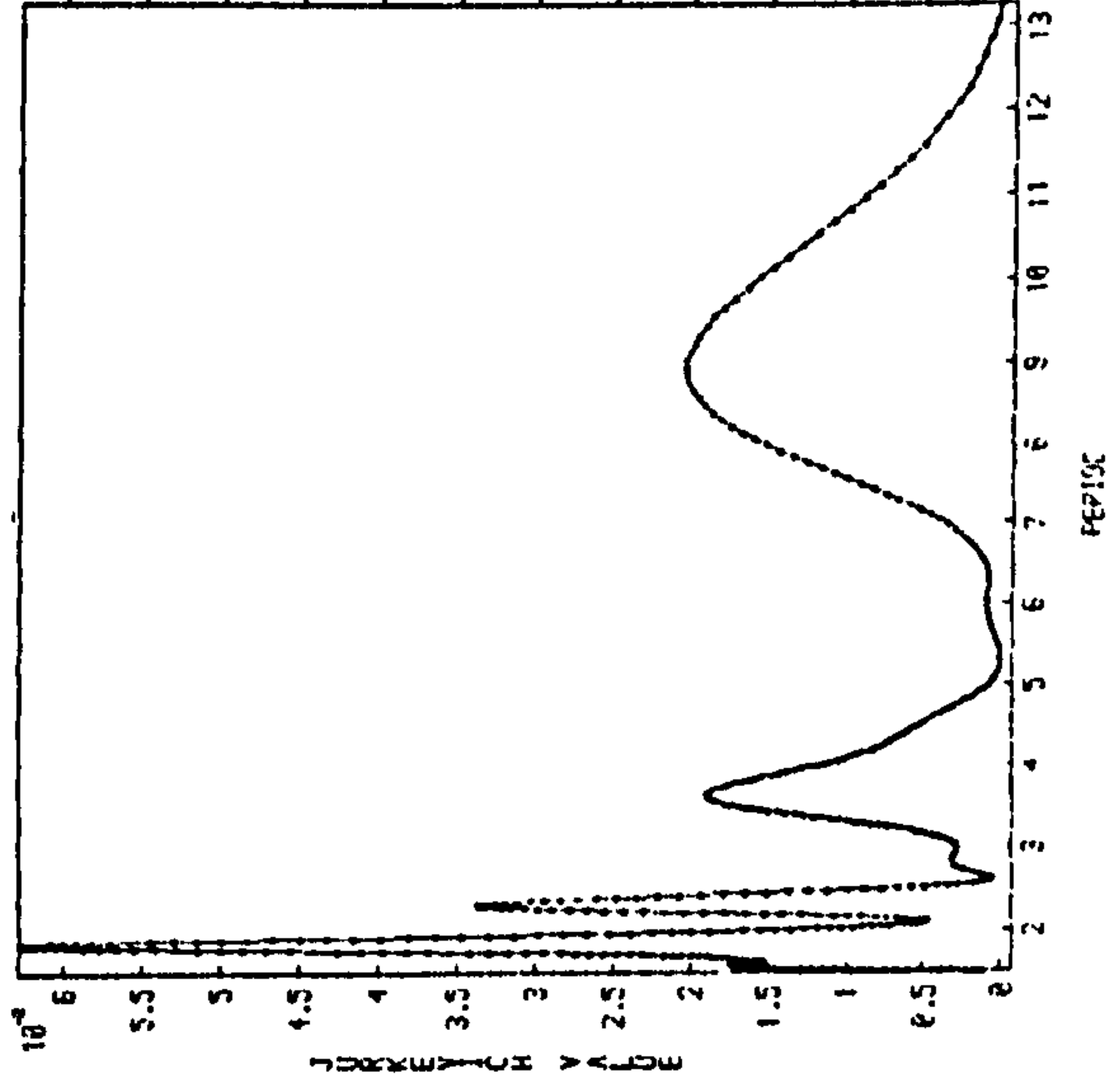
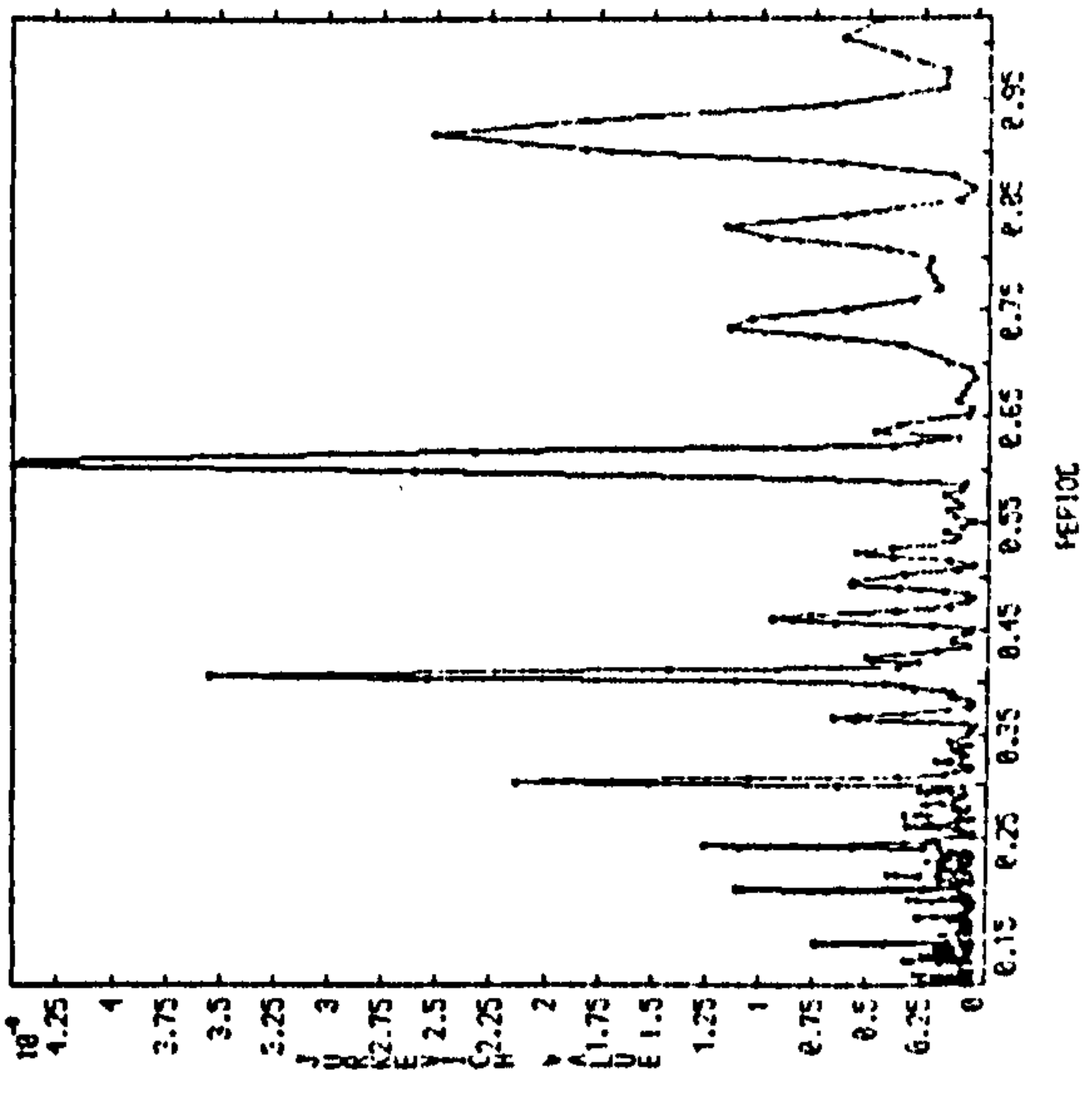
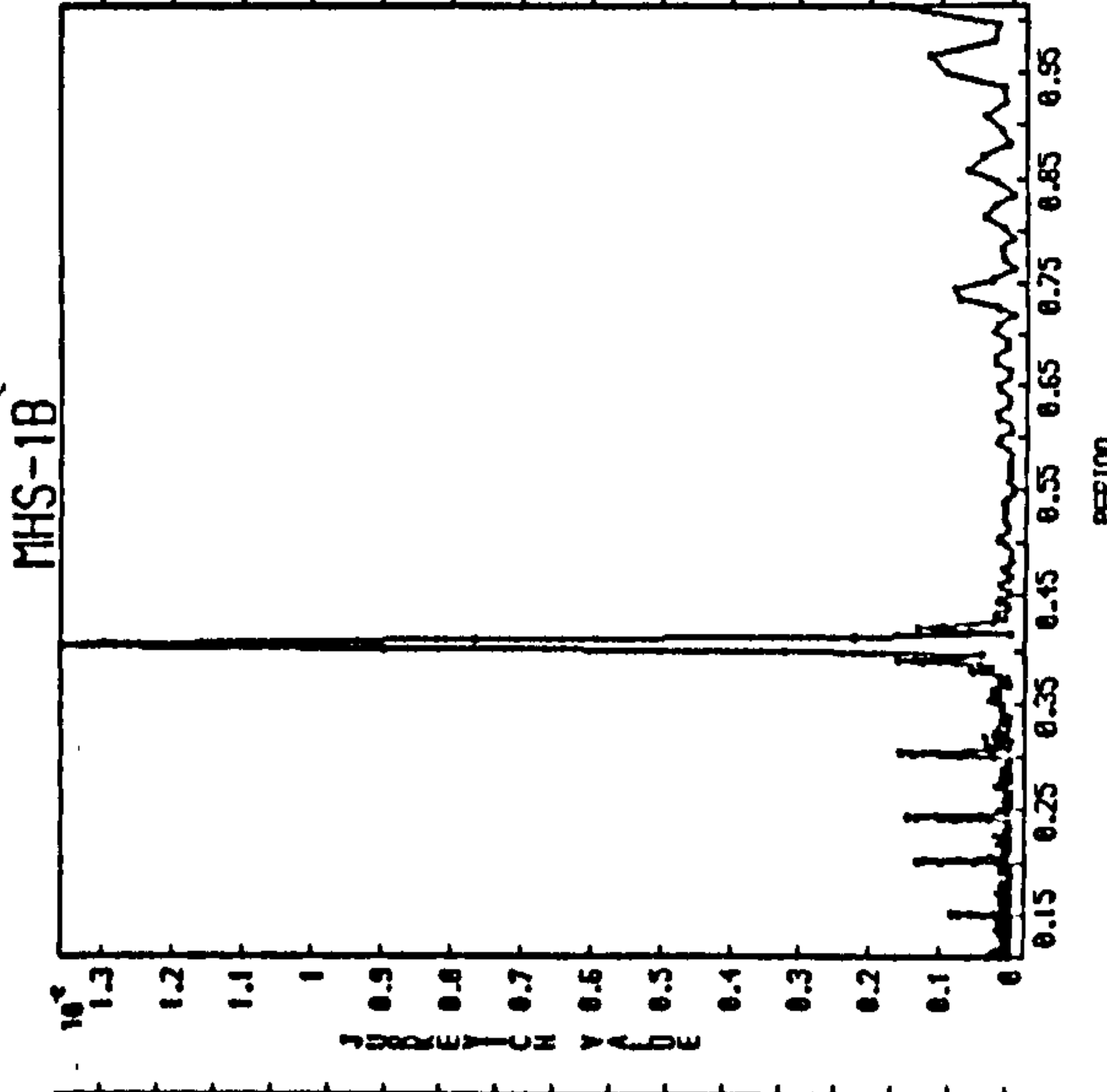
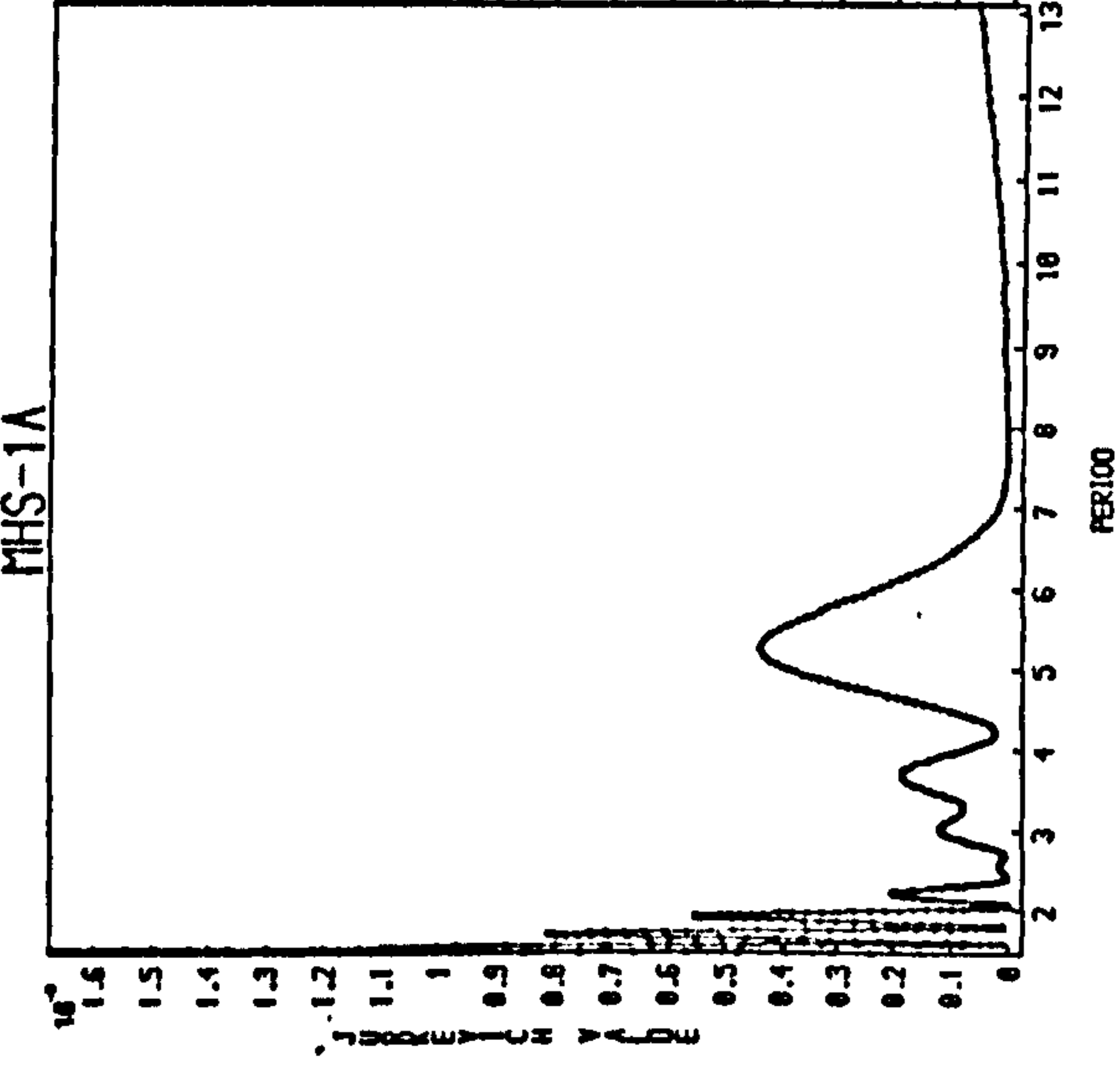
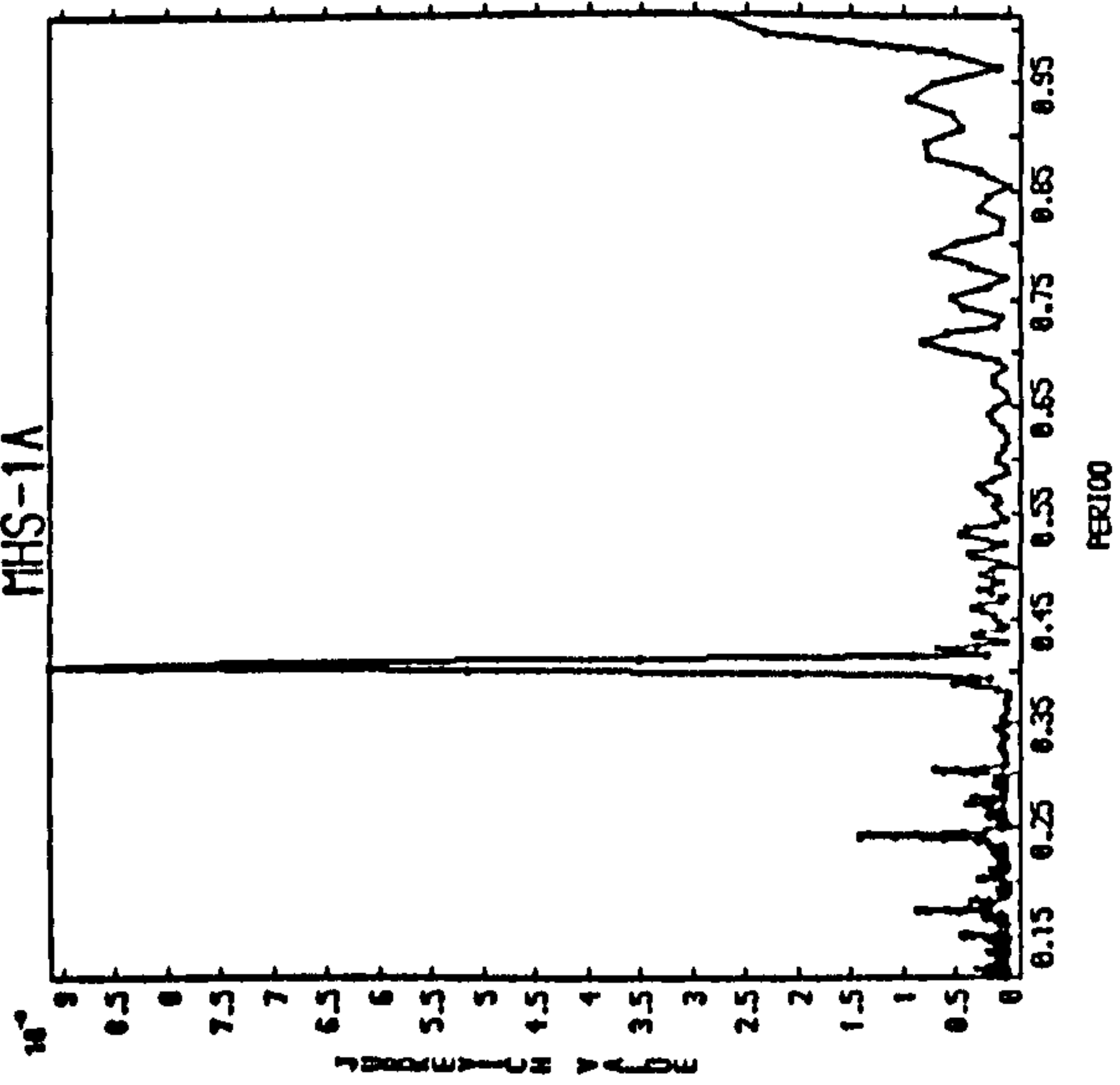
Date: 1855-78 or 1891

Ser./Acq. No. B-131



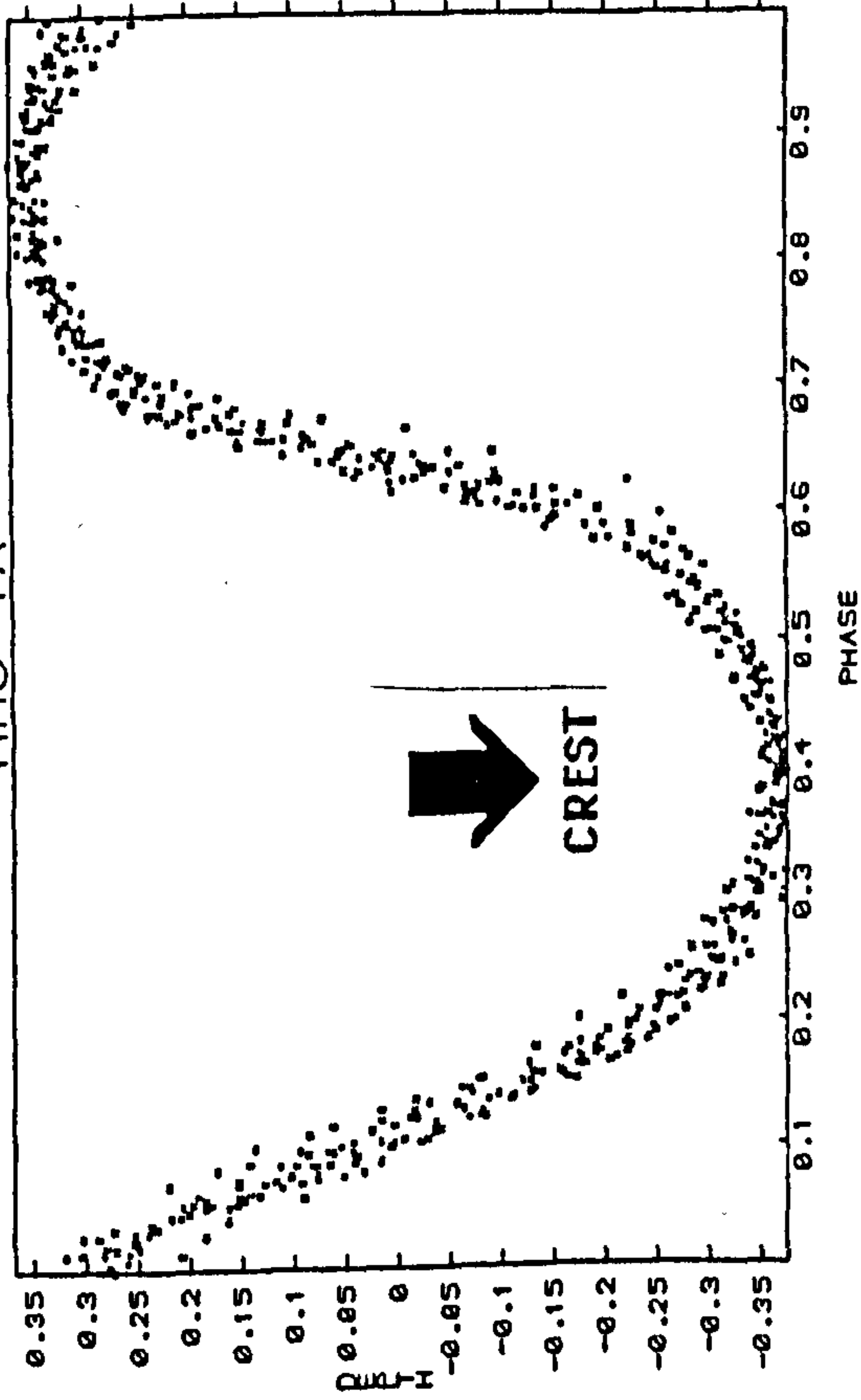
Mu — [ Filar  
Scale  
Bench  
Div. Eng.  
Adjust.  
Leveling  
Focus  
Eye P.  
Tube  
Tool  
Gauge  
Binding  
Misc.

Drun 2.8cm diameter  
0-100 ± 0.2 divisions  
Scale -0.5 - 12.5 mm by 0.5mm





MHS-1A

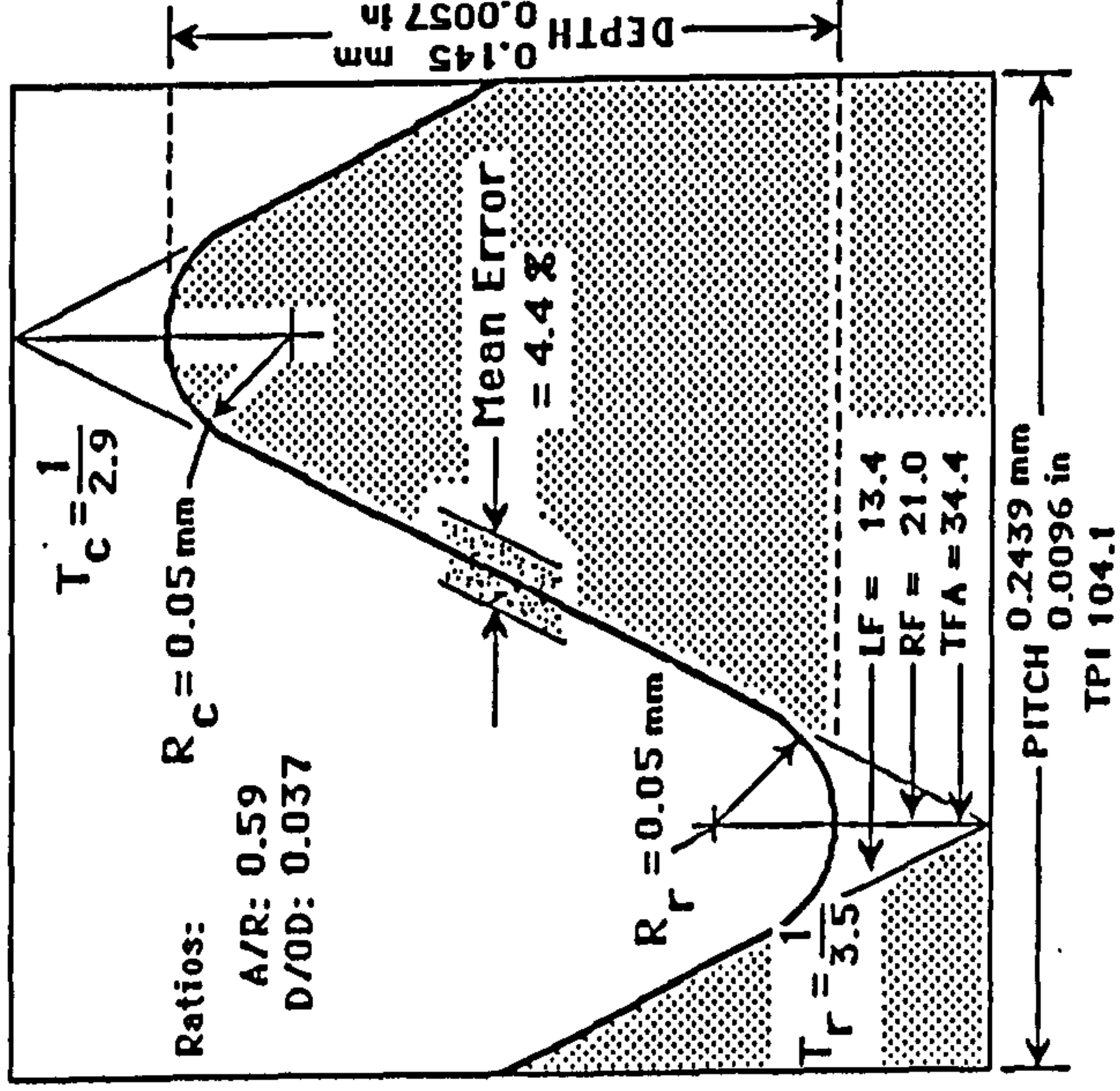


Characteristics:

Screw ☒ Nut ☐  
Leng: 1.50" / 0.625"  
Diameter: 0.156"  
Steel ☒ Brass ☐  
Other:

Instrument Identification:

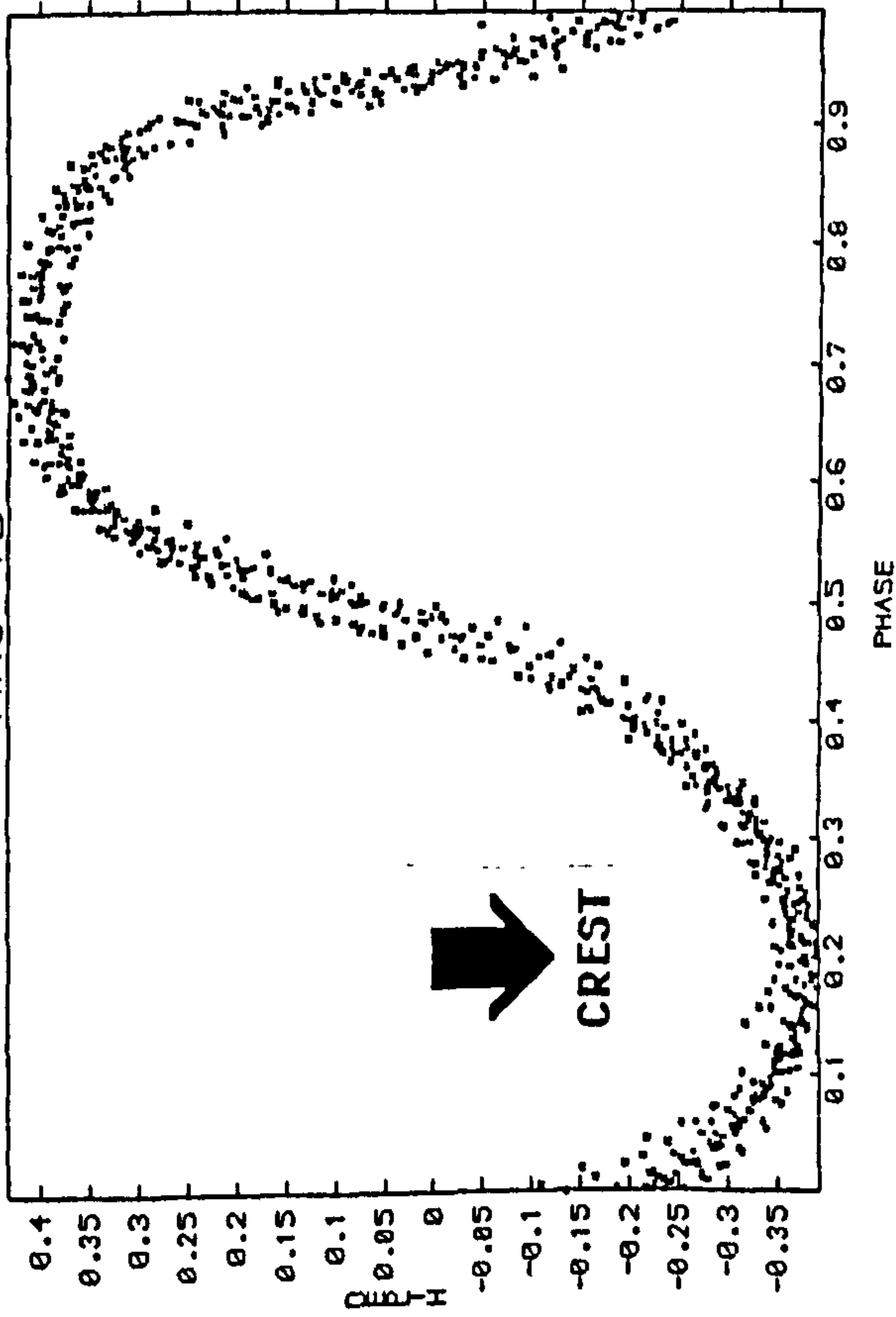
Study Code: MHS-1a  
Instrument: Micrometer  
Maker: Wm. Simms  
Date: ca.1850  
Ser./Acq. No. 7



Mu — [ Filar  
Scale  
Bench  
Div. Eng.  
Adjust.  
Leveling  
Focus  
Eye P.  
Tube  
Tool  
Gauge  
Binding  
Misc.

Drum: 1.313" diameter  
0-100 ± 0.25 divisions  
Scale: 0.5" with 10  
divisions subdivided to  
1/5th divisions

MHS-1B



Characteristics:

Screw ☒ Nut ☐

Leng: ~1.5" / 0.625"

Diameter: 0.156"

Steel ☒ Brass ☐

Other:

Instrument Identification:

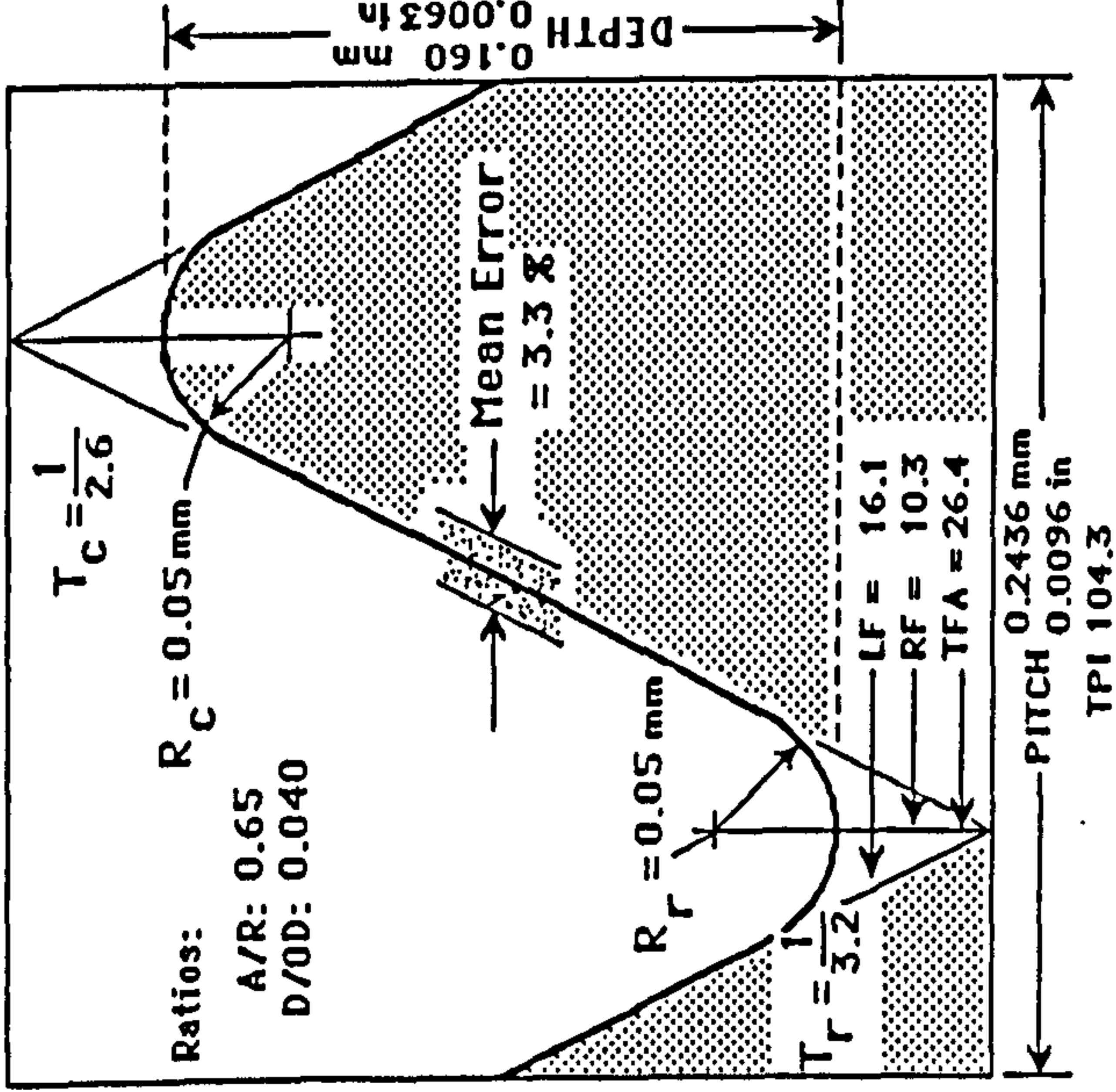
Study Code: MHS-1b

Instrument: Micrometer

Maker: Wm. Simms

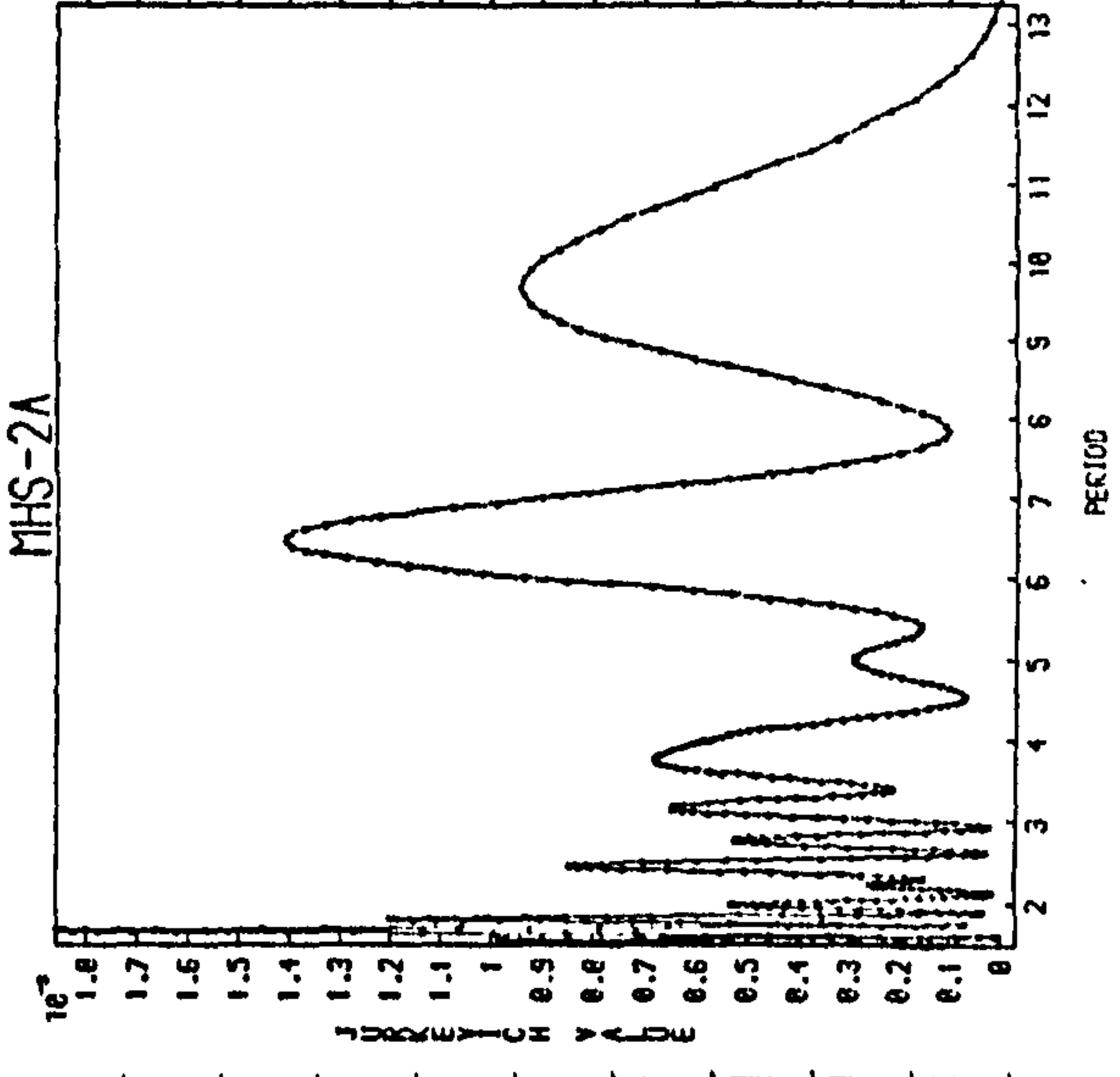
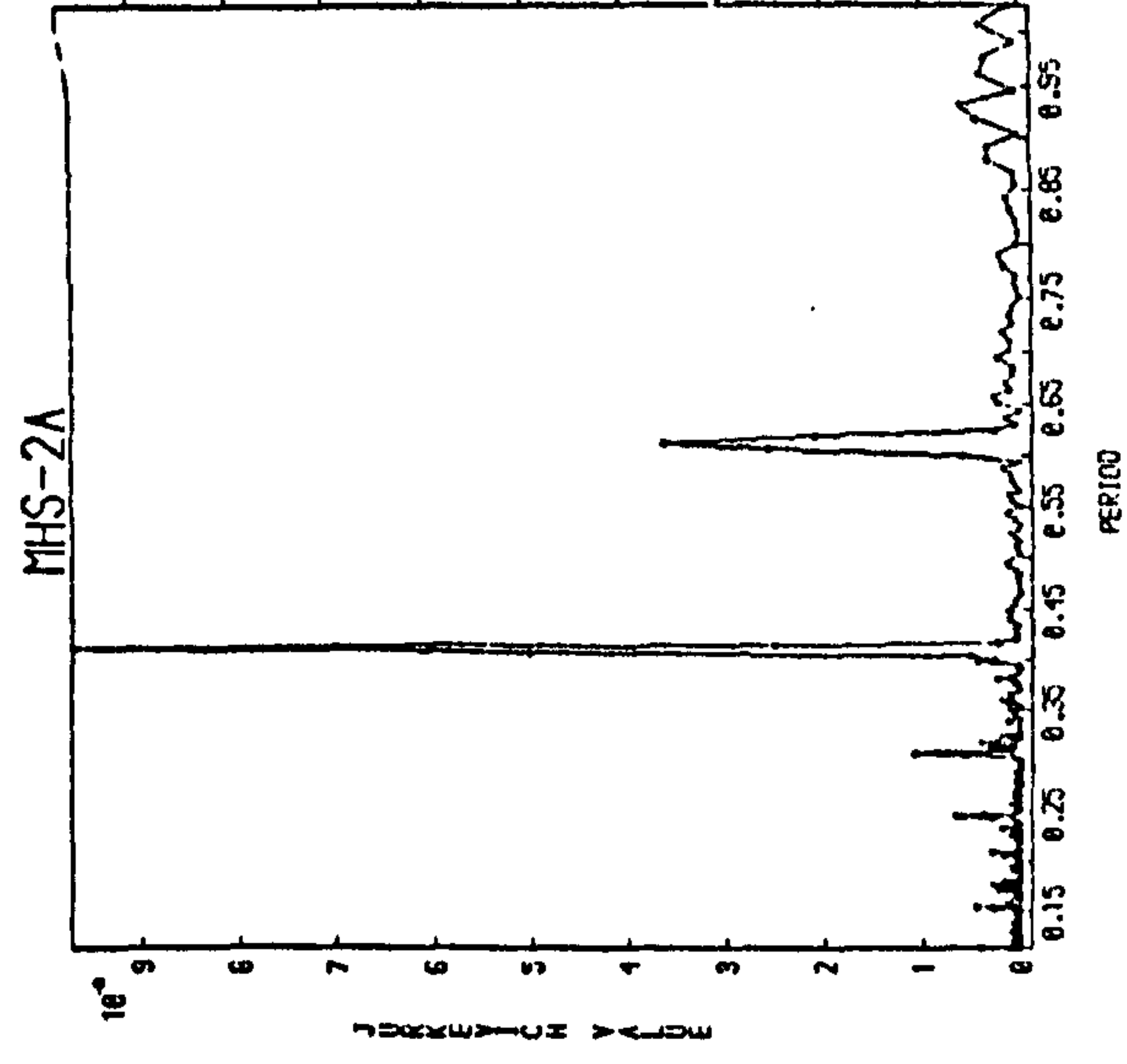
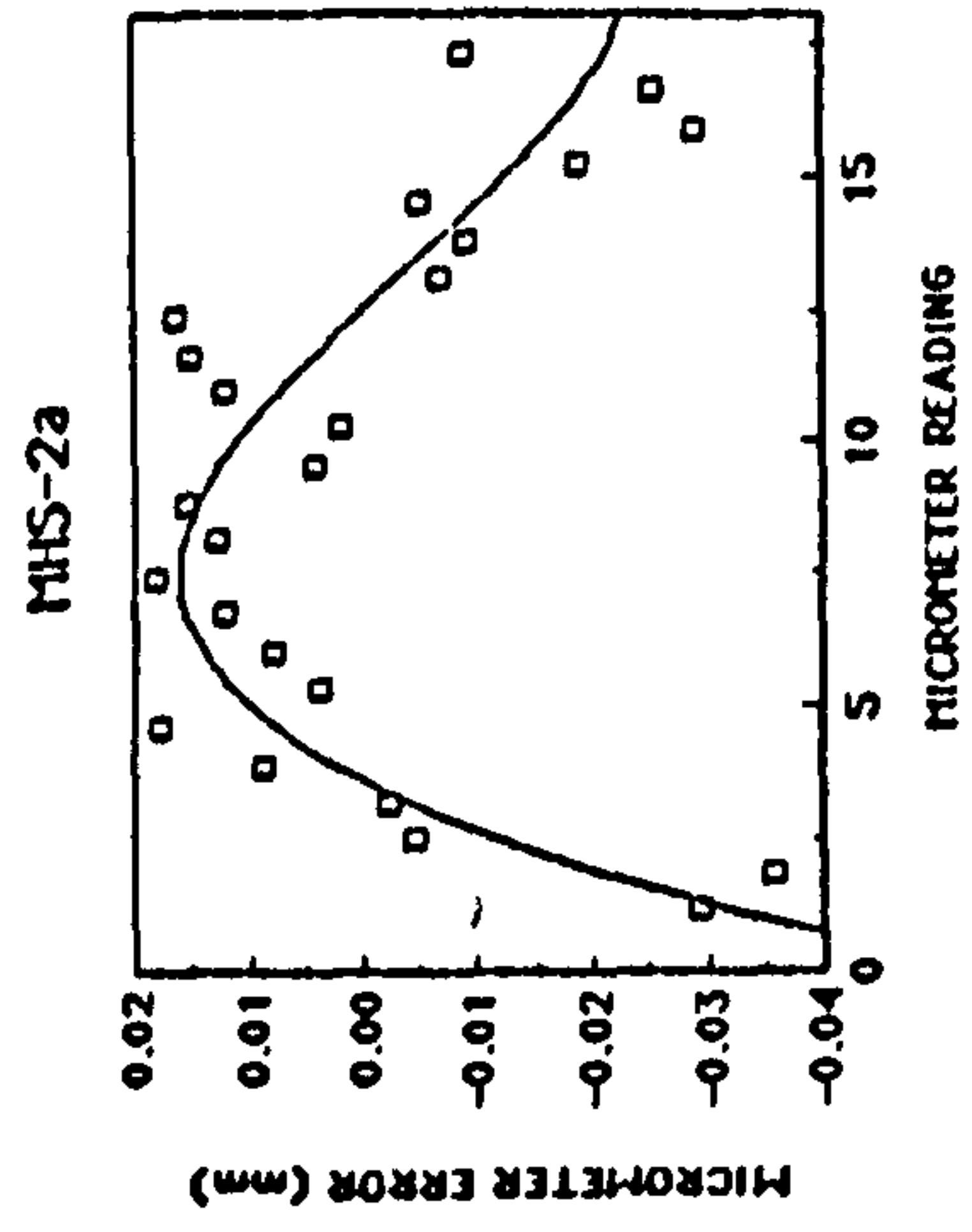
Date: ca.1850

Ser./Acq. No. 7



Mu — [ Filar Scale Bench Div. Eng. Adjust. Leveling Focus Eye P. Tube Tool Gauge Binding Misc. ]

See MHS-1a for Drum/Scale description



Characteristics:

Screw

Nut

Leng: ~1.5" / ~0.63"

Diameter: 0.151"

Steel

Brass

Other:

Instrument Identification:

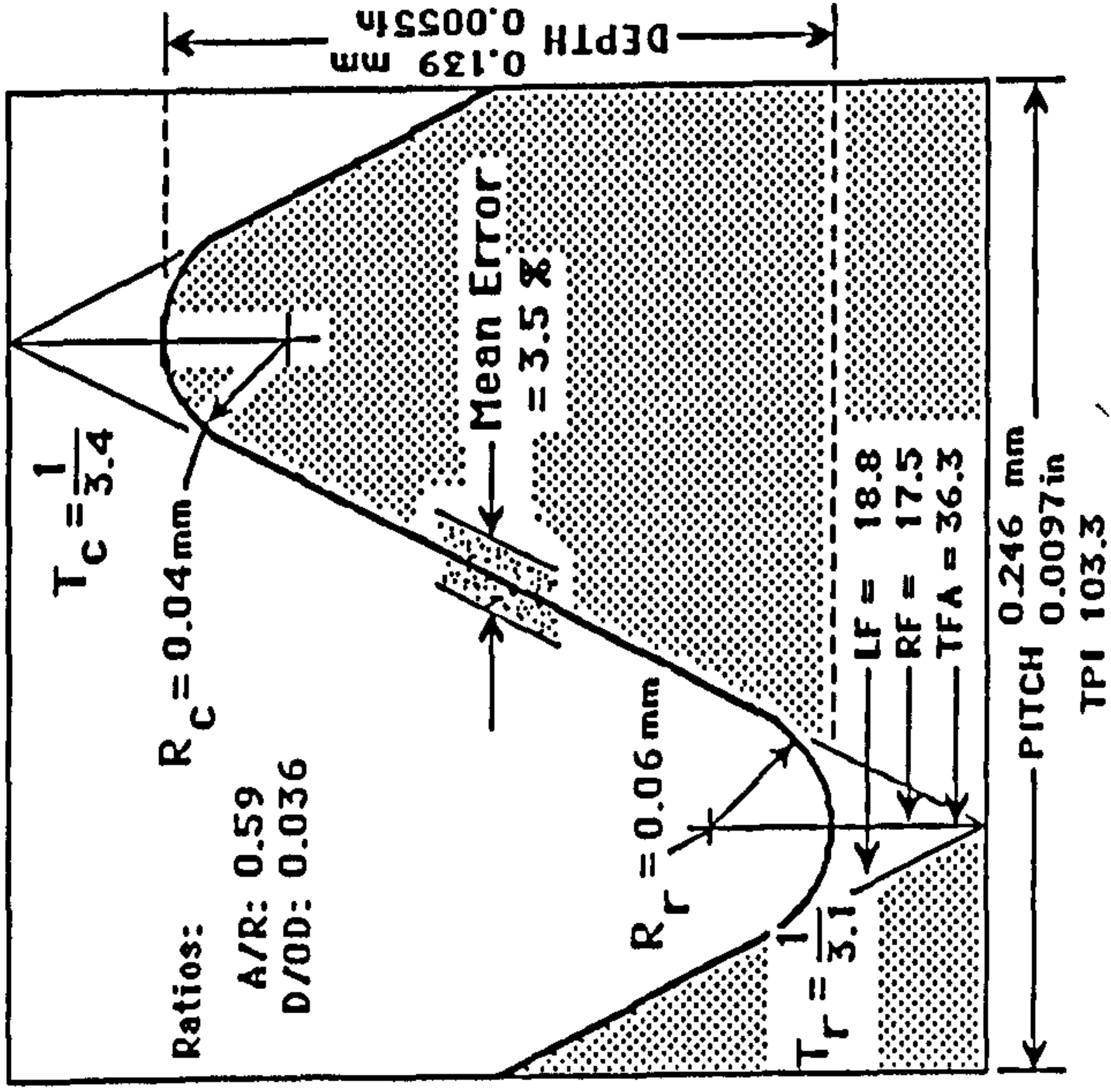
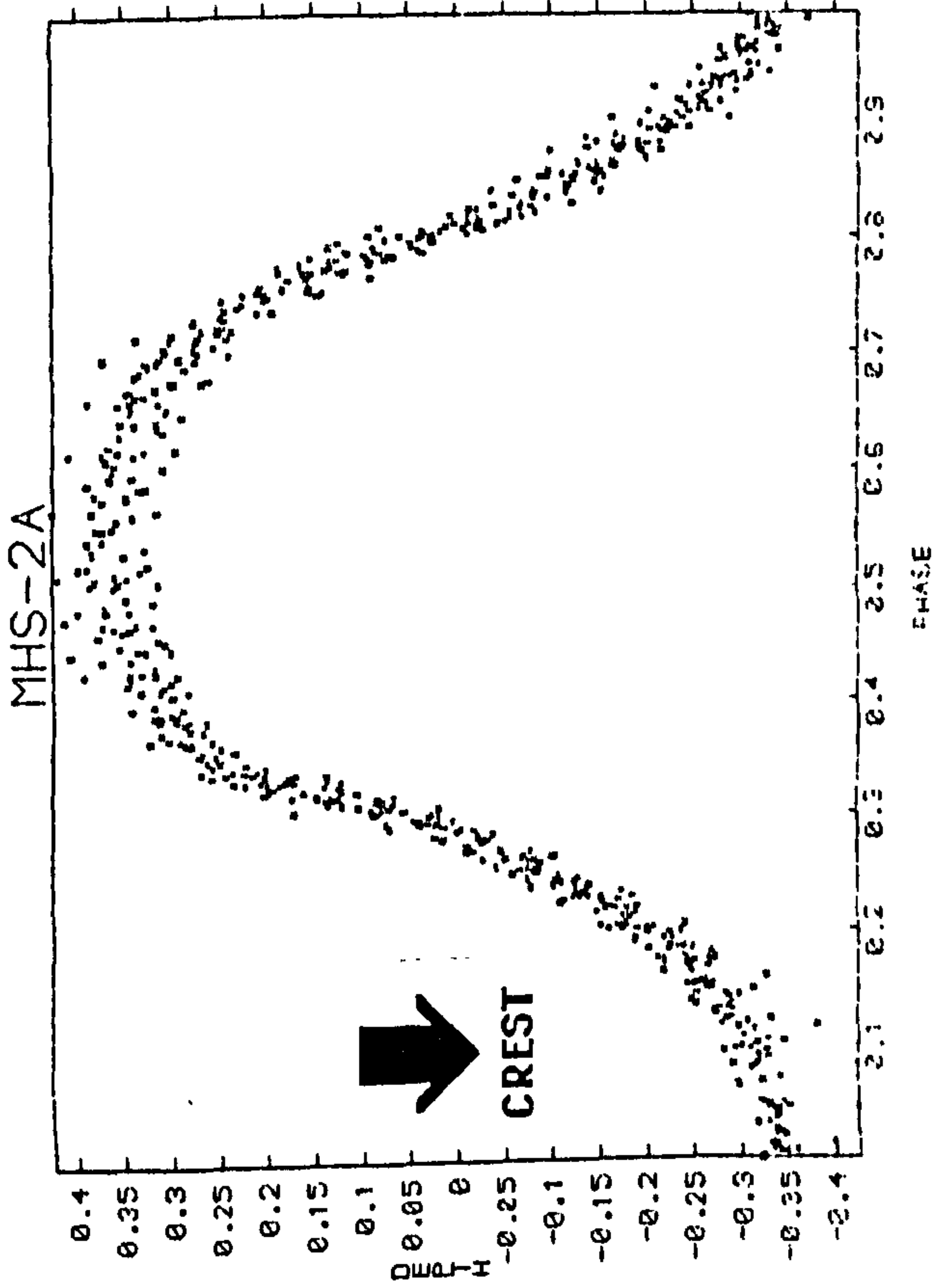
Study Code: MHS-2a

Instrument: Bifar Micrometer

Maker: Thomas Jones

Date: ca.1820

Ser./Acq. No. 79-23



MU

Filar

Scale

Bench

Div. Eng.

Adjust.

Leveling

Focus

Eye P.

Tube

Tool

Gauge

Binding

Misc.

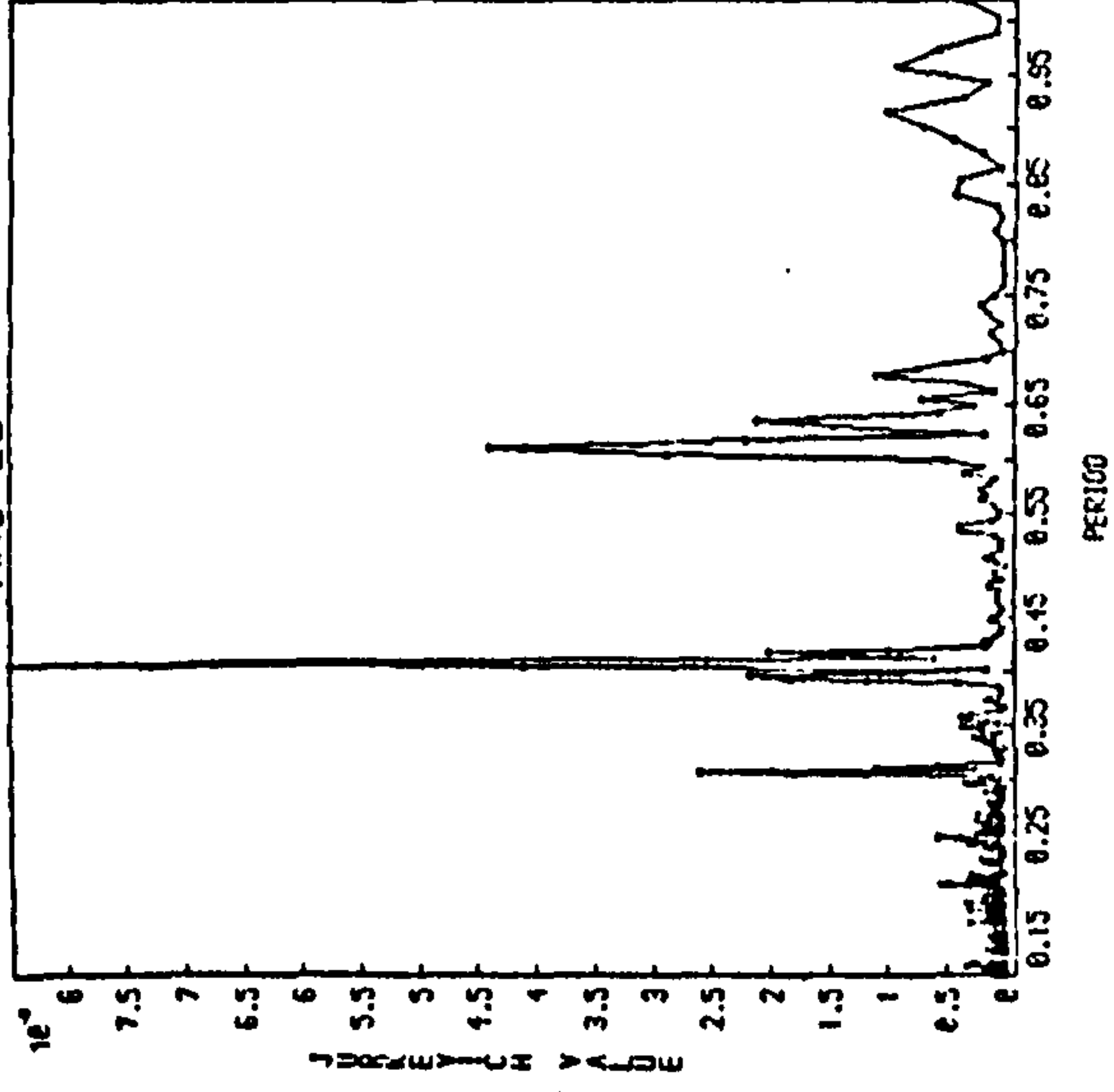
Drun: 1.25" diameter  
0-100 ± 0.25 divisions  
Scale: 1.375" long divided  
0-28 by 5 divisions



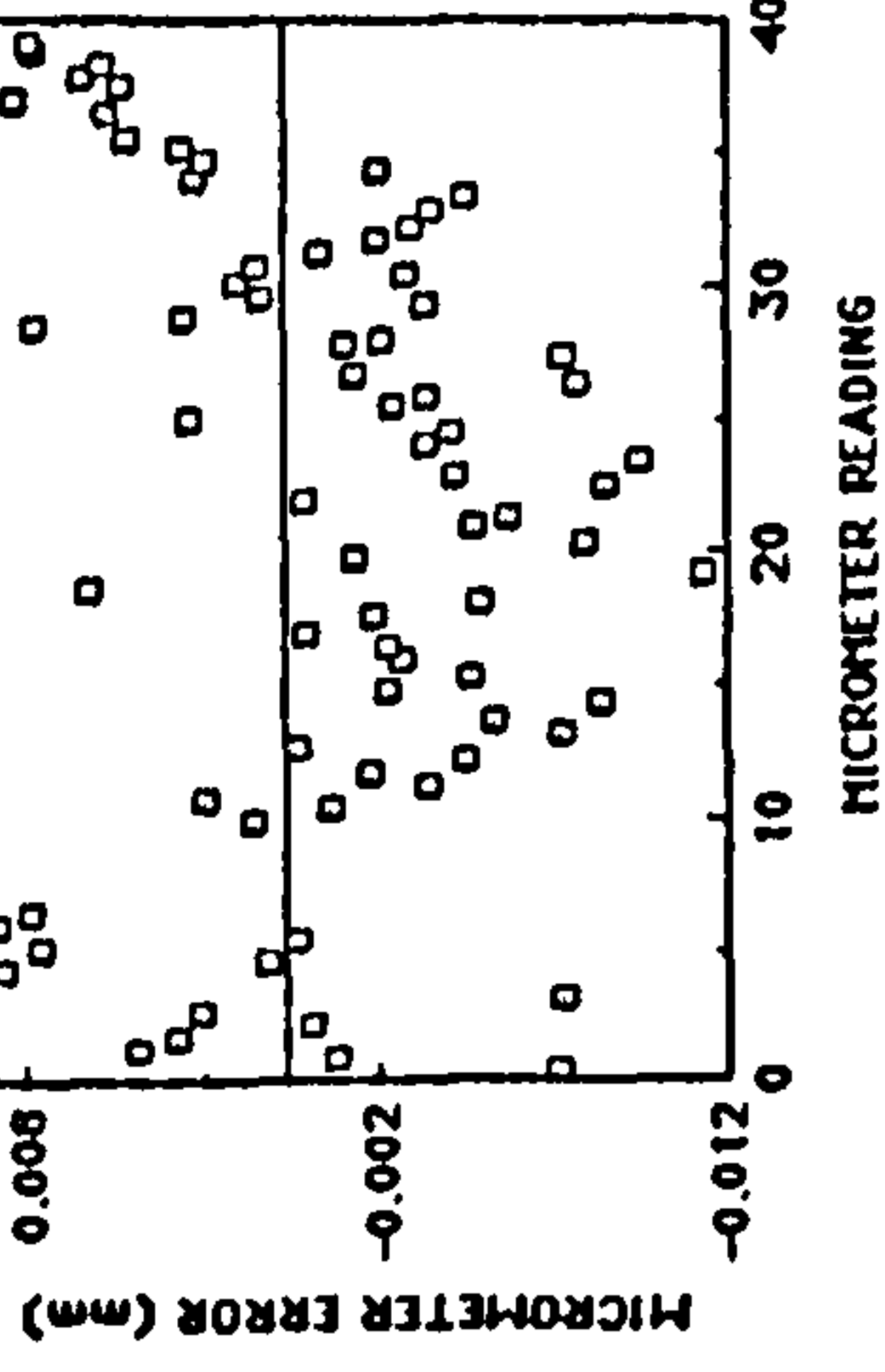
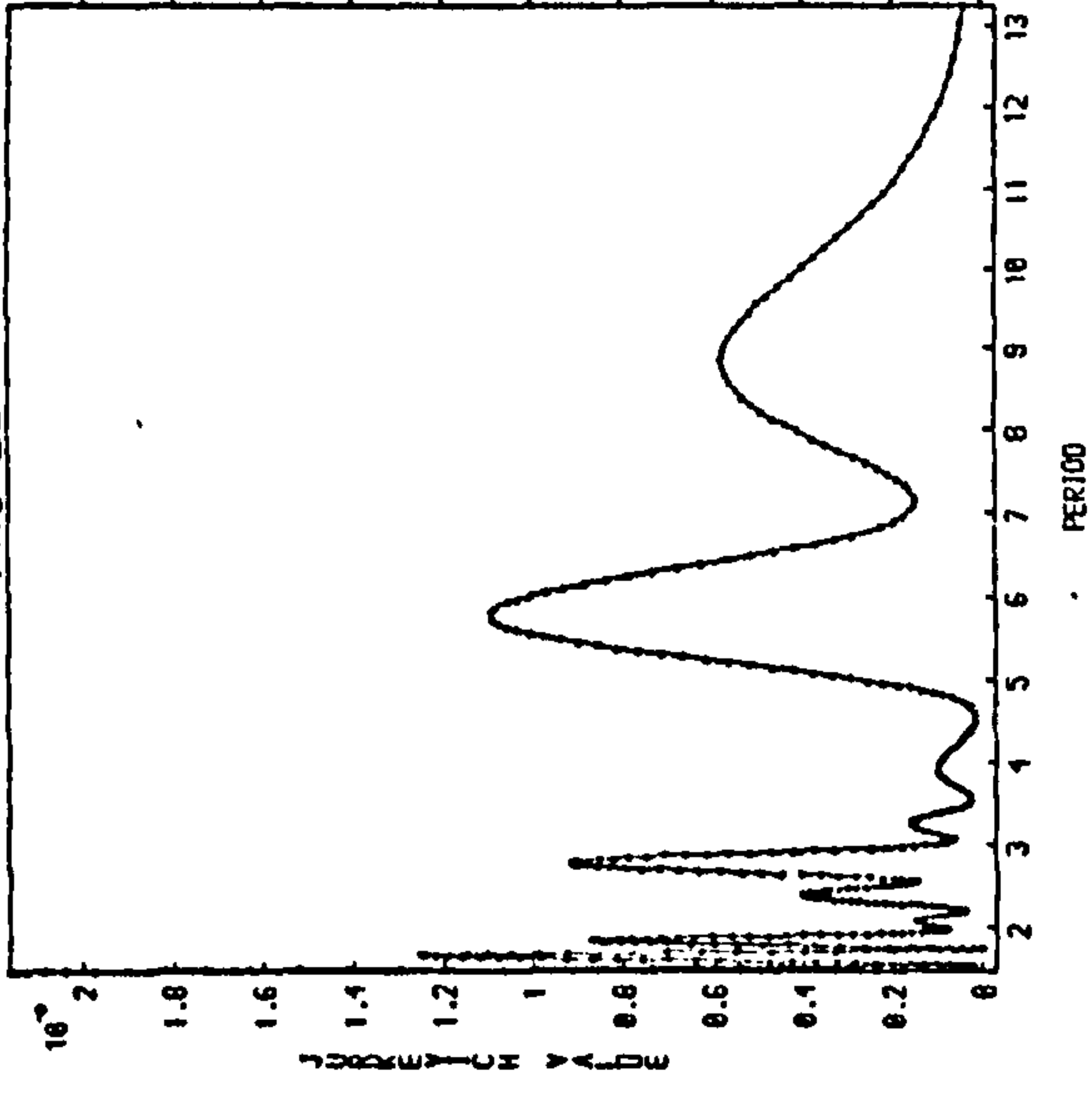
MHS-28



MHS-2B



MHS-2B



Characteristics:

Screw

Nut

Leng: 1.5" / 0.63"

Diameter: 0.151"

Steel

Brass

Other:

Instrument Identification:

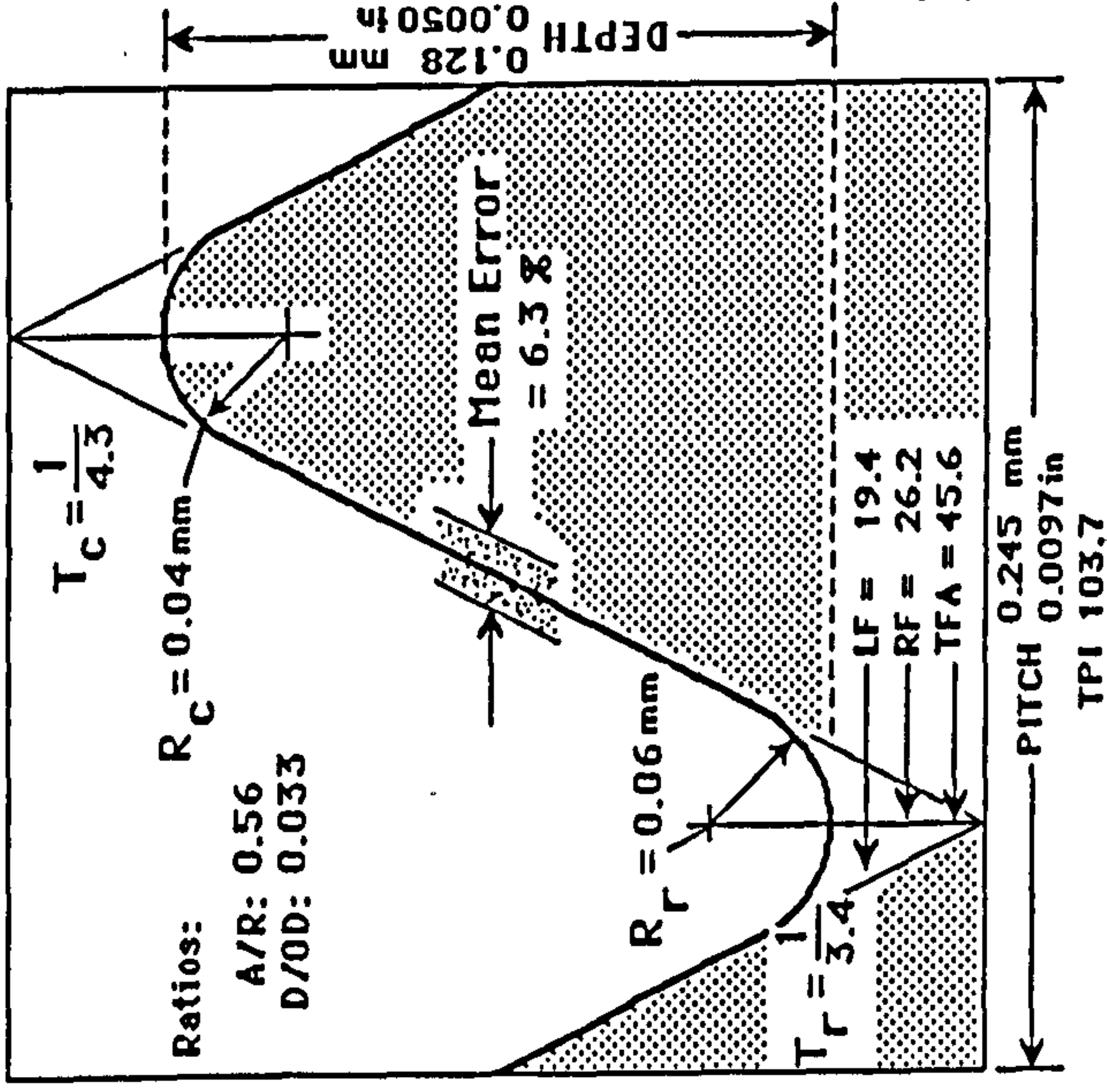
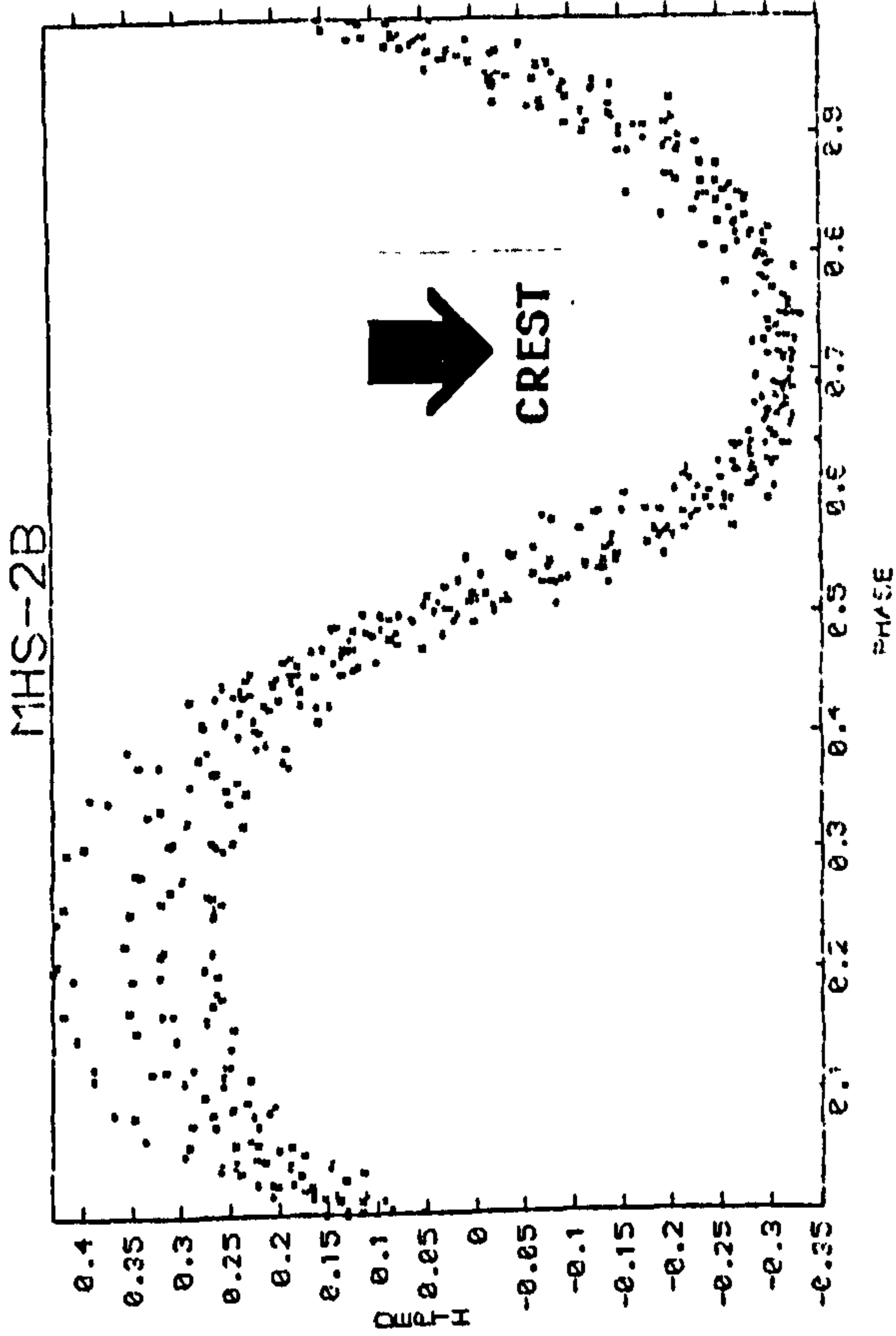
Study Code: MHS-2b

Instrument: Biflar Micrometer

Maker: Thomas Jones

Date: ca.1820

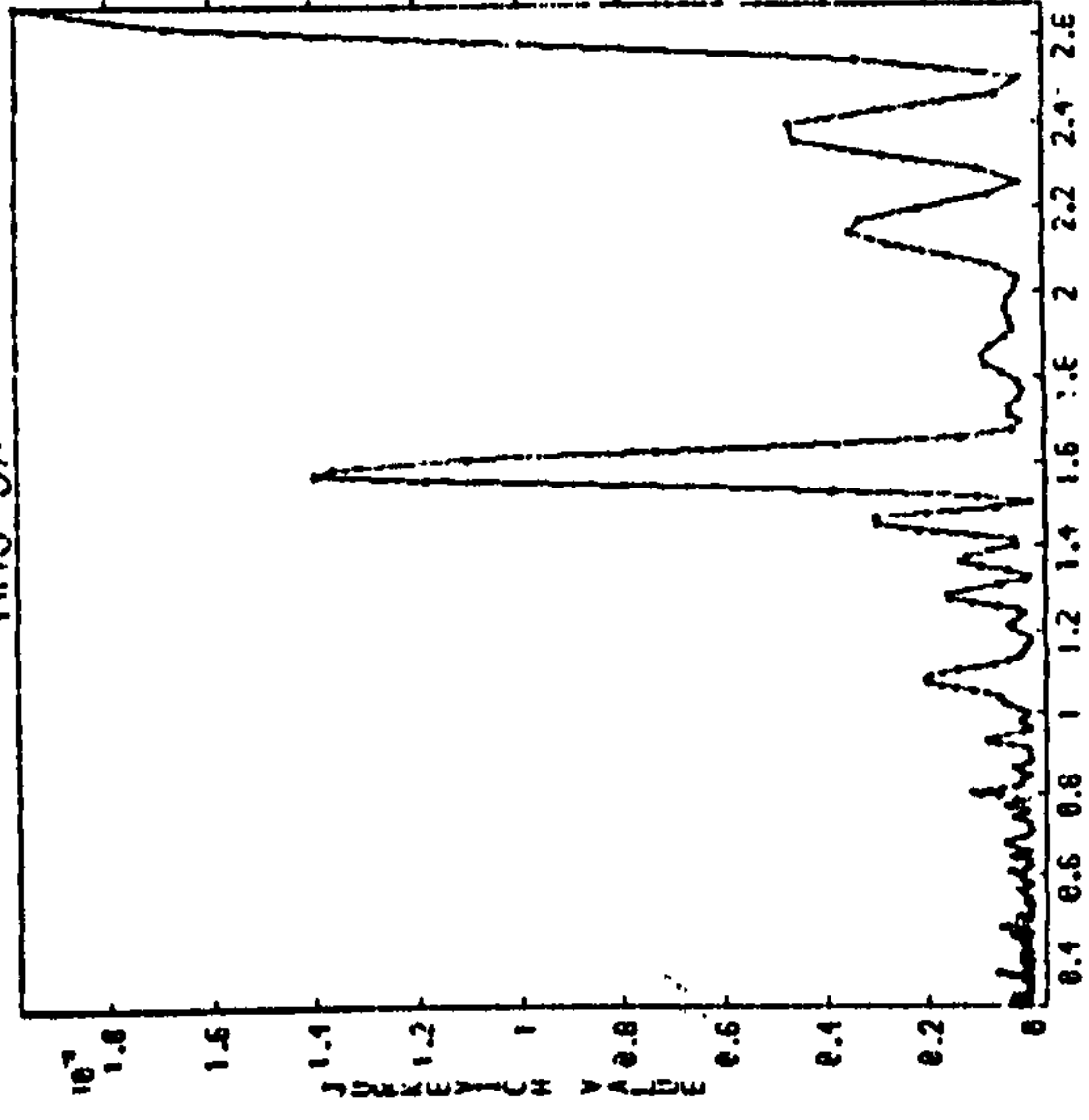
Ser./Acq. No. 79-23



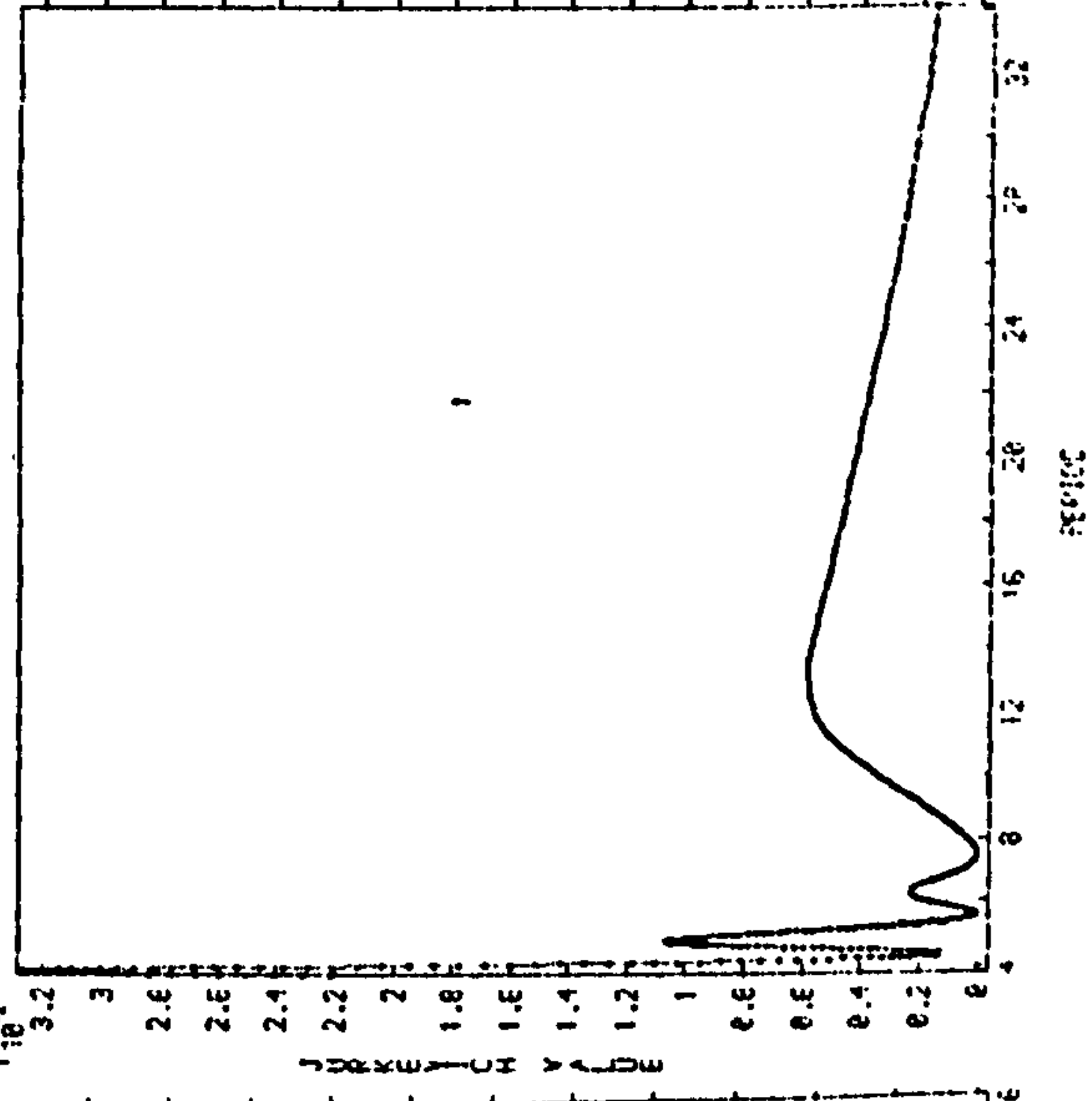
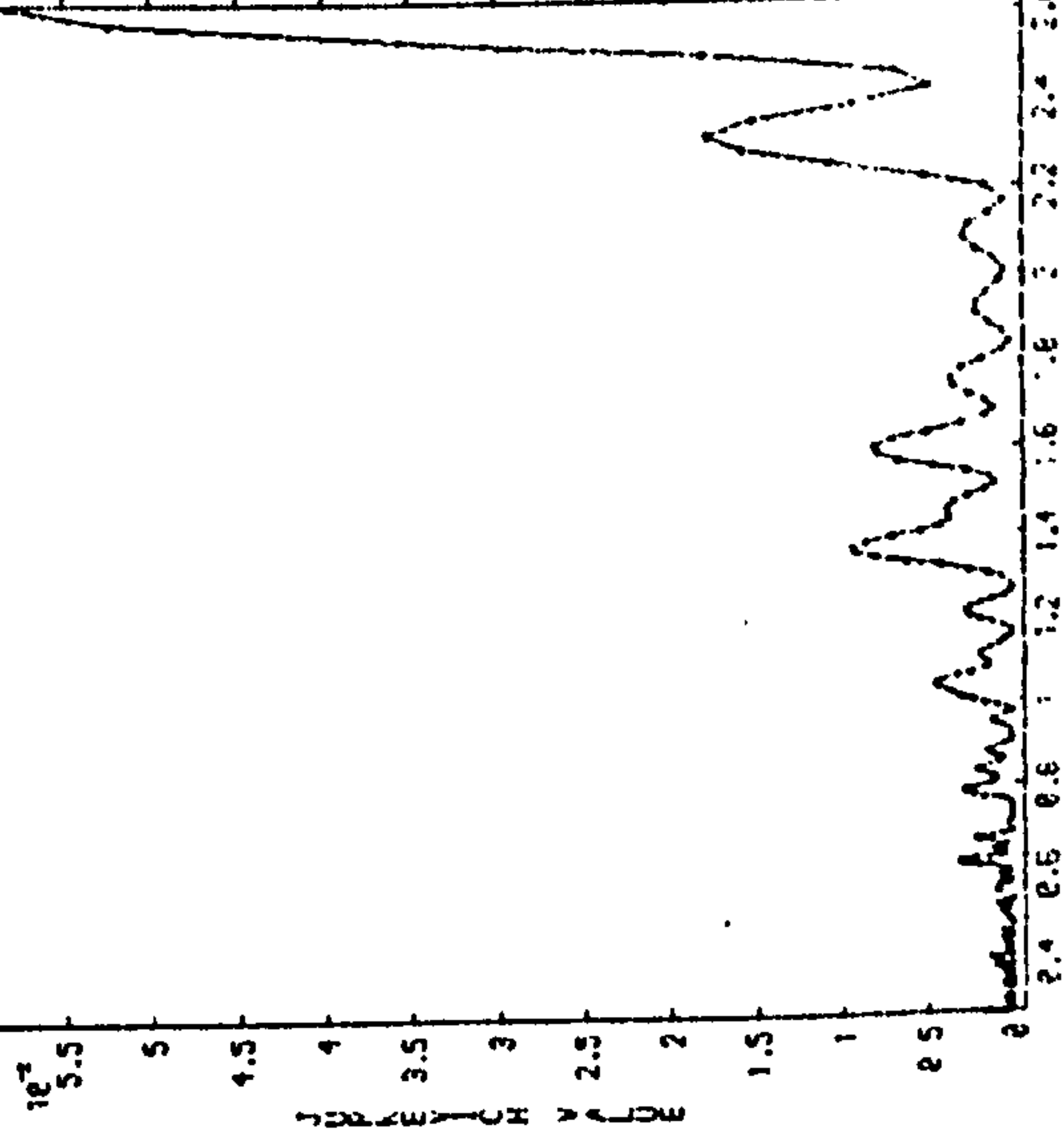
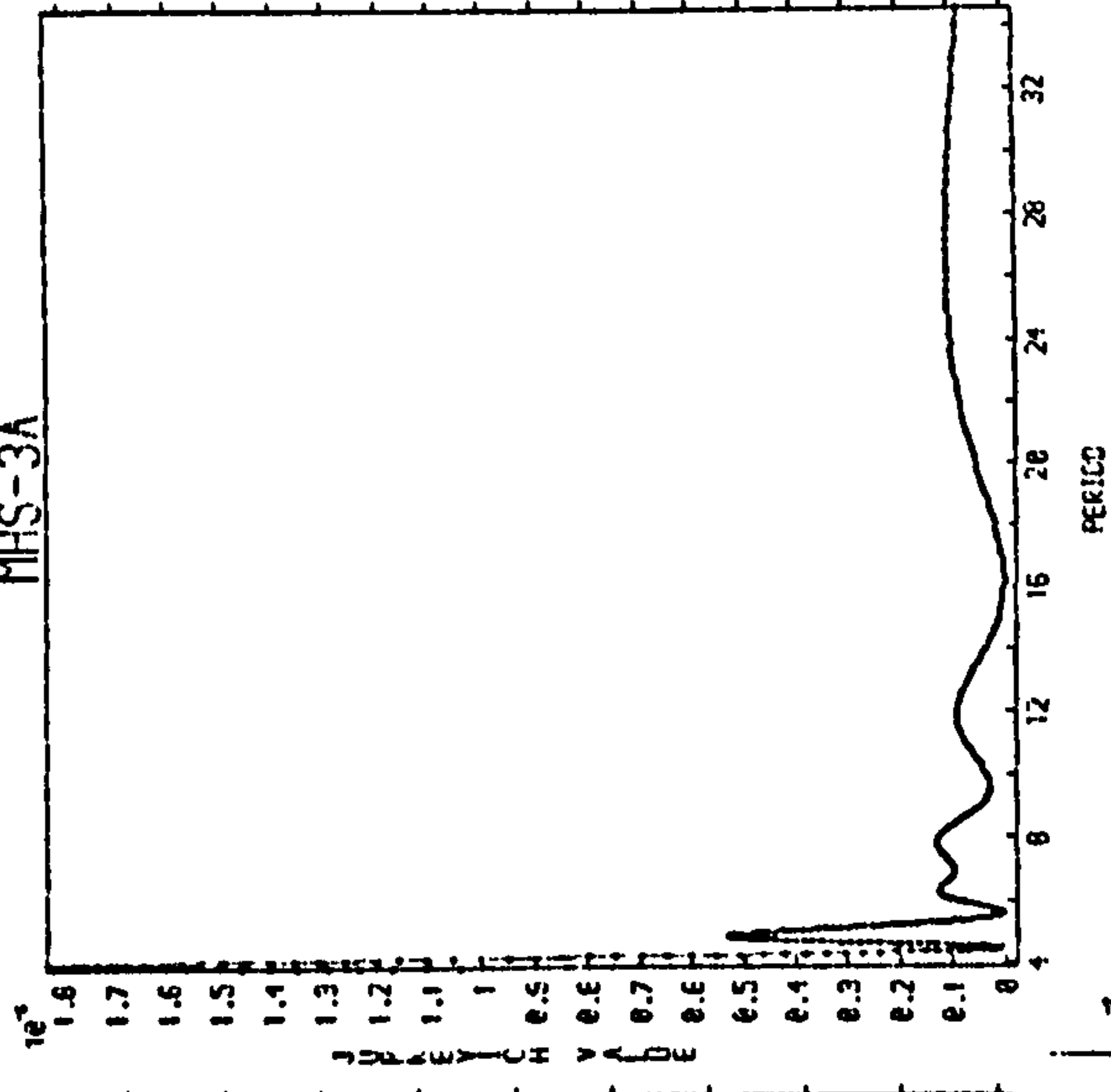
MU — [ Filar Scale Bench Div. Eng. Adjust. Leveling Focus Eye P. Tube Tool Gauge Binding Misc. ]

See MHS-2a for Drum and Scale size and divisions

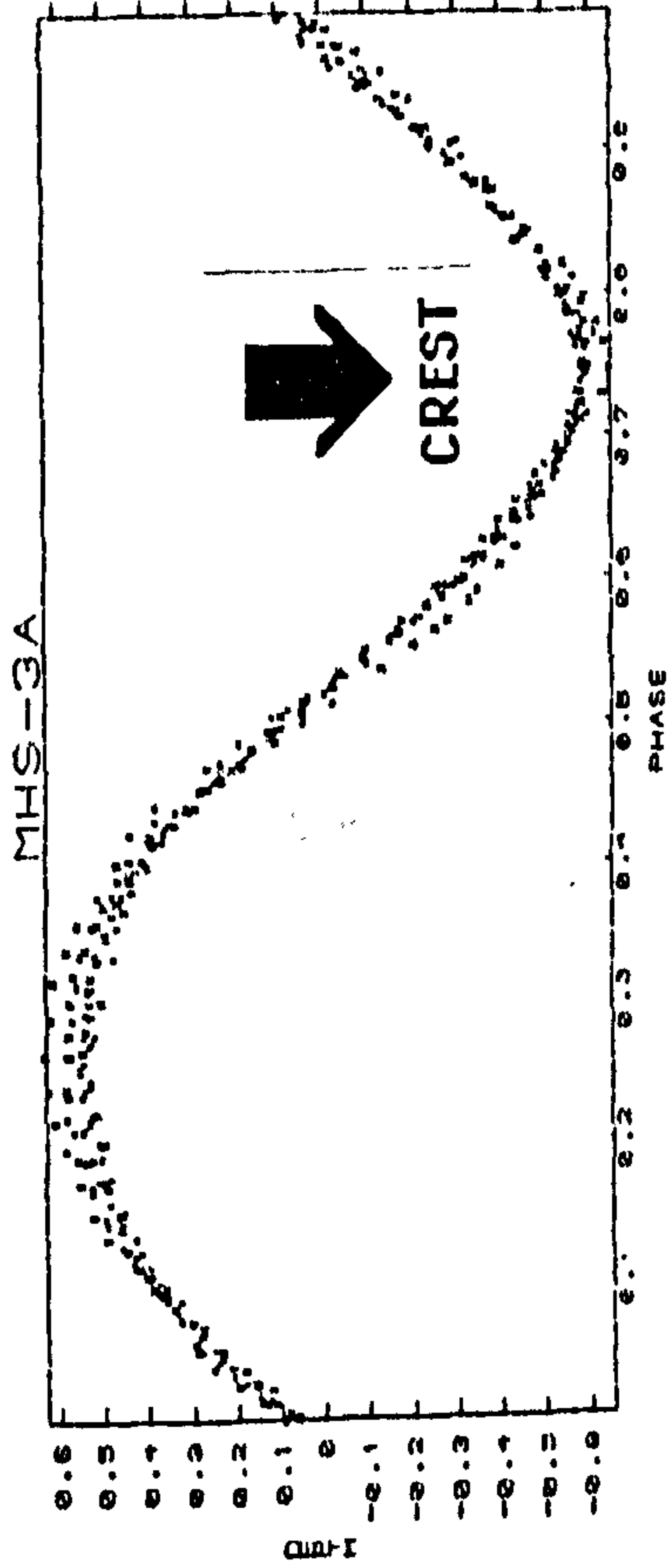
MHS-3A



MHS-3A







### Characteristics:

	Screw	Nut
1		
2		
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97		
98		
99		
100		

**Leng: 5.50" / 0.50"**

Diameter: 0.281-

Steel	Brass
	

**Other:**

### Instrument Identification:

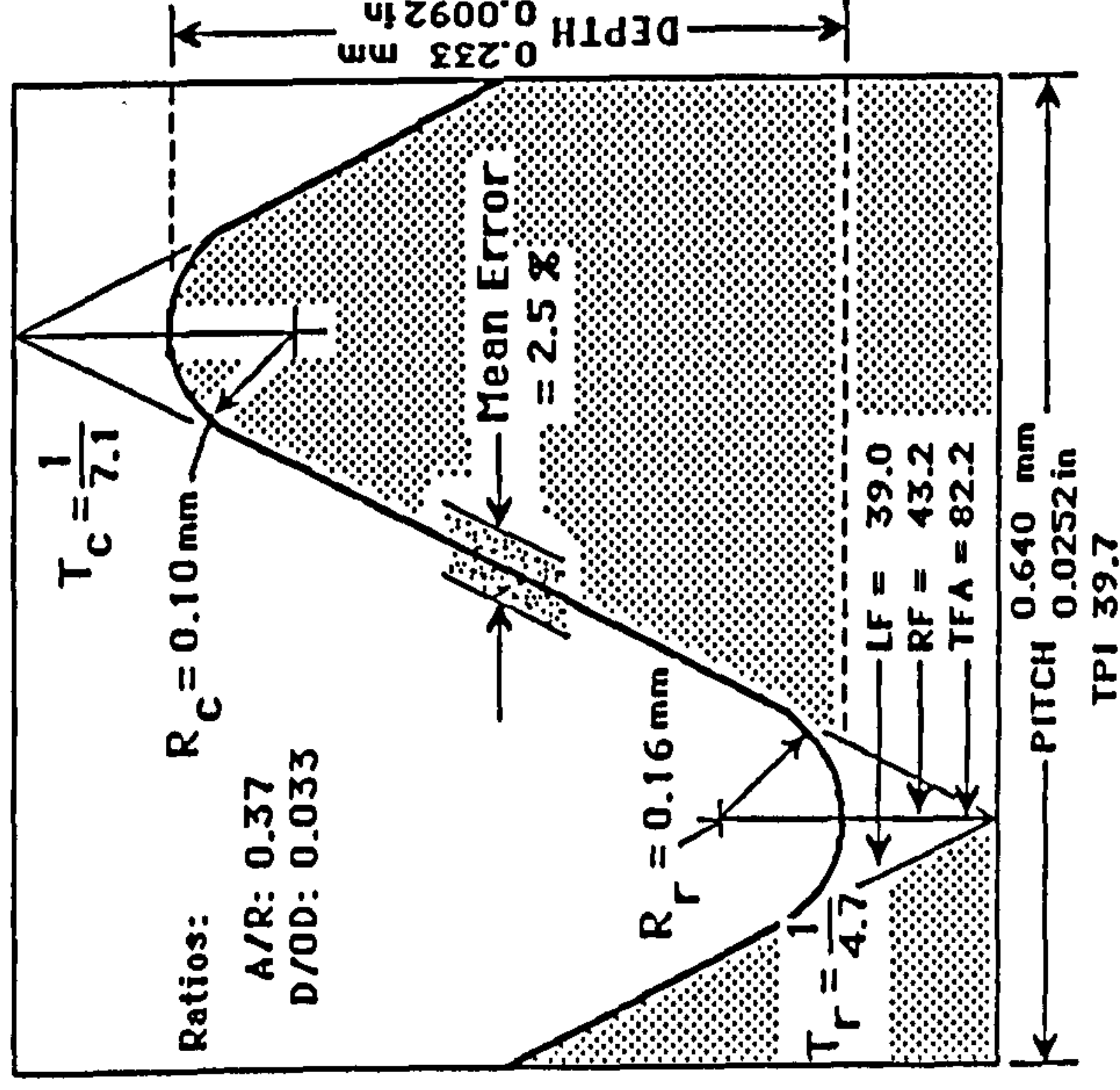
Study Code: MHS-3a

**Instrument: Micrometer**

**Maker:** John Bird

Date: ca.1770

**Ser./Acq. No. .**



**Scale: 1.0" divided 0-40**  
**Gear and dial divided 0-30**

# Filar

# Mu - Scale

## Bench

Div. Eng.

**Adjust.**

## Leveling

## Focus

**Eye P.**

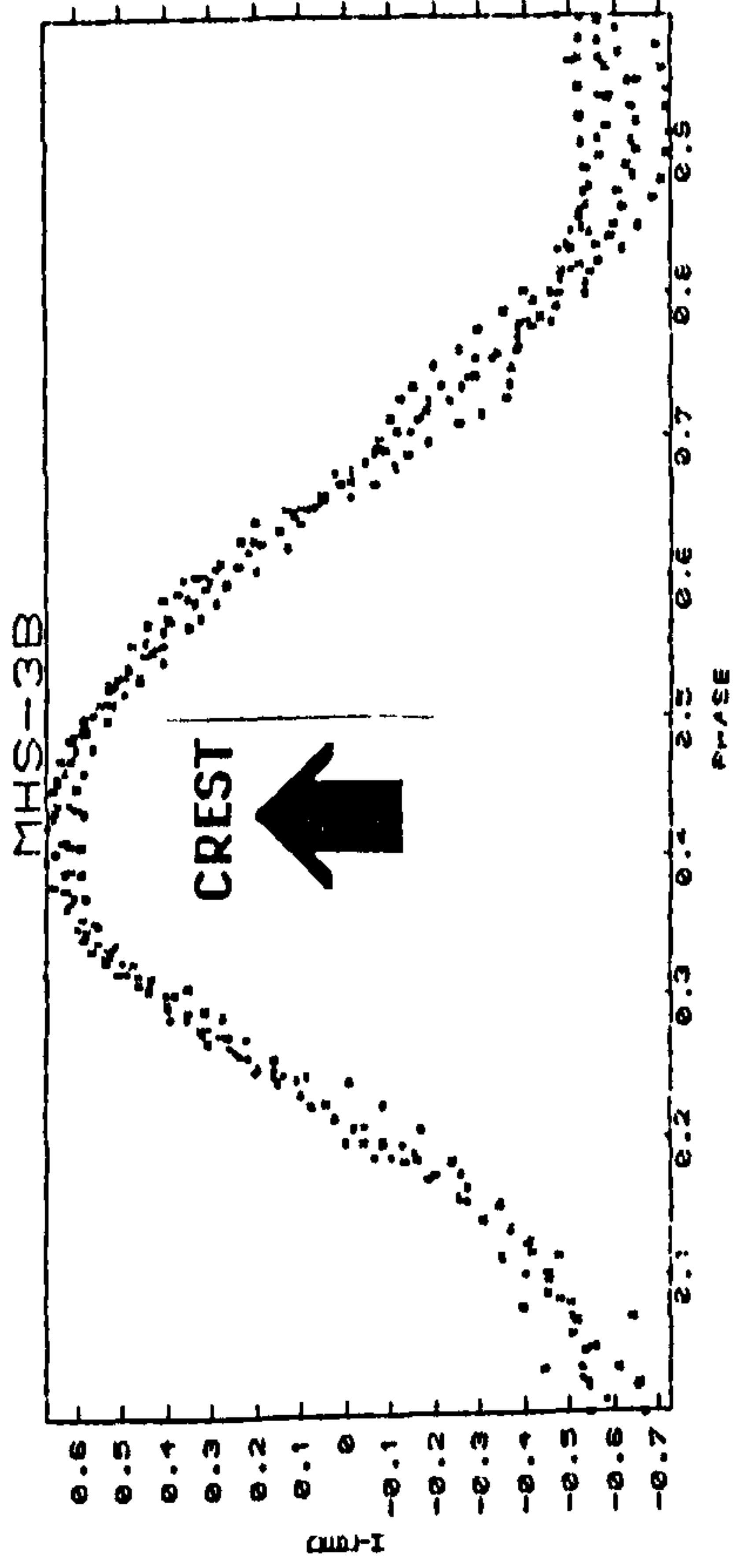
## Tube

## Tool

## Gauge

## Binding

**Misc.**



### Characteristics:

**Nut**  **Screw** 

**Leng: 5.50- / 0.50-**

Diameter: 0.281-

Steel ☐ Brass ☐

**Other:**

## Instrument Identification:

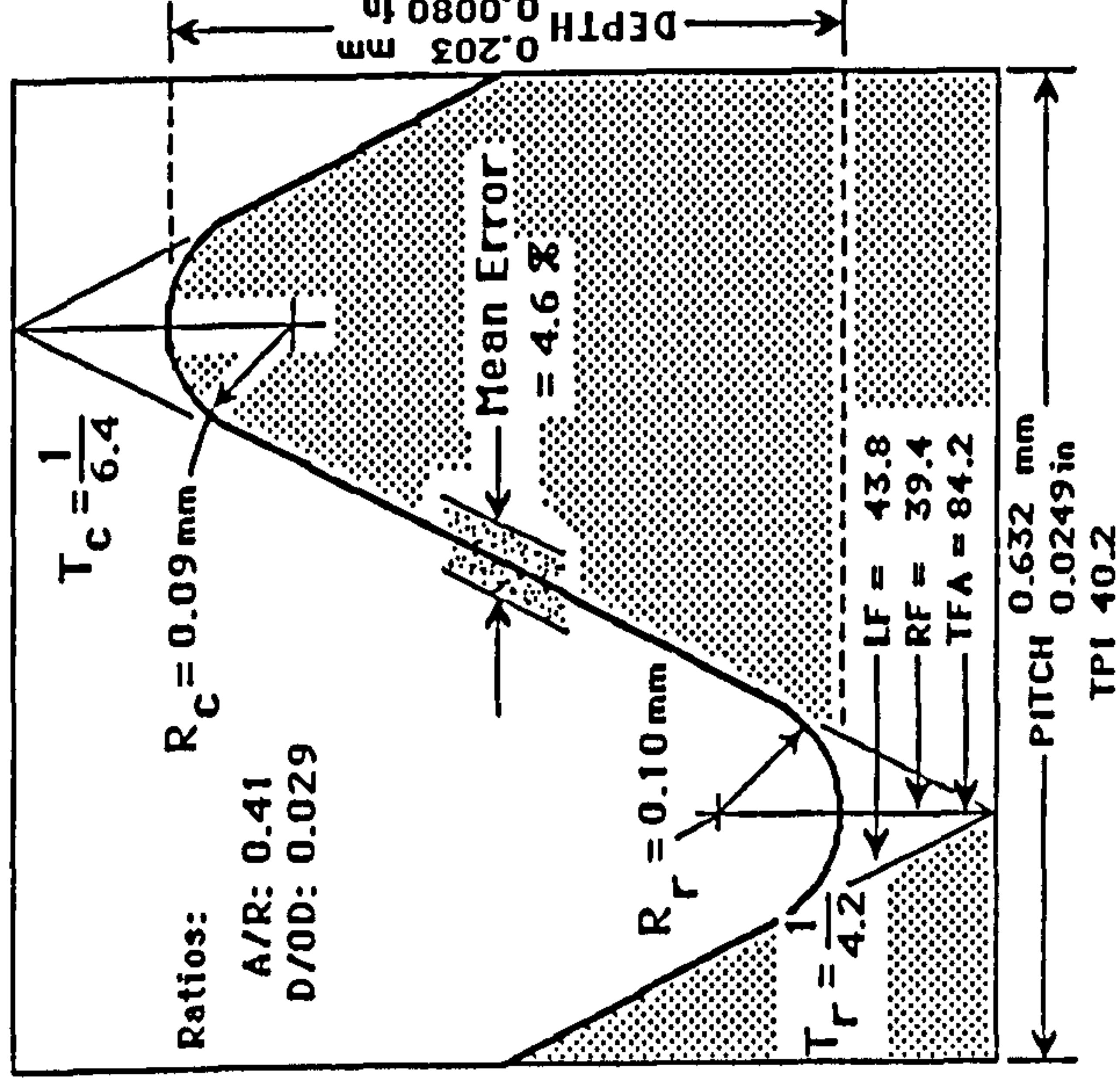
Study Code: MHS-3b

**Instrument: Micrometer**

**Maker:** John Bird

Date: ca. 1770

**Ser./Acq. No.:**



Scale information on MHS-3a.  
The dial housing was damaged.

# Filar

**Mu + scale**

## Bench

Div. Eng.

**Adjust.**

## Leveling

## Focus

**Eye P.**

**Tube**

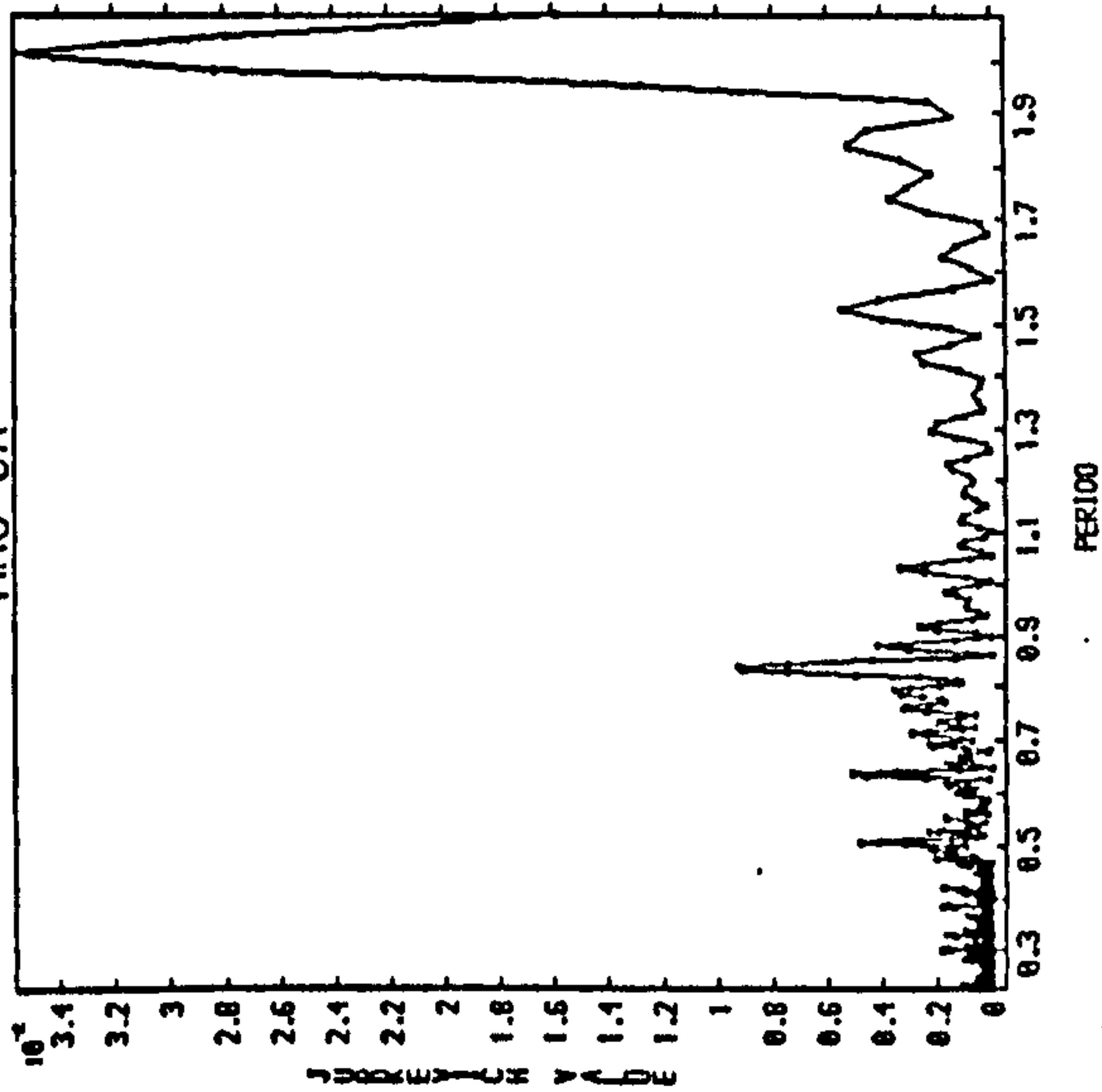
## Tool

## Gauge

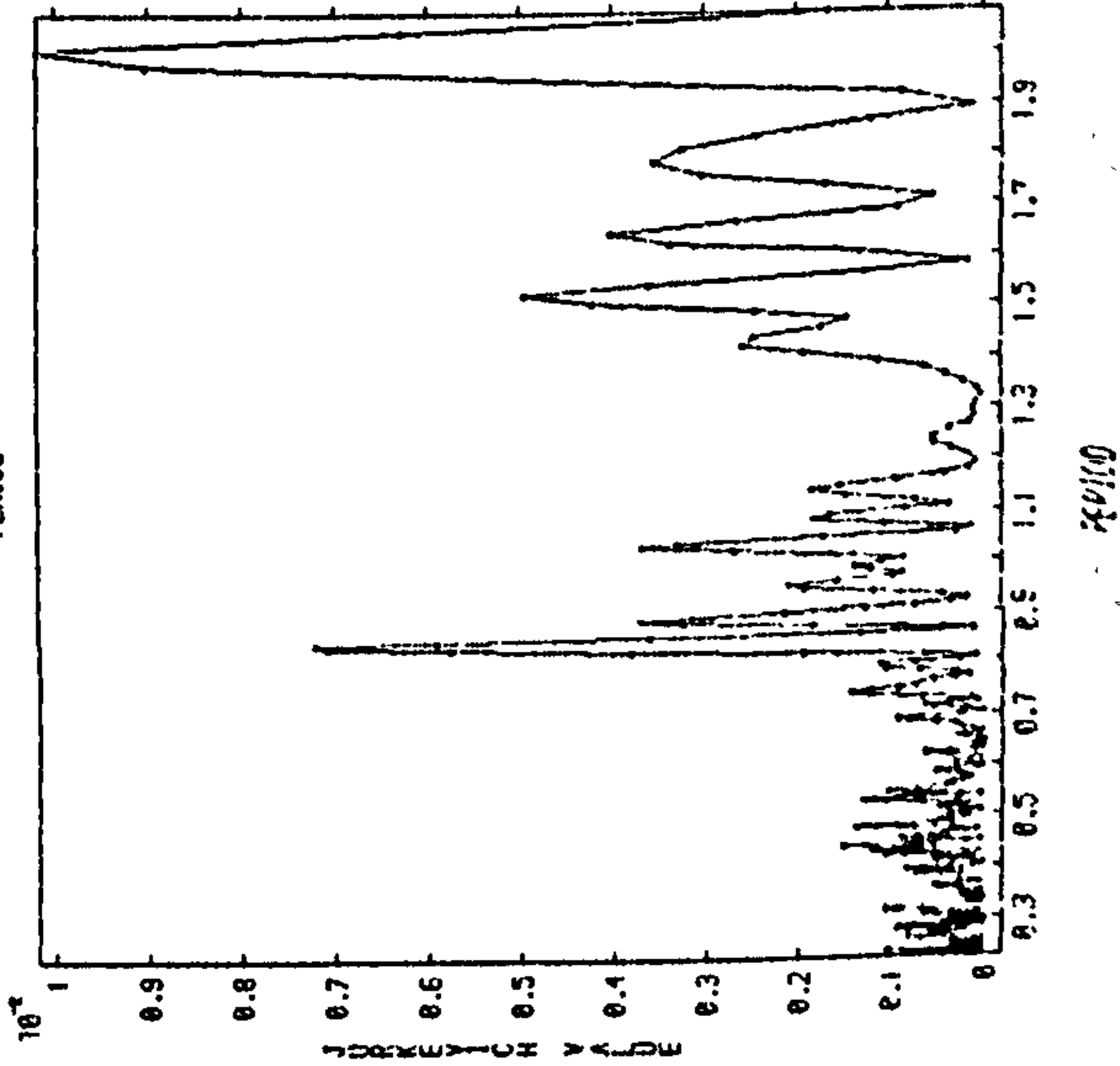
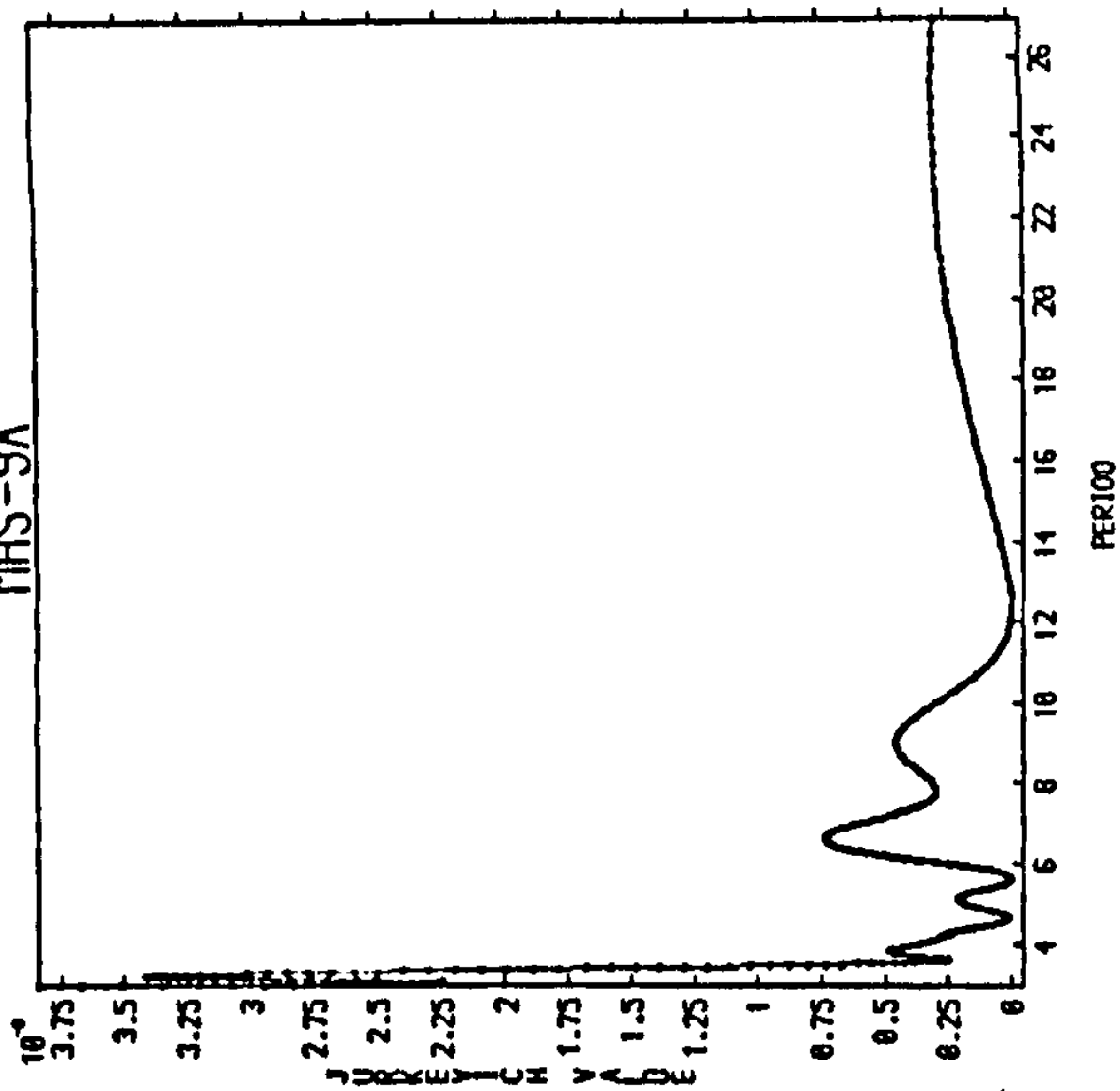
## Binding

**Misc:**

MHS-9A



MHS-9A



44110



Characteristics:

Screw

Nut

Leng: 1.00" / 0.38"

Diameter: 0.1542"

Steel

Brass

Other:

Instrument Identification:

Study Code: MHS-9

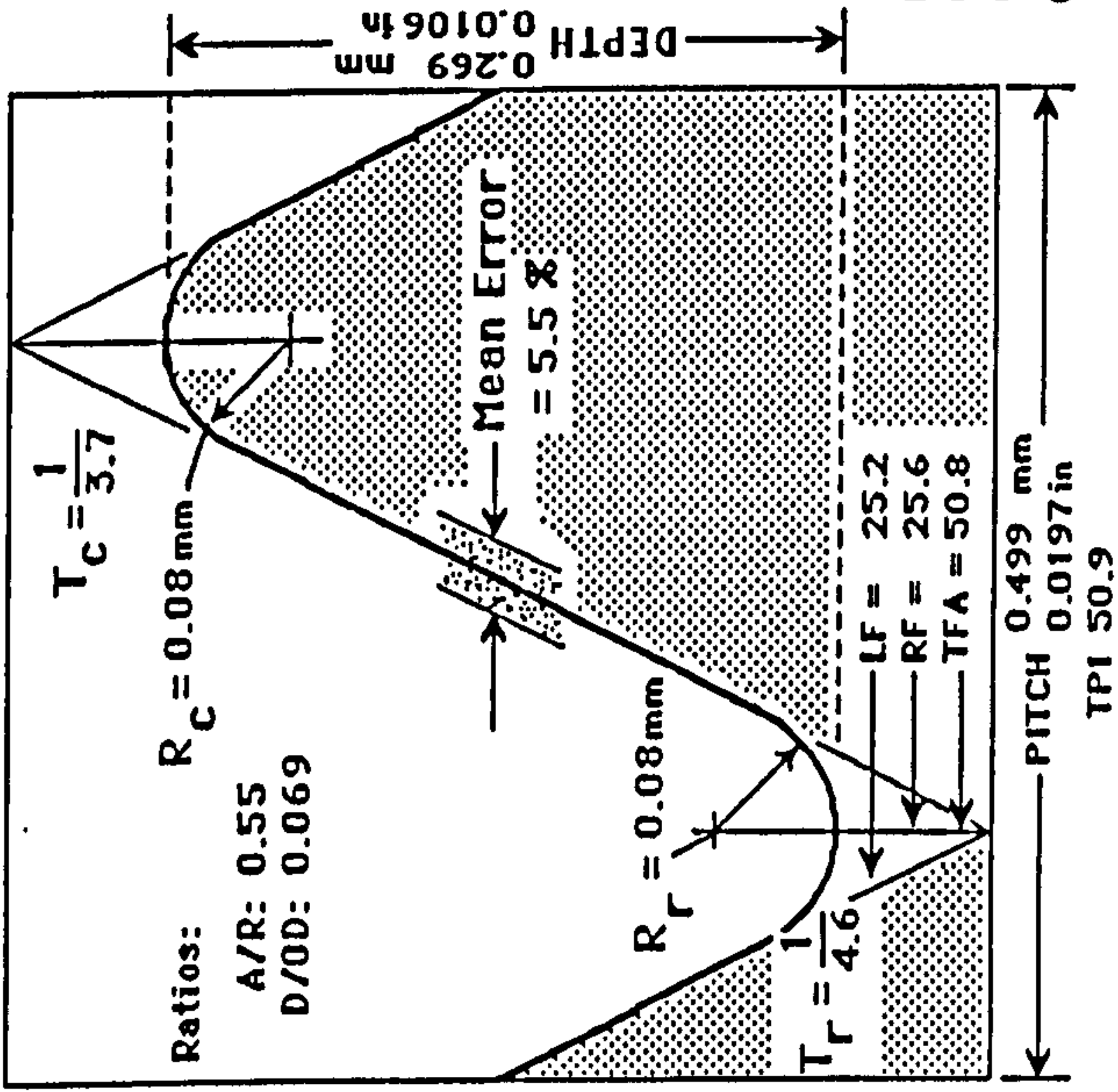
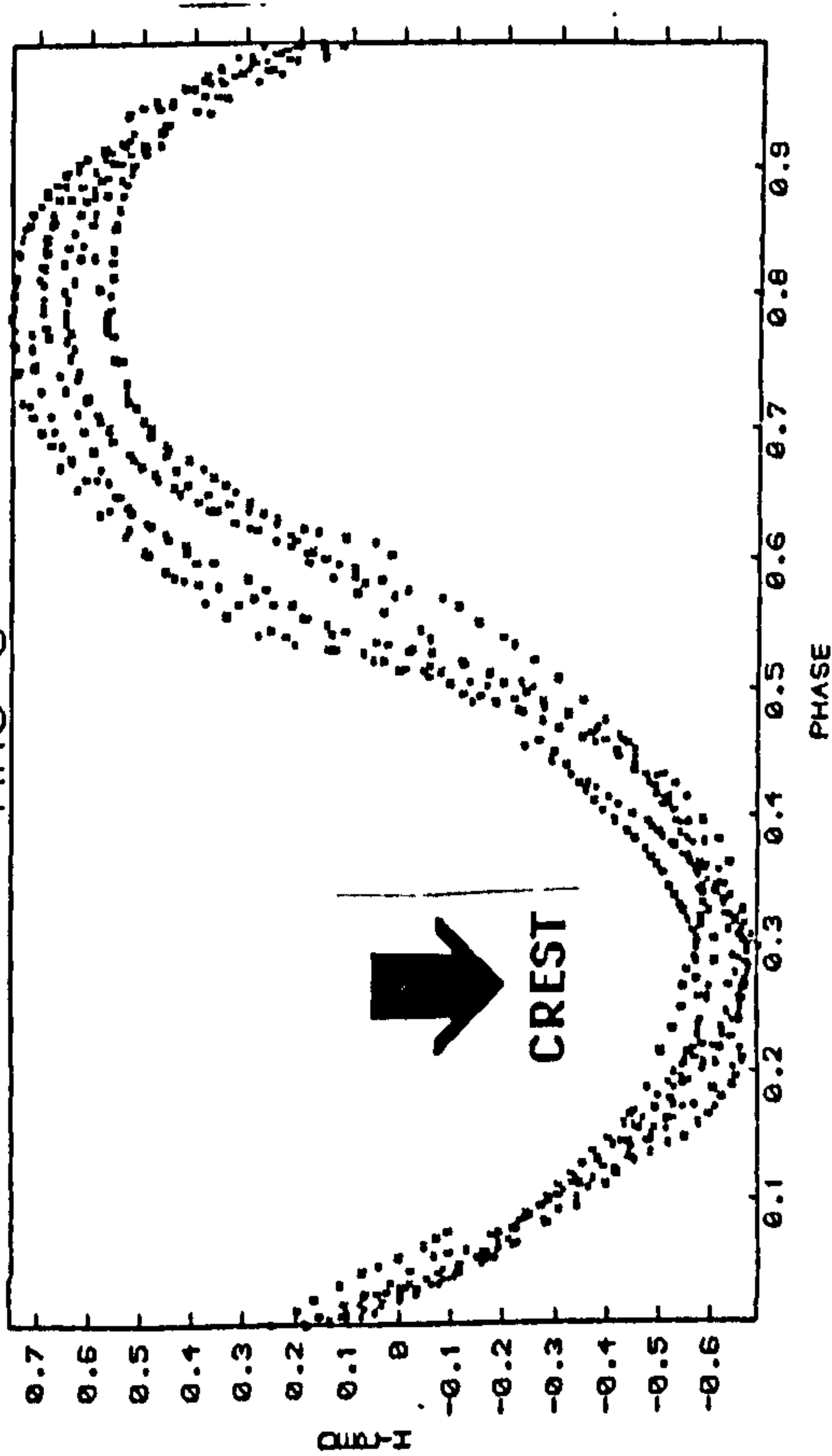
Instrument: Microscope Micrometer

Maker: Powell & Leyland

Date: 1864

Ser./Acq. No. .

MHS-9



Mu	Filar
	Scale
	Bench
	Div. Eng.
	Adjust.
	Leveling
	Focus
	Eye P.
	Tube
	Tool
	Gauge
	Binding
	Misc.

Drum: 1.313" diameter with 0-100 divisions and  $\pm 0.2$  div. resolution  
(at 170 Euston Rd)  
Wenham microscope #1 type  
See next page for comparison

Characteristics:

Screw

Nut

Leng: 1.00" / 0.38"

Diameter: 0.1542"

Steel

Brass

Other:

Instrument Identification:

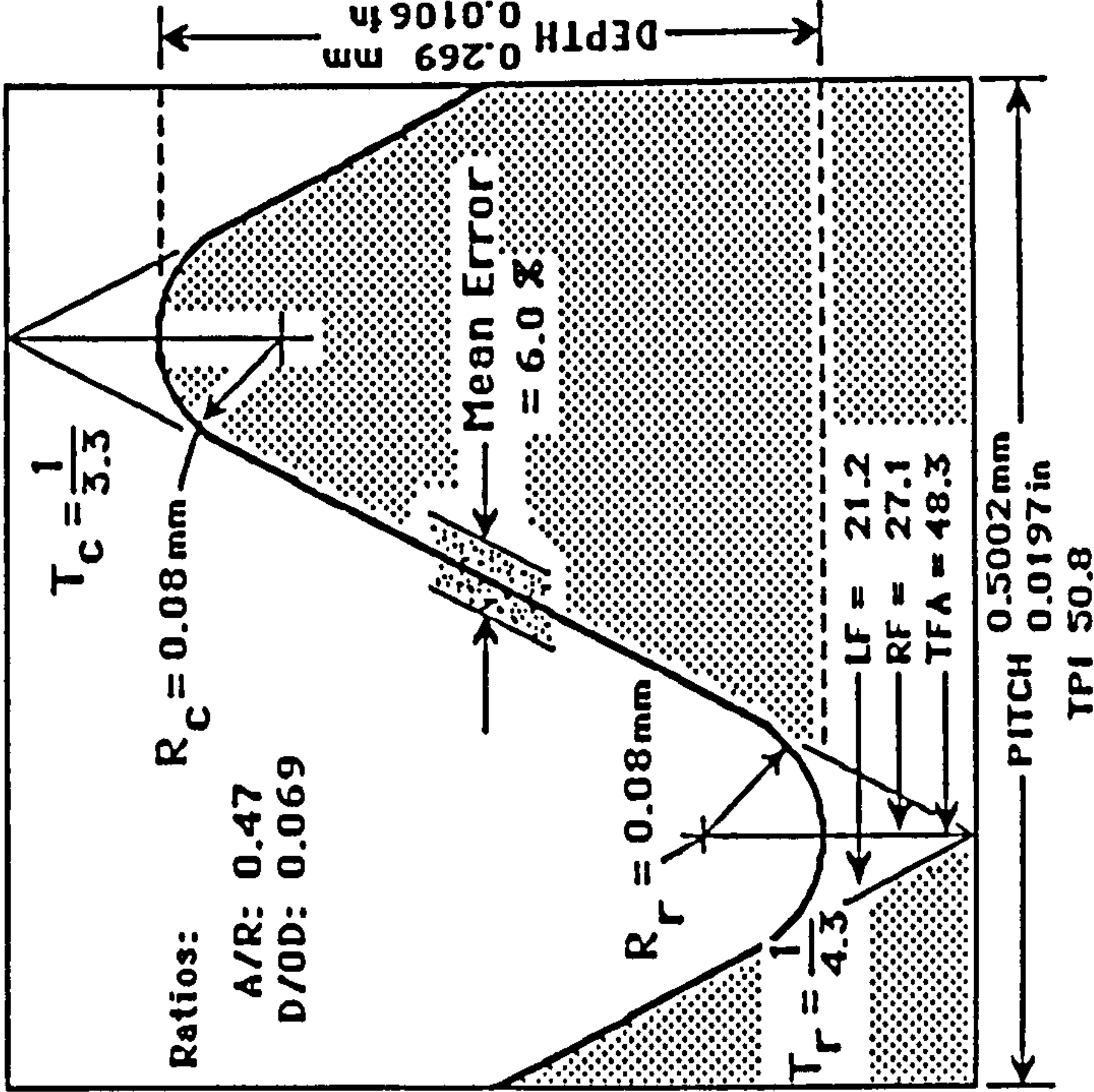
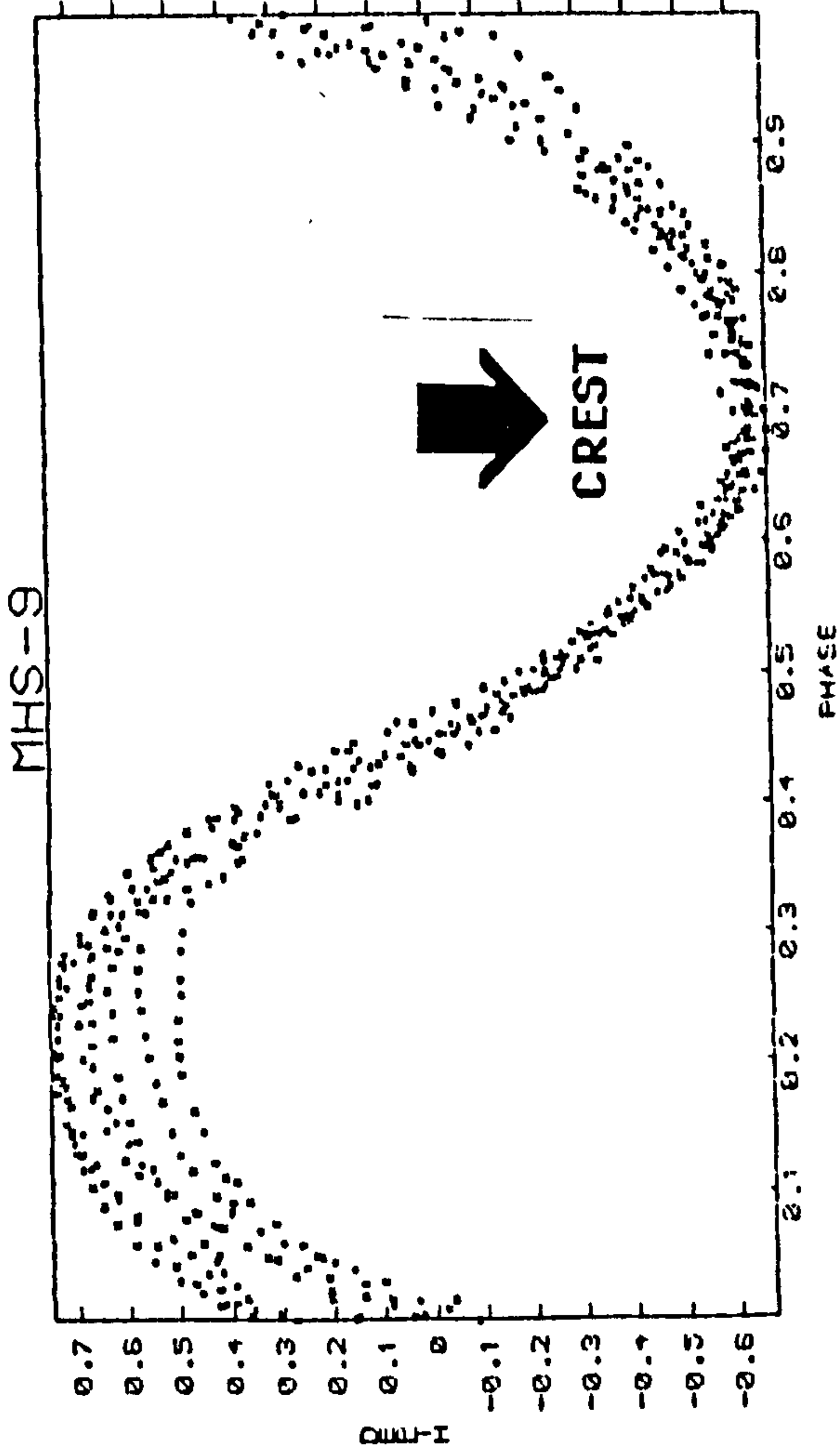
Study Code: MHS-9-2

Instrument: Micrometer

Maker: Powell & Leyland

Date: 1864

Ser./Acq. No. marked "R.L."\*



Mu

Filar

Scale

Bench

Div. Eng.

Adjust.

Leveling

Focus

Eye P.

Tube

Tool

Gauge

Binding

Misc.

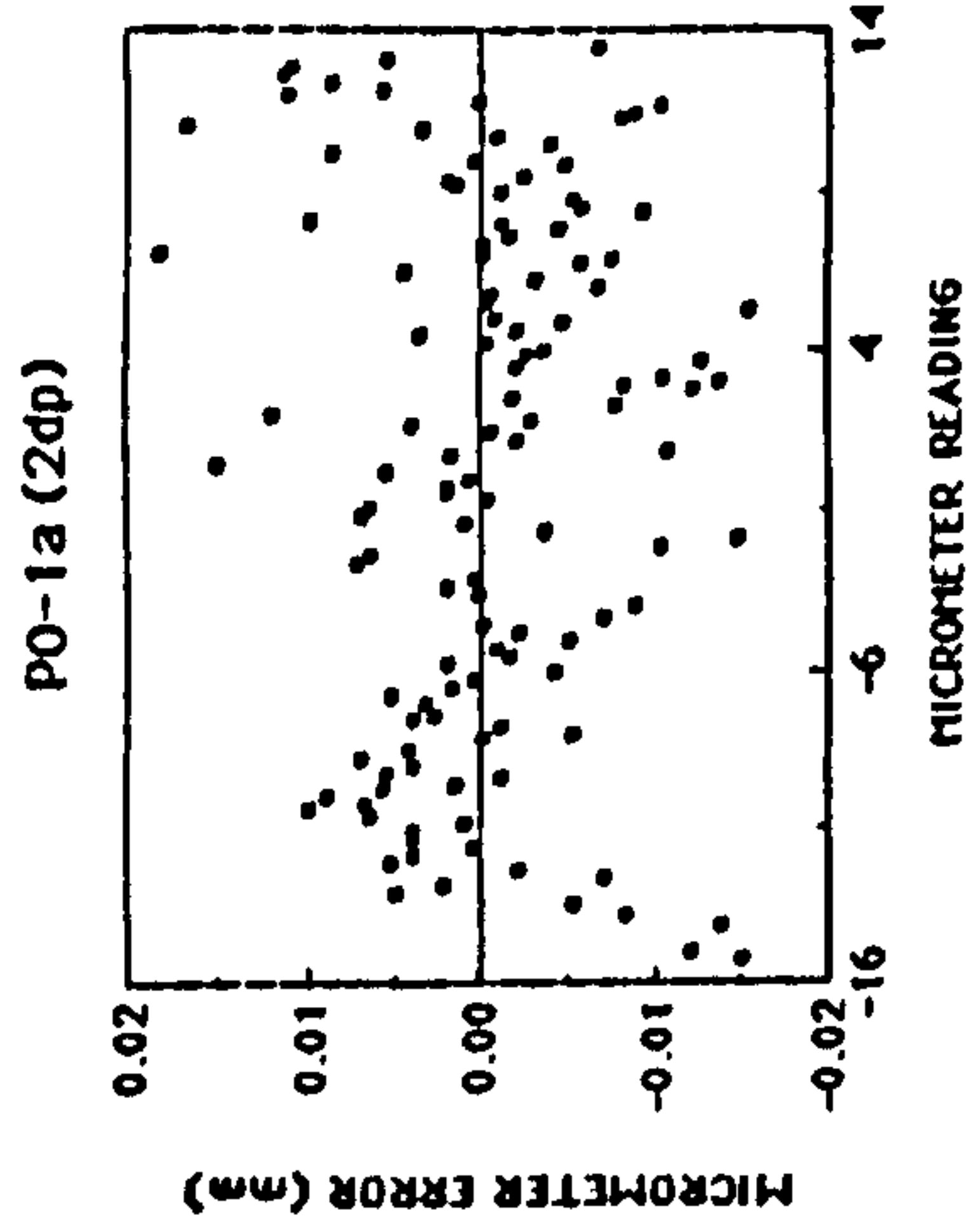
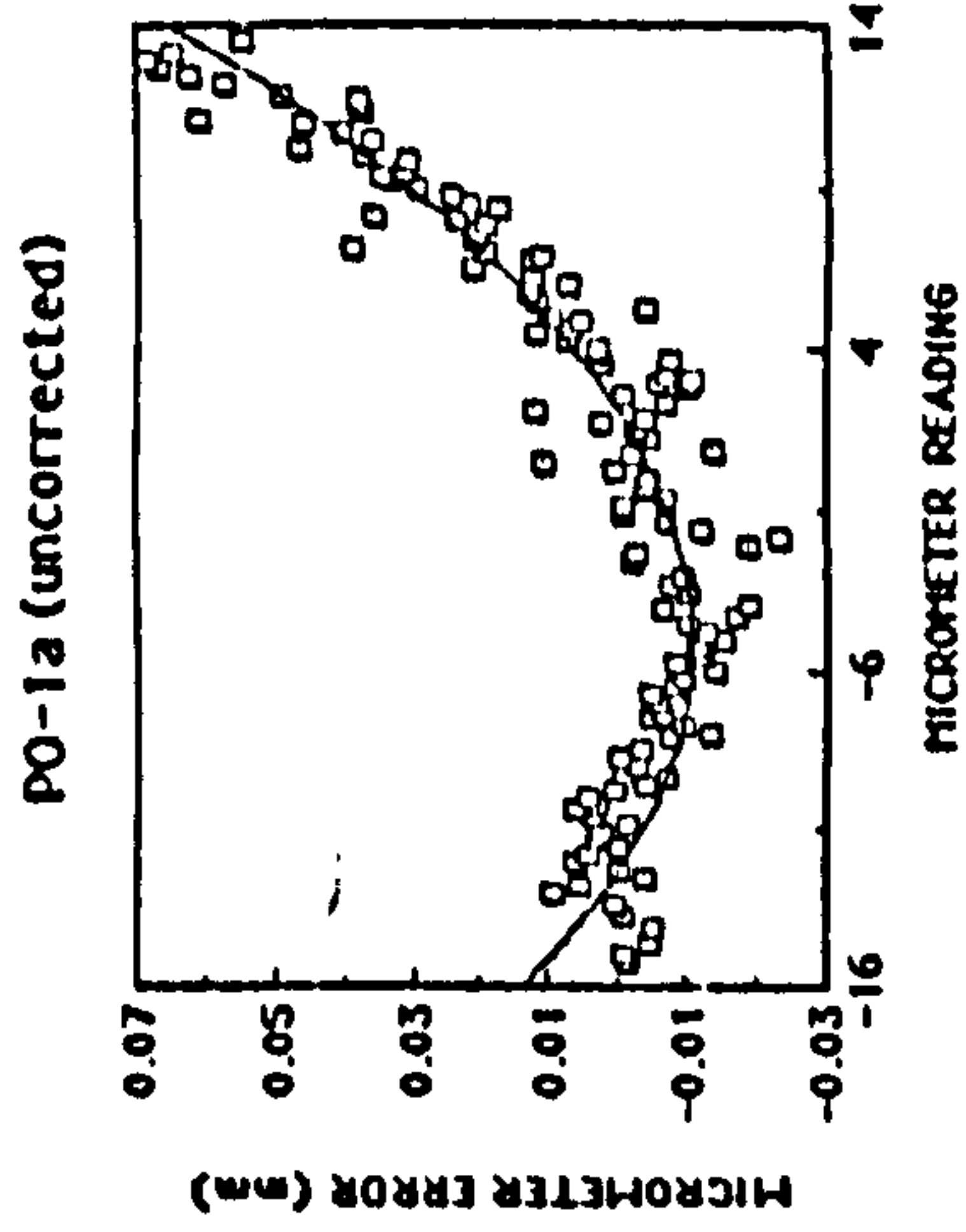
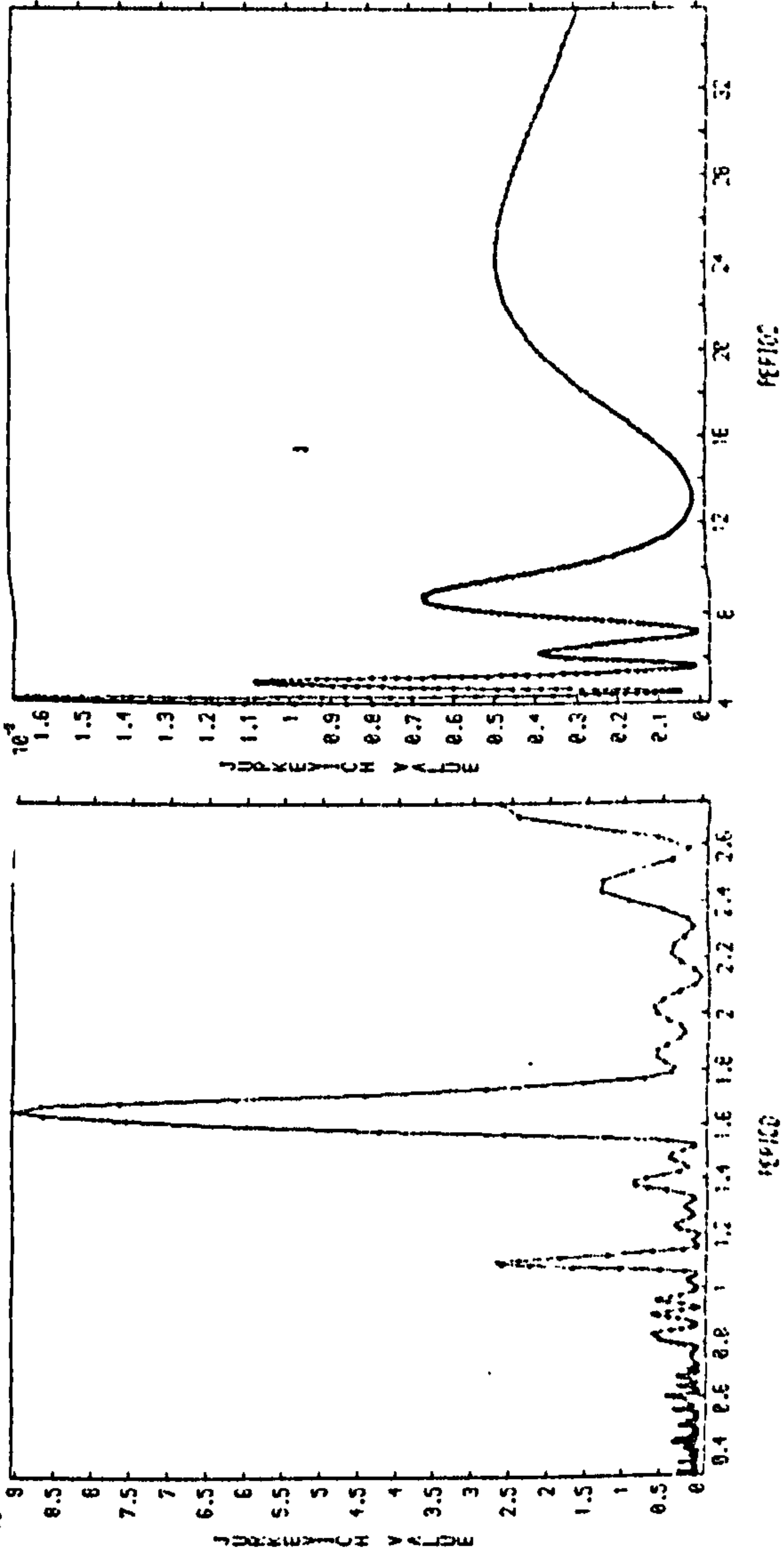
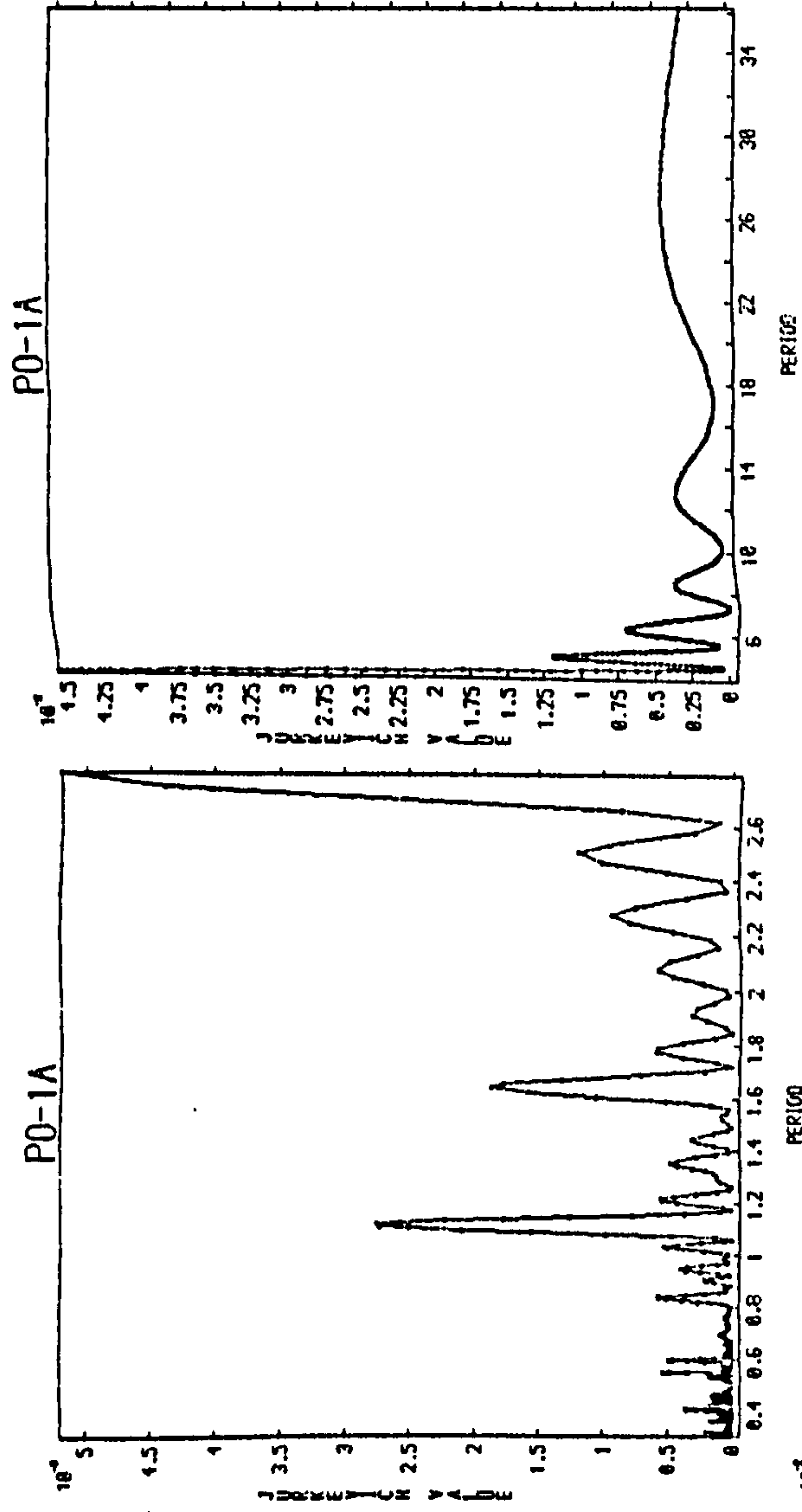
\* R.L. = Radcliffe Library

Compare with previous page

The quality of the SG seemed poor for the date and thus repeated but with the same results. The SG's and digitized profiles agree with Hackmann's observation that Powell made his micrometer screws by hand







Characteristics:

Screw

Nut

Leng: 1.50" / 0.375"

Diameter: 0.2608"

Steel

Brass

Other:

Instrument Identification:

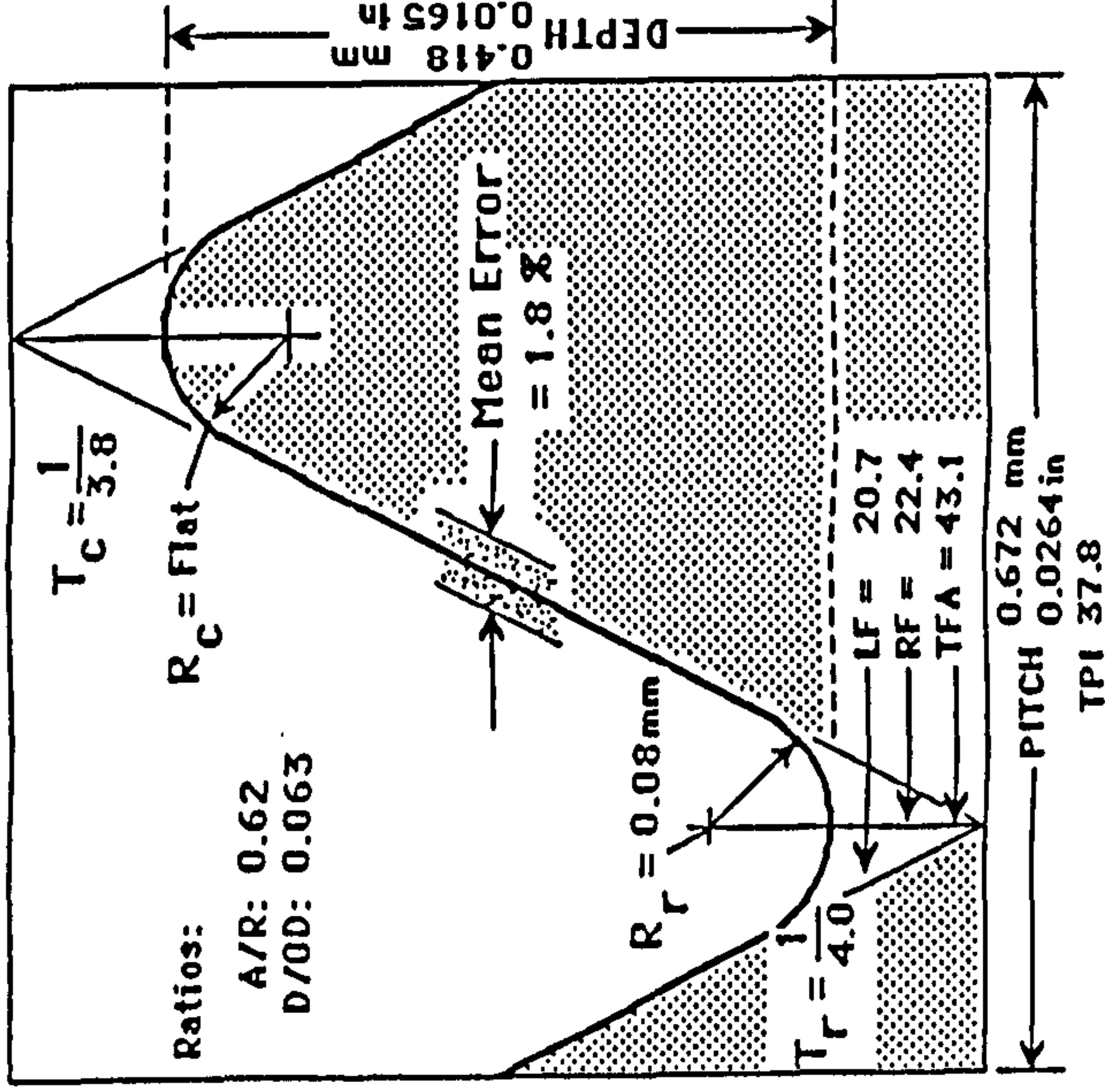
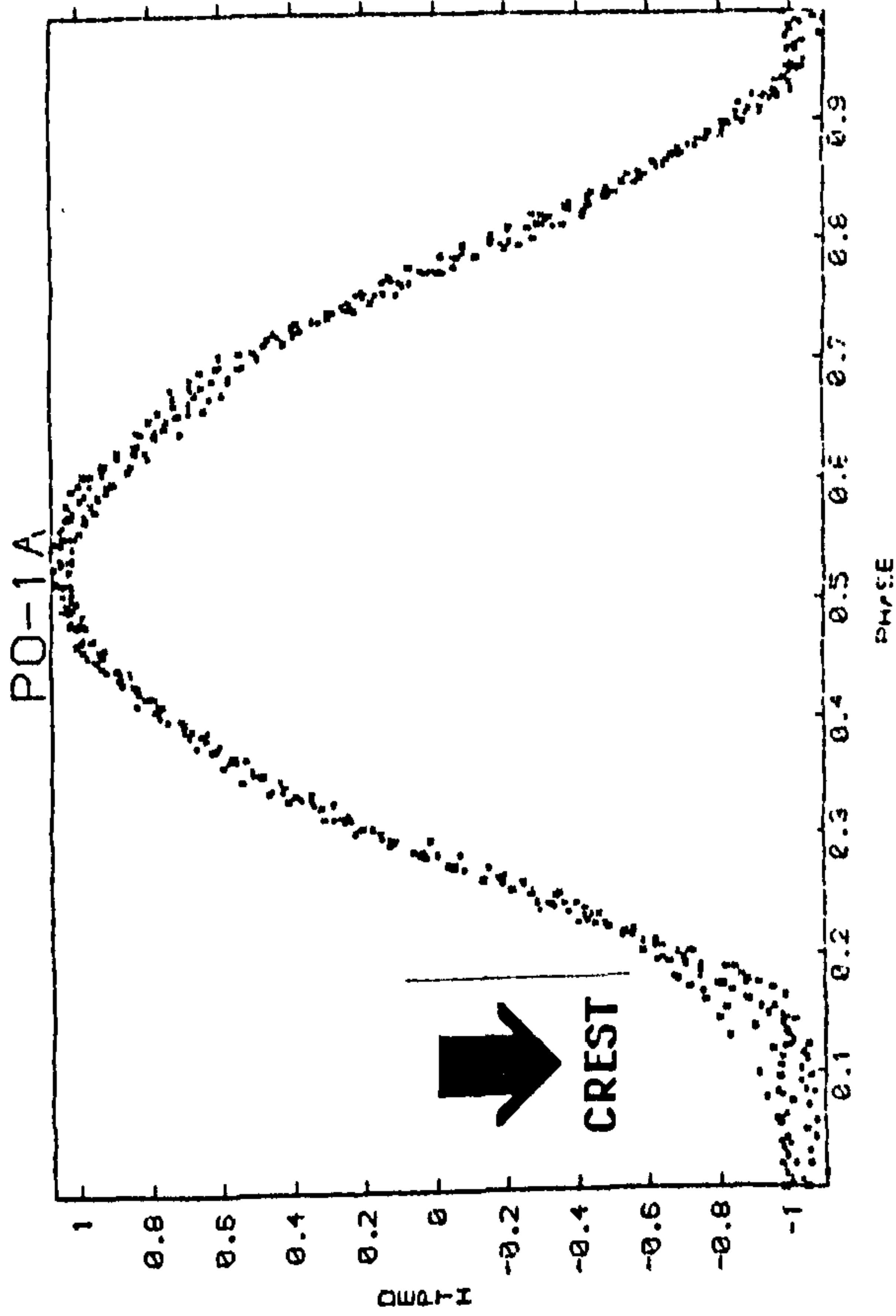
Study Code: P0-1a

Instrument: Micrometer

Maker: C. Langlois

Date: 1738

Ser./Acq. No. 1A 1811



Mu

Filar

Scale

Bench

Div. Eng.

Adjust.

Leveling

Focus

Eye P.

Tube

Tool

Gauge

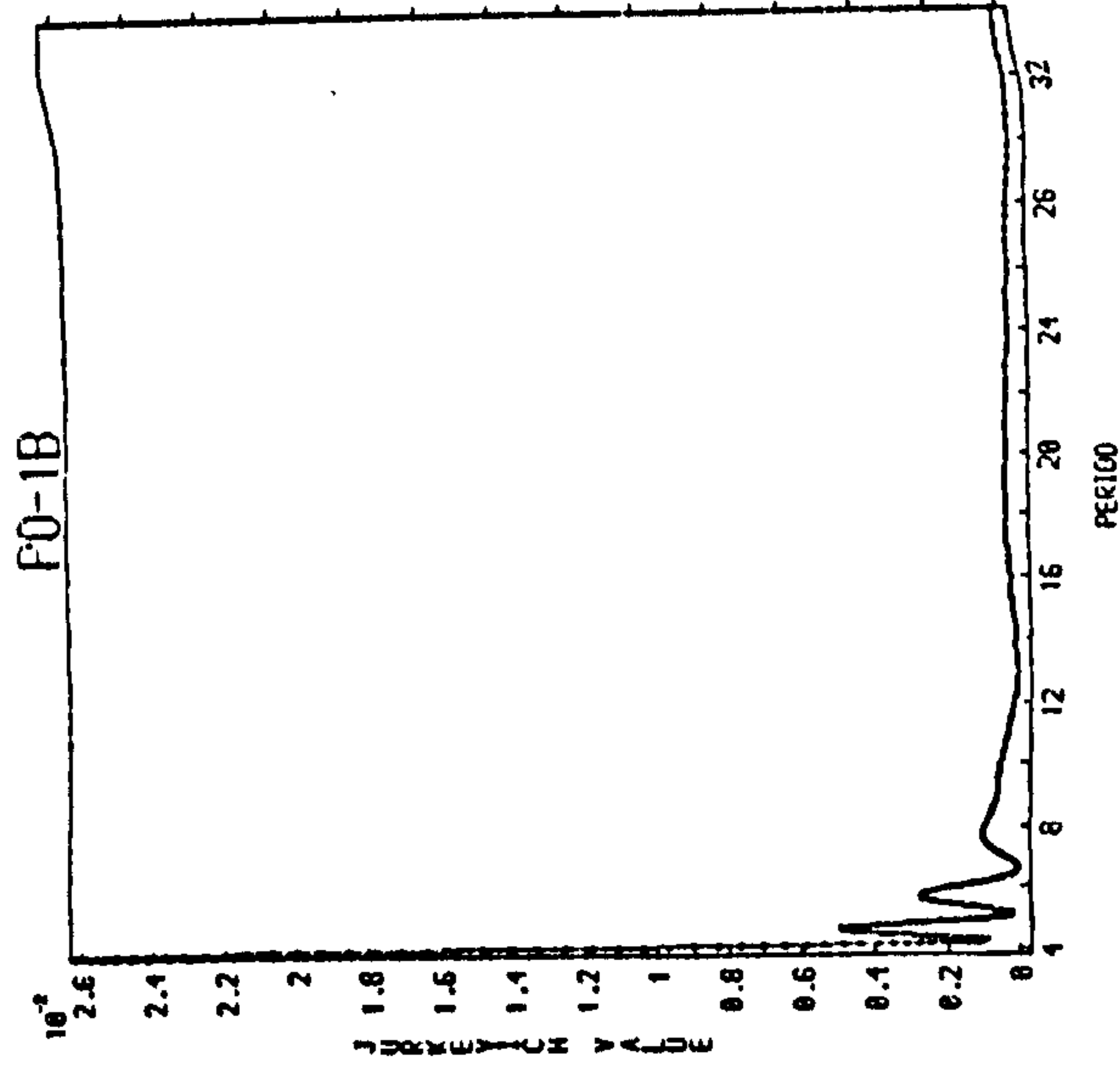
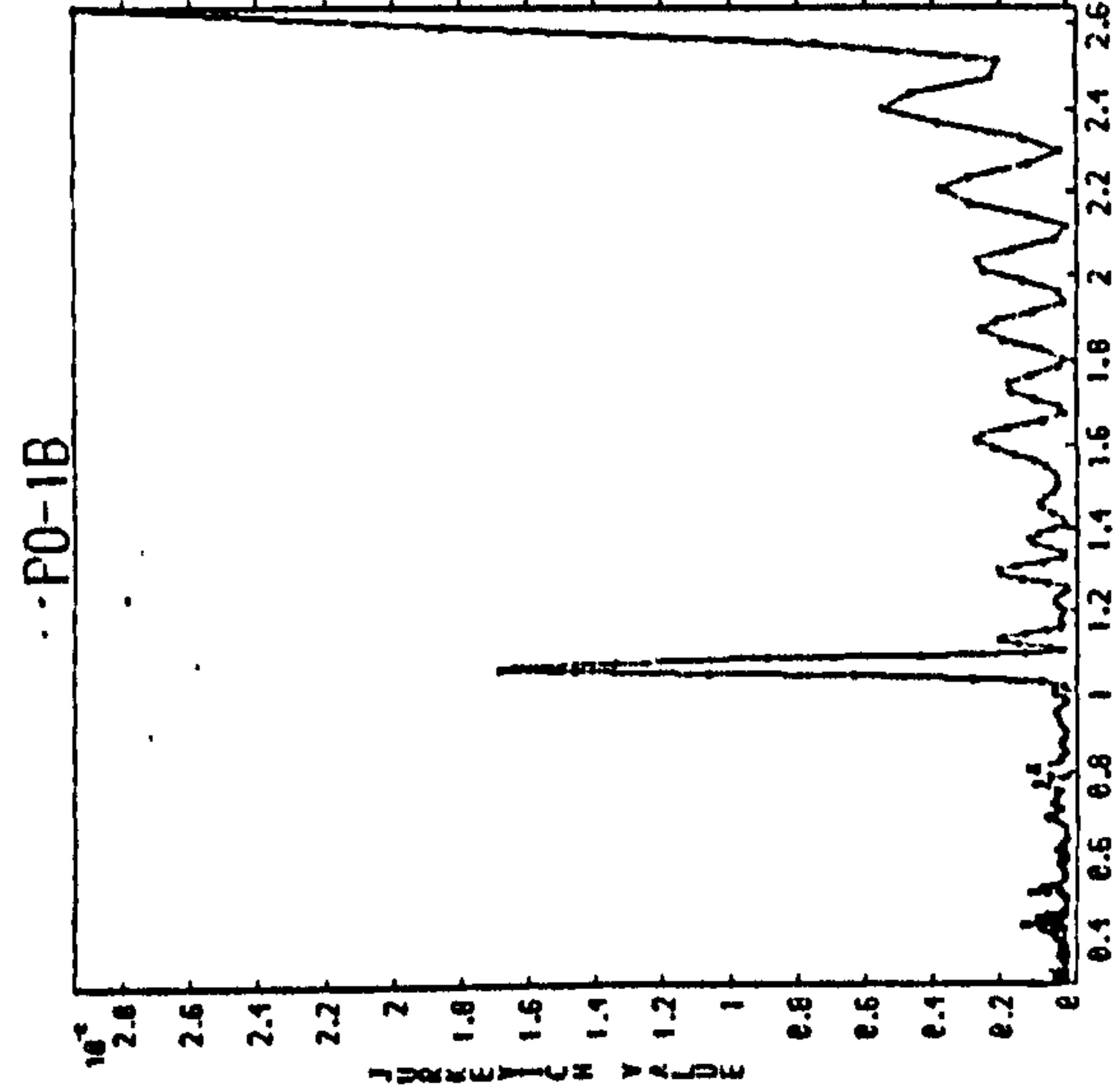
Binding

Misc.

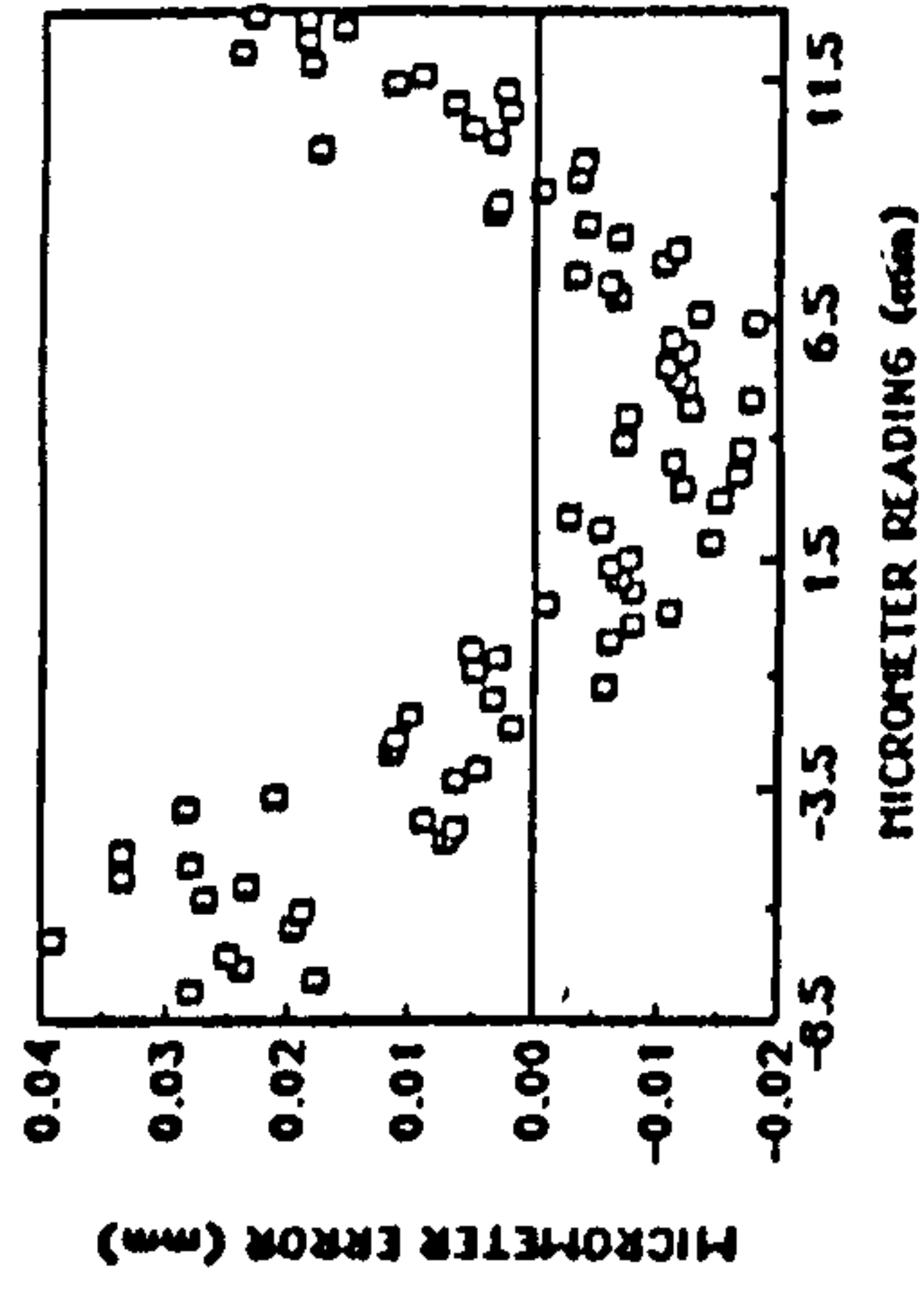
Drum: 3.25" diameter and divided  
0-100-0 with  $\pm 0.5$  div. resolution  
Scale" 1.06" long divided 20-0-20

See King (1955) p.106 for photo  
of this instrument

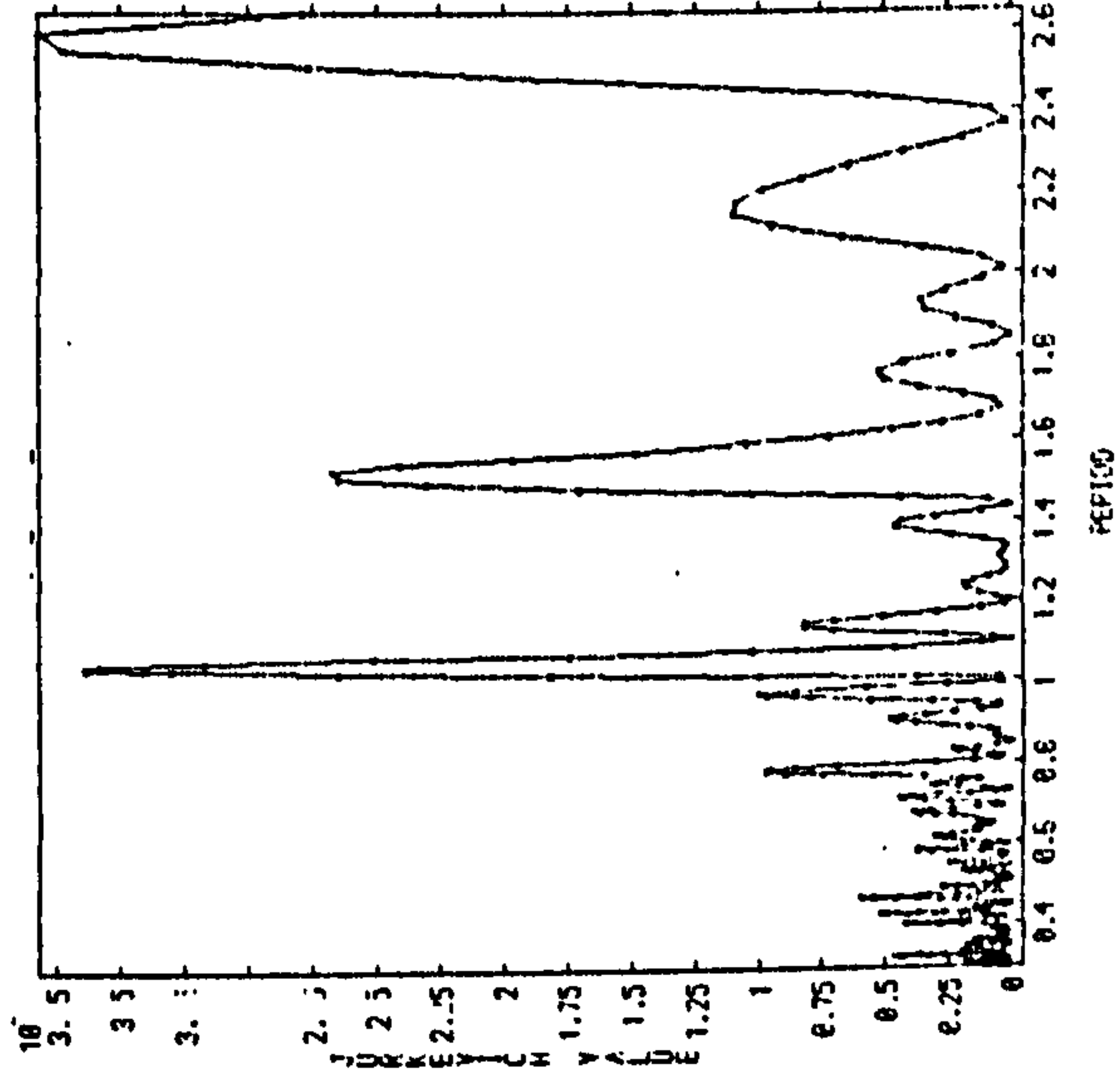
P0-1B



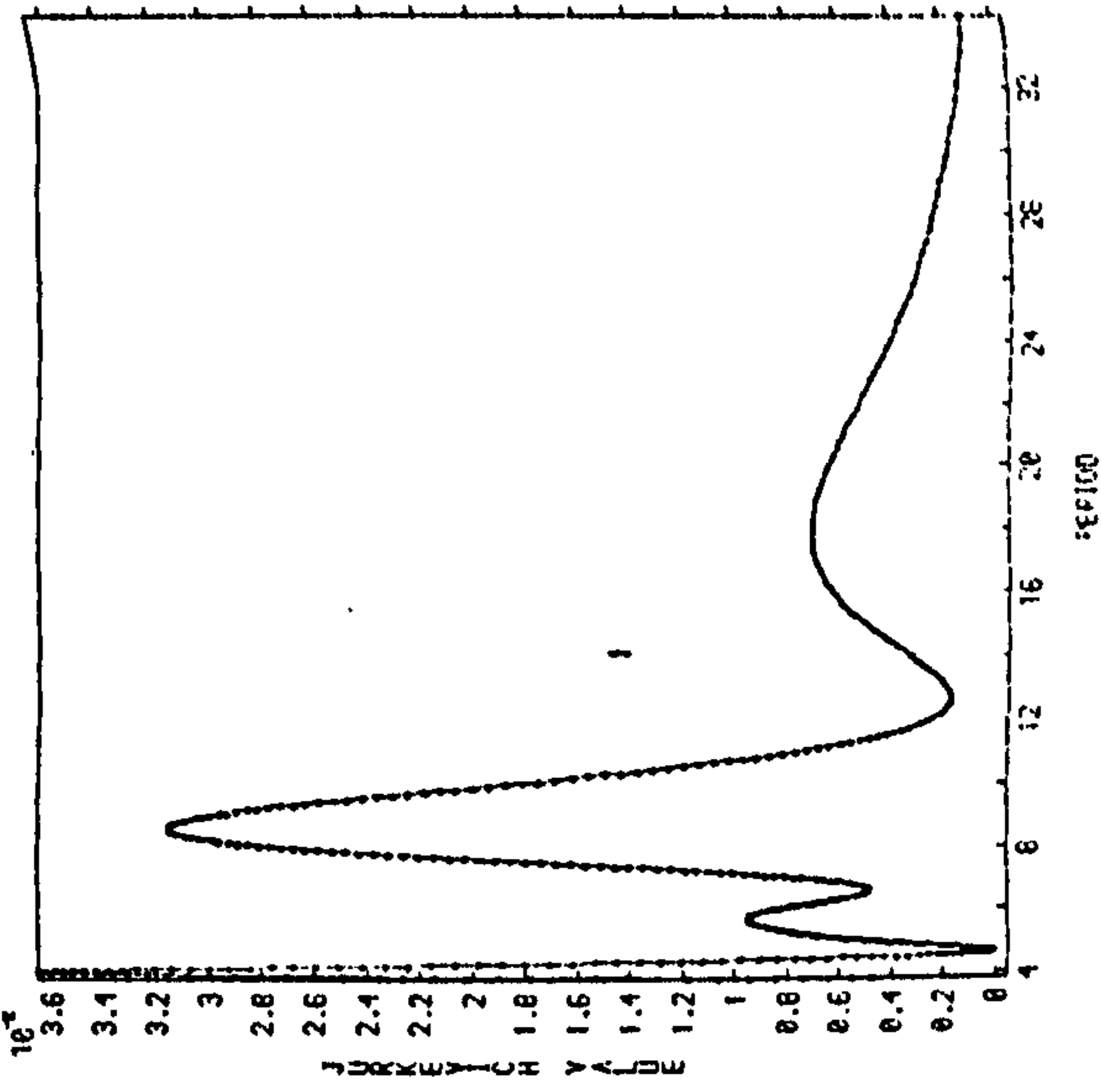
P0-1b



PERIOD



PERIOD





Characteristics:

Screw

Nut

Leng: 1.25" / 0.313"

Diameter: 0.2546"

Steel

Brass

Other:

Instrument Identification:

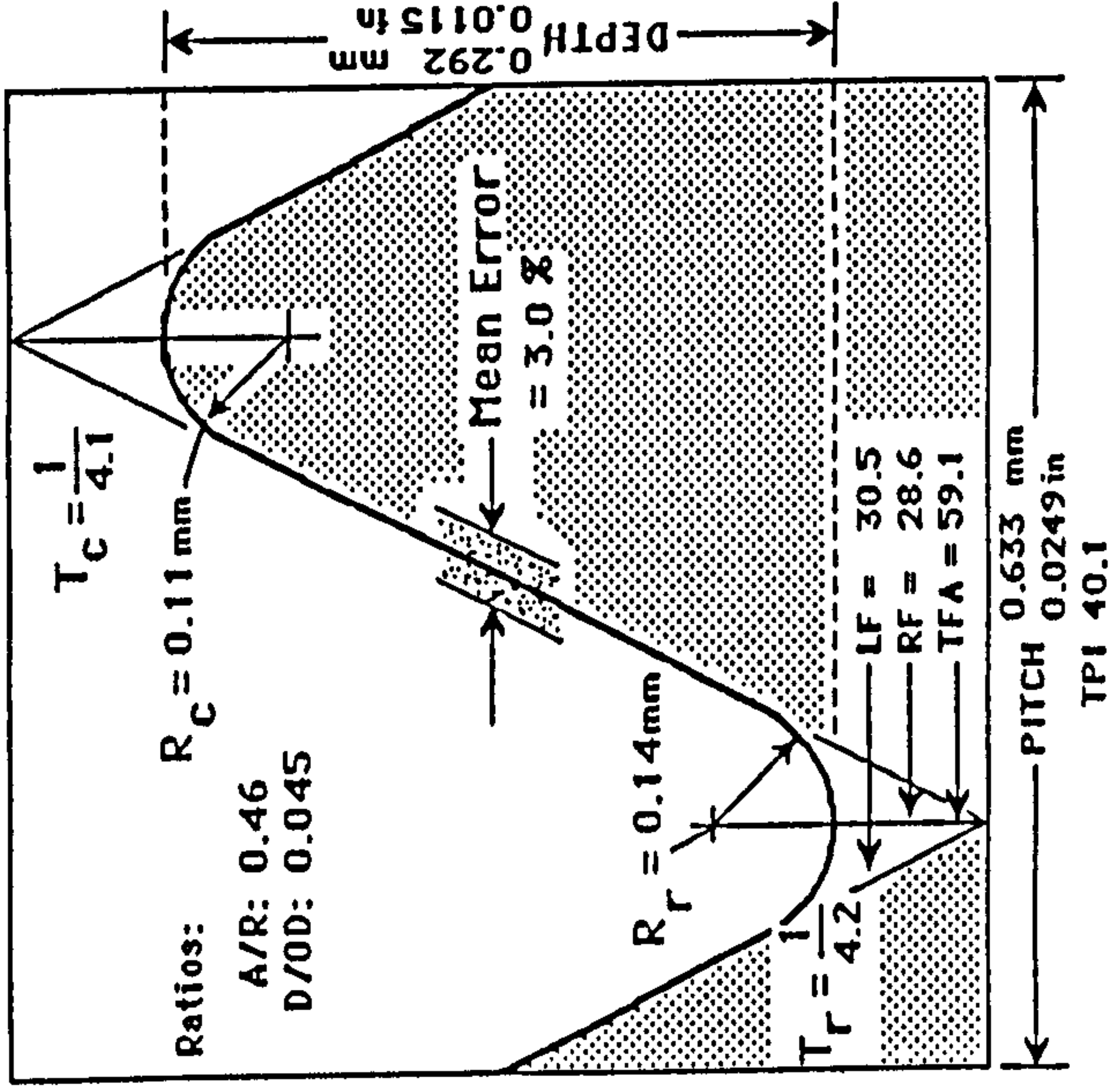
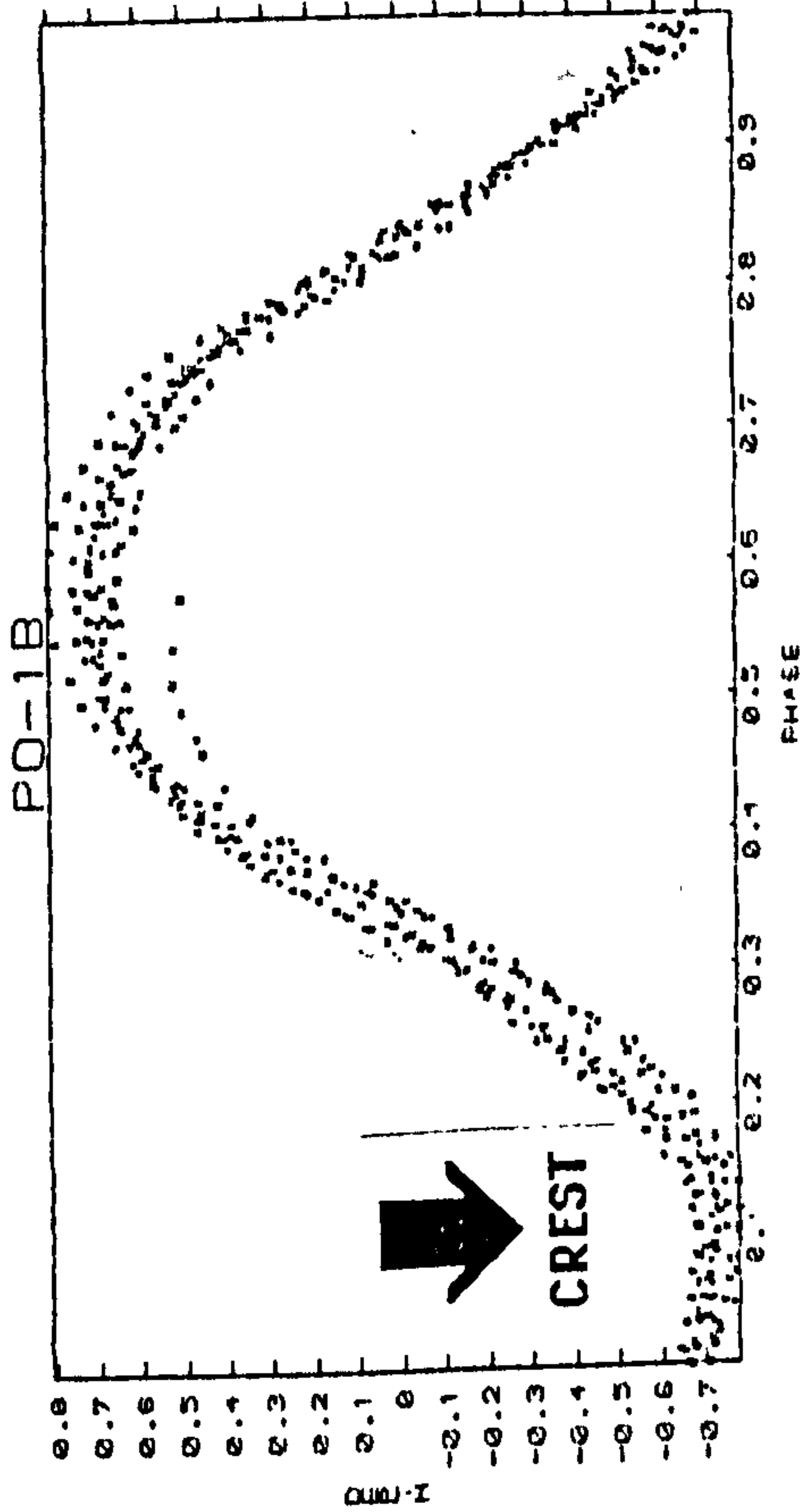
Study Code: P0-1b

Instrument: Micrometer

Maker: C. Langlois

Date: 1738

Ser./Acq. No. 1A 1811



Mu	Filar
	Scale
	Bench
	Div. Eng.
	Adjust.
	Leveling
	Focus
	Eye P.
	Tube
	Tool
	Gauge
	Binding
	Misc.

See PO-1 for scale and drum description

Characteristics:

Screw

Nut

Leng: 1.50" / 0.375"

Diameter: 0.261" nom.

Steel

Brass

Other:

Instrument Identification:

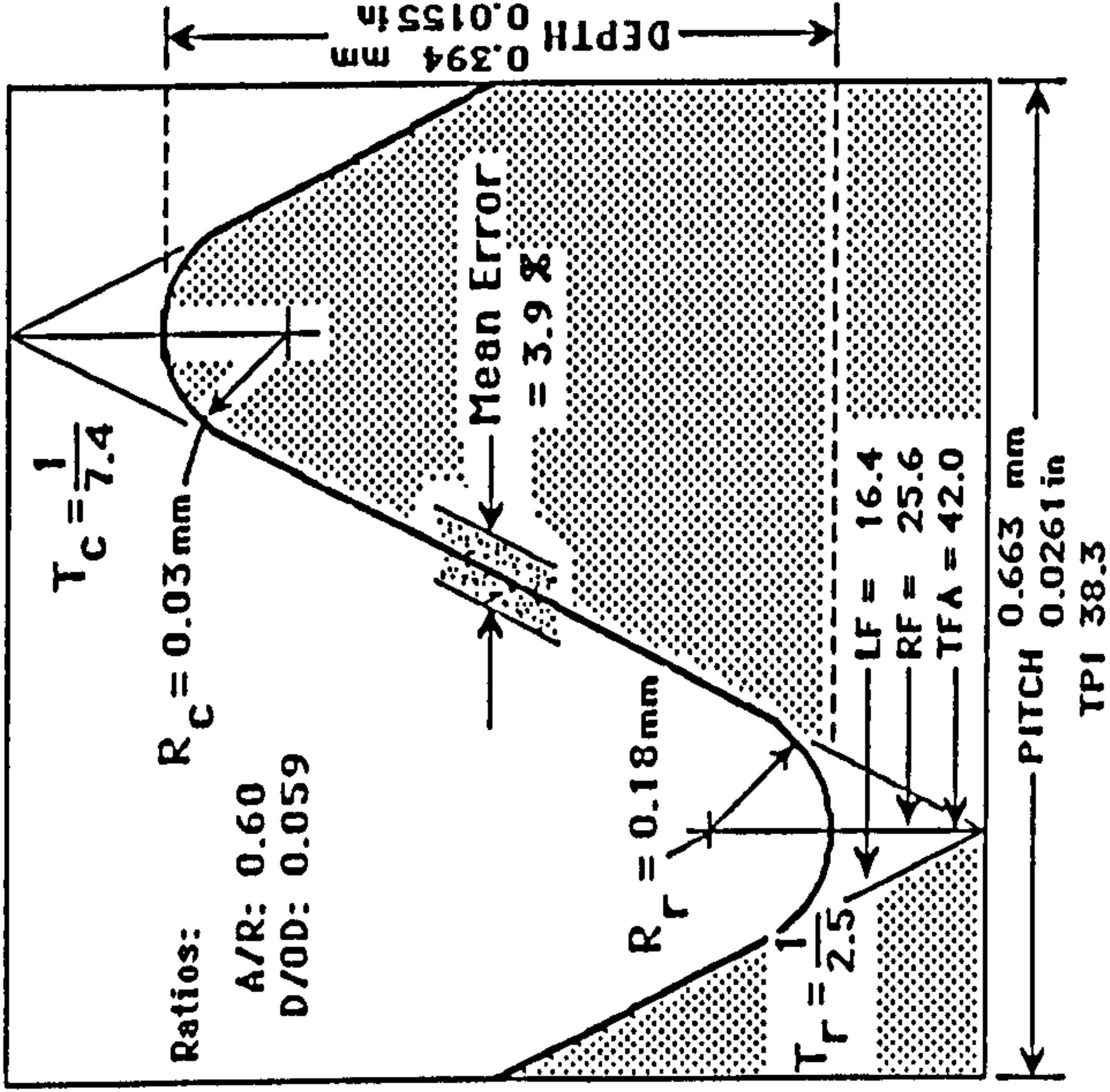
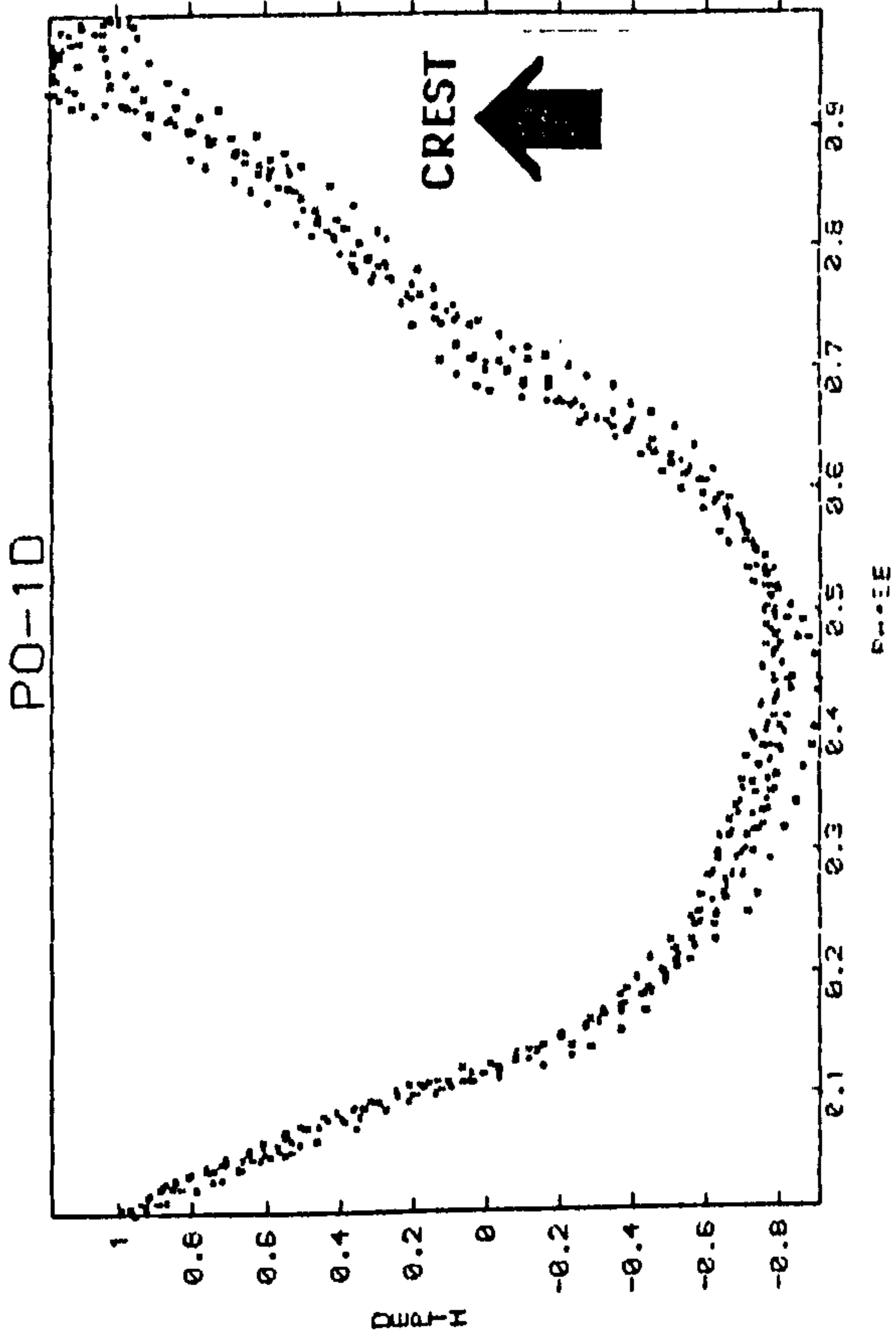
Study Code: P0-1d

Instrument: Micrometer

Maker: C. Langlois

Date: 1738

Ser./Acq. No. 1A 1811



- Mu
- Filar
  - Scale
  - Bench
  - Div. Eng. Adjust.
  - Leveling
  - Focus
  - Eye P.
  - Tube
  - Tool
  - Gauge
  - Binding
  - Misc.

Nut for P0-1a

Parent instrument is a 6ft portable sextant used by de LaCaille at the Cape (1751)

Characteristics:

Screw

Nut

Leng: 1.25" / 0/313"

Diameter: 0.255"nom.

Steel

Brass

Other:

Instrument Identification:

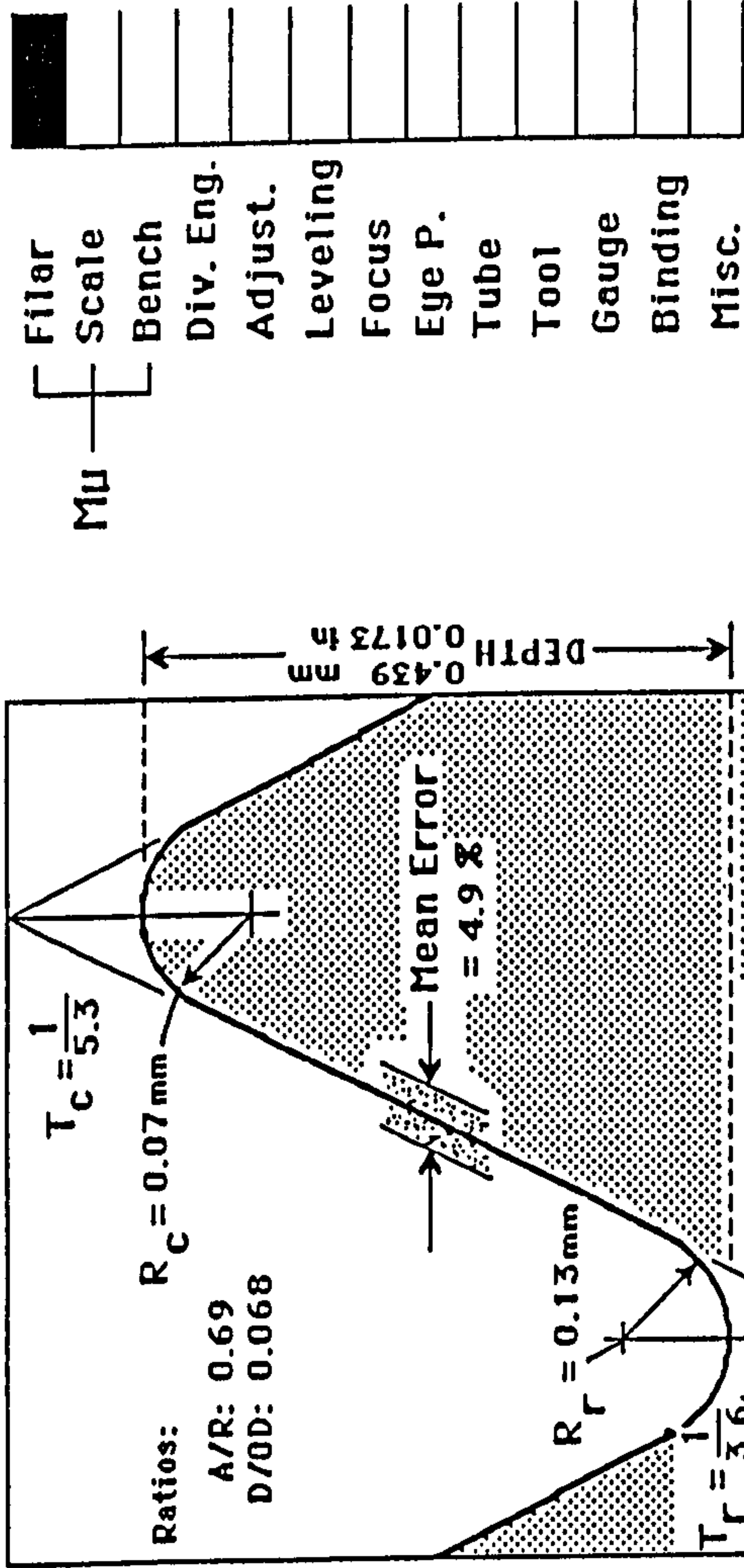
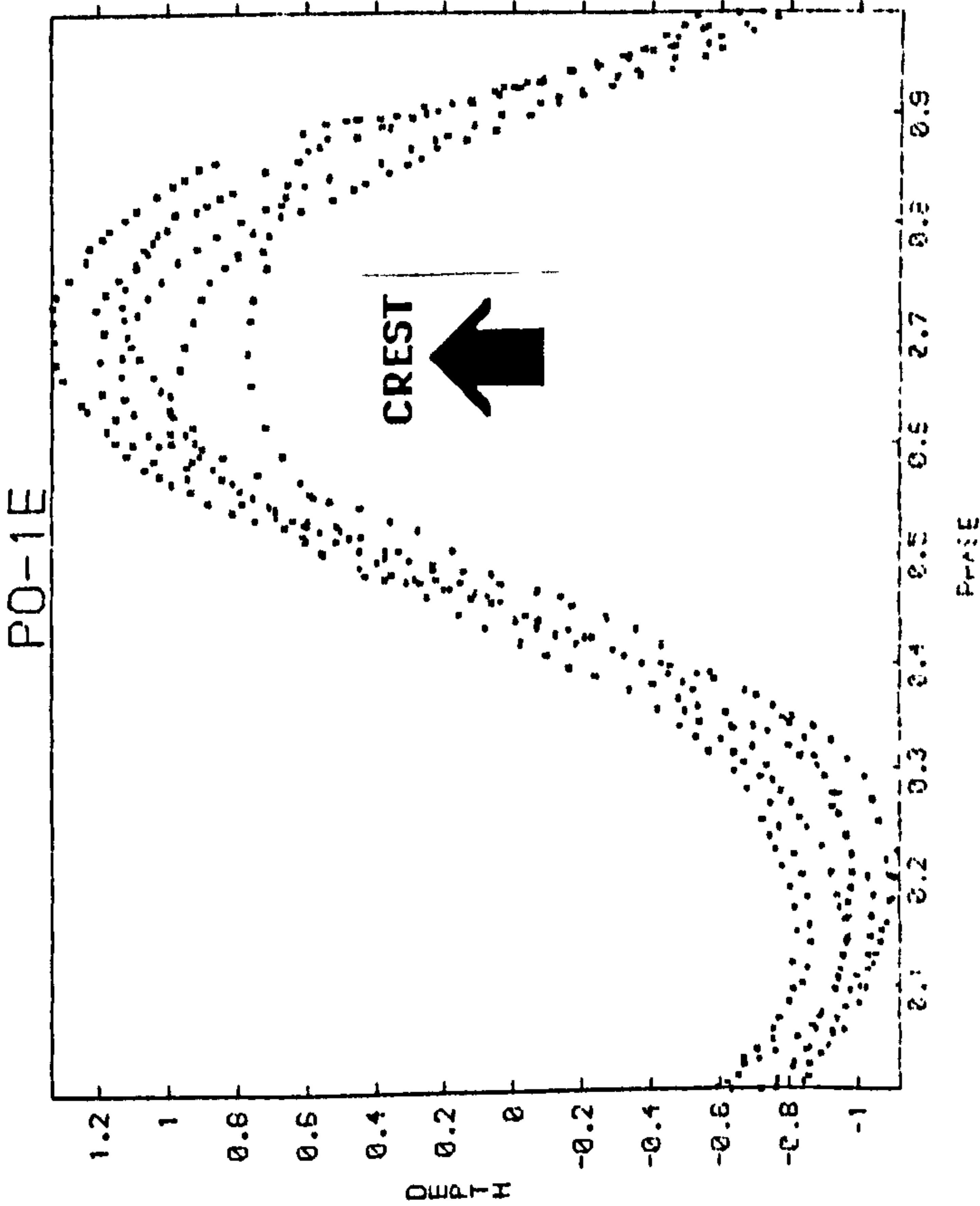
Study Code: PO-1e

Instrument: Micrometer

Maker: C. Langlois

Date: 1738

Ser./Acq. No.: 1A 1811

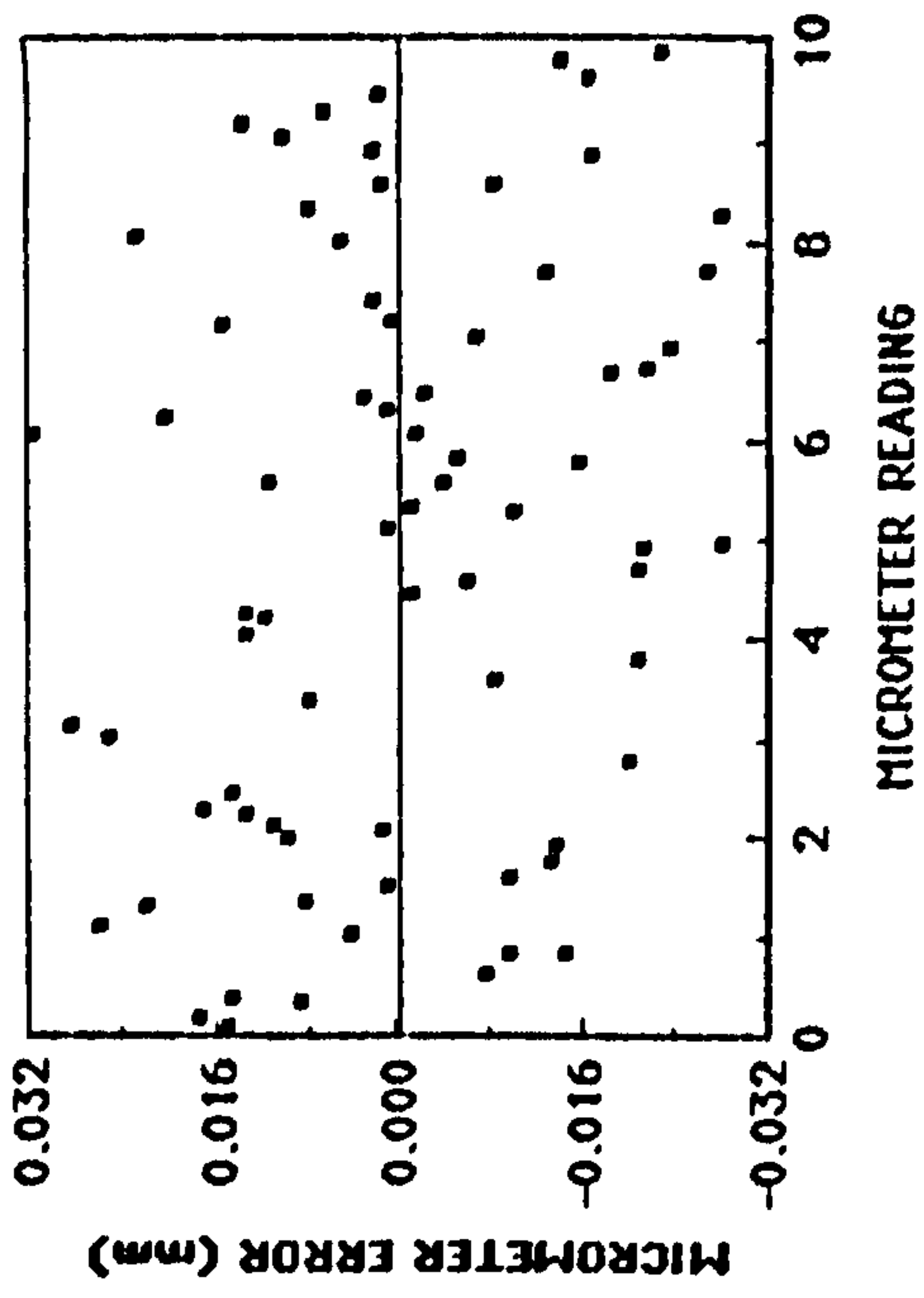


Nut for PO-1b

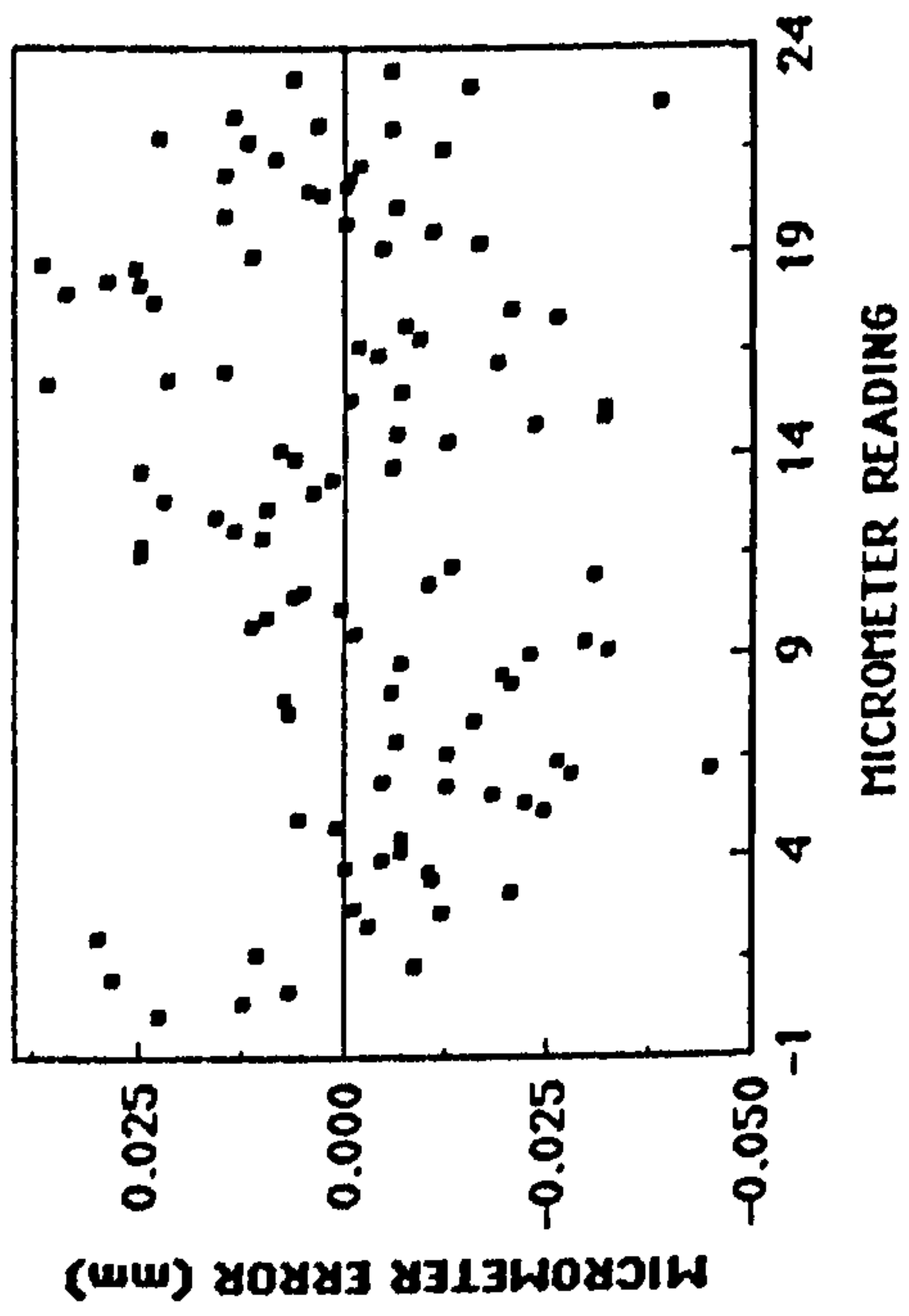
Parent instrument de LaCaille's  
6ft portable sextant used at the  
Cape of Good Hope (1751)

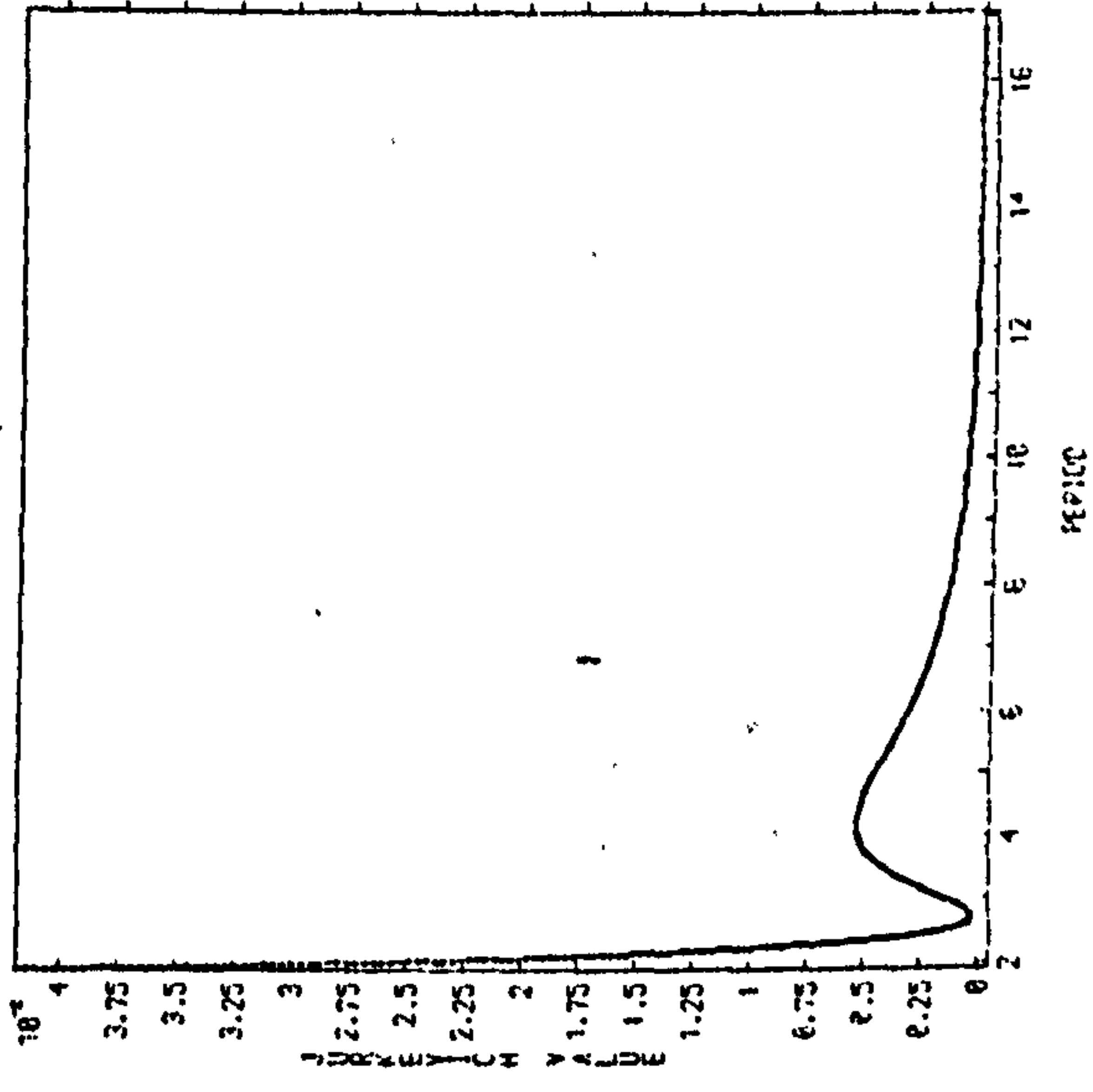
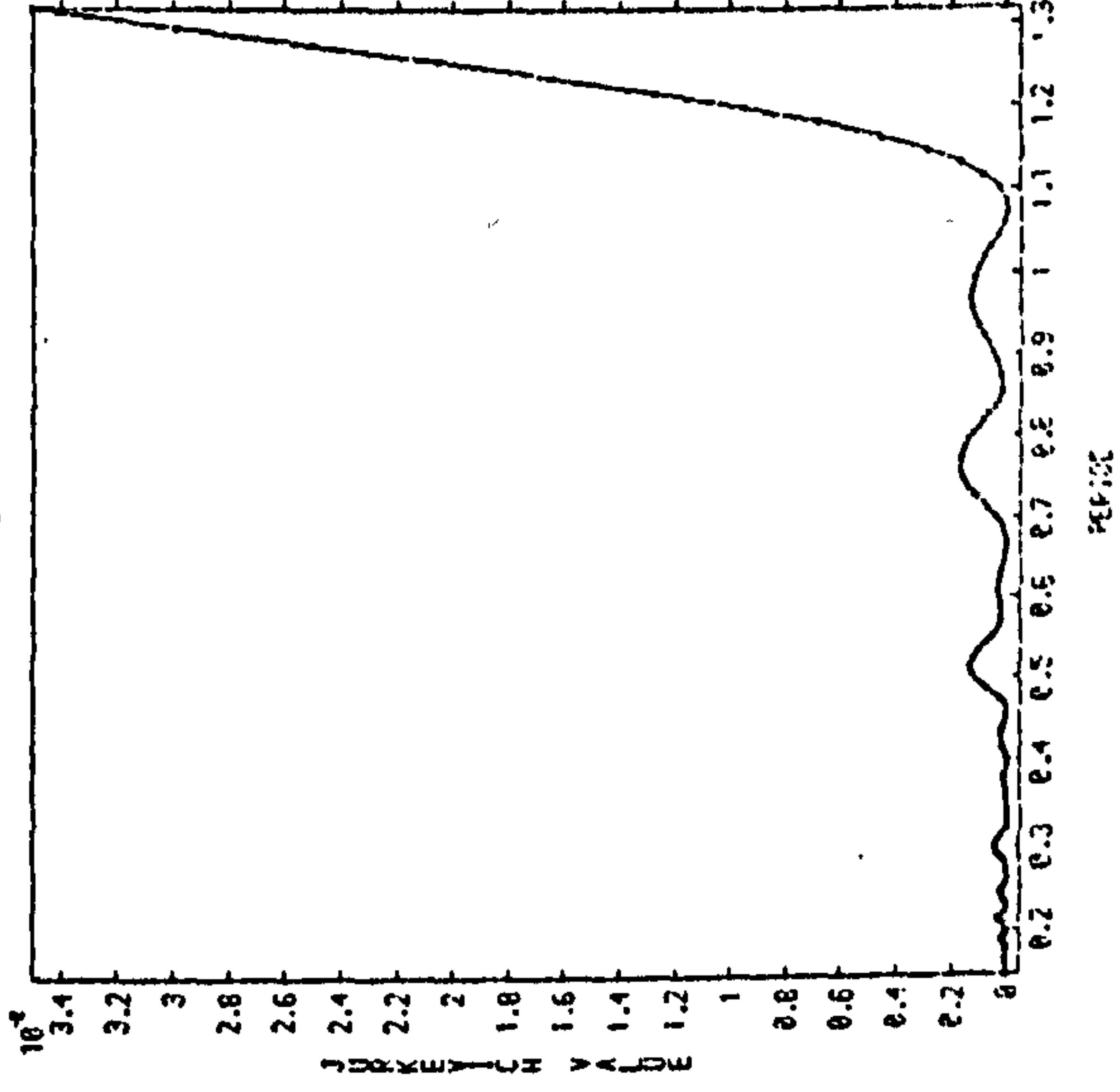
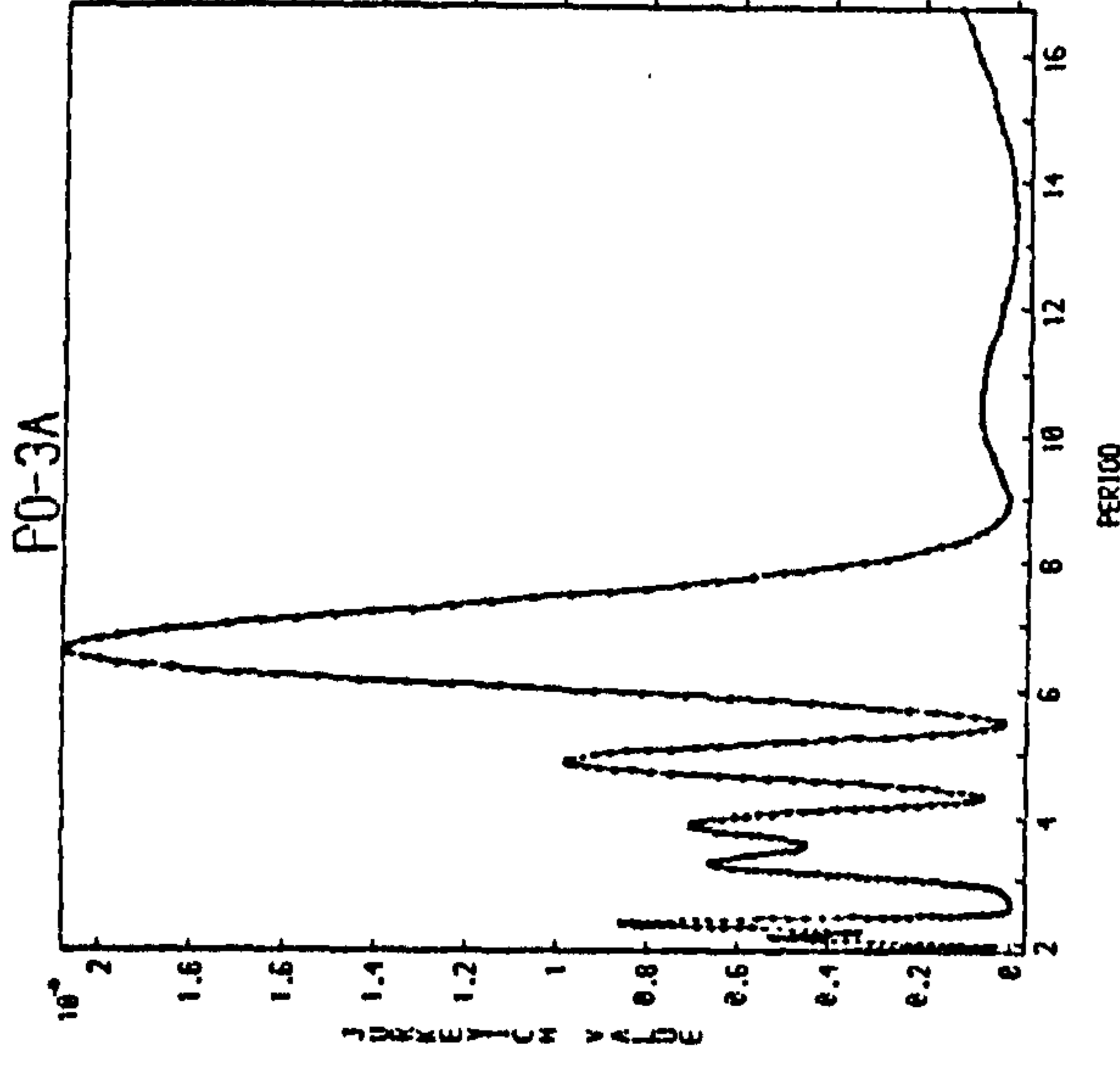
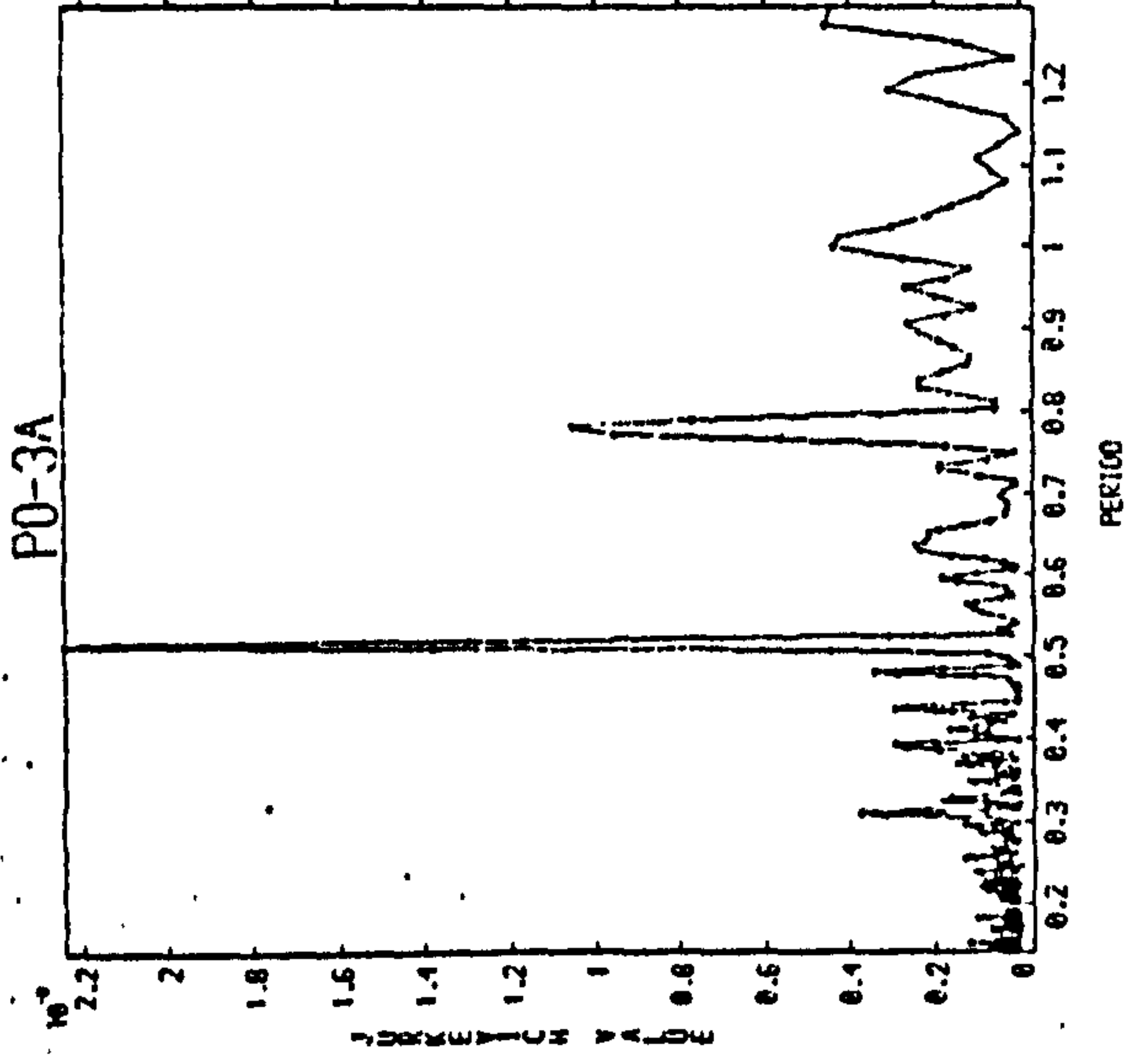
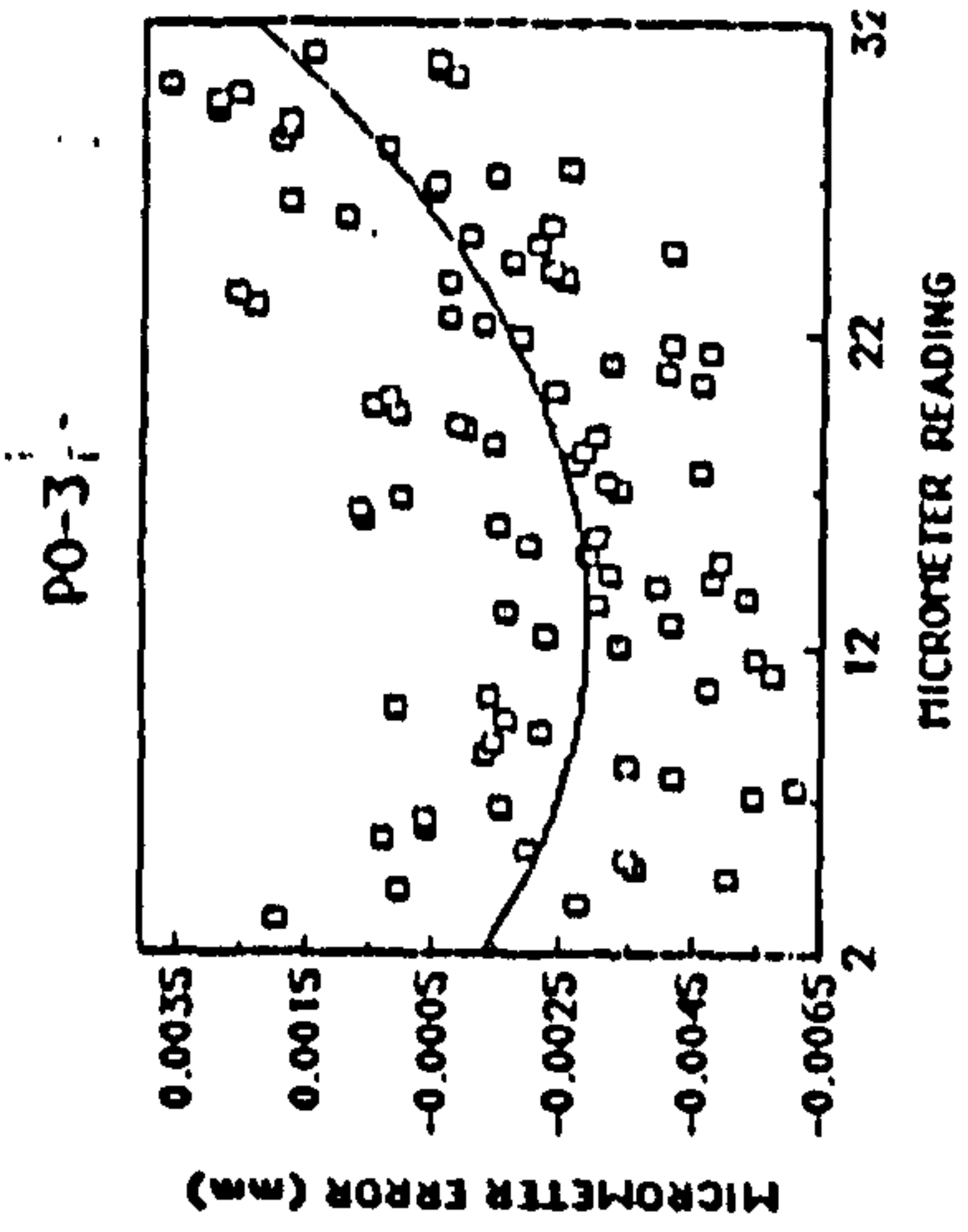


P0-2a



P0-2b (2dp)





Characteristics:

Screw

Nut

Leng: ≈0.63" / 0.266"

Diameter: 0.1200"

Steel

Brass

Other:

Instrument Identification:

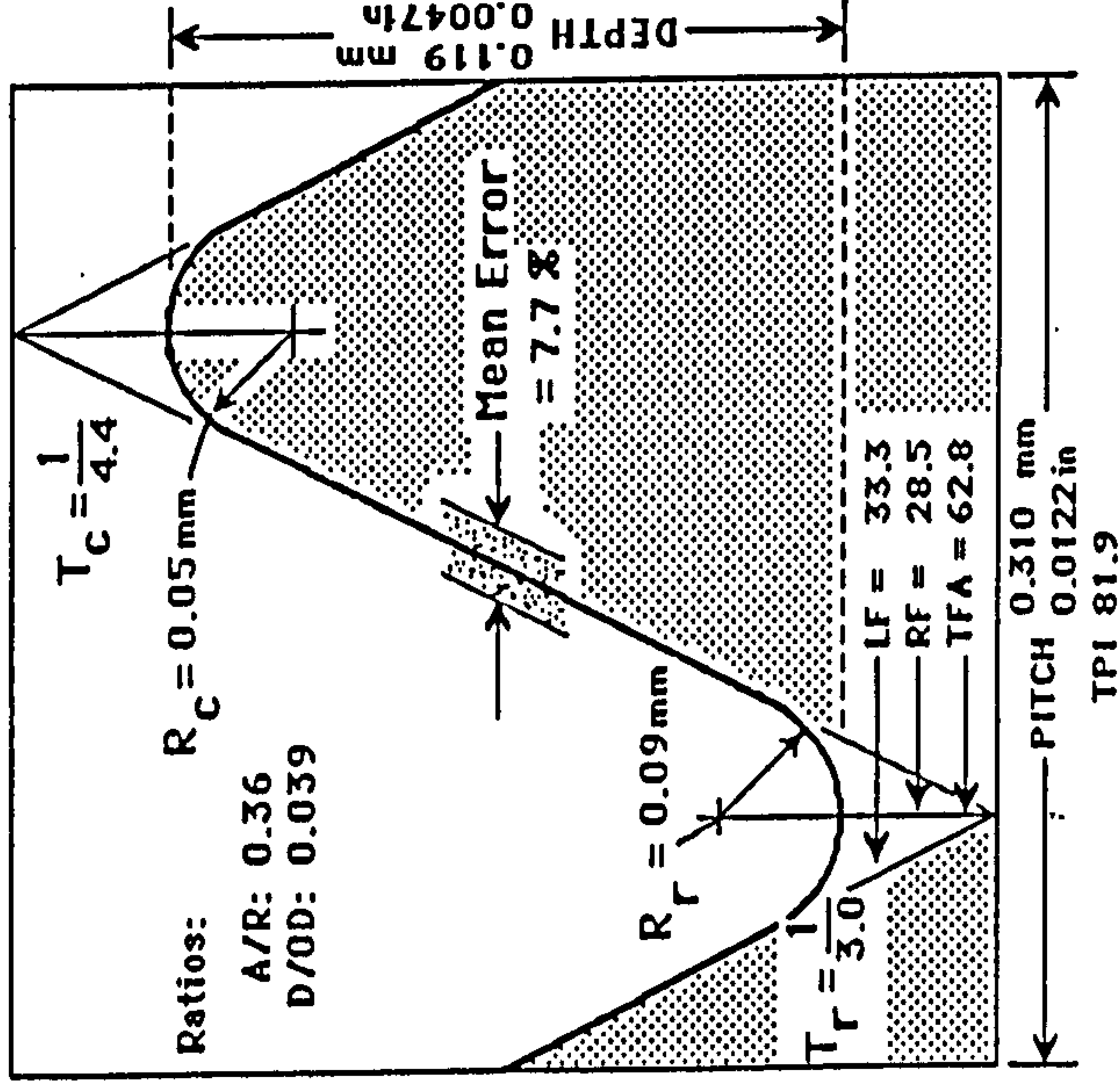
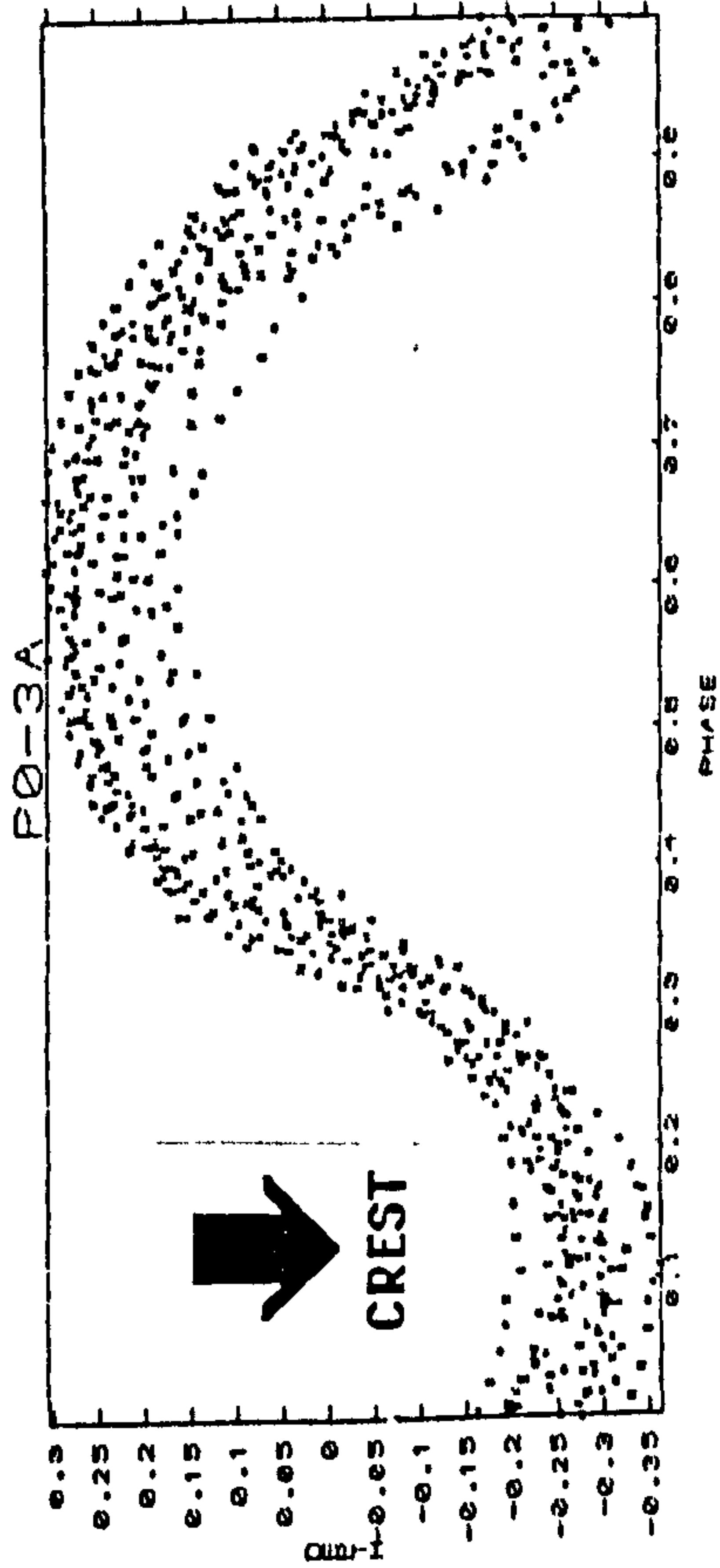
Study Code: P0-3a

Instrument: Repeating circle

Maker: Reichenbach

Date: ca.1810

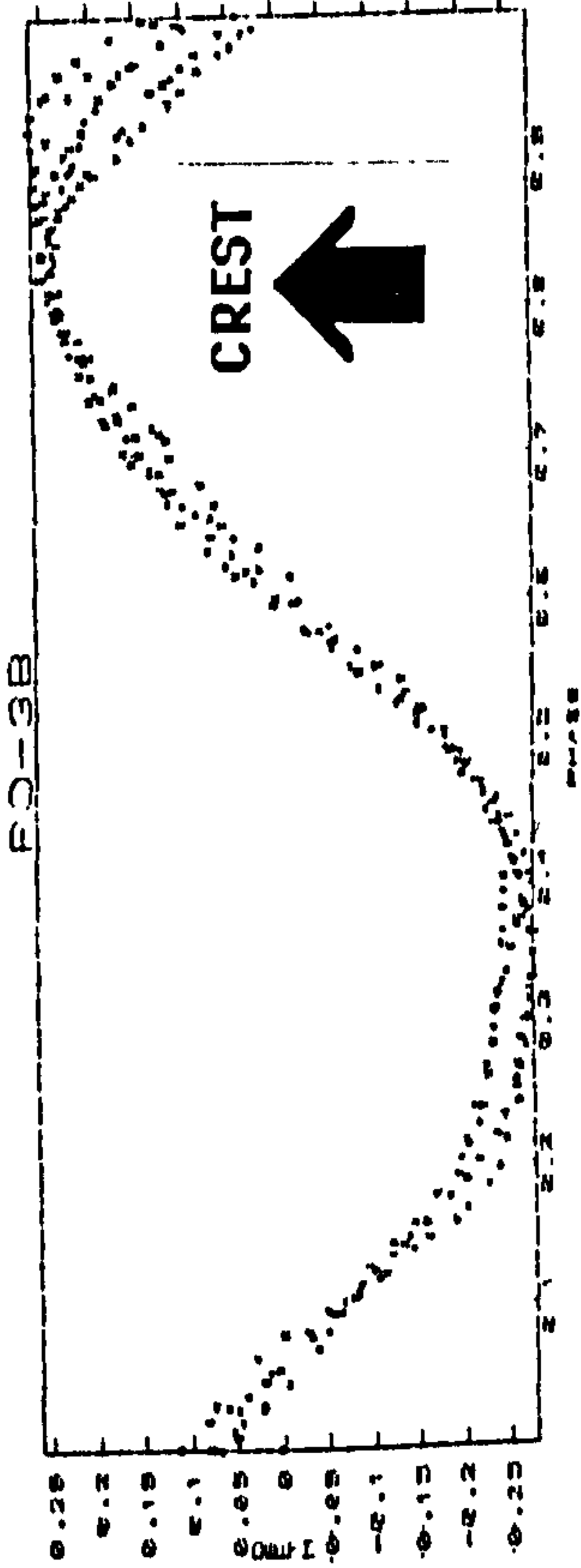
Ser./Acq. No.:



Mu	Filar	
	Scale	
—	Bench	
	Div. Eng.	
—	Adjust.	
	Leveling	
—	Focus	
	Eye P.	
—	Tube	
	Tool	
—	Gauge	
	Binding	
—	Misc.	

Drum: 1.125" diameter divided  
0-100 with ±0.2 div. resolution





**Characteristics:**

Screw ☐ Nut ☒

Leng:  $\approx 0.63''$  /  $0.266''$

Diameter:  $0.1200''$

Steel ☒ Brass ☐

Other: ☐

**Instrument Identification:**

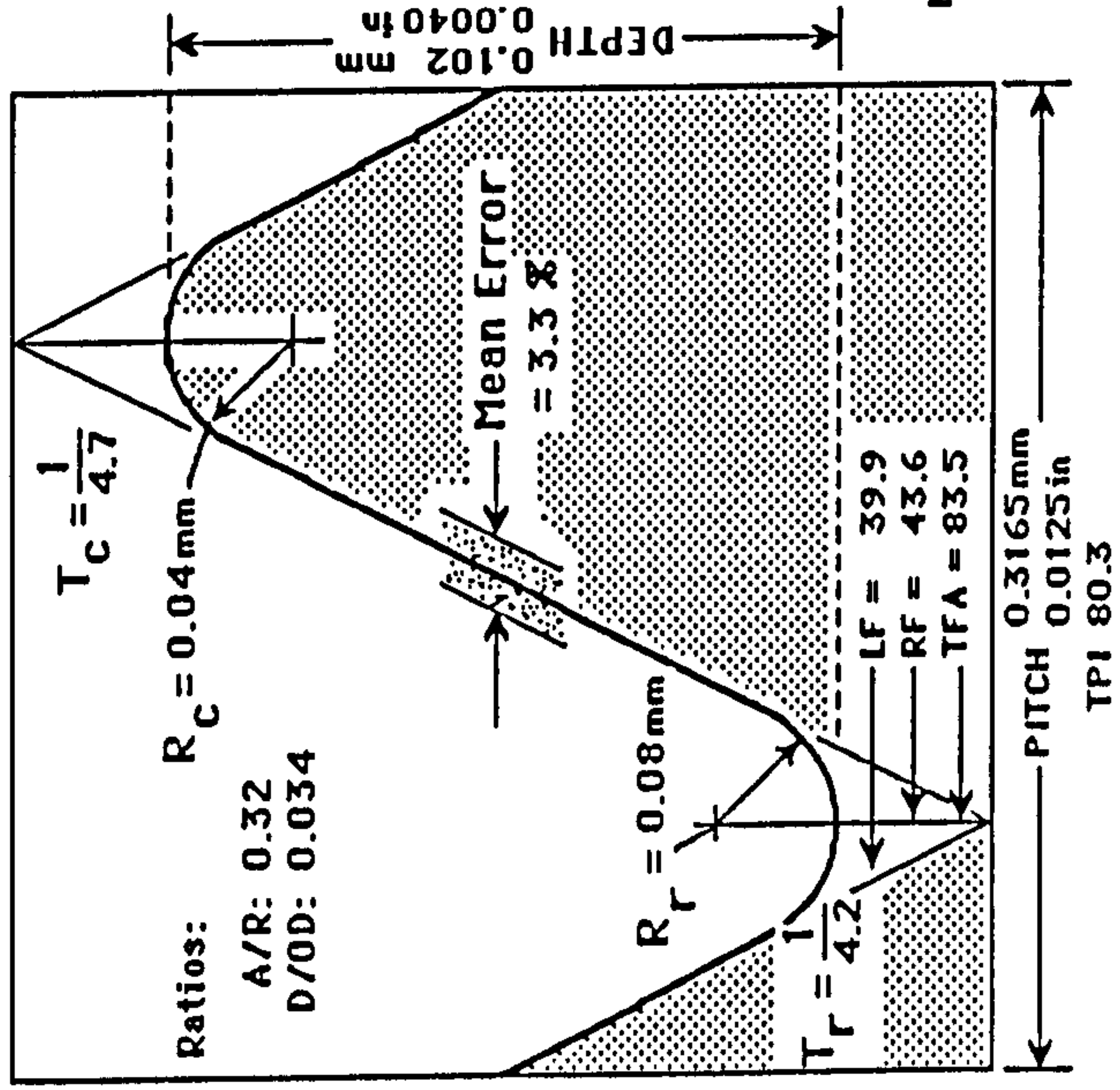
Study Code: P0-3b

Instrument: Repeating circle

Maker: Richenbach

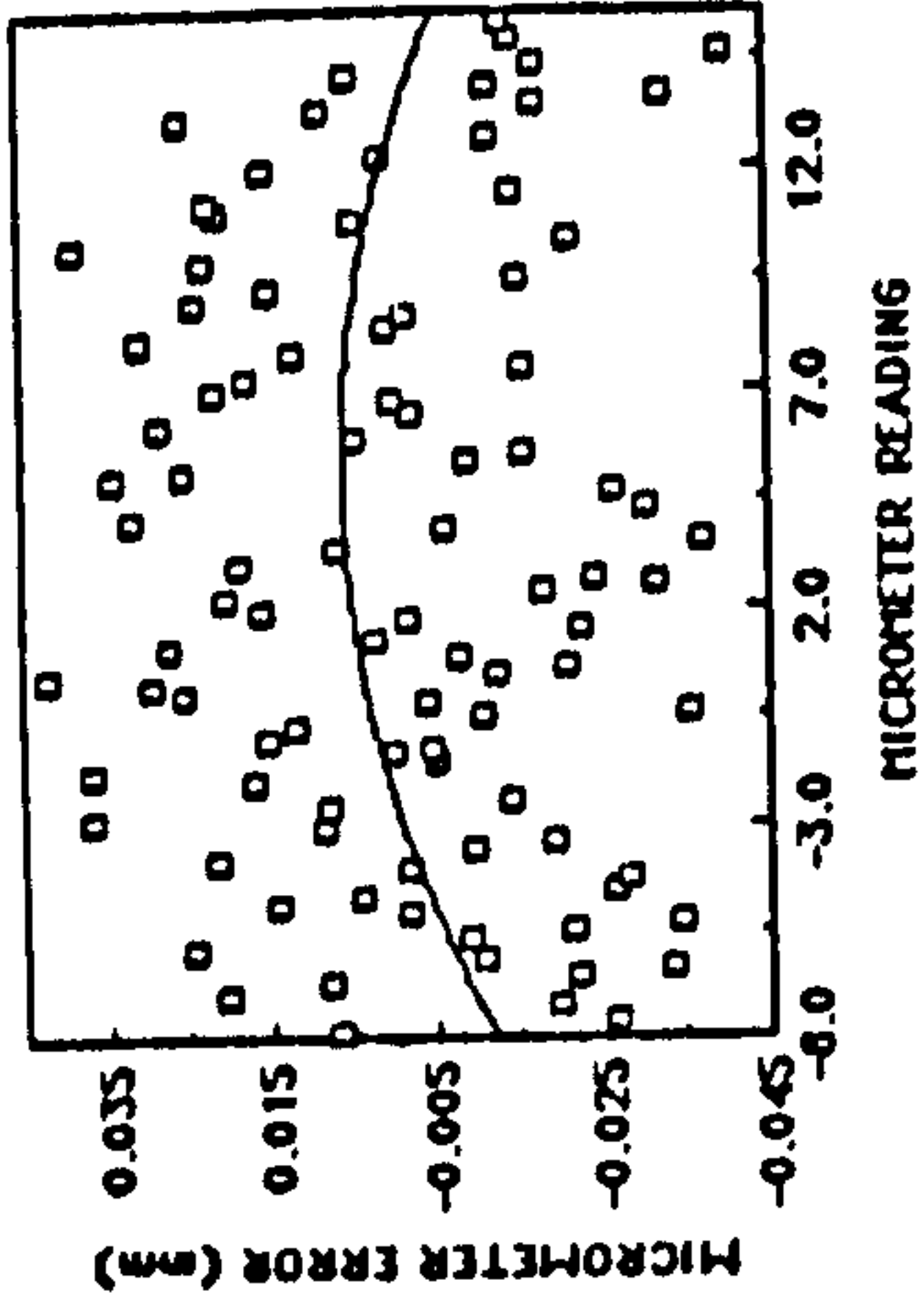
Date: ca.1810

Ser./Acq. No. .

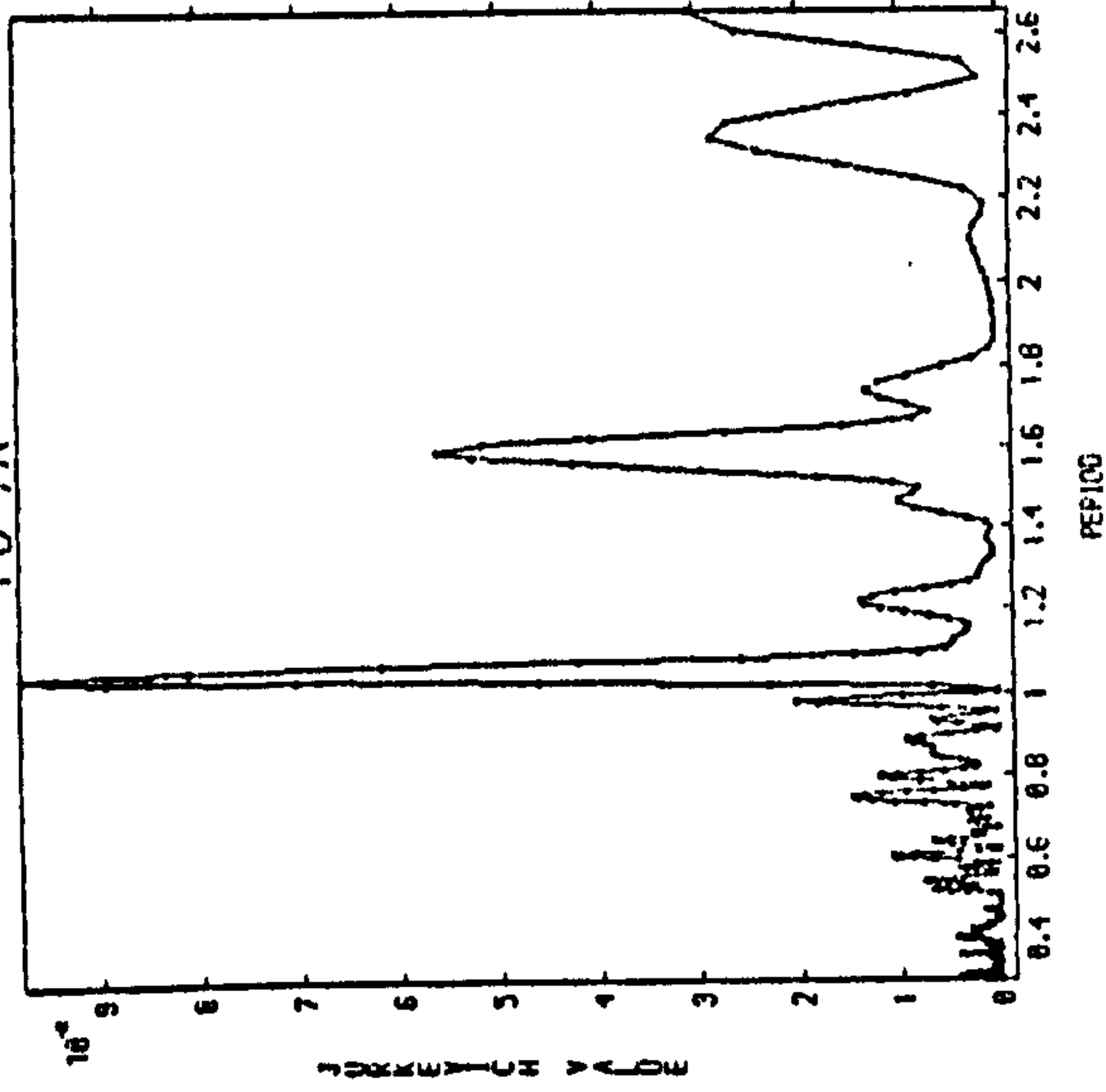


Mu	Filar	
	Scale	
	Bench	
	Div. Eng.	
	Adjust.	
	Leveling	
	Focus	
	Eye P.	
	Tube	
	Tool	
	Gauge	
	Binding	
	Misc.	

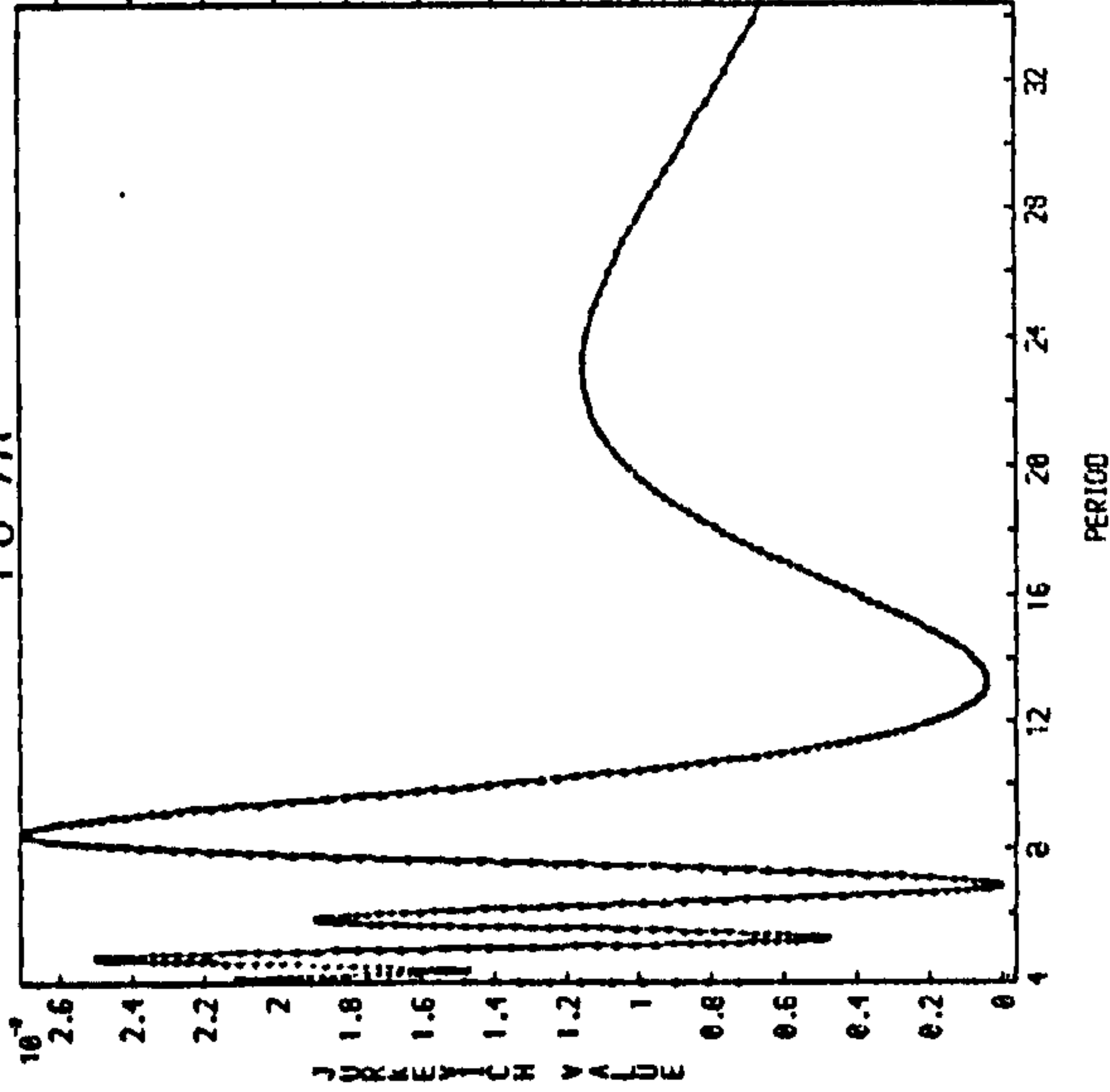
P0-7a



P0-7A



P0-7A



Characteristics:

Screw

Nut

Leng: 1.188" / 0.188"

Diameter: 0.2592"

Steel

Brass

Other:

Instrument Identification:

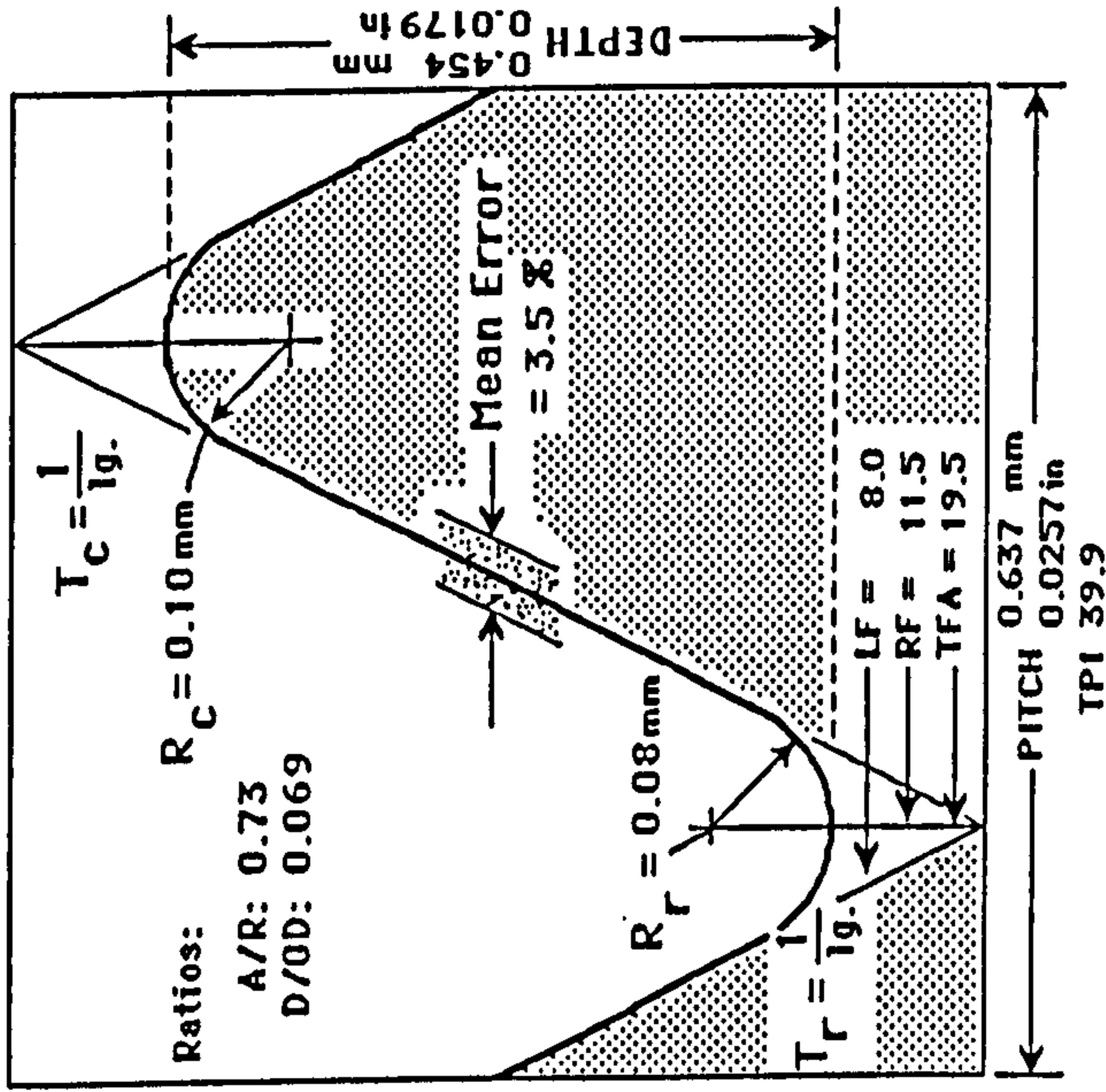
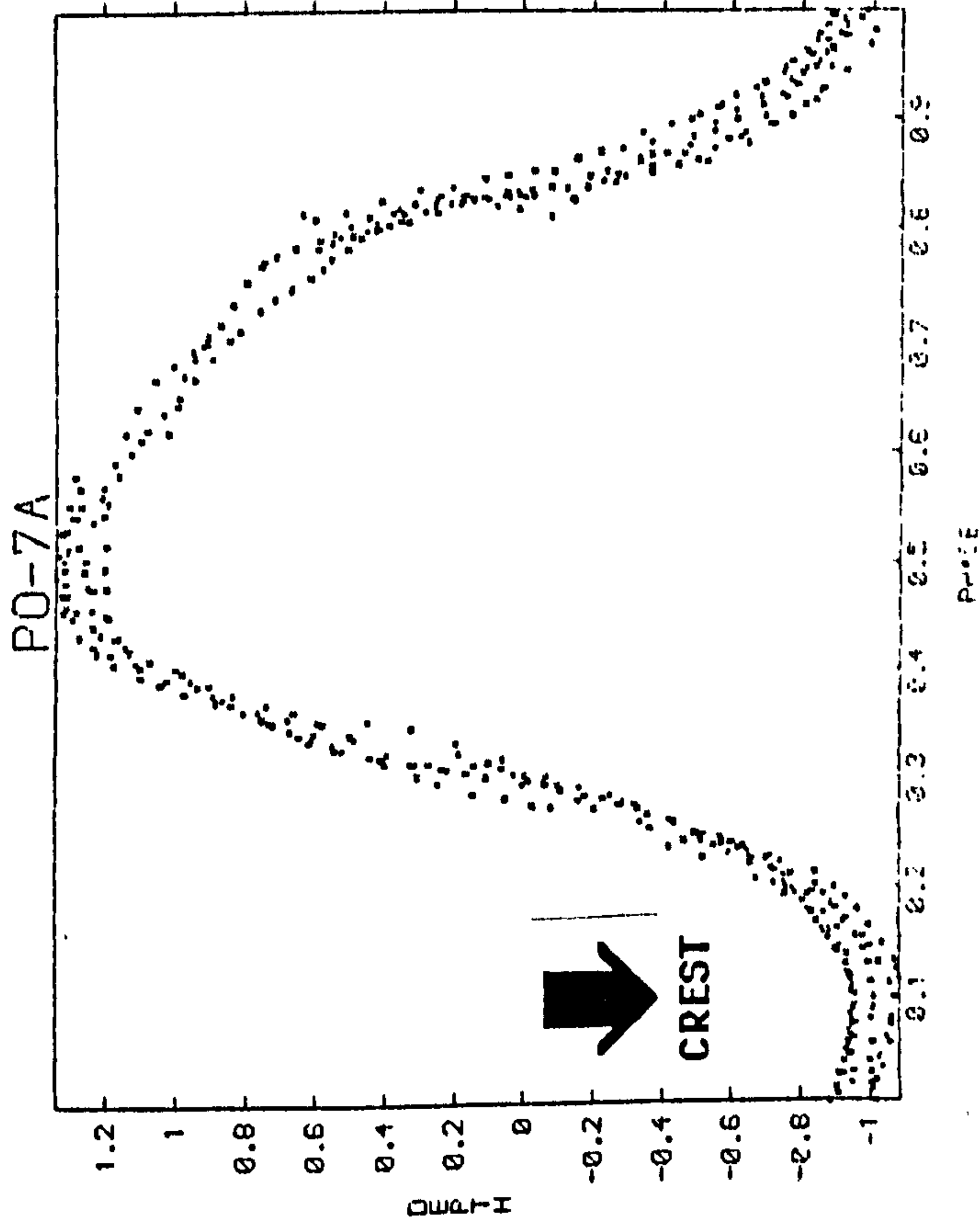
Study Code: P0-7a

Instrument: 6ft portable sextant

Maker: C. Langlois

Date: 1746

Ser./Acq. No. .

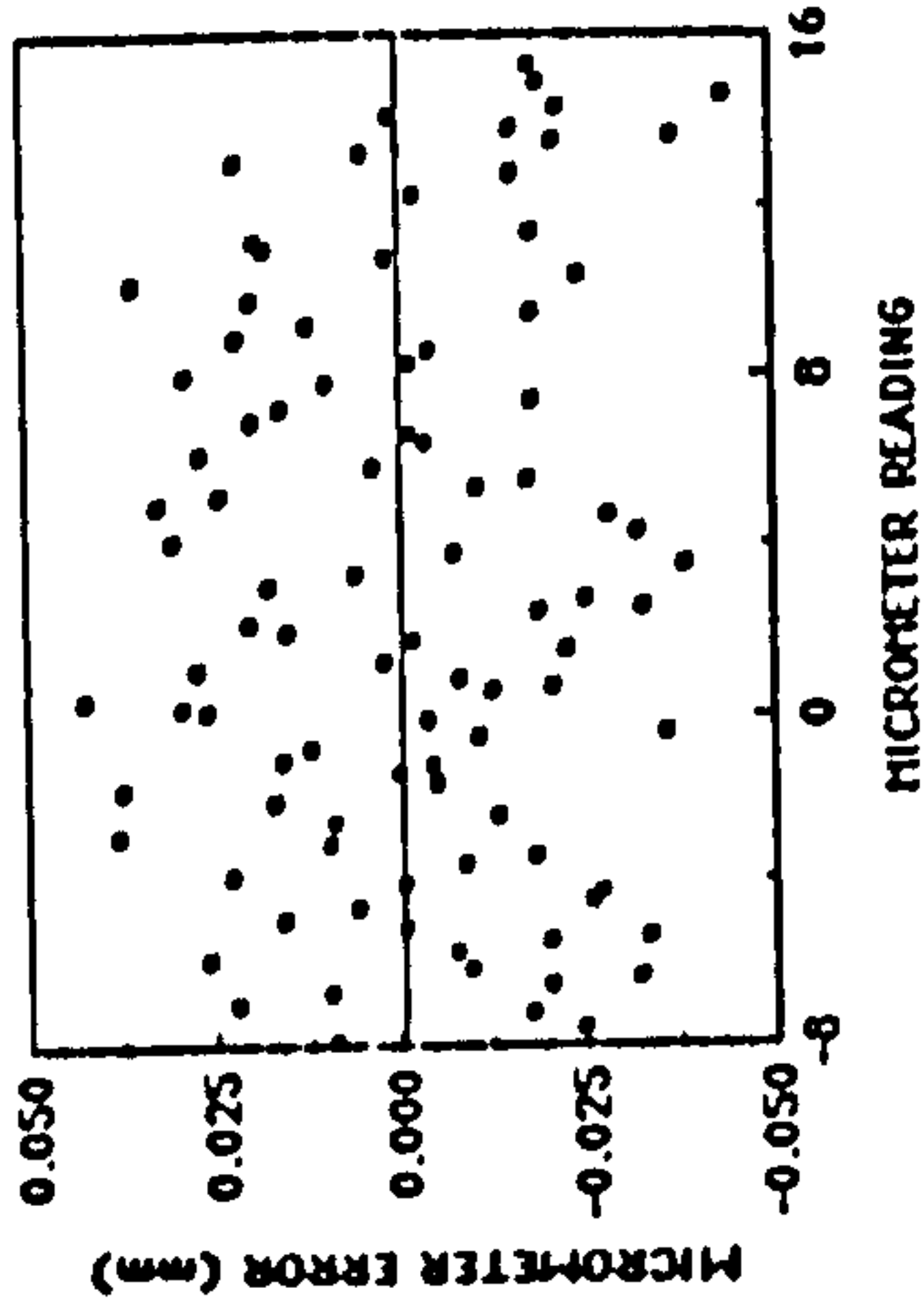


Mu	Filar
	Scale
Bench	Div. Eng.
	Adjust.
Leveling	Focus
	Eye P.
Tube	Tool
	Gauge
Binding	Misc.

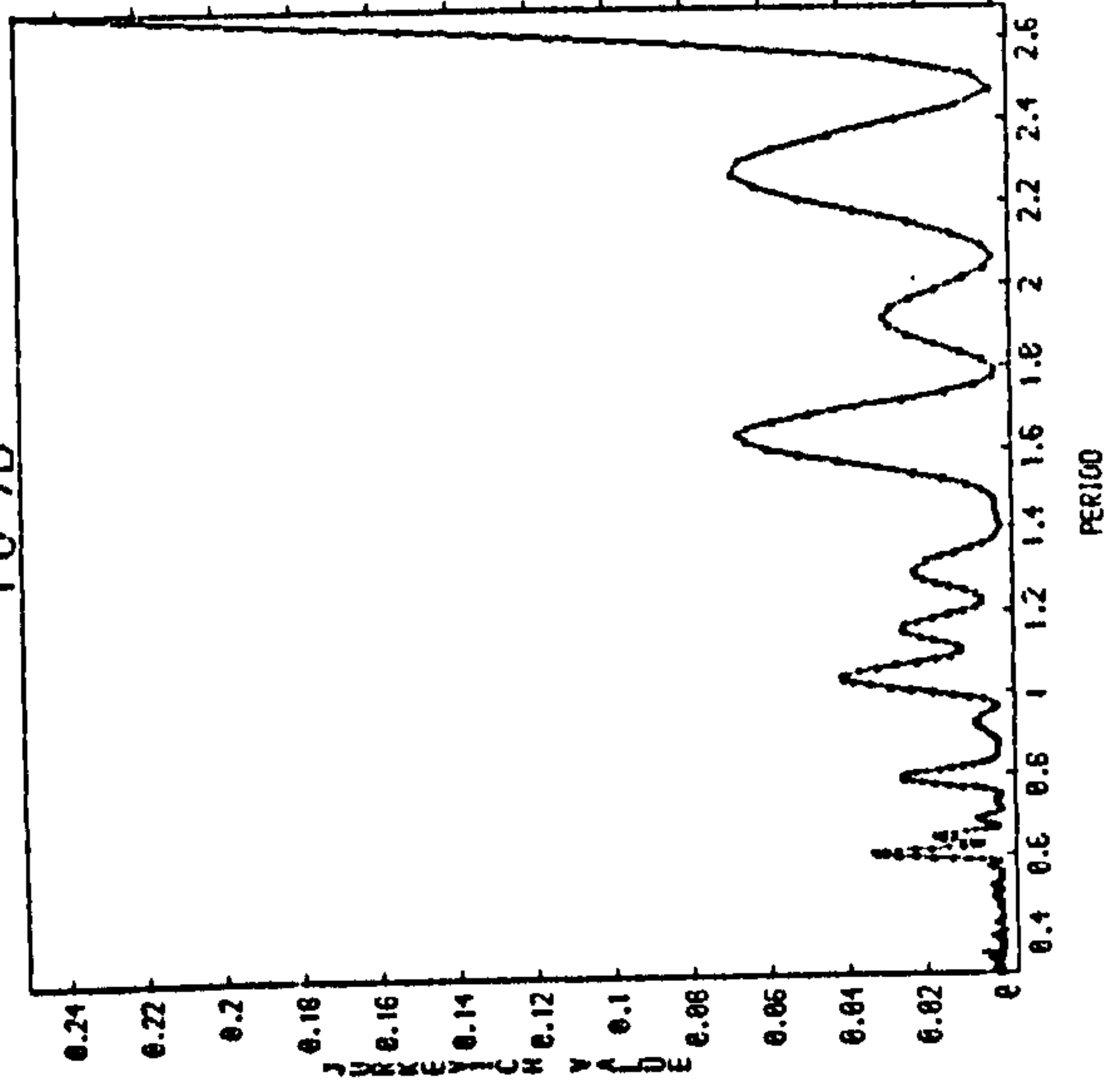
Drum: 2.875" diameter with  
0-100 divisions and  $\pm 0.2$  div.  
resolution  
Scale: 15-0-15 divisions



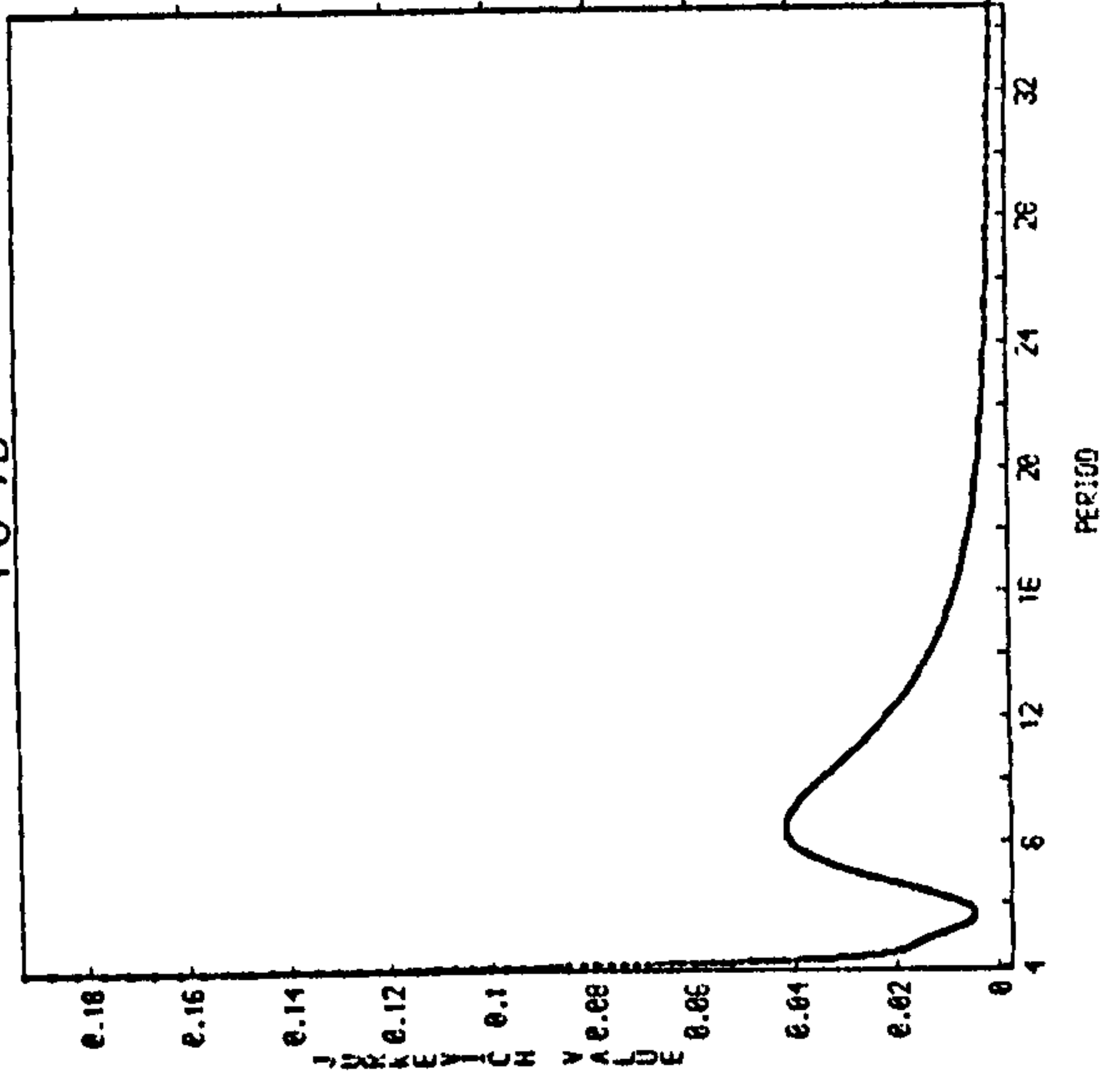
Data from "PO-78"



P0-7B



P0-7B



Characteristics:

Screw

Nut

Leng: 1.188" / 0.313"

Diameter: 0.259" nom.

Steel

Brass

Other:

Instrument Identification:

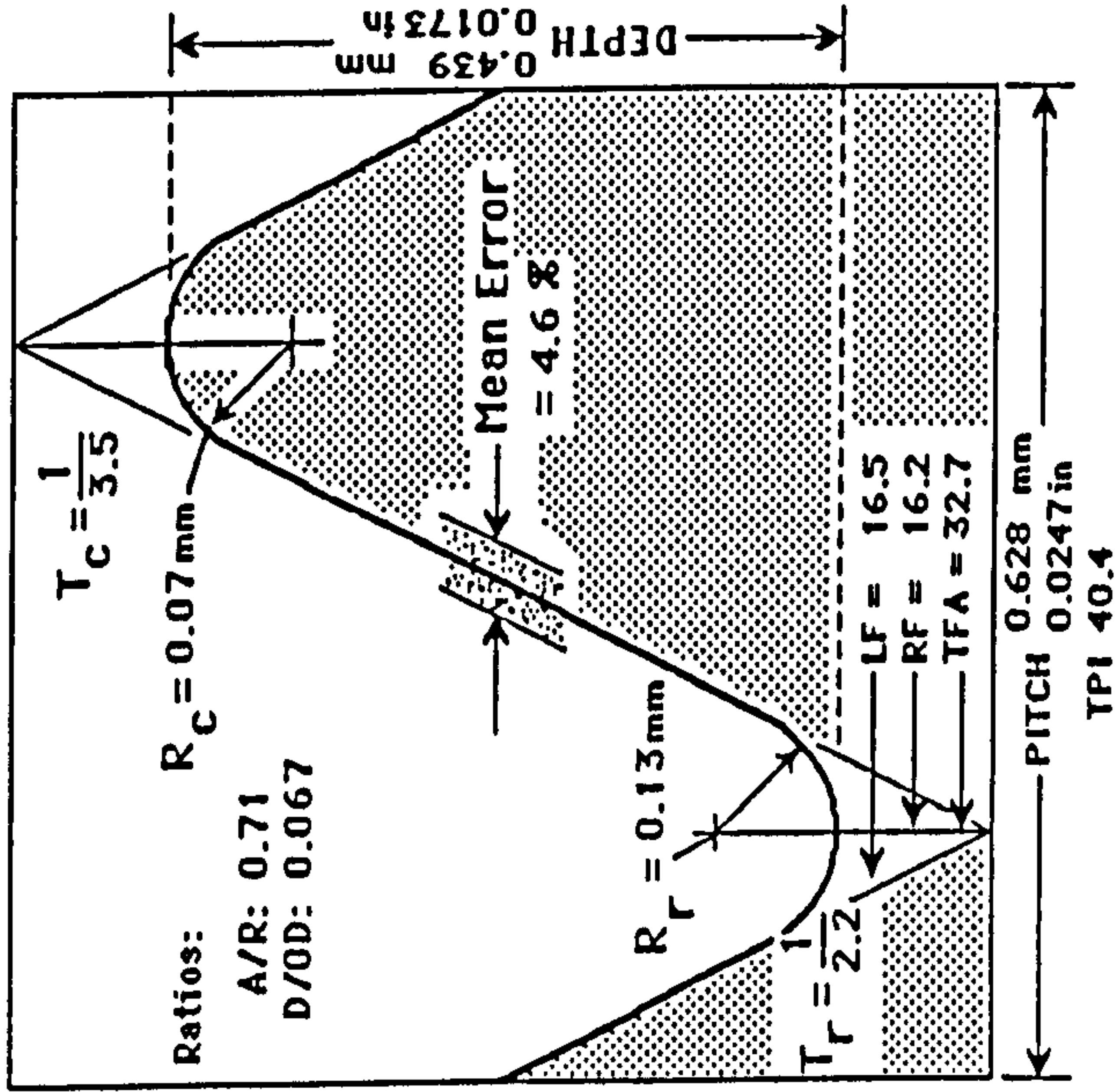
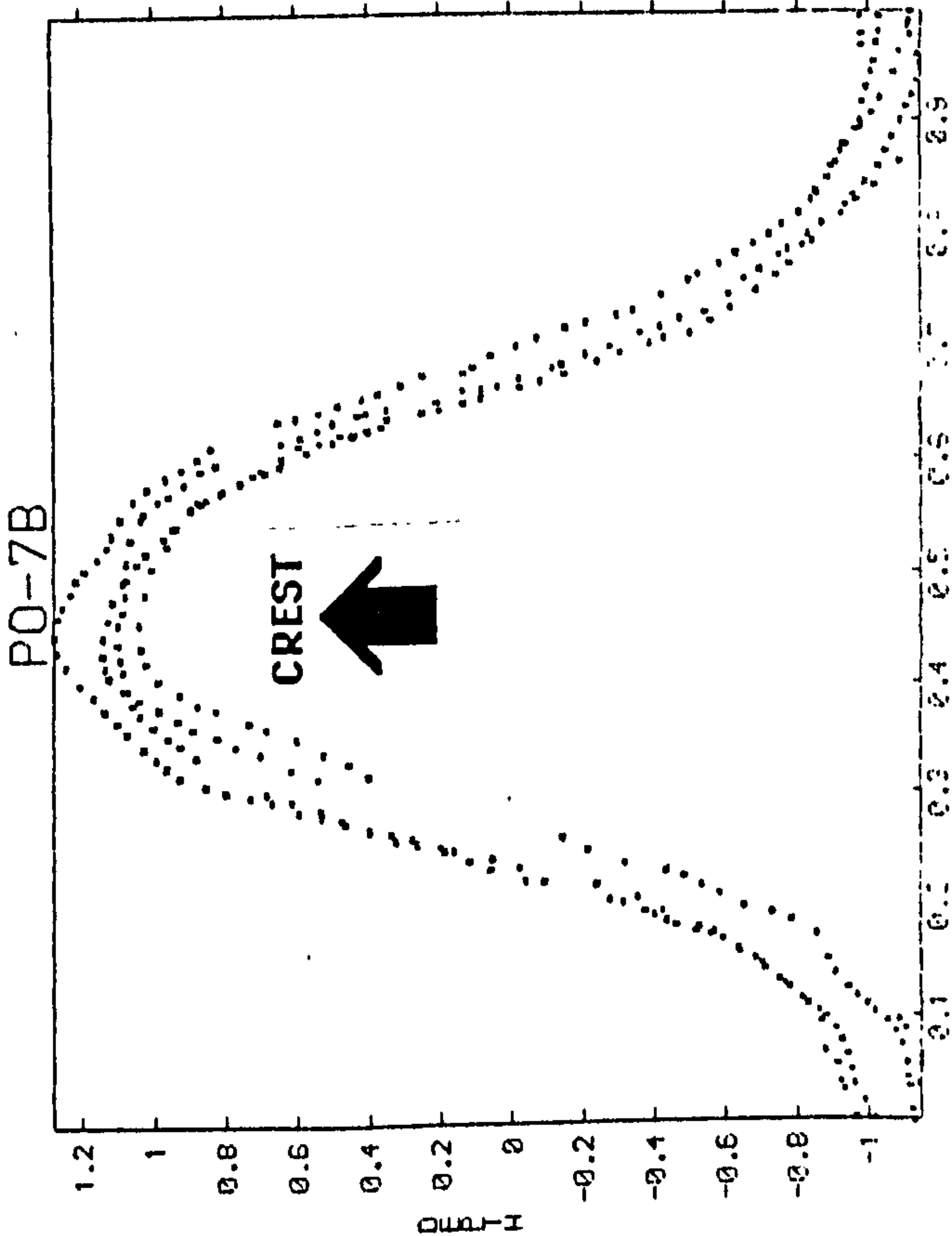
Study Code: P0-7b

Instrument: 6ft portable sextant

Maker: C. Langlois

Date: 1746

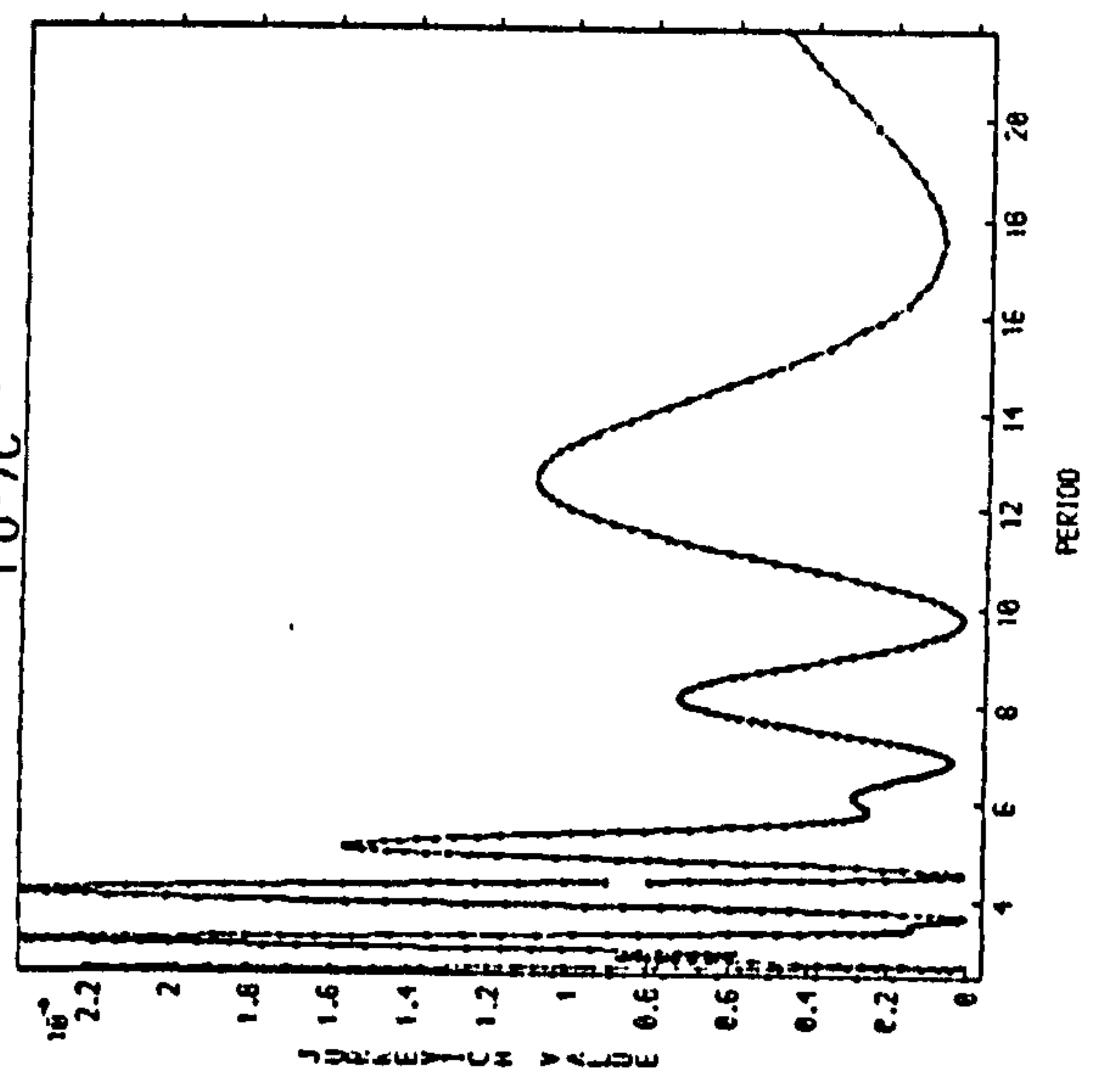
Ser./Acq. No. .



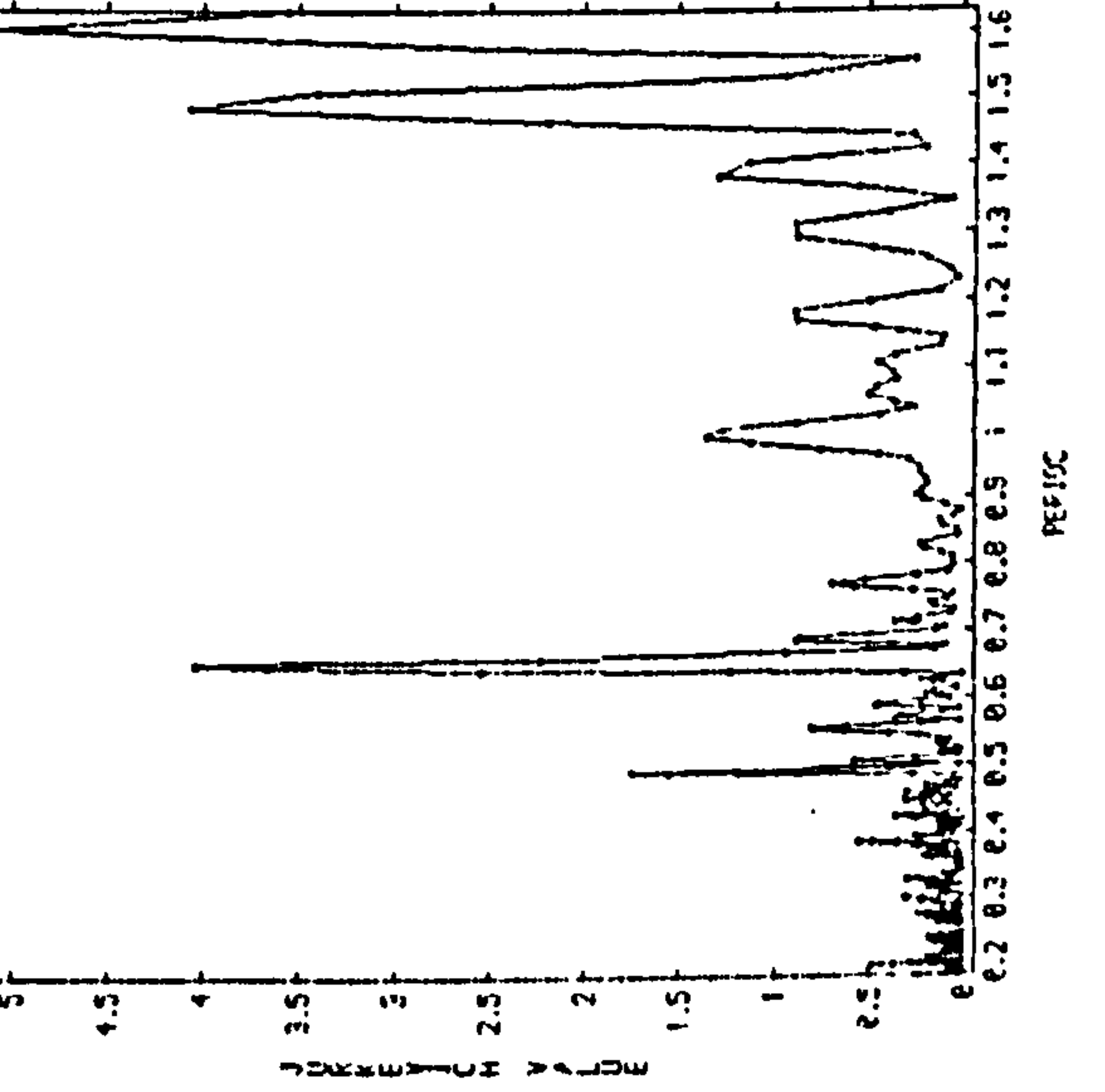
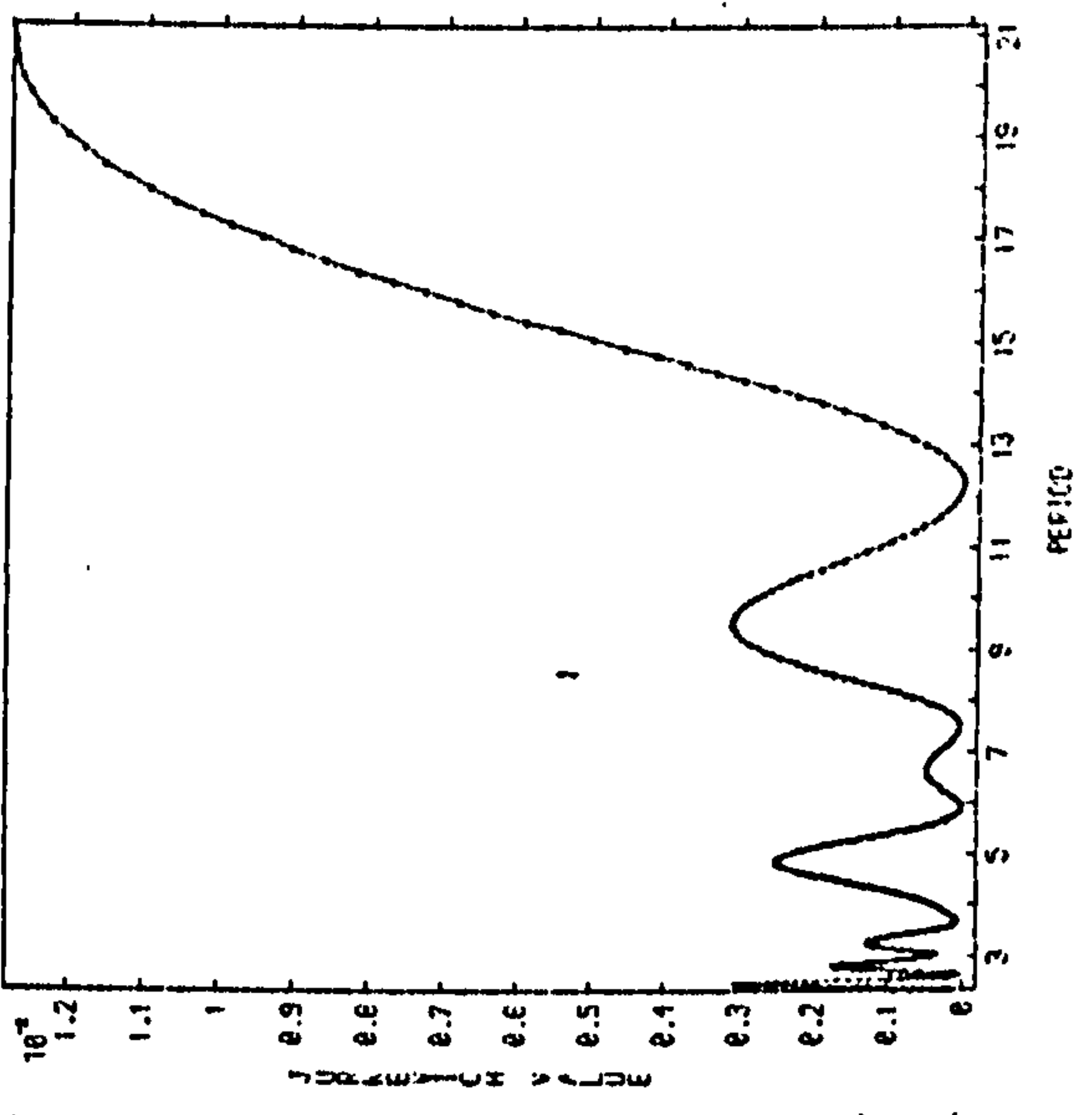
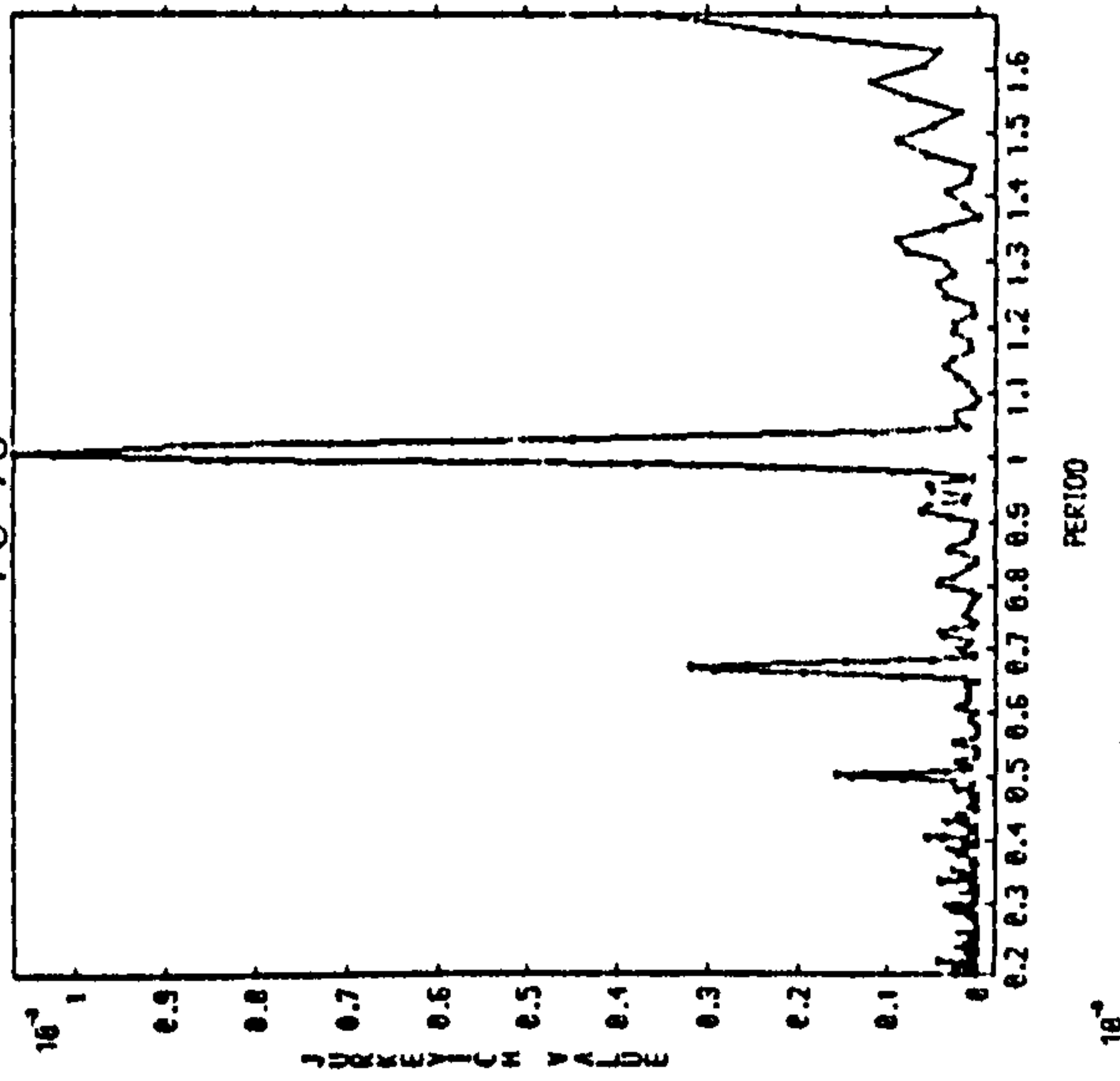
See P0-7a for drum description

Mu	[	Filar	
		Scale	
[	]	Bench	
		Div. Eng.	
]	]	Adjust.	
		Leveling	
]	]	Focus	
		Eye P.	
]	]	Tube	
		Tool	
]	]	Gauge	
		Binding	
]	]	Misc.	

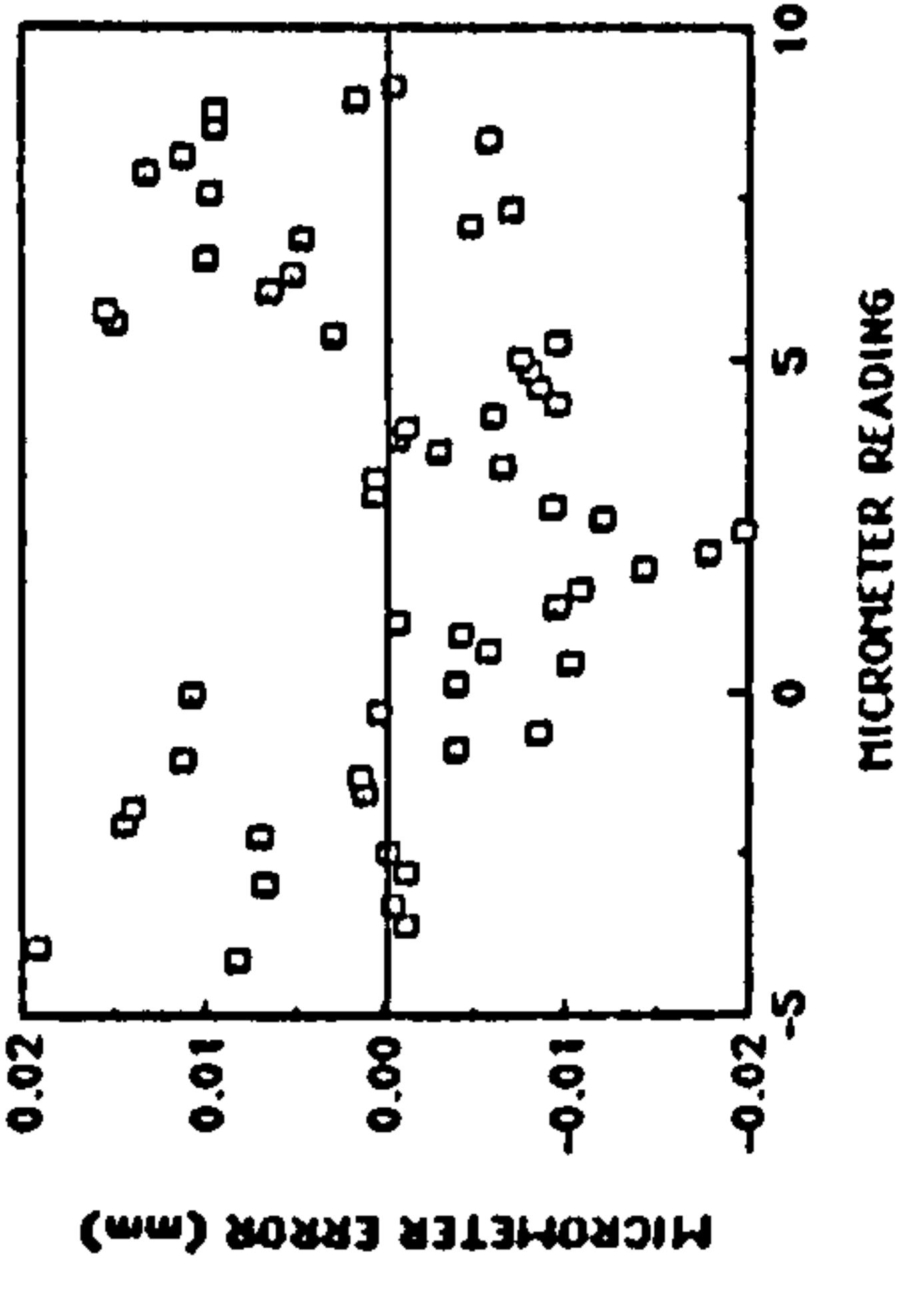
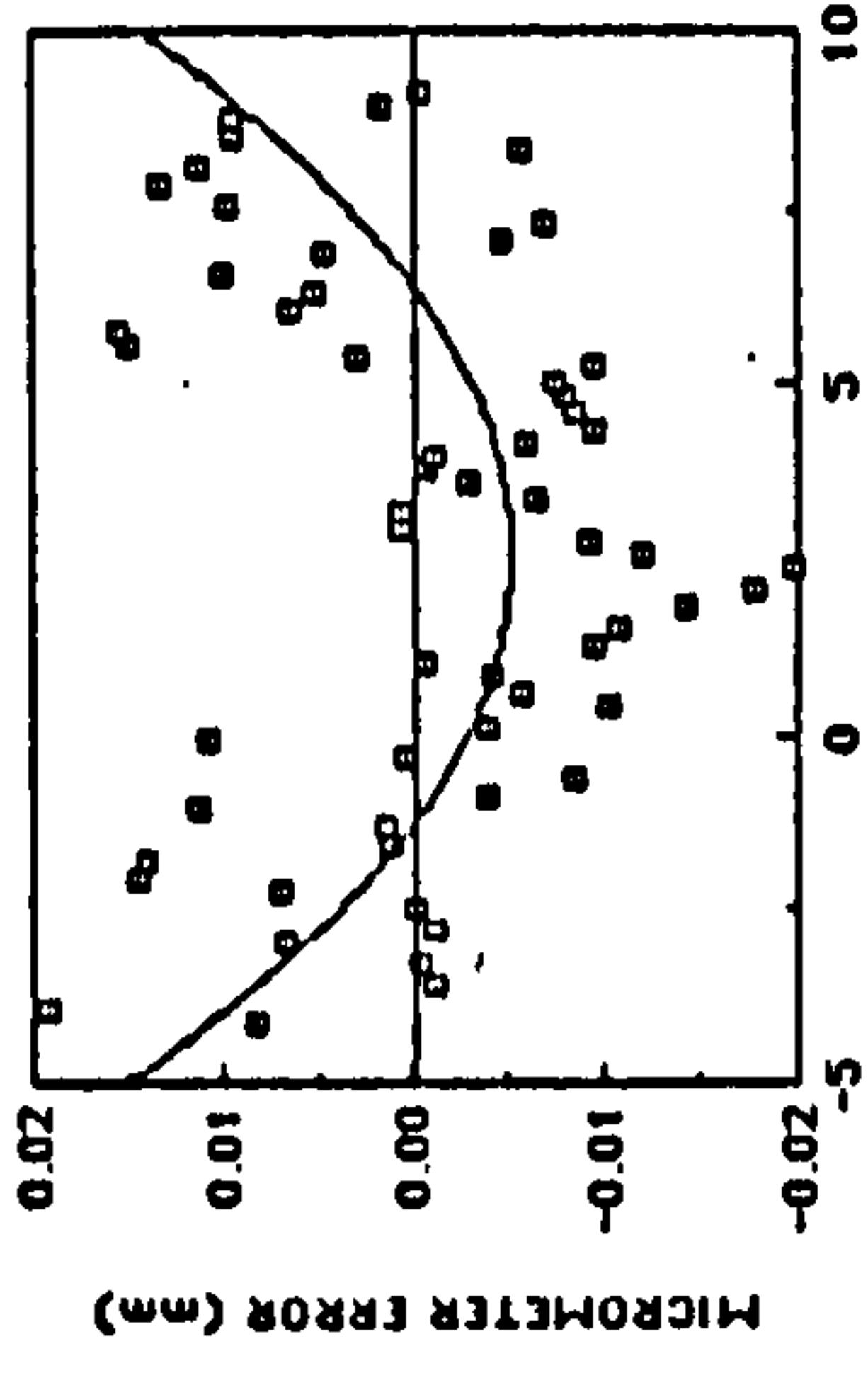
P0-7C



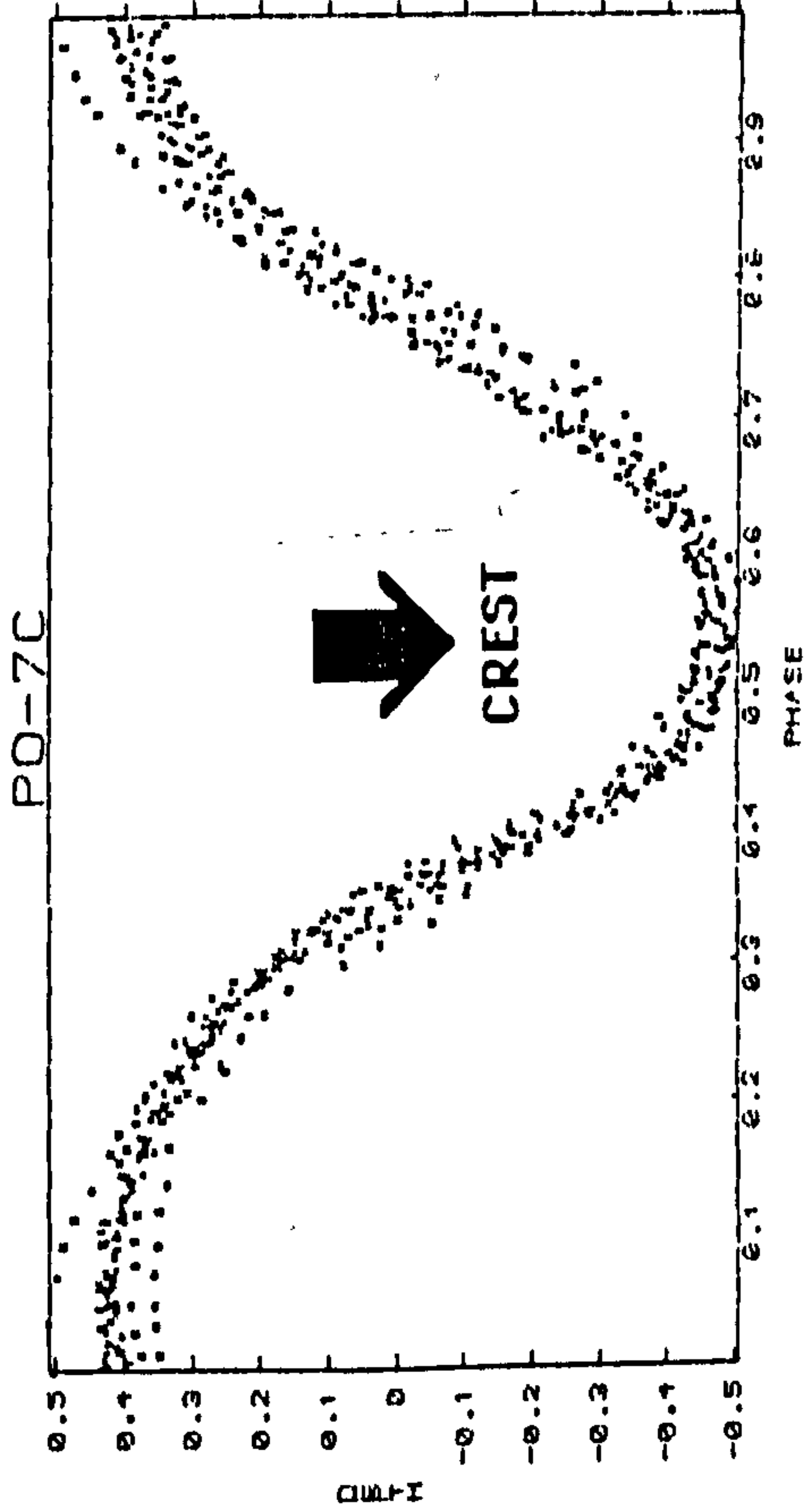
P0-7C



P0-7c







**Characteristics:**

Screw ☒ Nut ☐

Length: 1.00"/0.188&.109"

Diameter: 0.1527"

Steel ☒ Brass ☐

Other:

**Instrument Identification:**

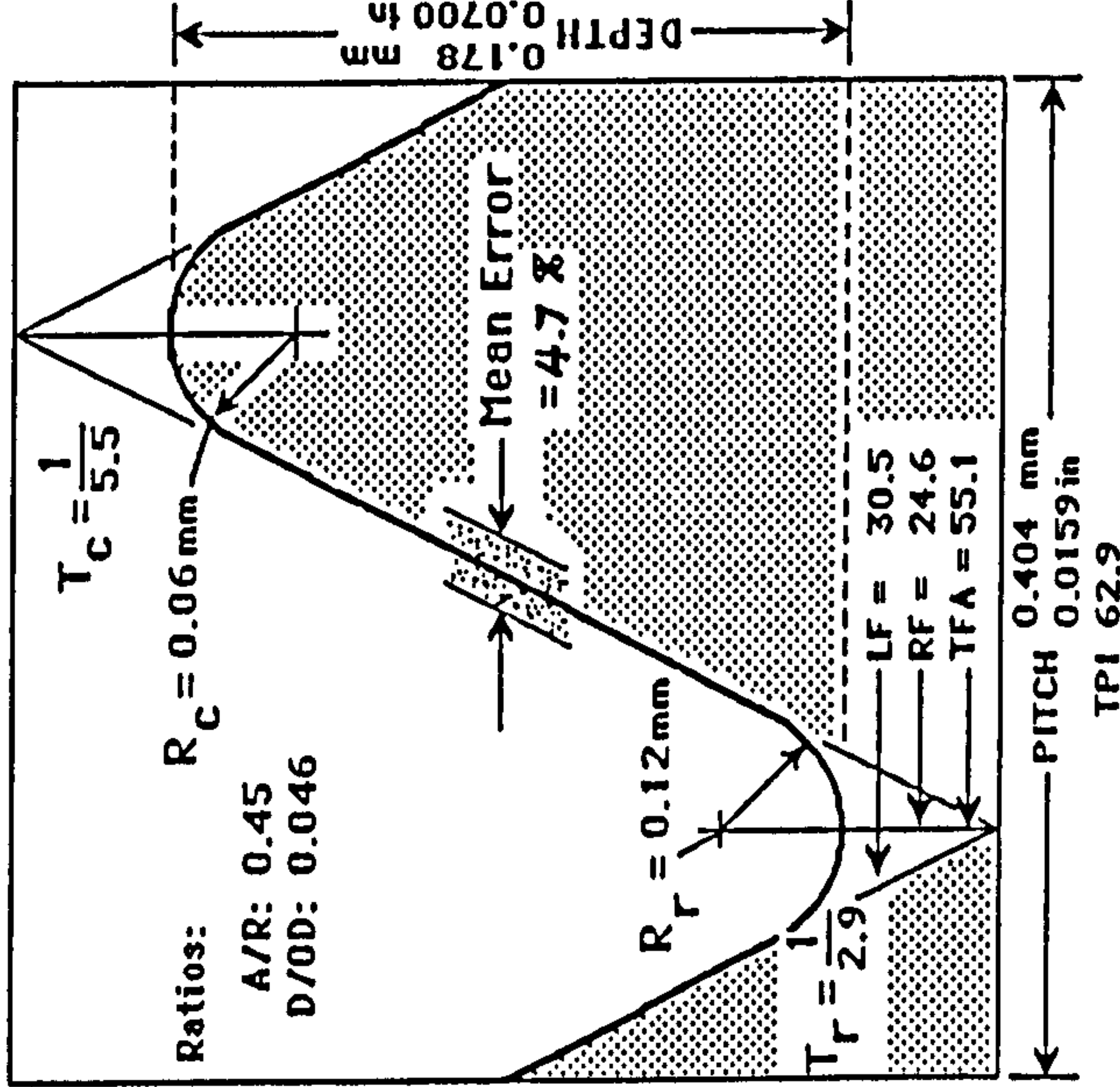
Study Code: PO-7c.

Instrument: Micrometer

Maker: Berthet

Date: 3rd q 18th c

Ser./Acq. No. .



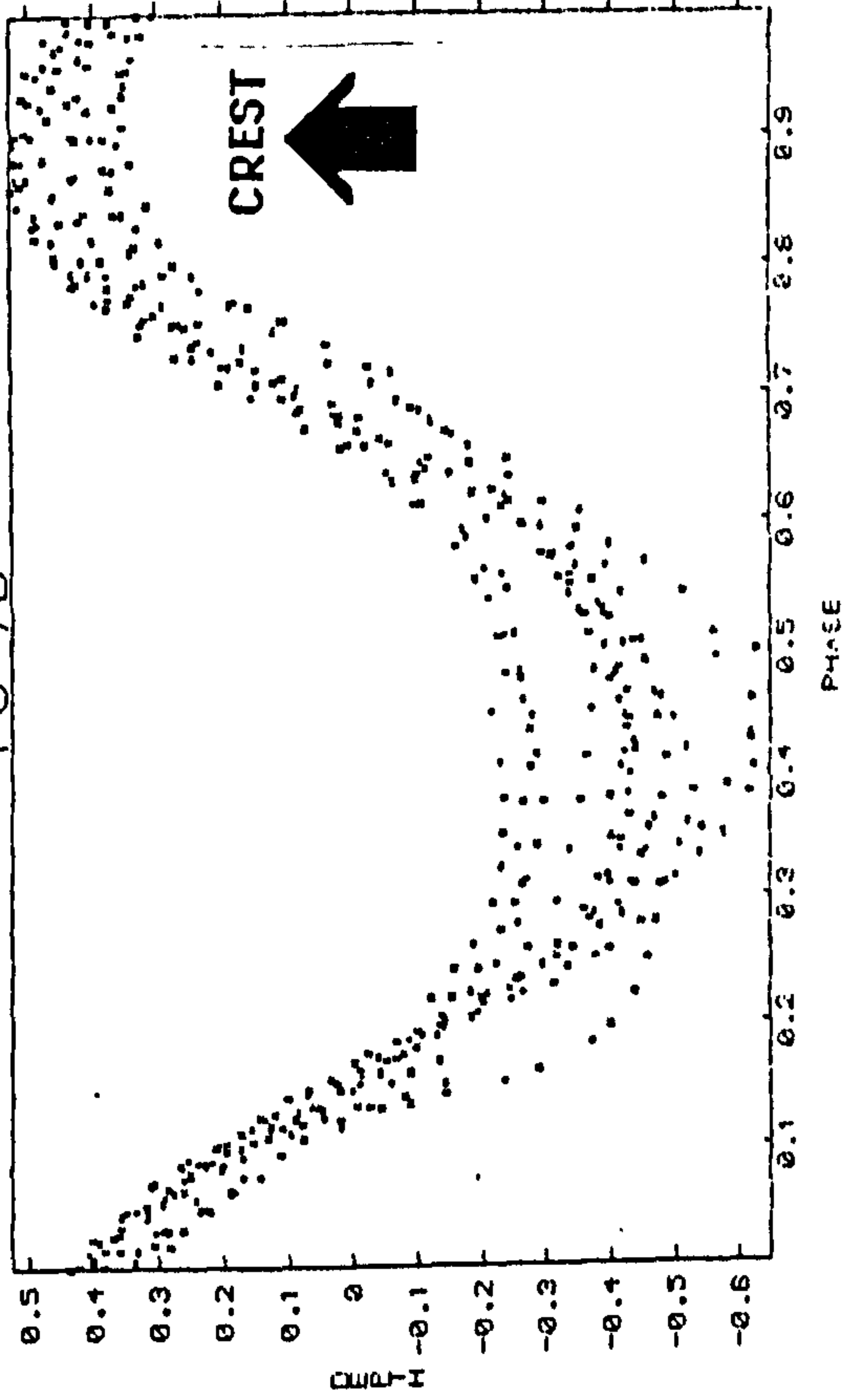
Mu — [ Filar Scale Bench Div. Eng. Adjust. Leveling Focus Eye P. Tube Tool Gauge Binding Misc.

Drum: 2.125" diameter, 0-100-0 divisions with  $\pm 0.1$  div. resolution

Scale: 0-5-0

Replacement micrometer on Langlois' 6ft portable sextant

PO-7D



Characteristics:

Screw ☐ Nut ☒

Leng: 1.00"/0.188&.109"

Diameter: 0.153"nom.

Steel ☐ Brass ☒

Other:

Instrument Identification:

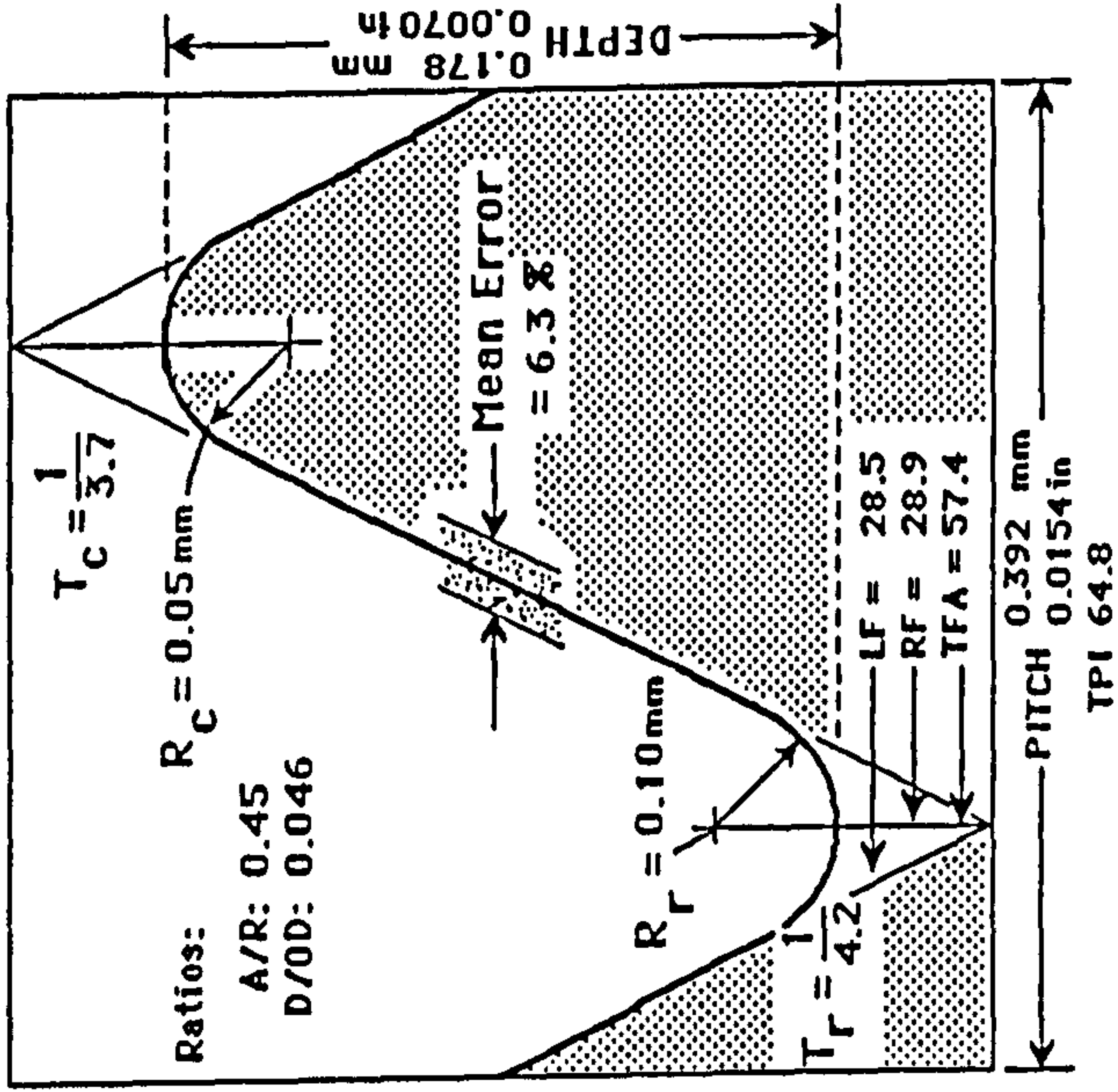
Study Code: P0-7d

Instrument: Micrometer

Maker: Berthet

Date: 3rd q 18th c

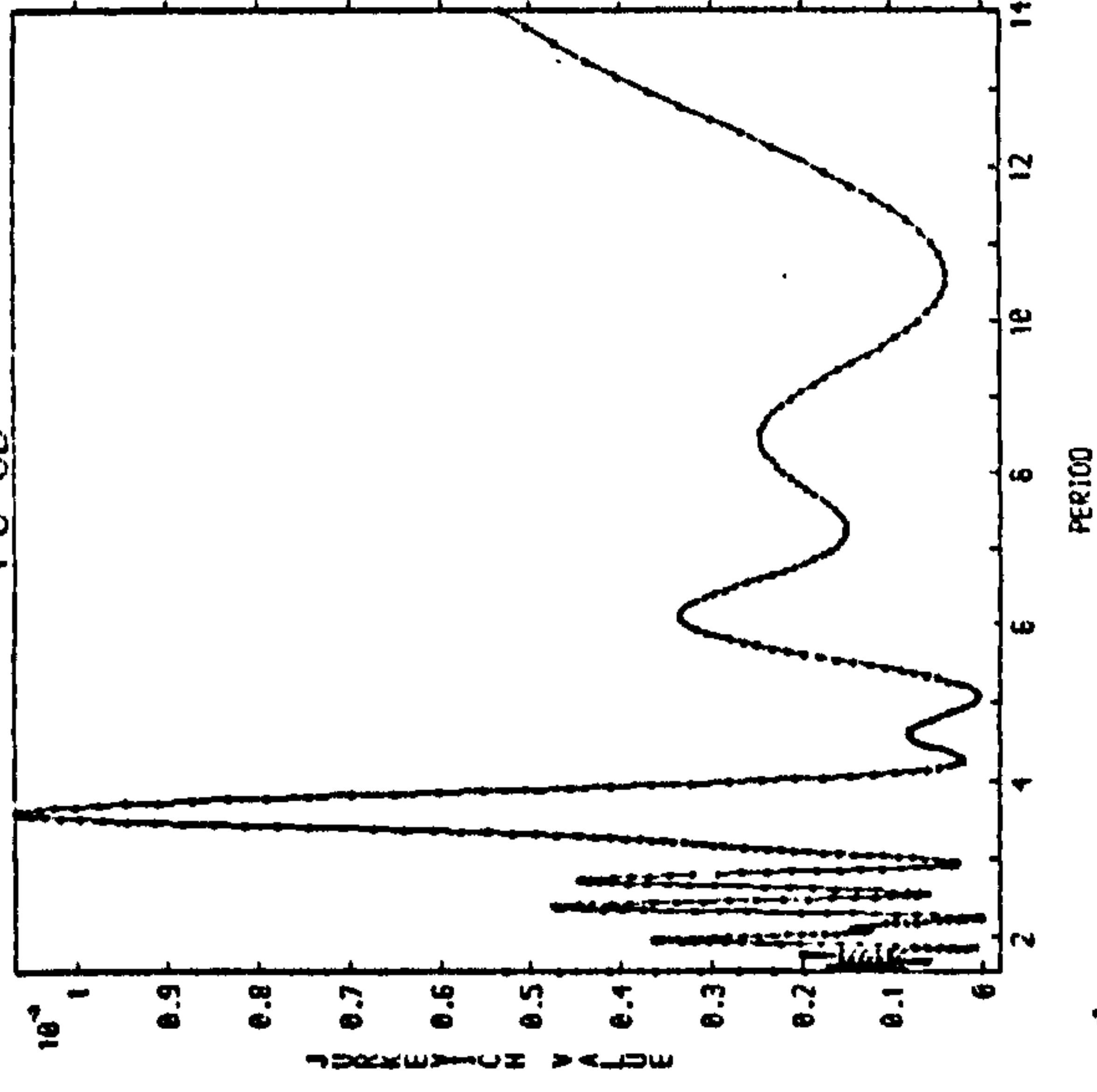
Ser./Acq. No. .



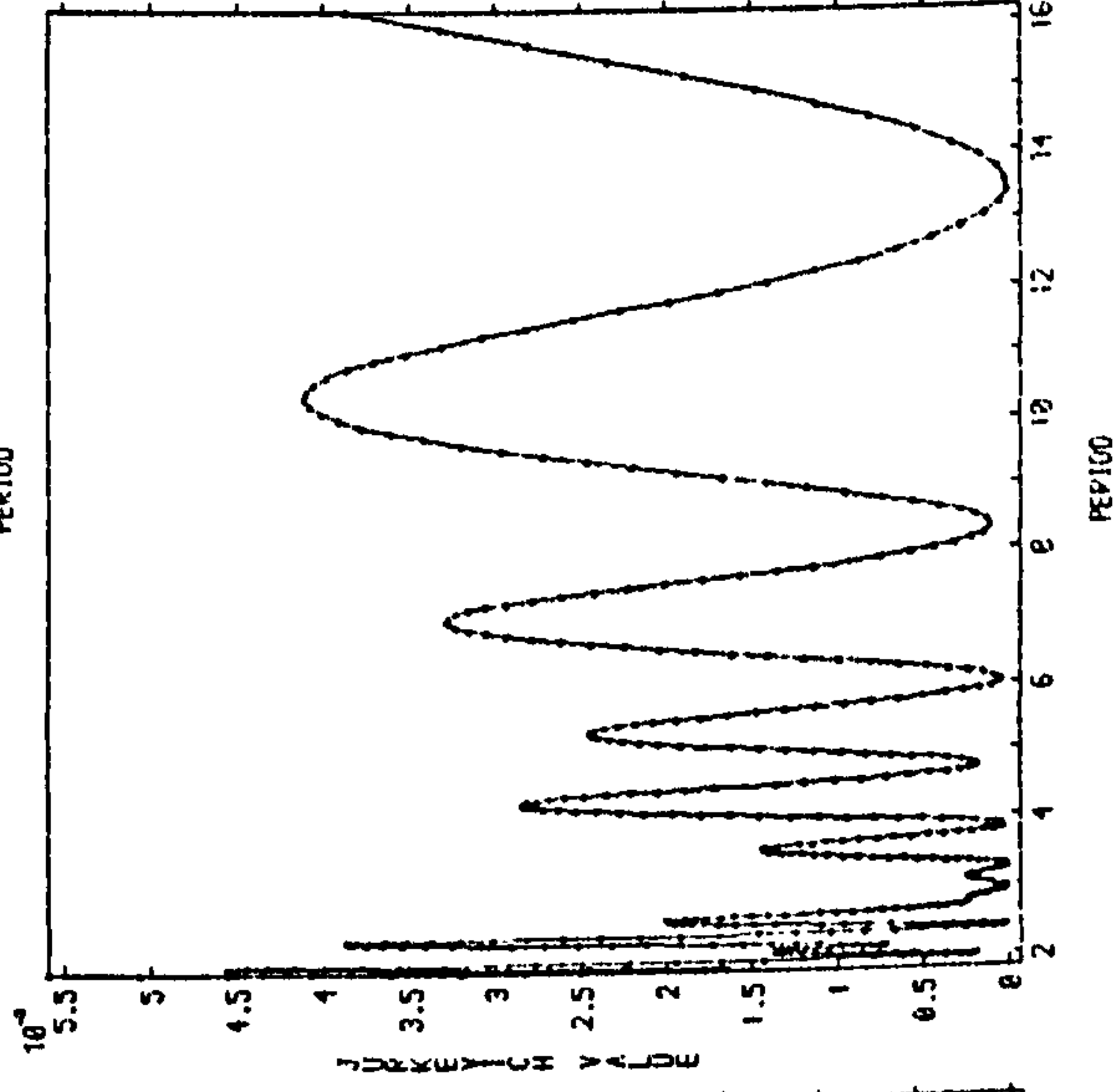
Mu — [ Filar  
Scale  
Bench  
Div. Eng.  
Adjust.  
Leveling  
Focus  
Eye P.  
Tube  
Tool.  
Gauge  
Binding  
Misc.

Nut for P0-7d

P0-8B

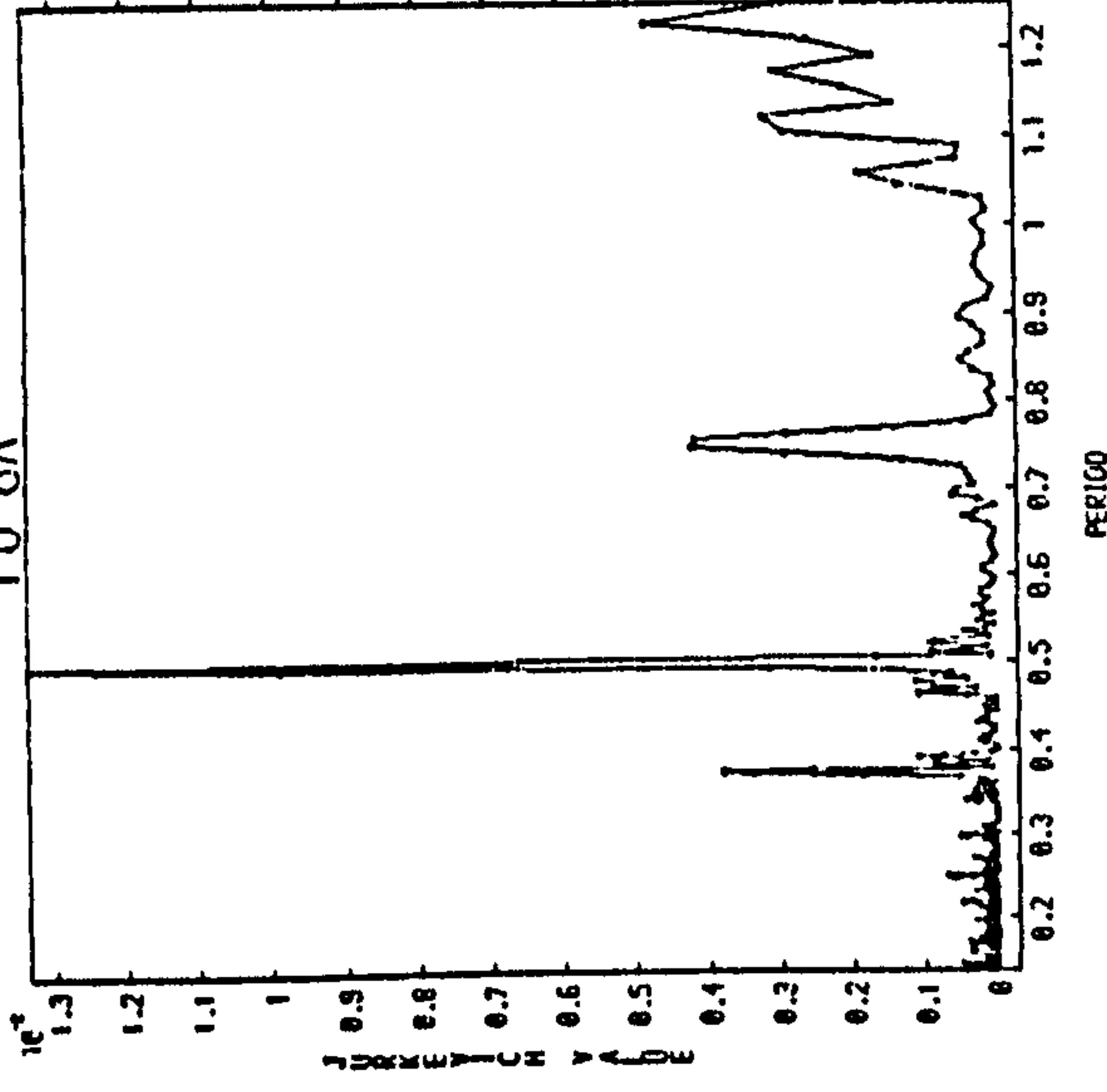


PERIOD

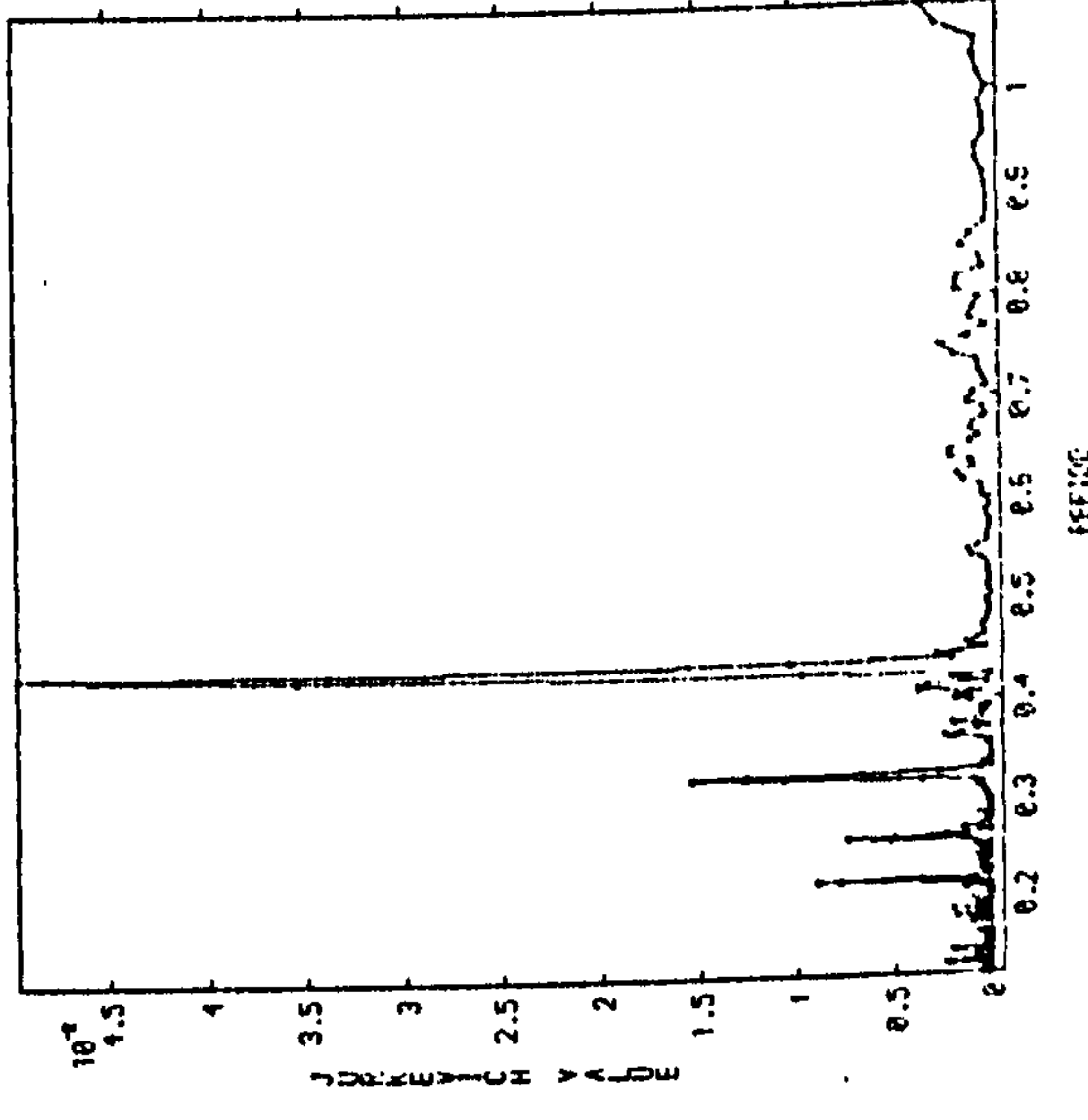


PERIOD

P0-8A



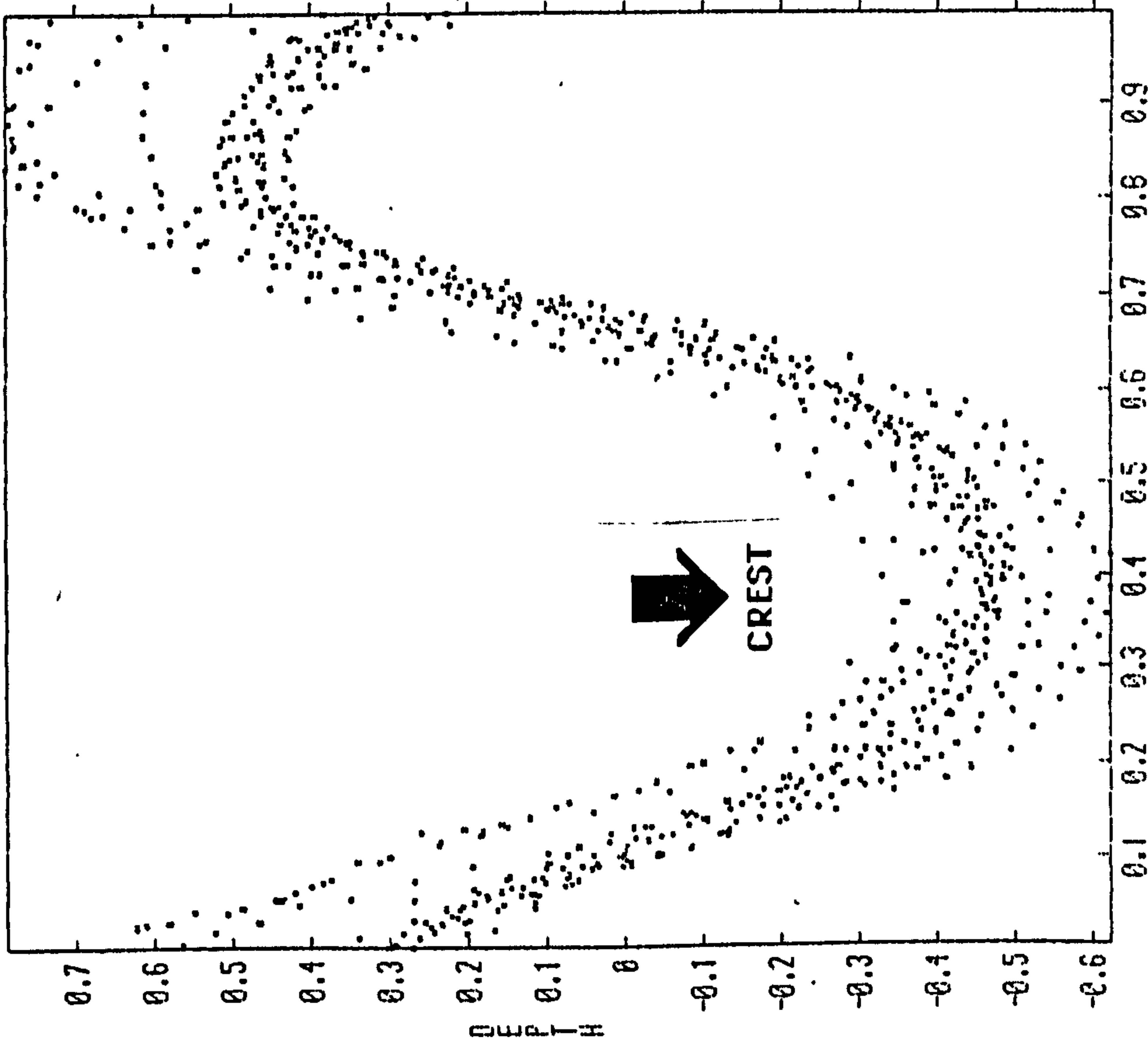
PERIOD



PERIOD



P0-8A



Characteristics:

Screw ☒ Nut ☐

Leng: 1.313" /  $\approx 1.375$ "

Diameter: 0.1863"

Steel ☒ Brass ☐

Other:

Instrument Identification:

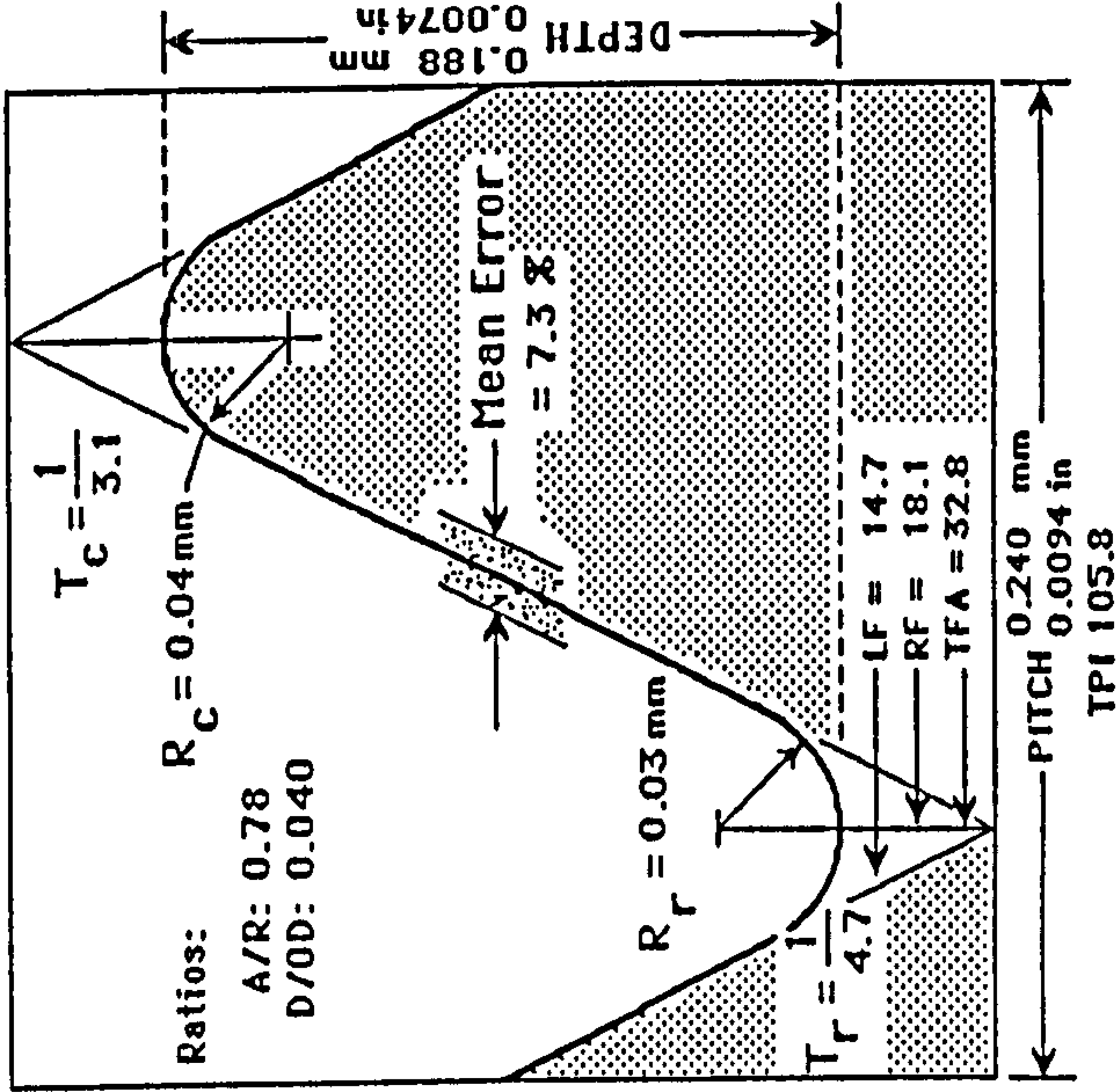
Study Code: P0-8a

Instrument: Altazimuth instrument

Maker: Rigaud à Paris

Date: ca.1880

Ser./Acq. No.



Filar

Mu

Scale

Bench

Div. Eng.

Adjust.

Leveling

Focus

Eye P.

Tube

Tool

Gauge

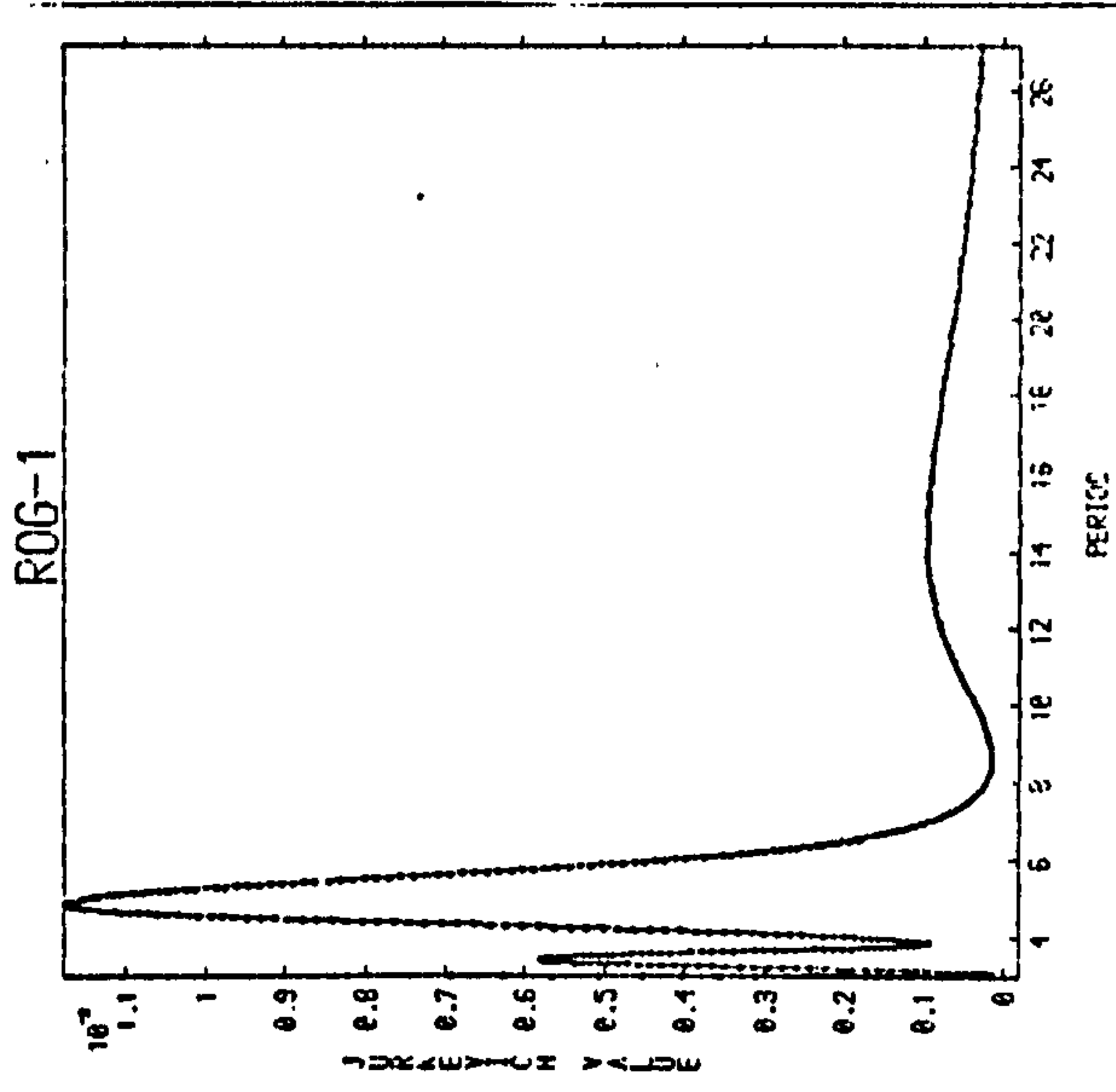
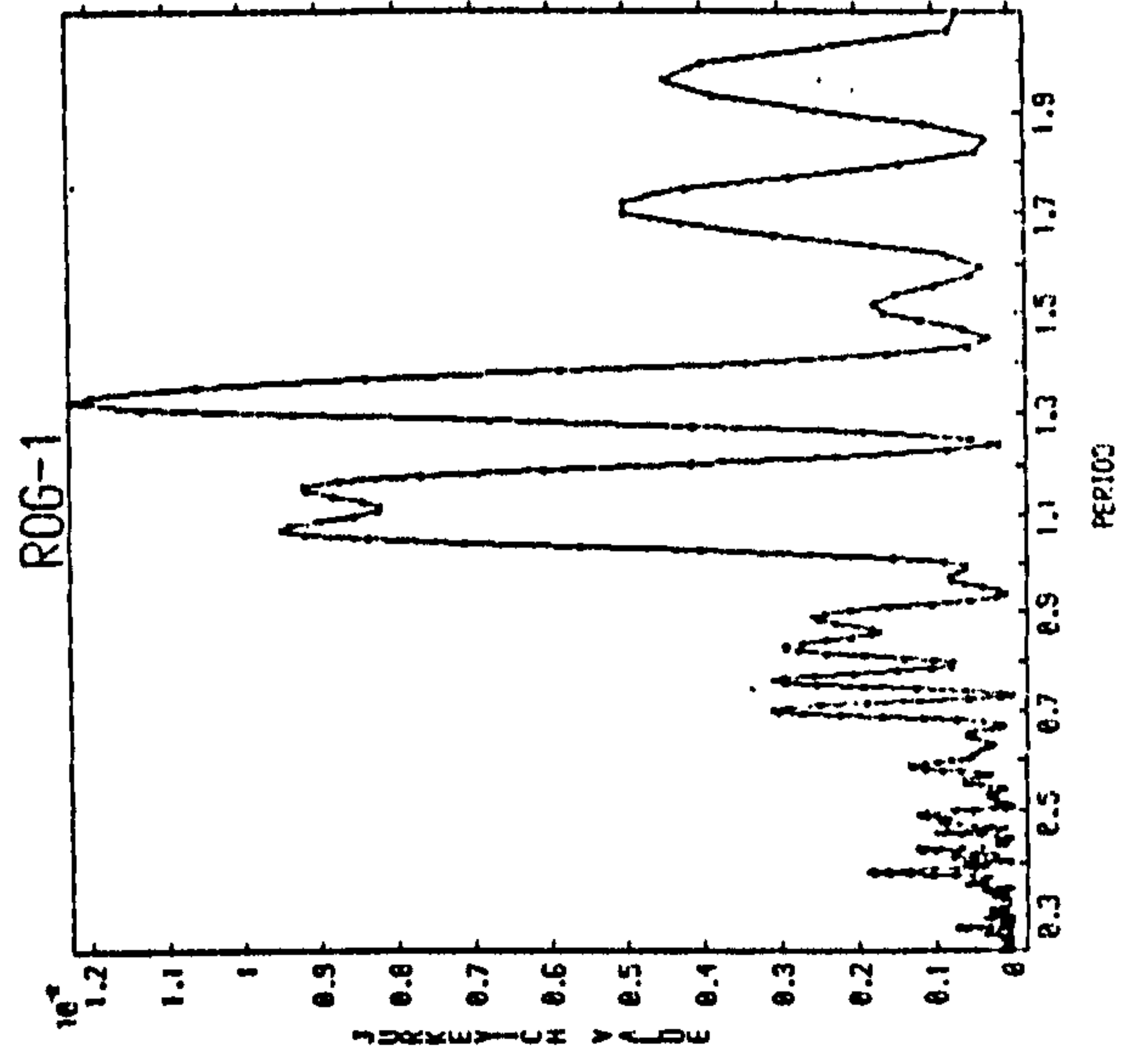
Binding

Misc.

Mu Drum: dia.: 1.563"

divisions: 100

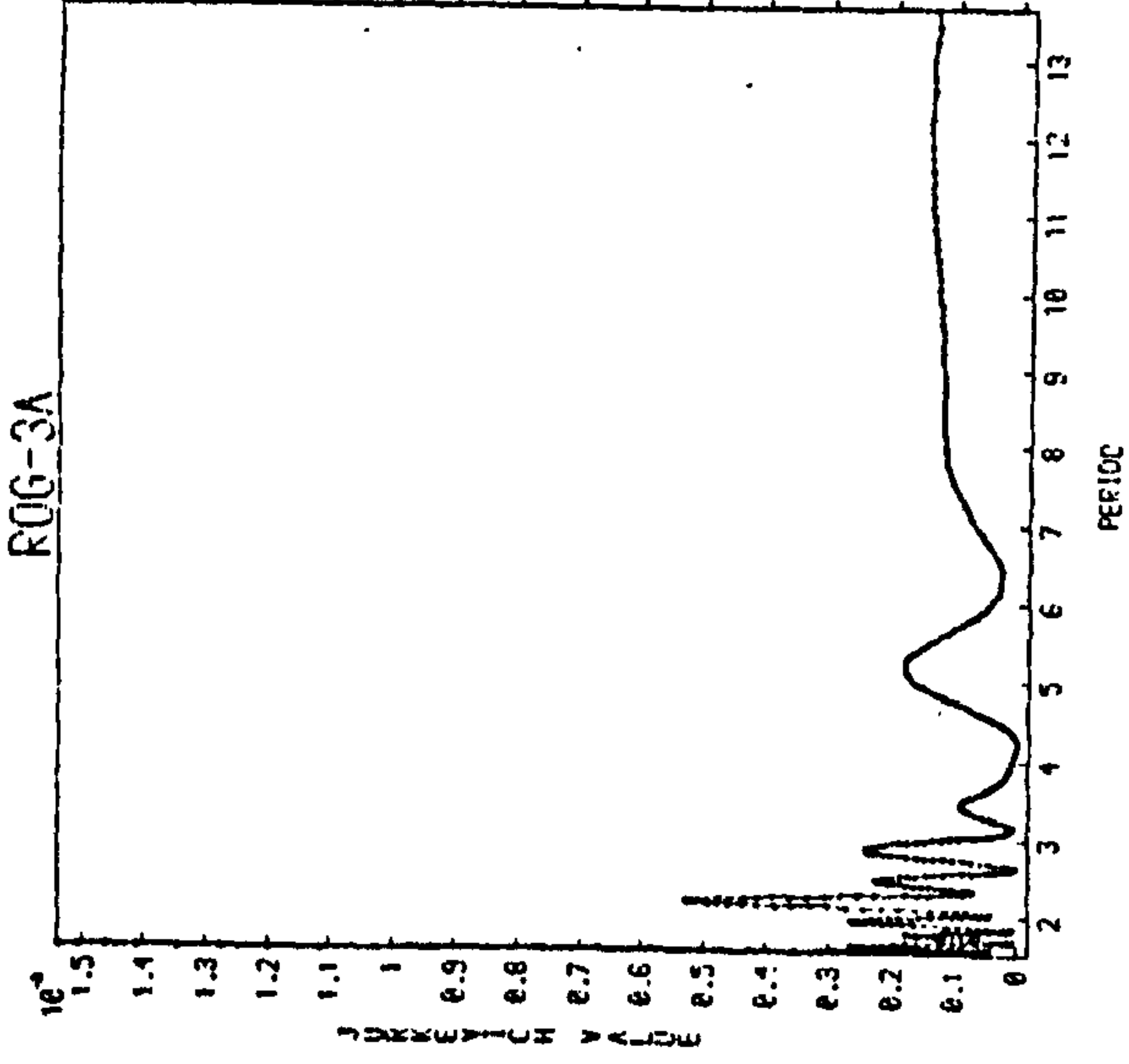
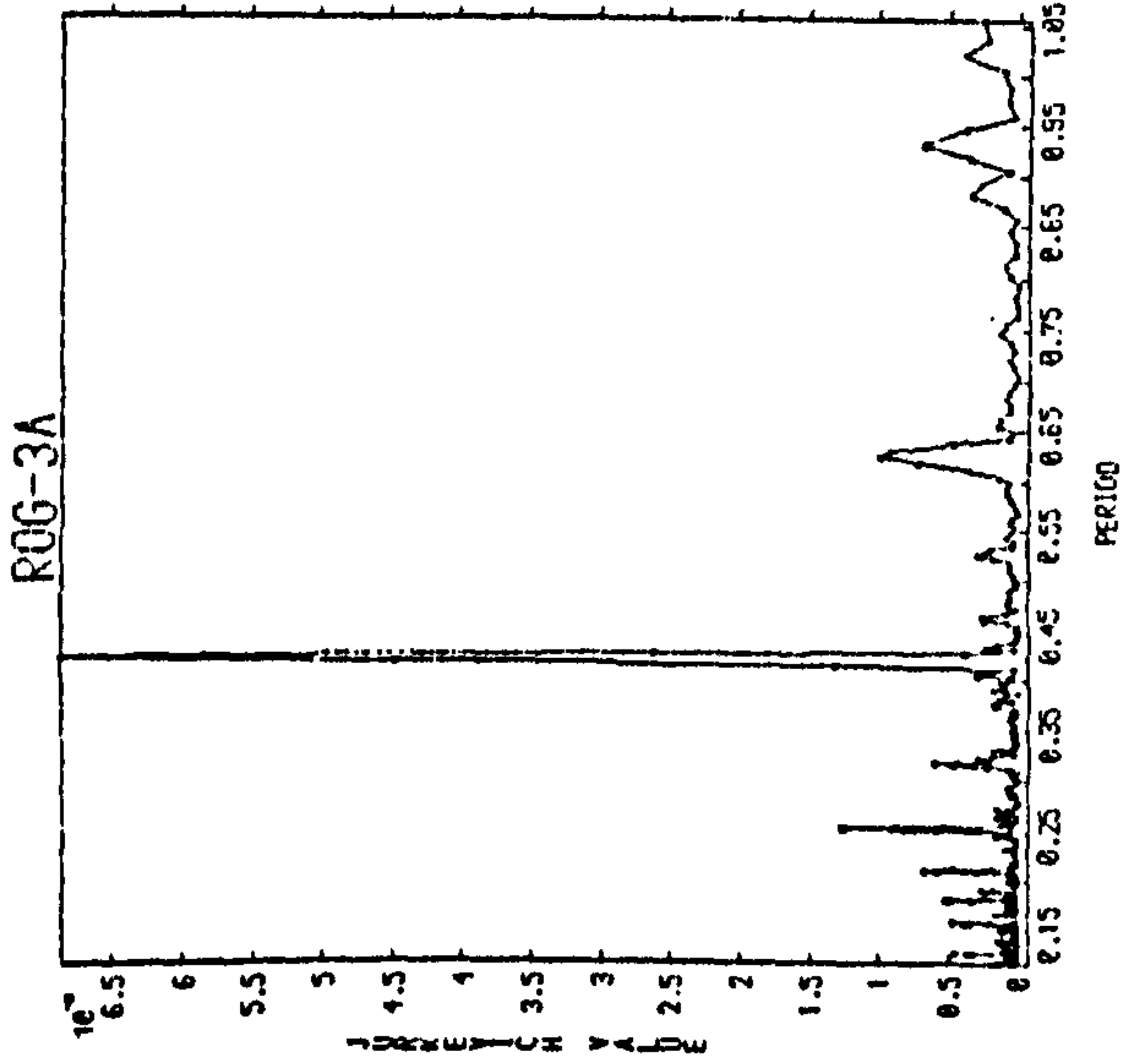
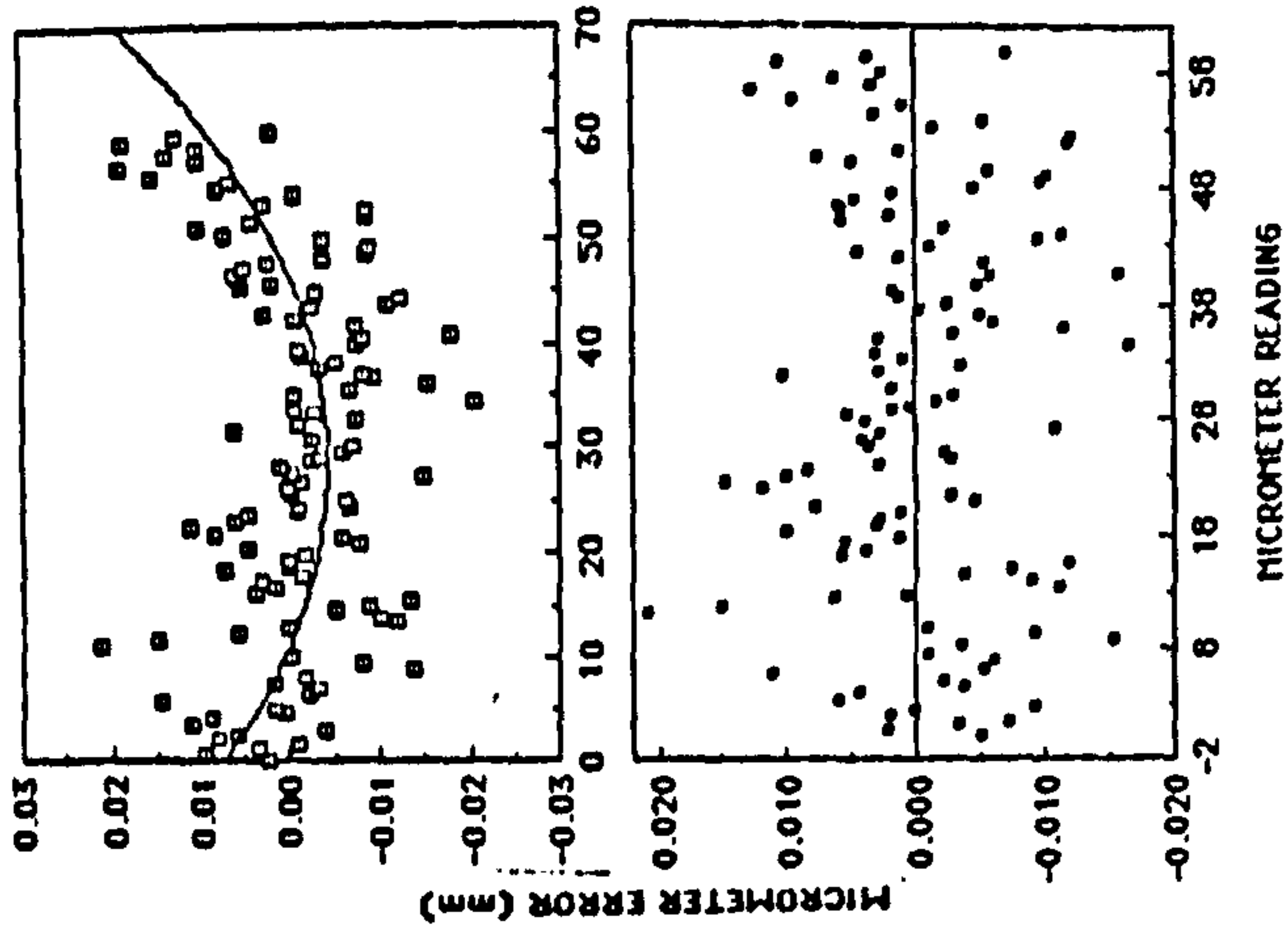
resolution: 1/10







Data from "R0G-3A2"



Characteristics:

Screw

Nut

Leng: 1.375"

Diameter: ~0.156"

Steel

Brass

Other:

Instrument Identification:

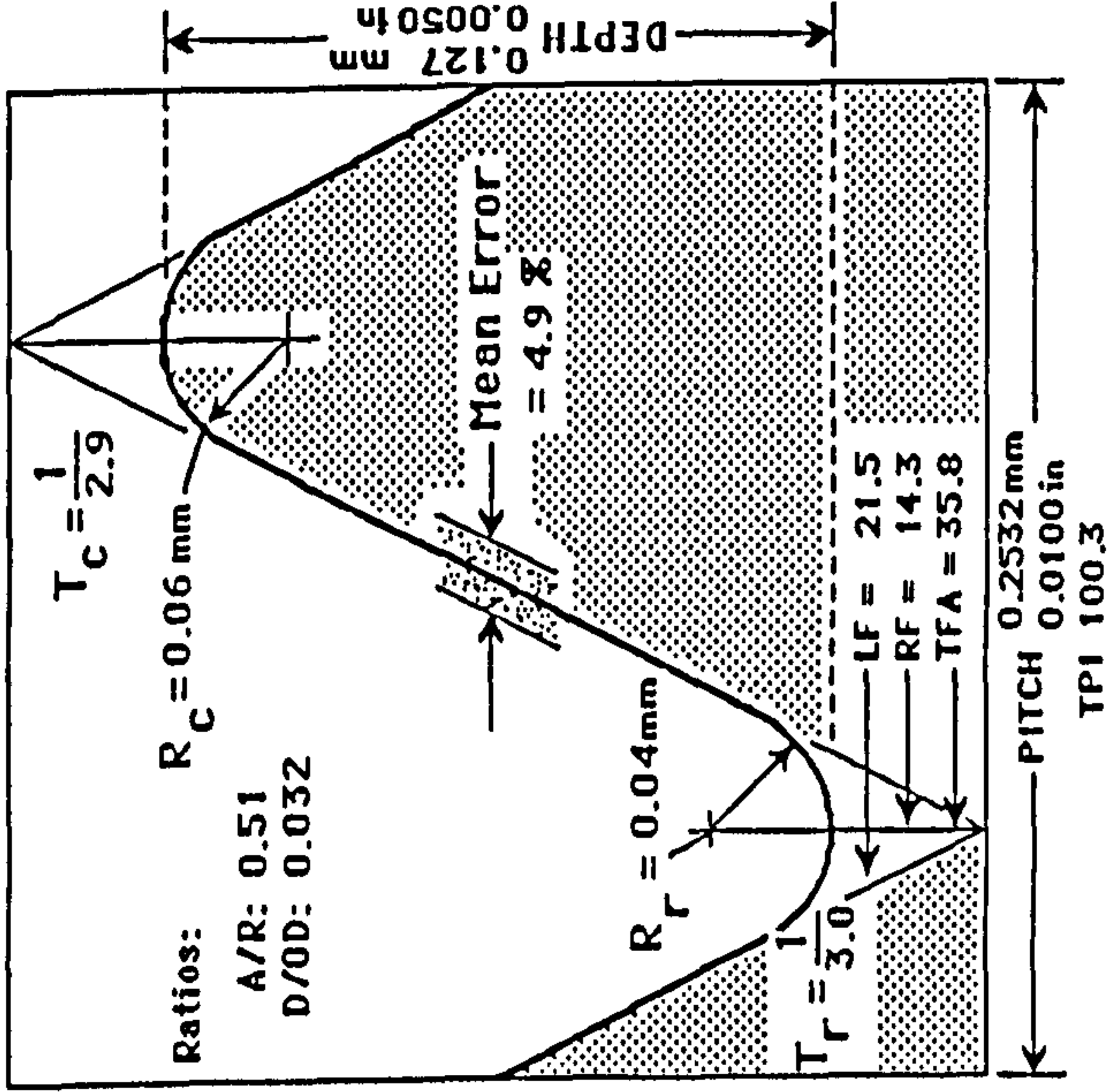
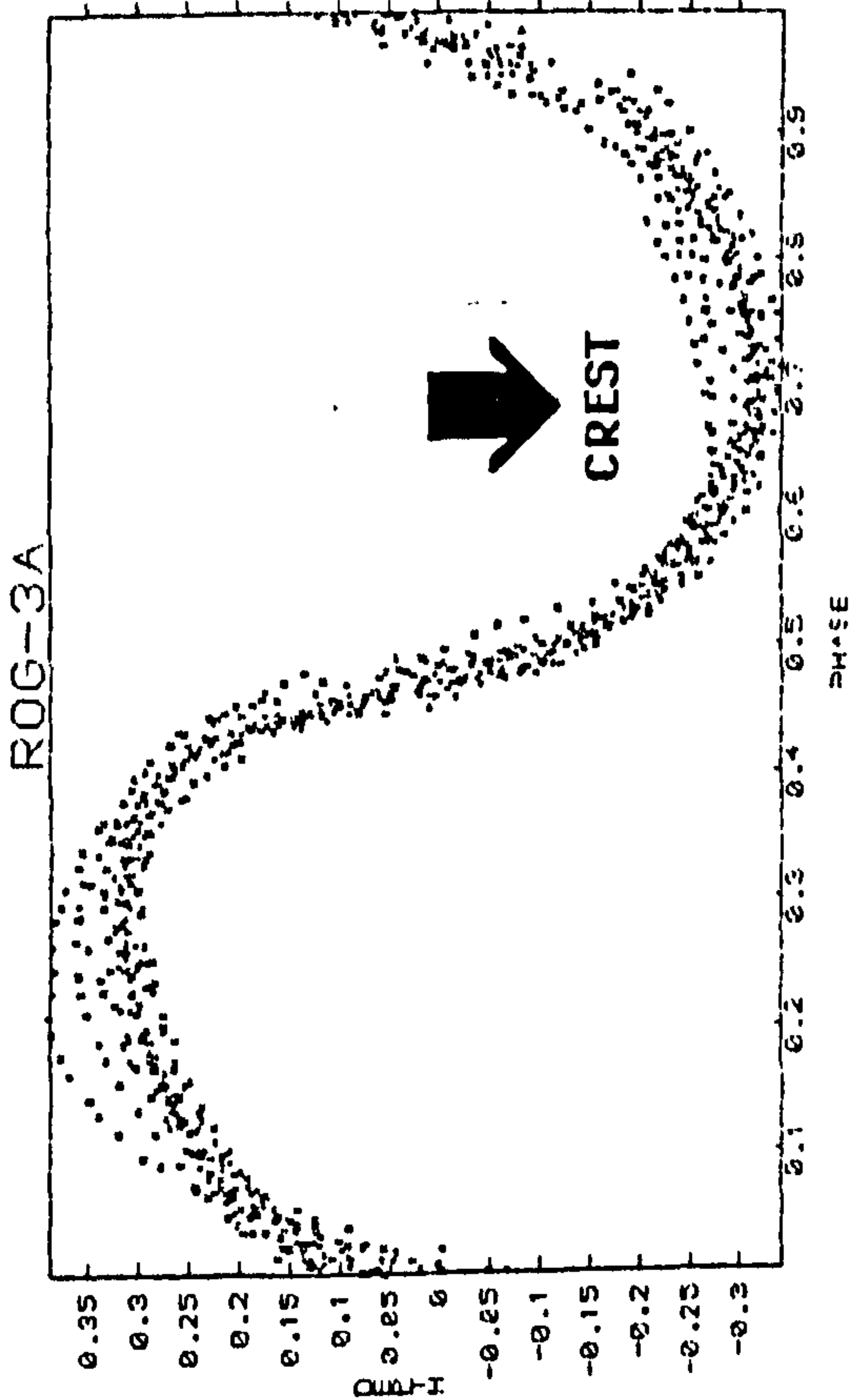
Study Code: ROG-3a

Instrument: Biflar Micrometer

Maker: Dollond

Date: ca.1840

Ser./Acq. No. 0L-17



Mu

Filar

Scale

Bench

Div. Eng.

Adjust.

Leveling

Focus

Eye P.

Tube

Tool

Gauge

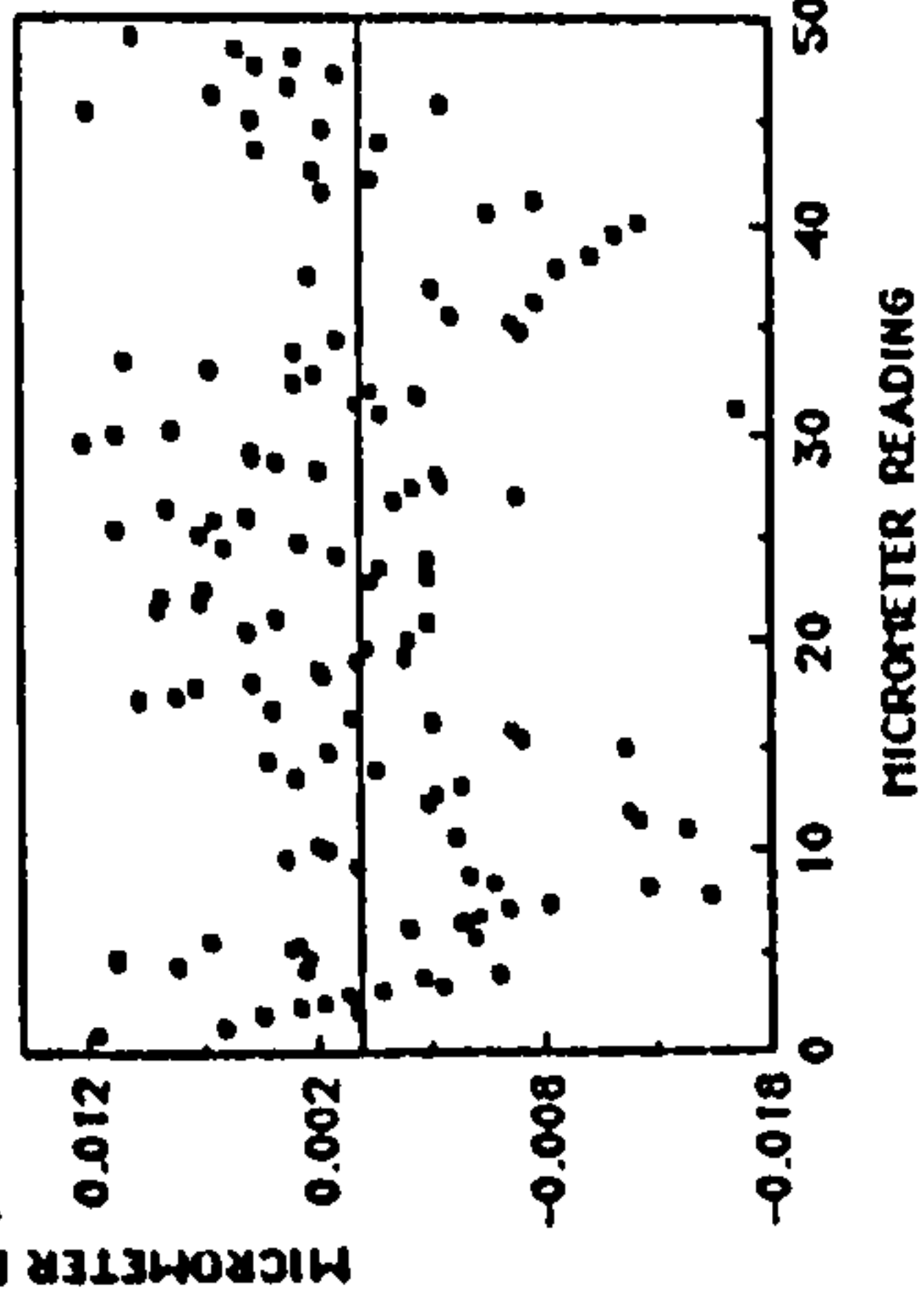
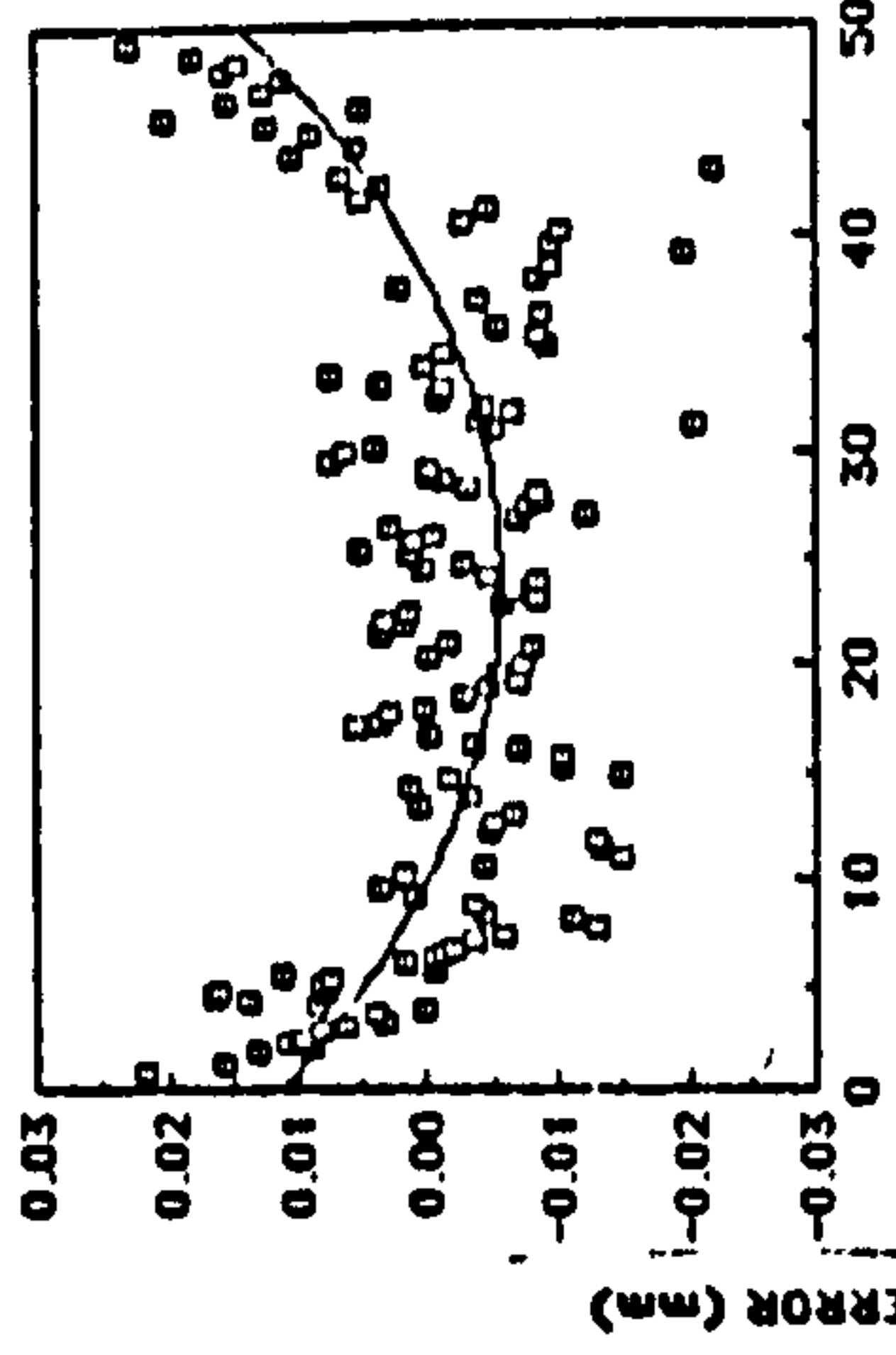
Binding

Misc.

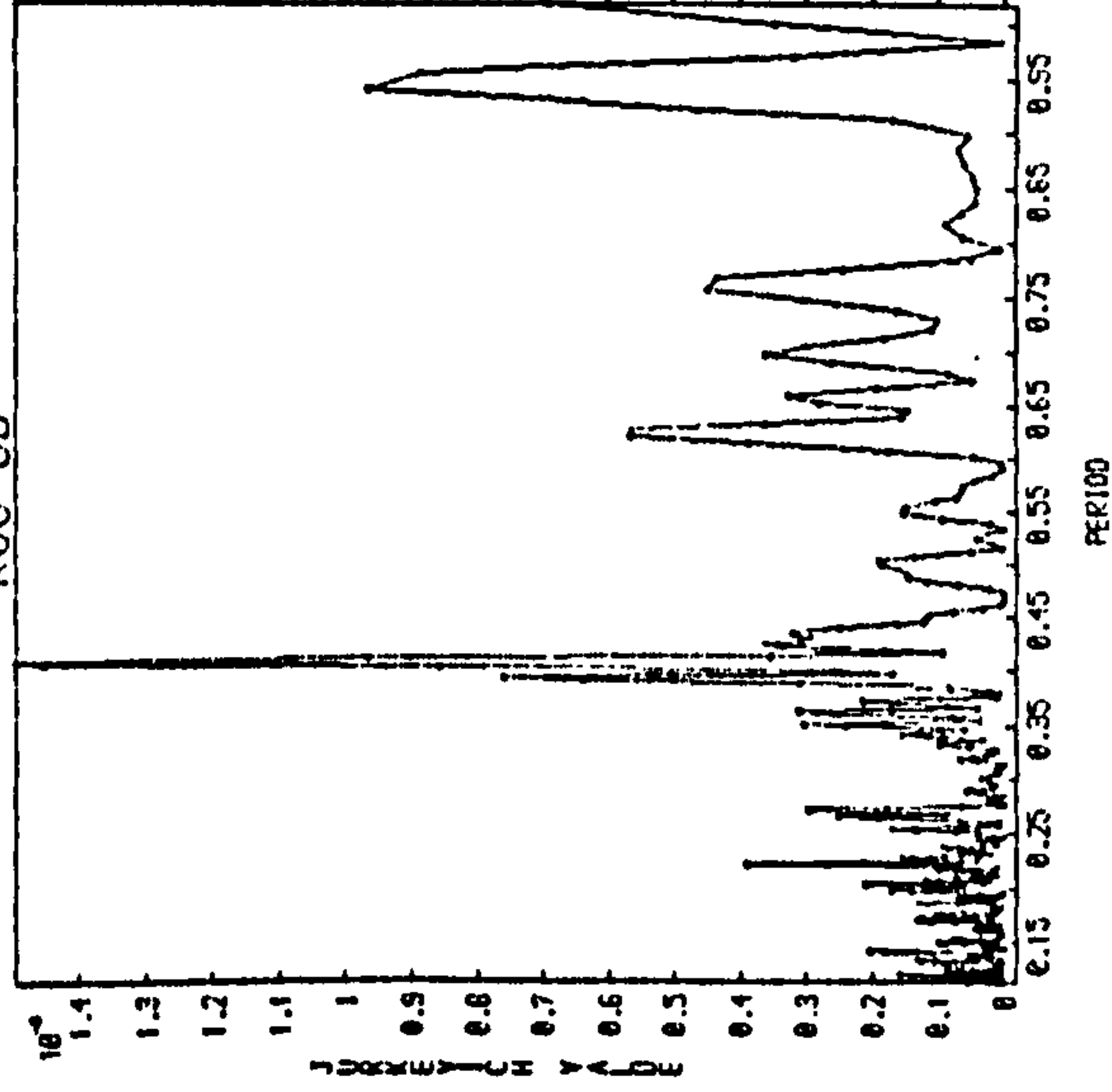
Drum: 2.06" diameter, 0-100 divisions with  $\pm 0.25$  div. resolution

A note in the case notes 1 rev= 20.16" and with concave lens 1 rev=9.878"

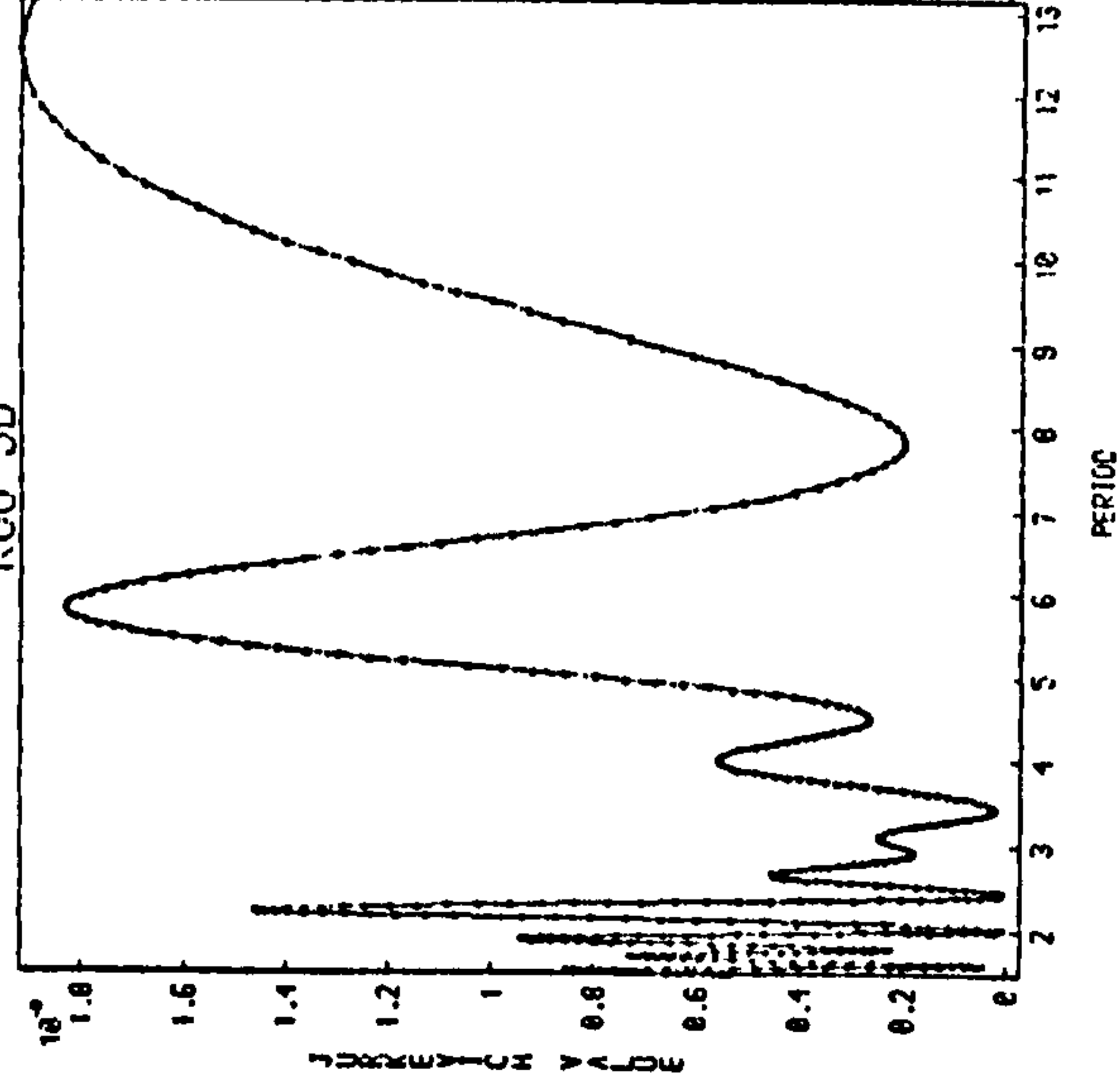
Data from "R0G-3B2"



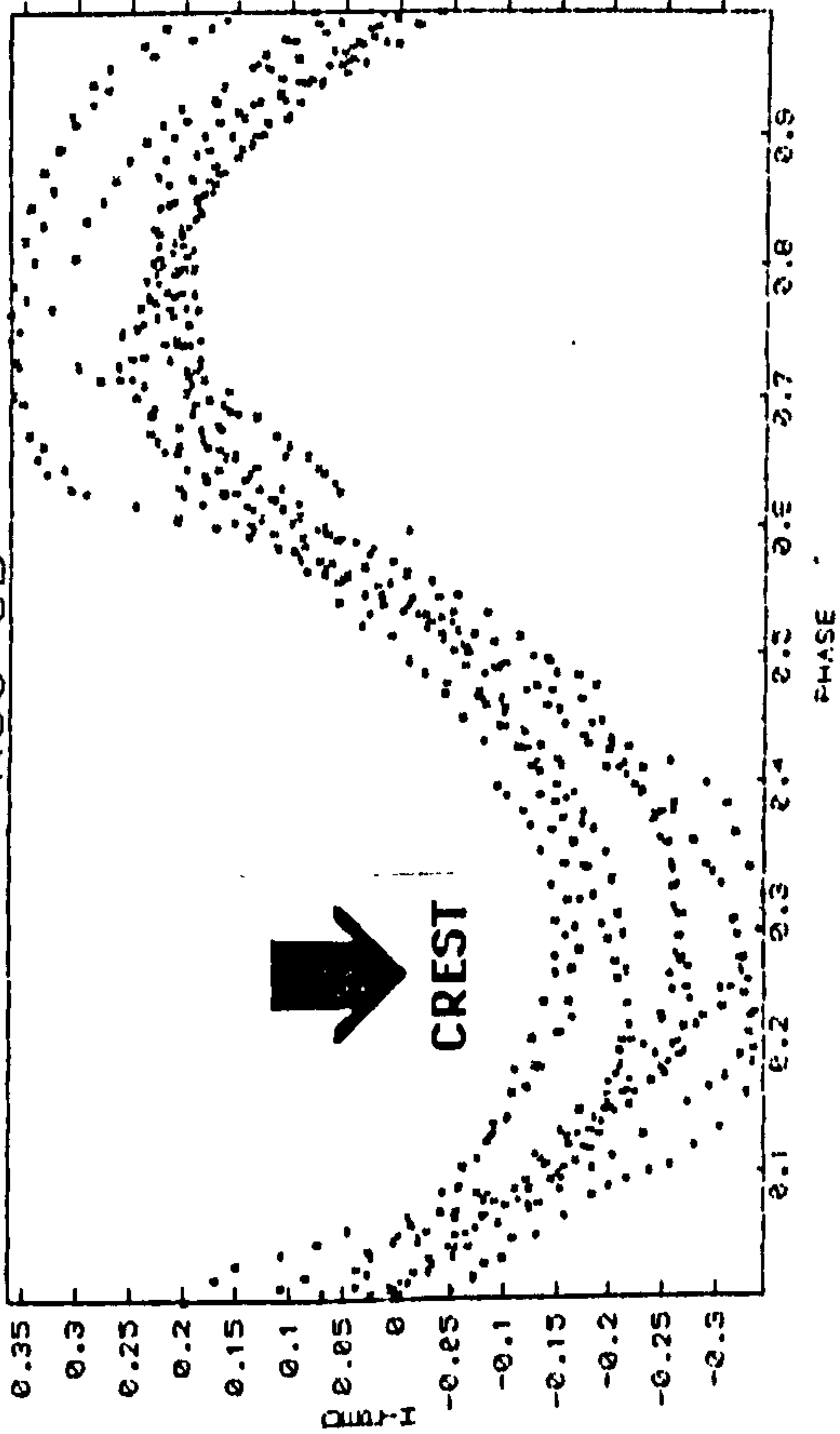
R0G-3B



R0G-3B



ROG-3B



Characteristics:

Screw ☒ Nut ☐

Leng: 1.375"

Diameter: 0.156"

Steel ☒ Brass ☐

Other:

Instrument Identification:

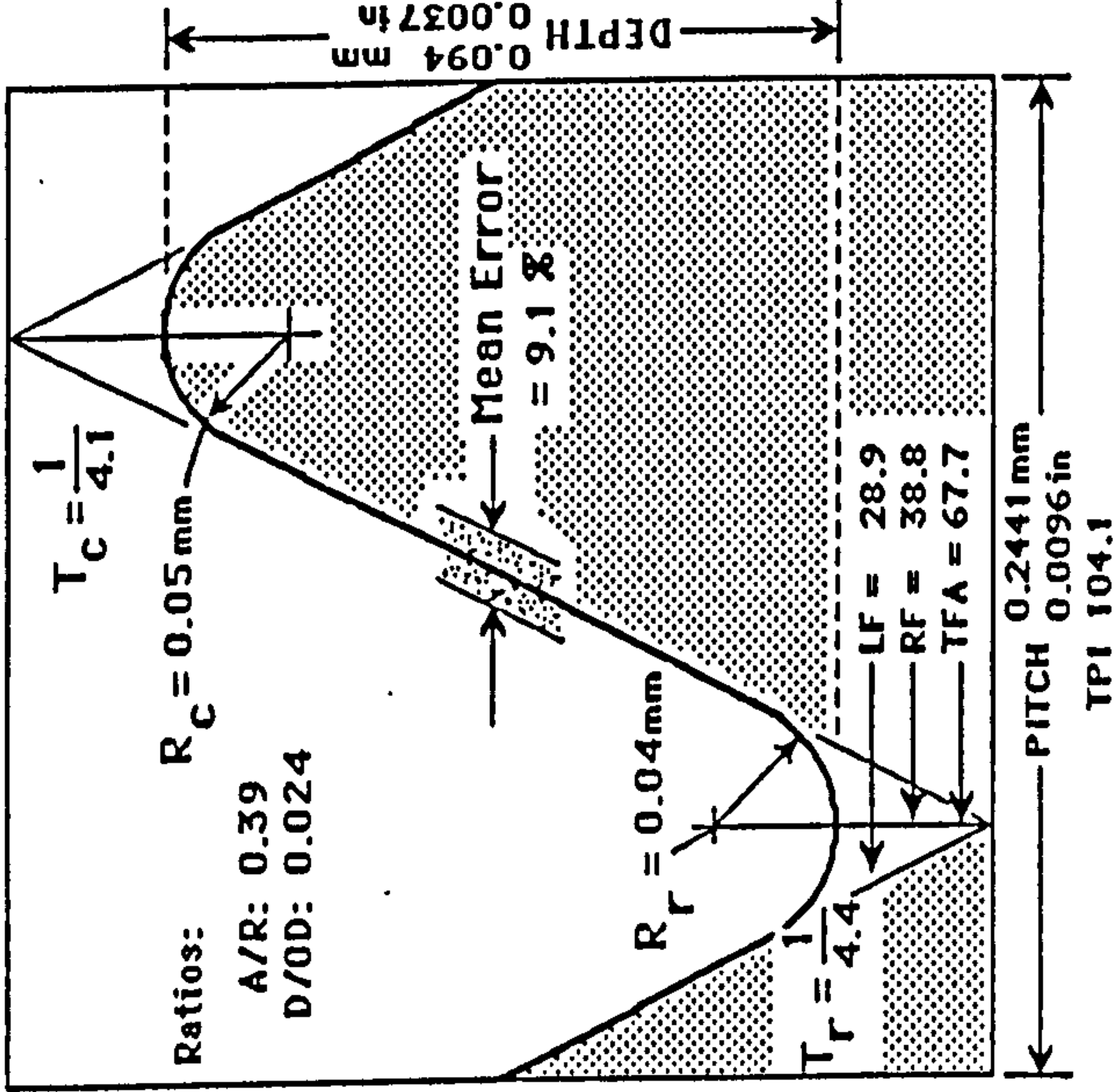
Study Code: ROG-3b

Instrument: Biflar micrometer

Maker: Dollond

Date: ca.1840

Ser./Acq. No. 0L-17

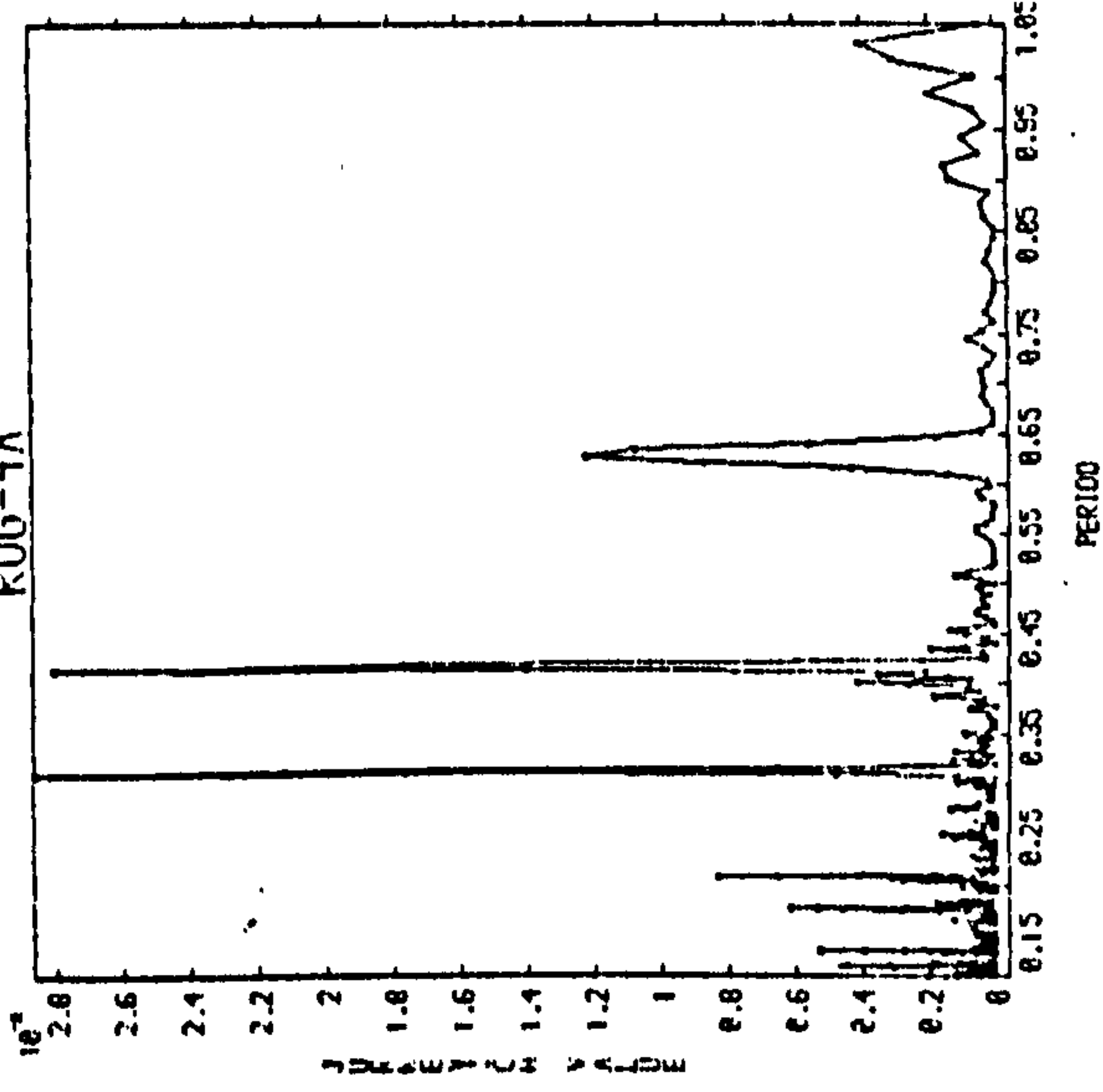


Mu	[	Filar
		Scale
		Bench
		Div. Eng.
		Adjust.
		Leveling
		Focus
		Eye P.
		Tube
		Tool
		Gauge
		Binding
		Misc.

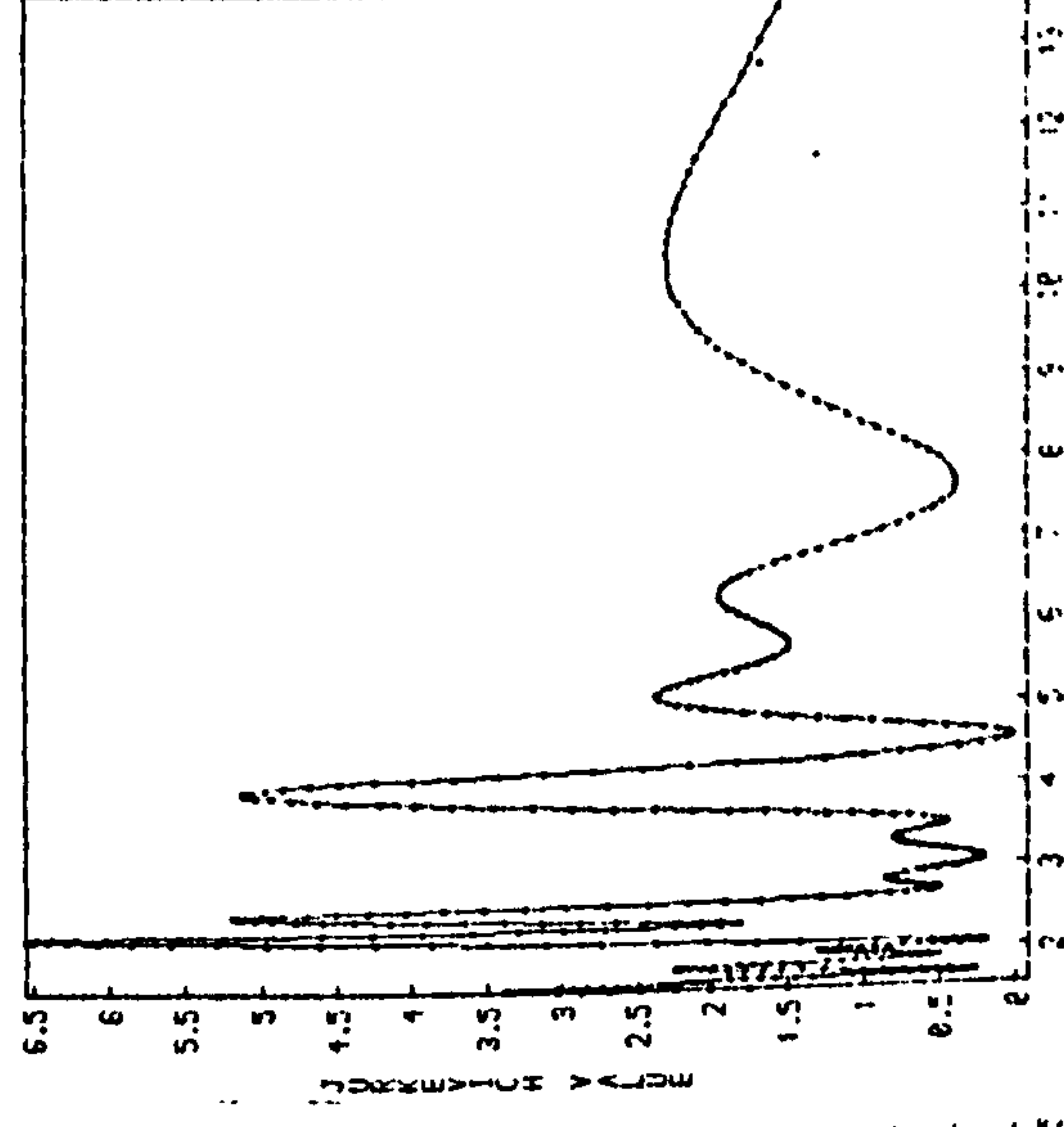
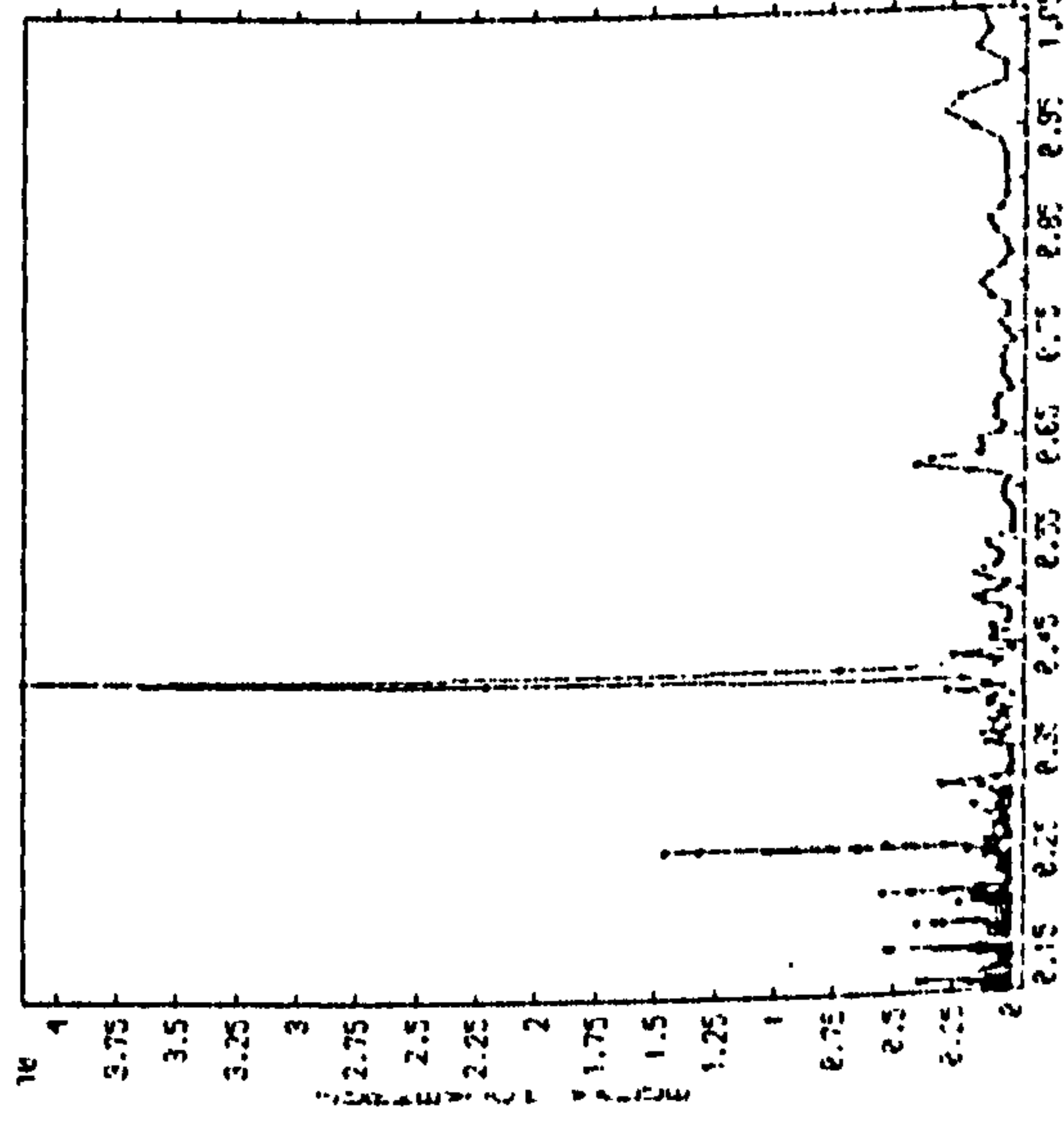
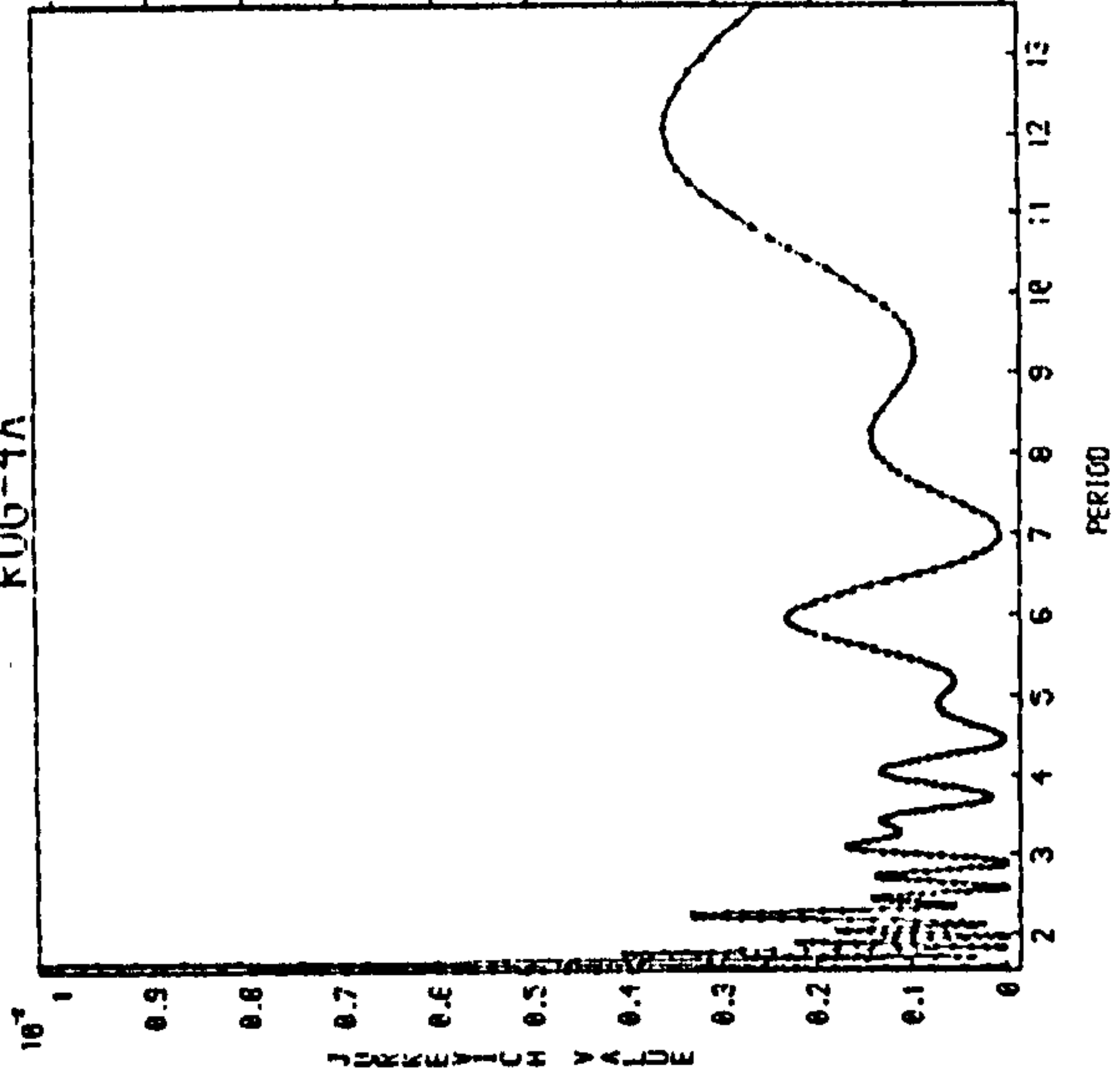
See ROG-3a for drum description



R06-4A



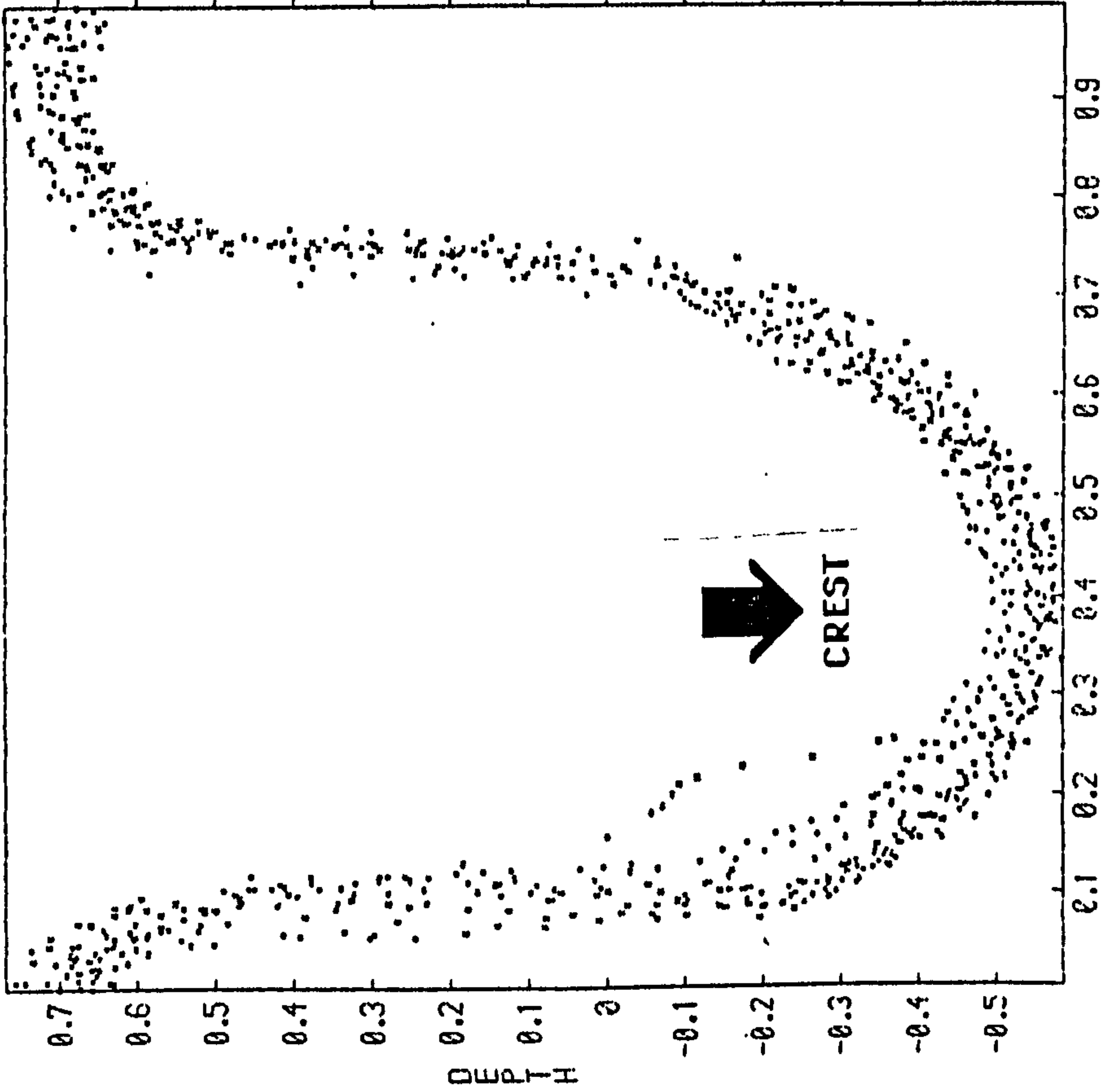
R06-4A



144100

144100

ROG-4A



Characteristics:

Screw ☒ Nut ☐

Leng: 1.125"

Diameter: 0.1769"

Steel ☒ Brass ☐

Other:

Instrument Identification:

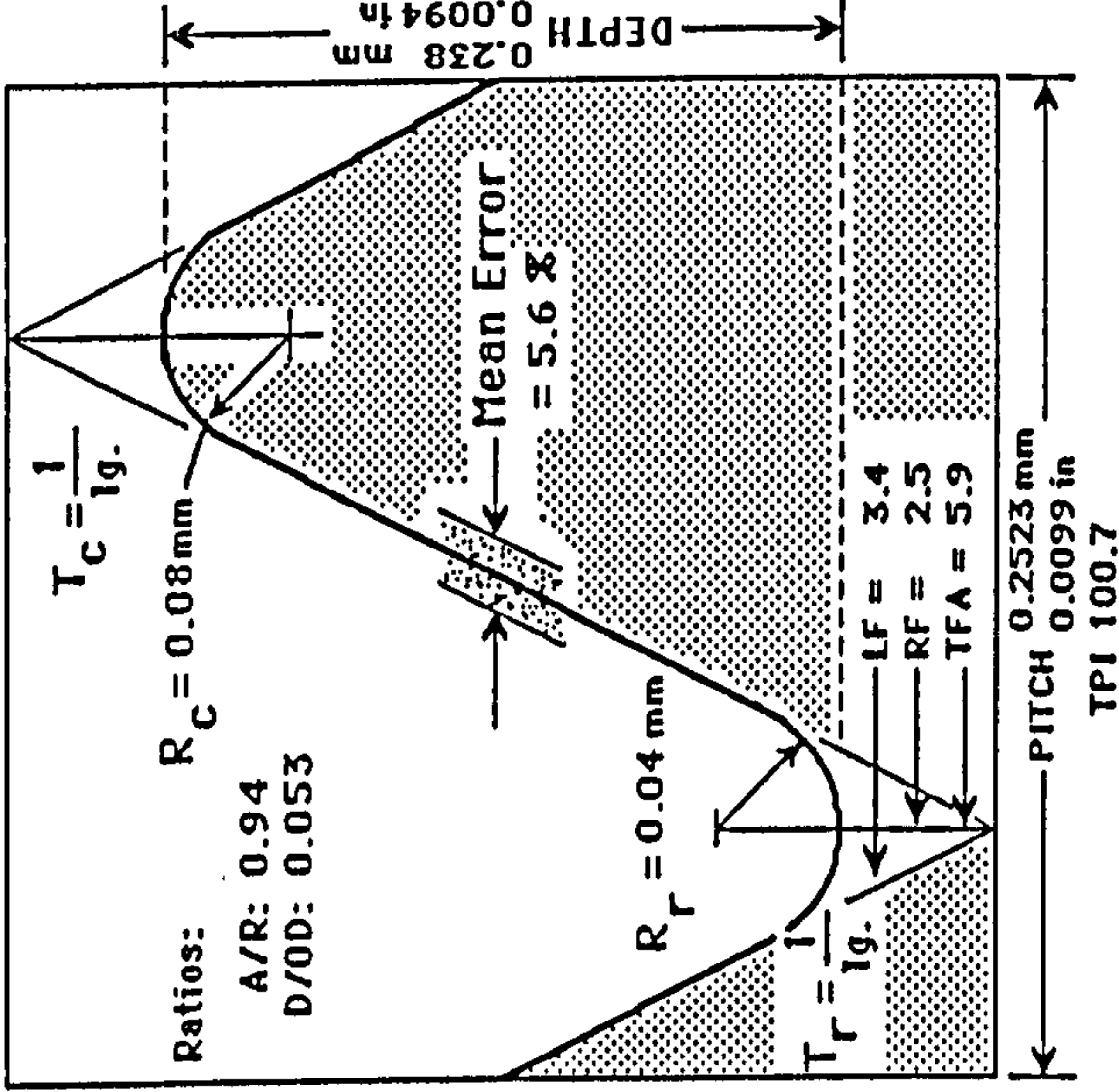
Study Code: ROG-4a

Instrument: Bifilar Mu

Maker: Troughton & Simms

Date: ca.1840

Ser./Acq. No. 0L-18

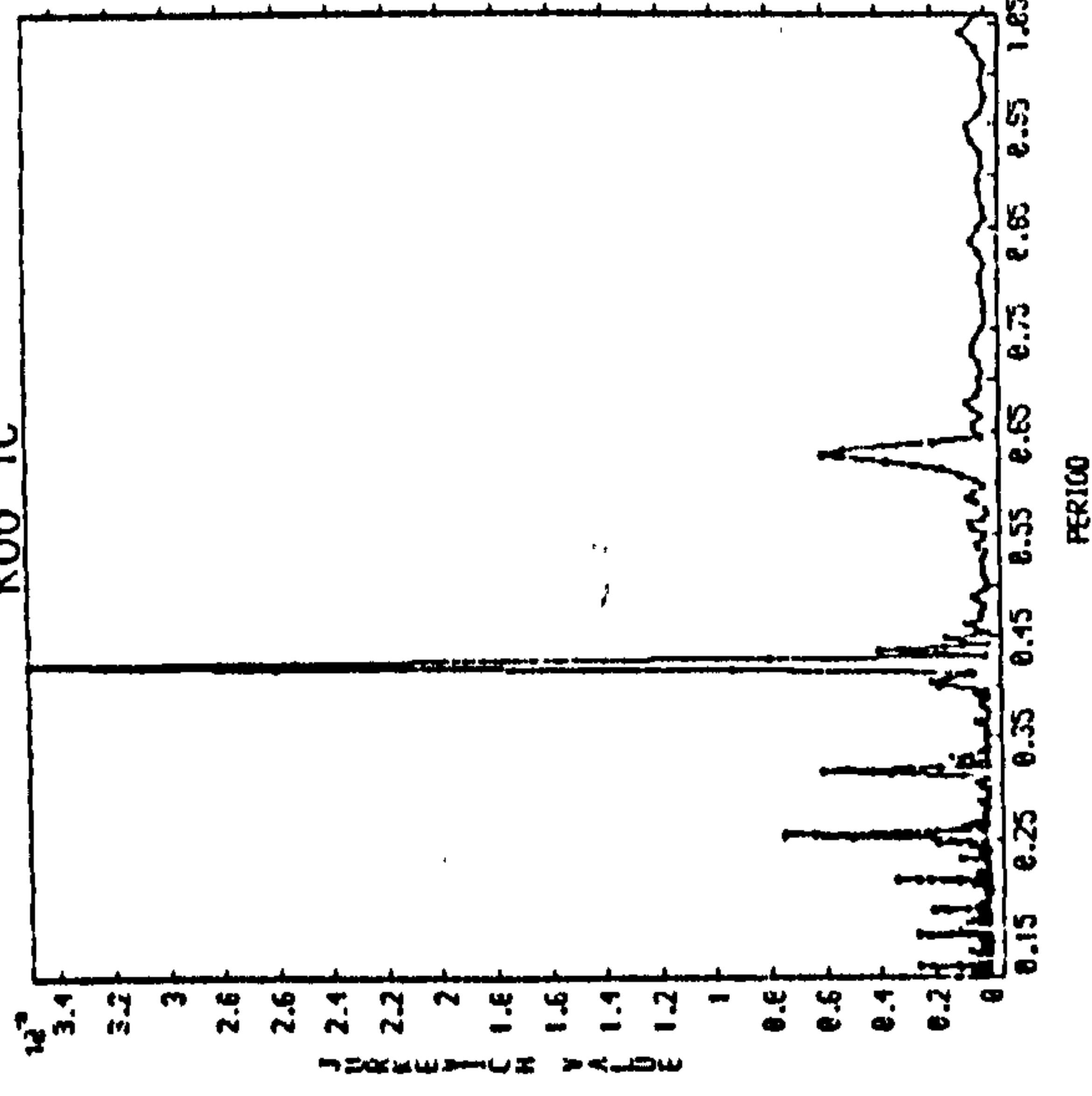


Mu	[	Filar
		Scale
Bench	]	Div. Eng.
		Adjust.
Leveling	]	Focus
		Eye P.
Tube	]	Tool
		Gauge
Binding	]	Misc.

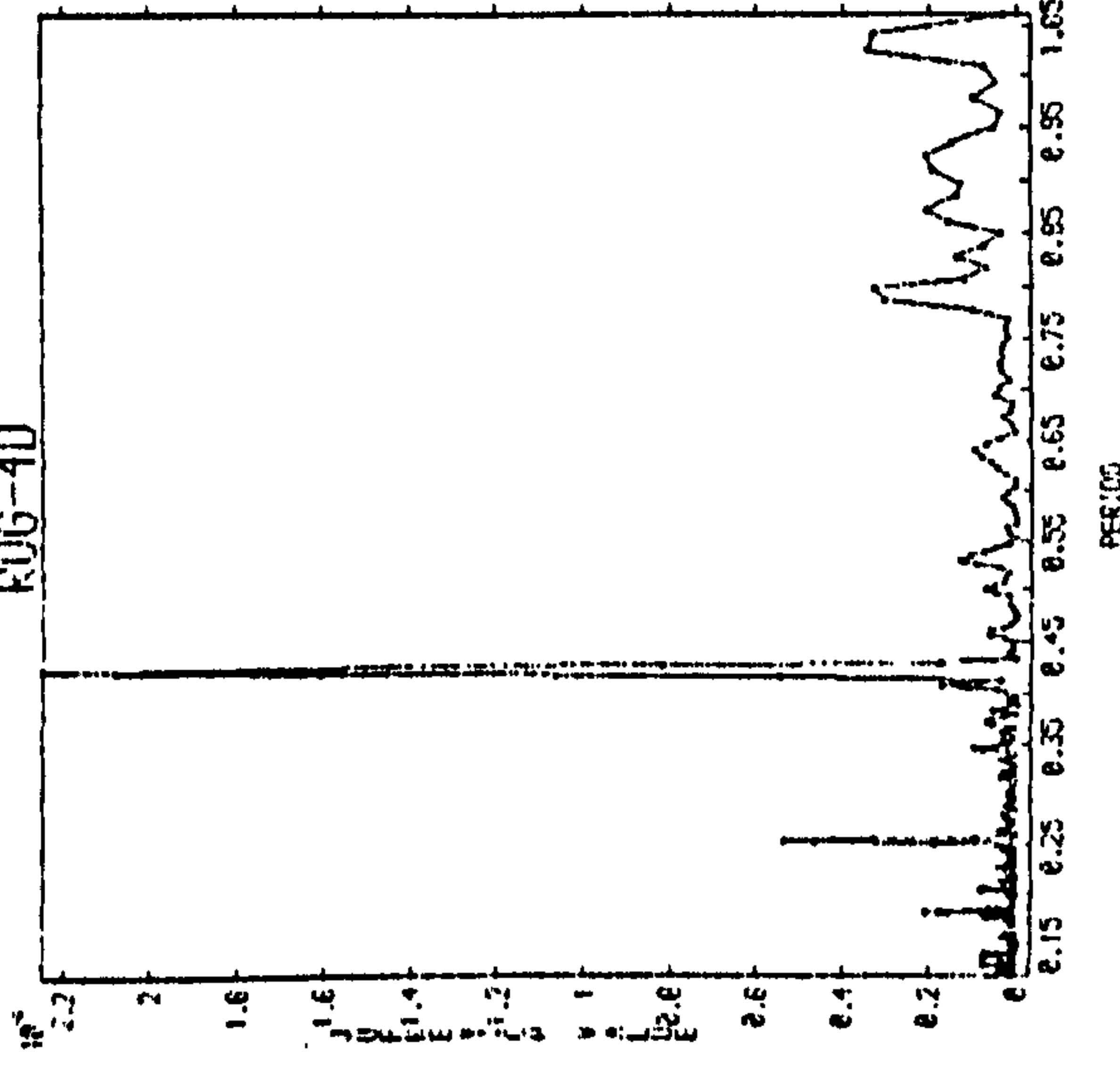
Mu Drum: dia.: 1.875"  
divisions: 100  
resolution: 1/10



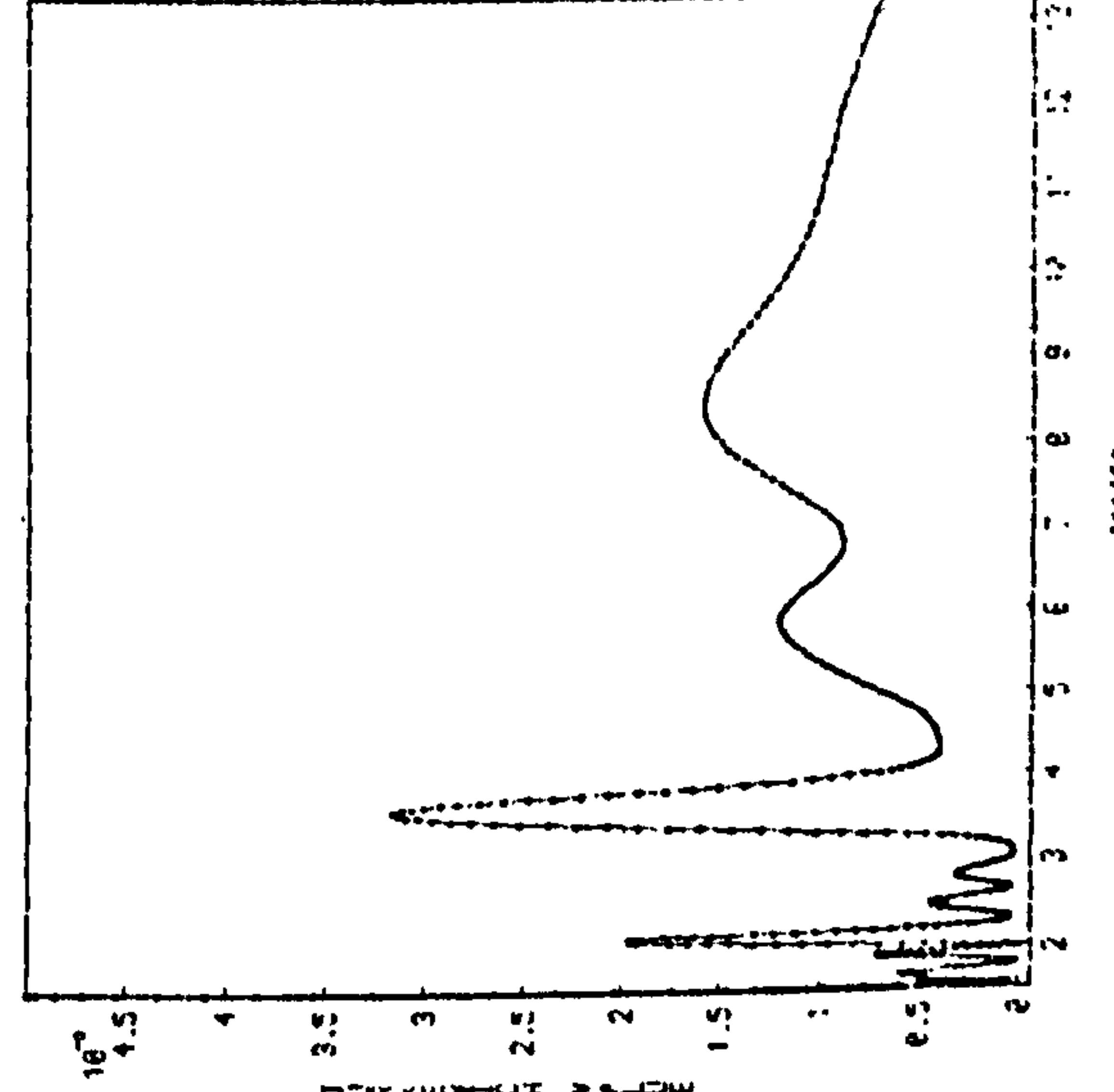
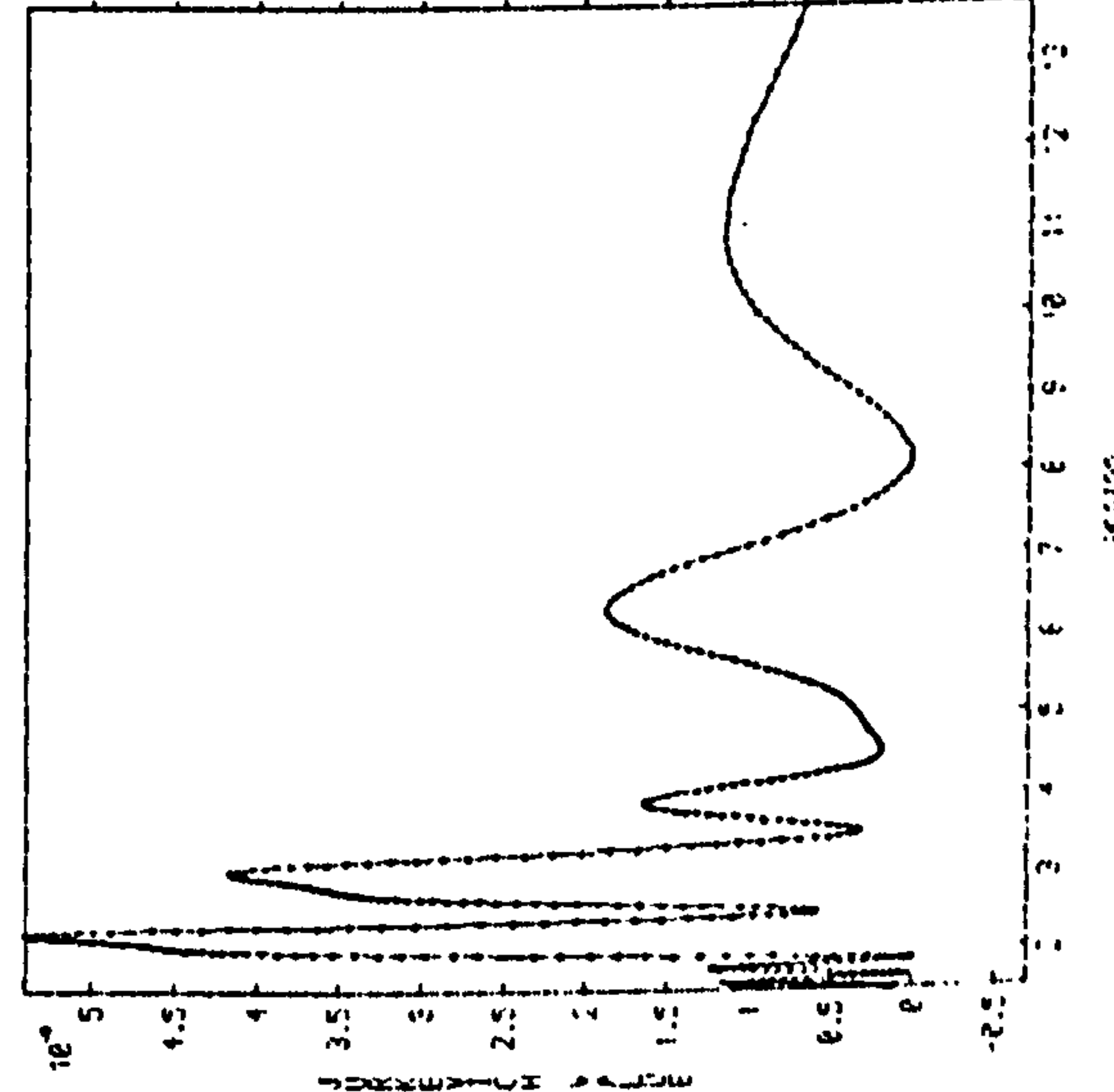
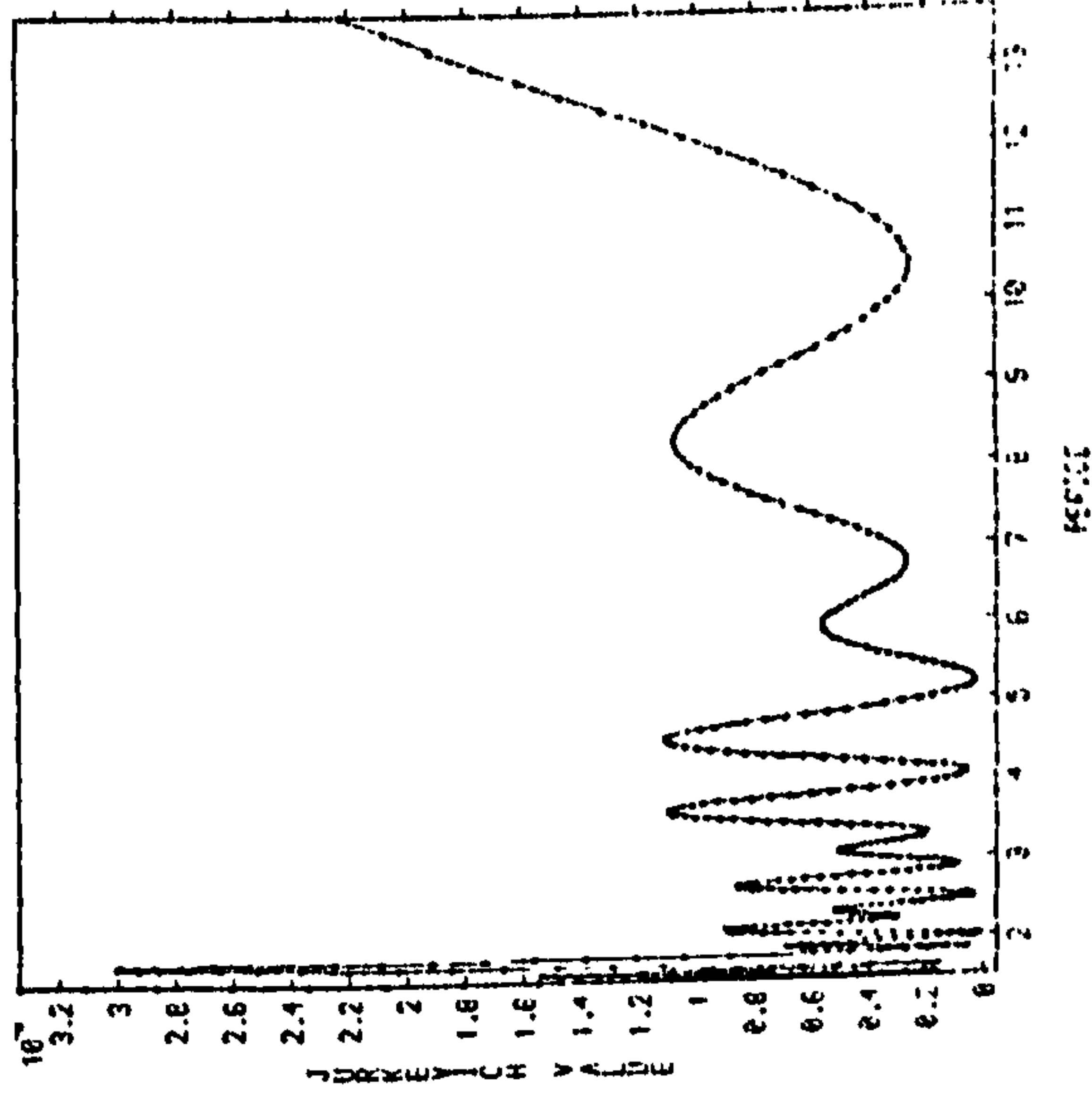
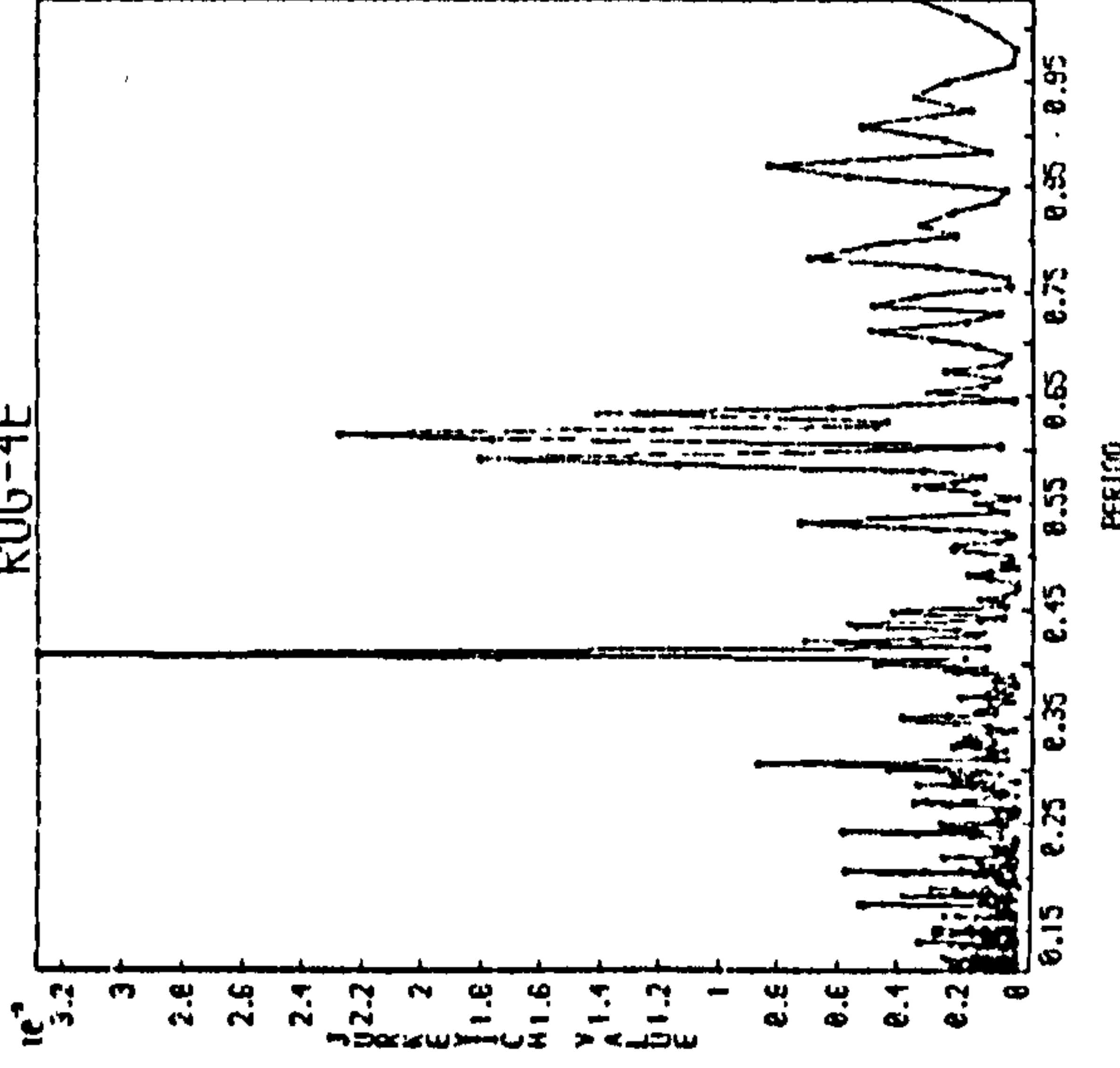
R06-4C



R06-4D

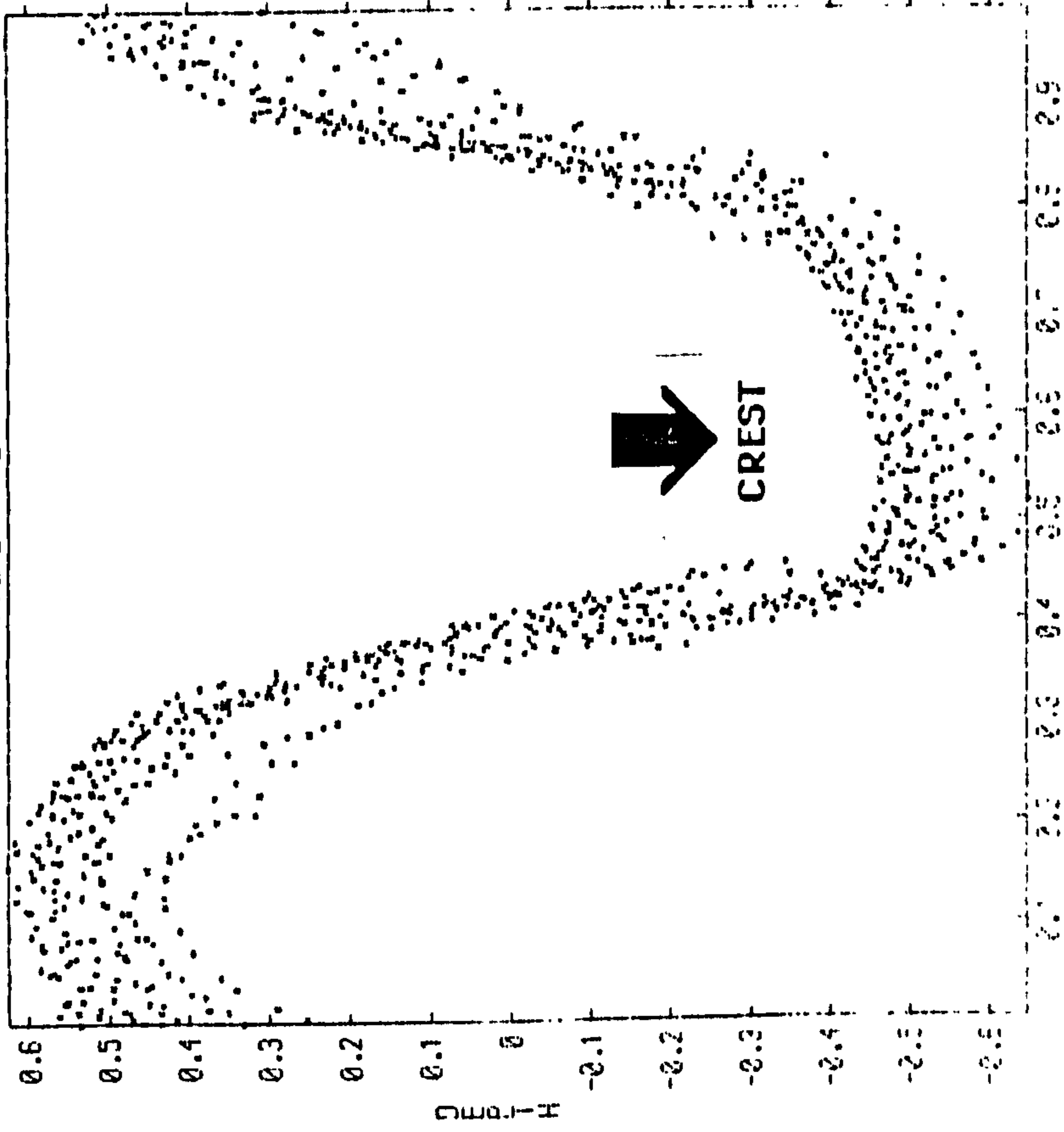


R06-4E





ROG-4C



5-752

Characteristics:

Screw ☒ Nut ☐

Leng: 1.438"

Diameter: 0.1780"

Steel ☒ Brass ☐

Other:

Instrument Identification:

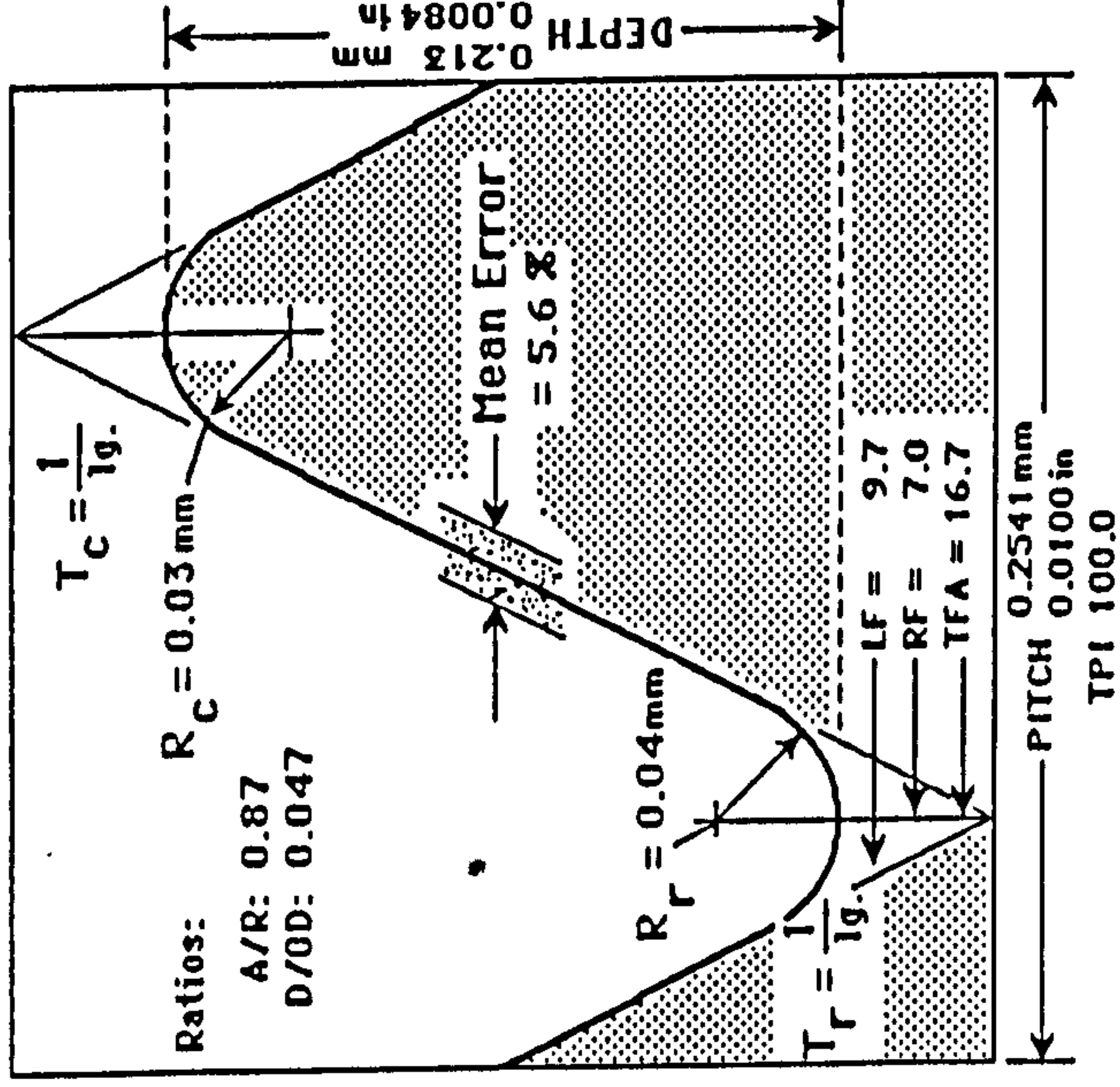
Study Code: ROG-4c

Instrument: Biflar micrometer

Maker: Troughton & Simms

Date: ca.1840

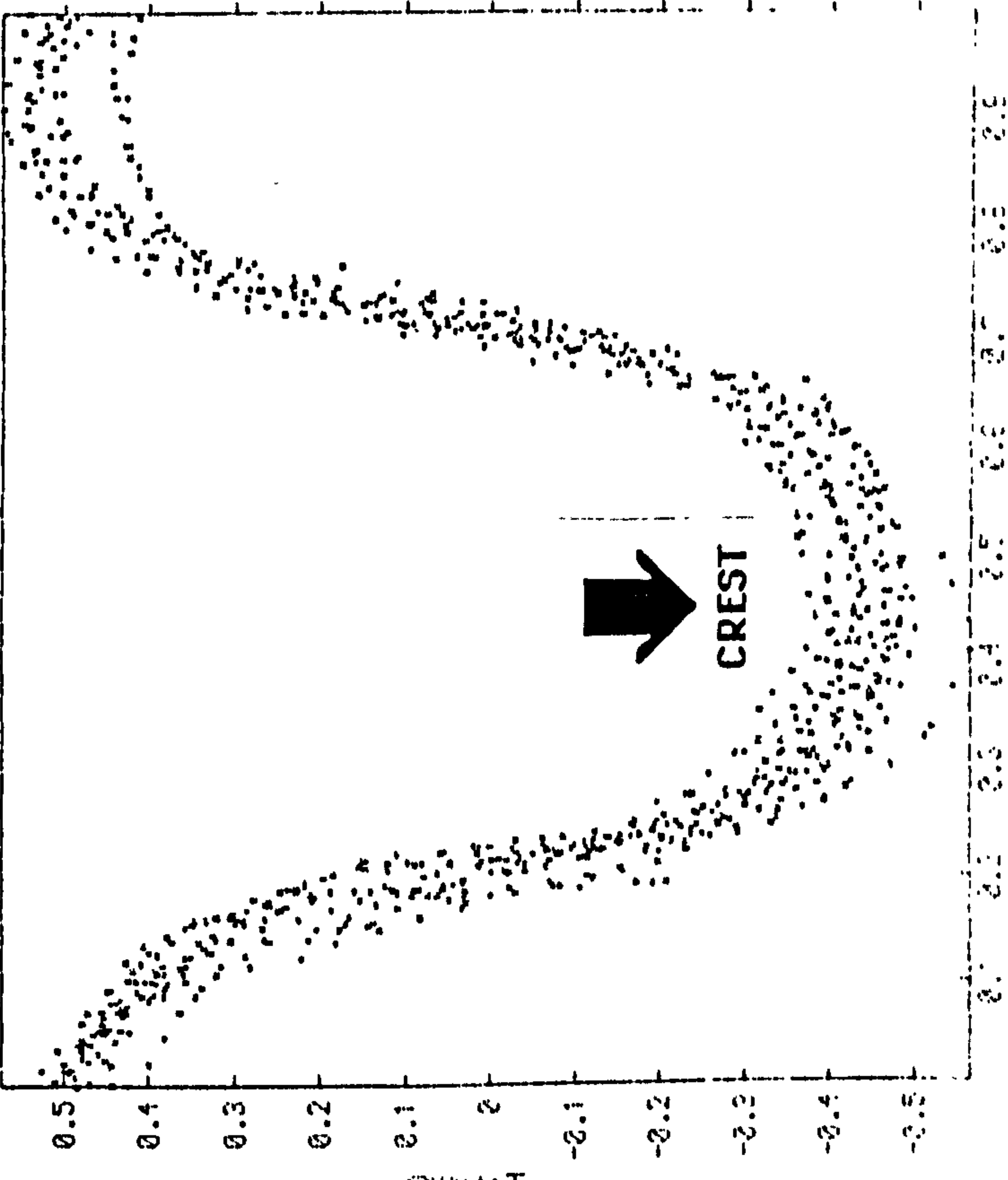
Ser./Acq. No. 0L-18



Drum: 1.875" diameter, 0-100 divisions with  $\pm 0.1 \text{ div. resolution}$

Mu	Filar	
		Scale
Bench	Div. Eng.	
		Adjust.
Leveling	Focus	
		Eye P.
Tube	Tool	
		Gauge
Binding	Misc.	

R0G-4D



**Characteristics:**

Screw ☒ Nut ☐

Leng: 1.438"

Diameter: 0.1788"

Steel ☐ Brass ☐

Other: ☐

**Instrument Identification:**

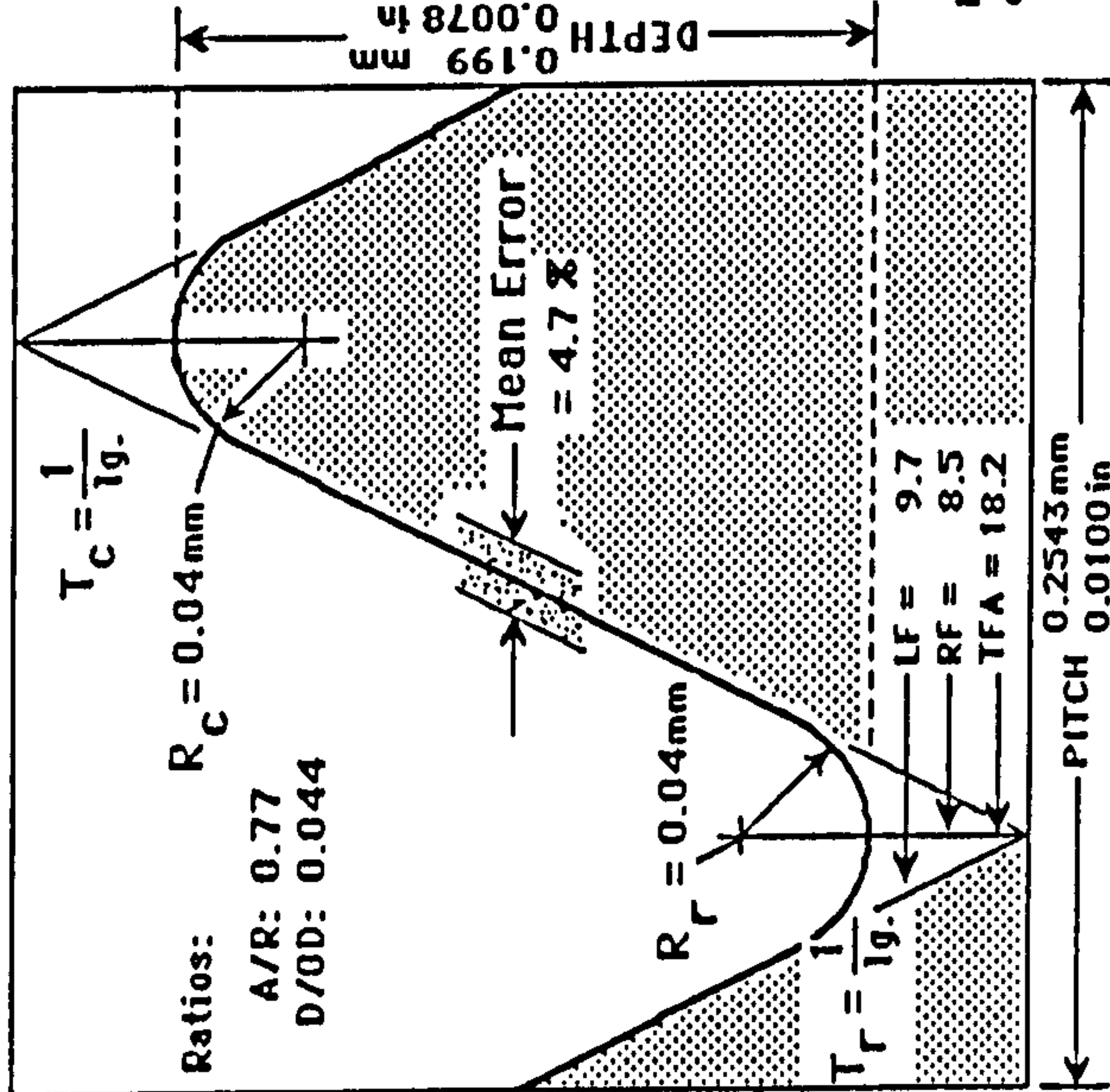
Study Code: R0G-4d

Instrument: Bifilar micrometer

Maker: Troughton & Simms

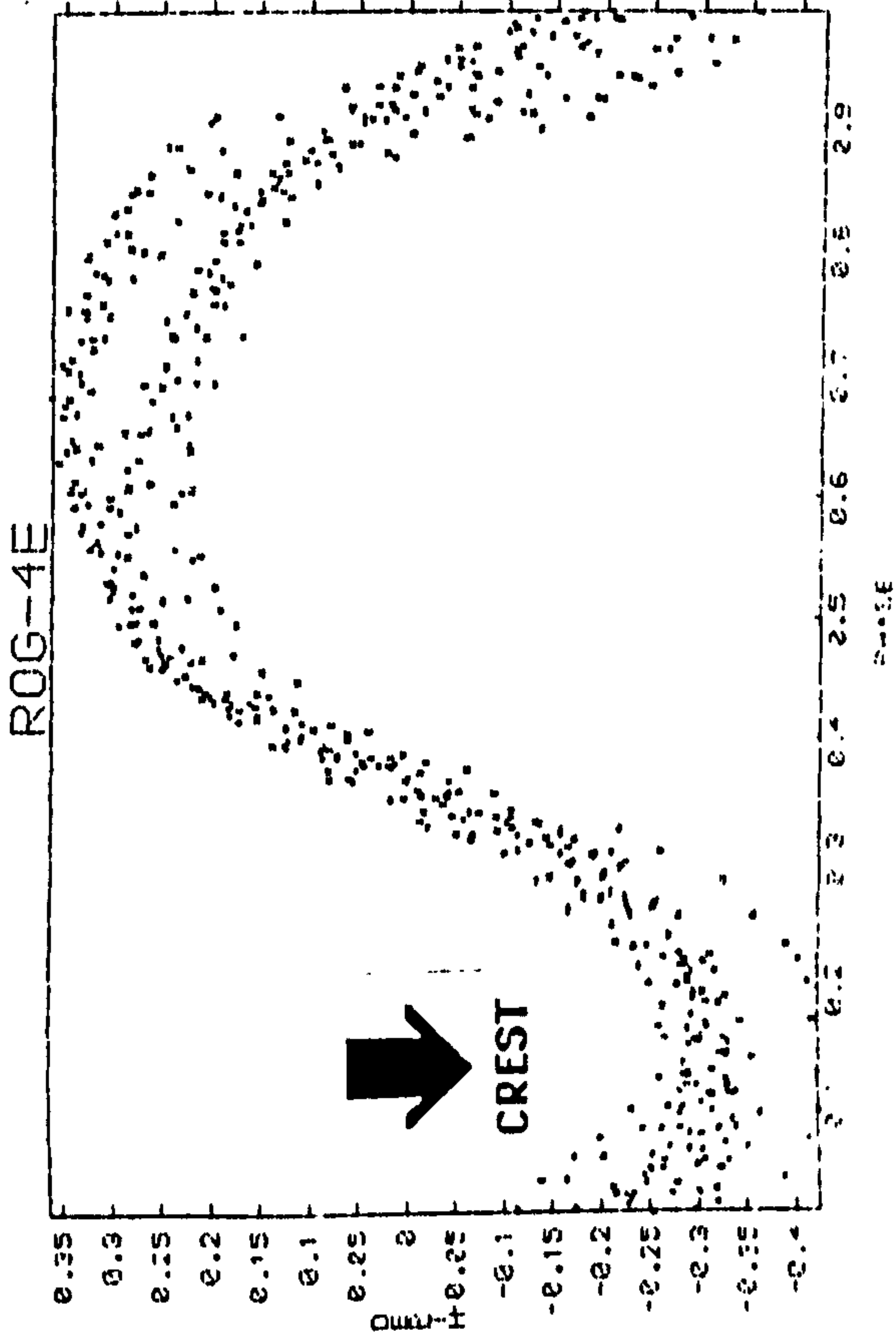
Date: ca.1840

Ser./Acq. No. 0L-18



Mu — [ Filar Scale Bench Div. Eng. Adjust. Leveling Focus Eye P. Tube Tool Gauge Binding Misc. ]

Drum: 1.875" diameter 0-100 divisions with ±0.1div. resolution



Characteristics:

Screw ☒ Nut ☐

Leng: 0.50"

Diameter: 0.0965"

Steel ☒ Brass ☐

Other:

Instrument Identification:

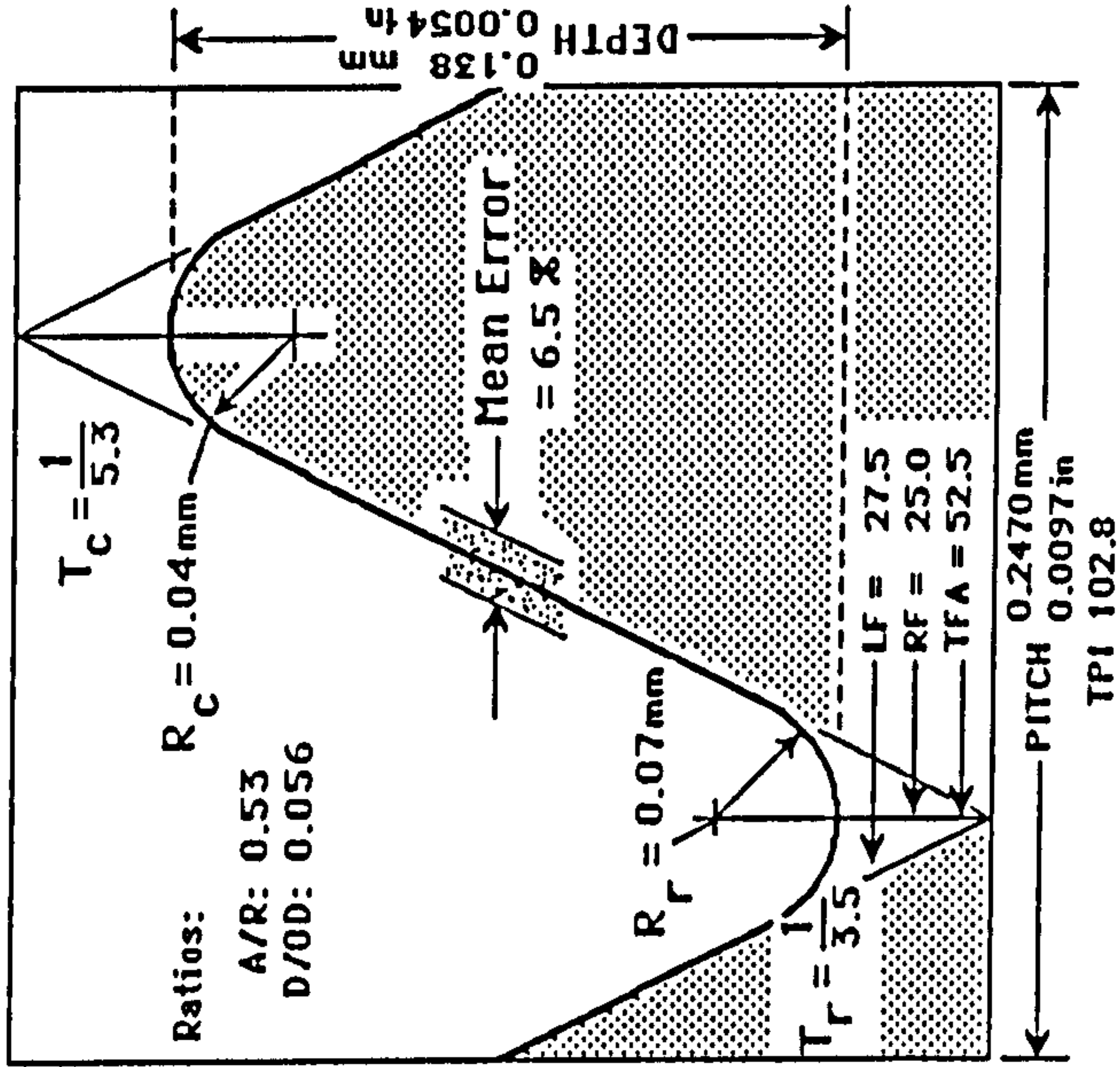
Study Code: ROG-4e

Instrument: Dynameter

Maker: Troughton & Simms

Date: ca.1840

Ser./Acq. No. 0L-18



Mu

Filar

Scale

Bench

Div. Eng.

Adjust.

Leveling

Focus

Eye P.

Tube

Tool

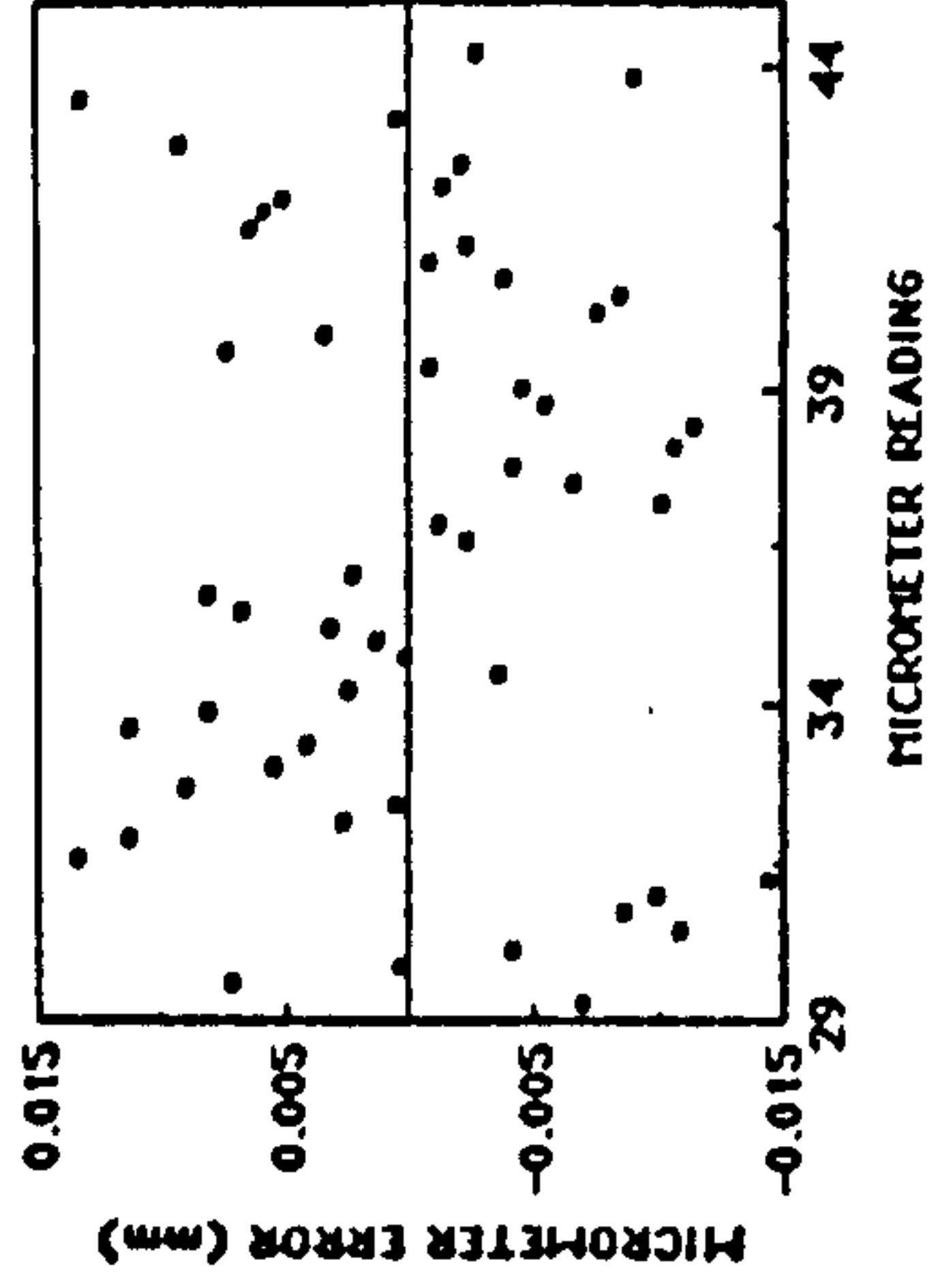
Gauge

Binding

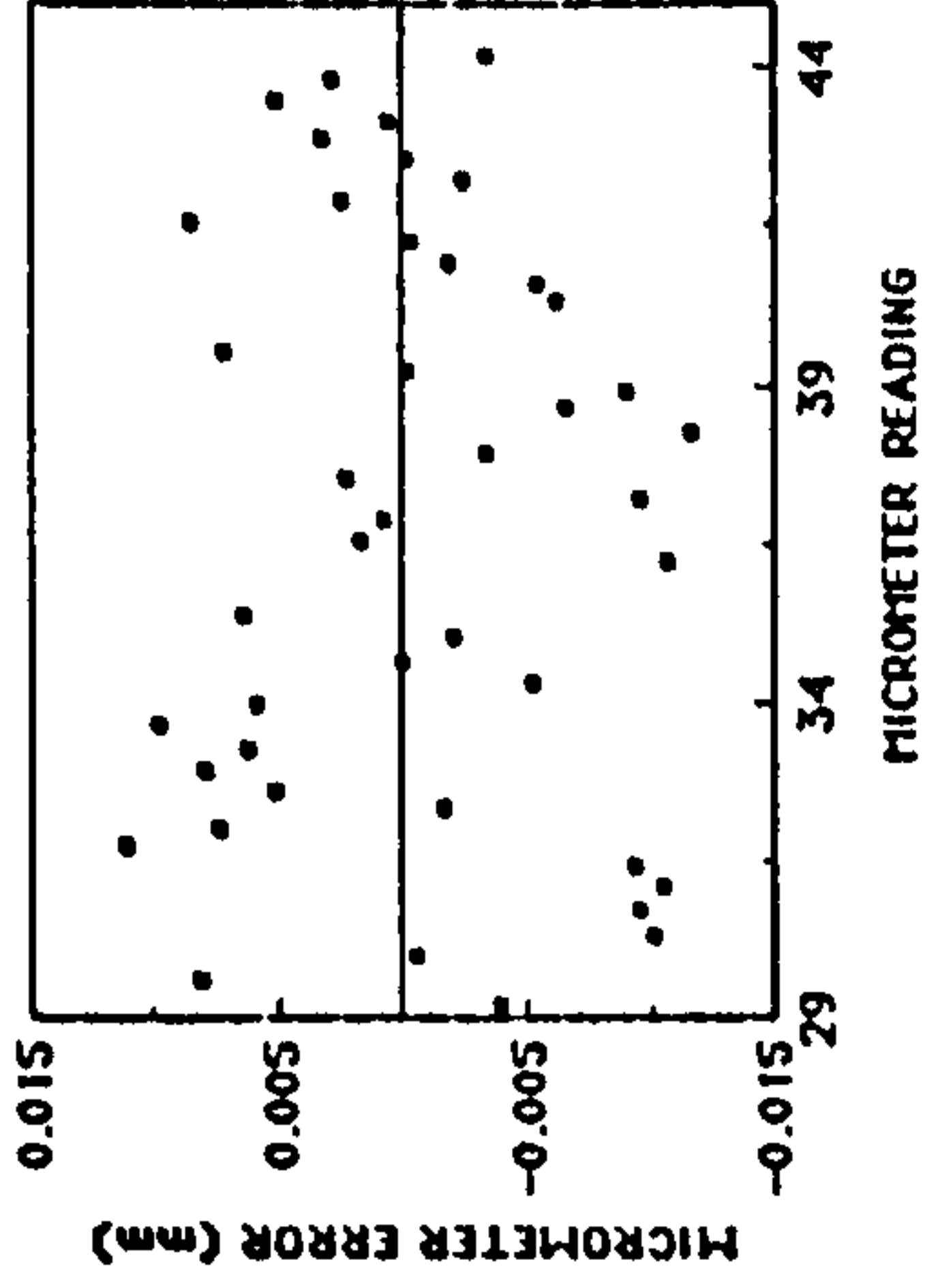
Misc.

Drum: 0.875" diameter 0-100 divisions,  $\pm 0.4$  div. resolution

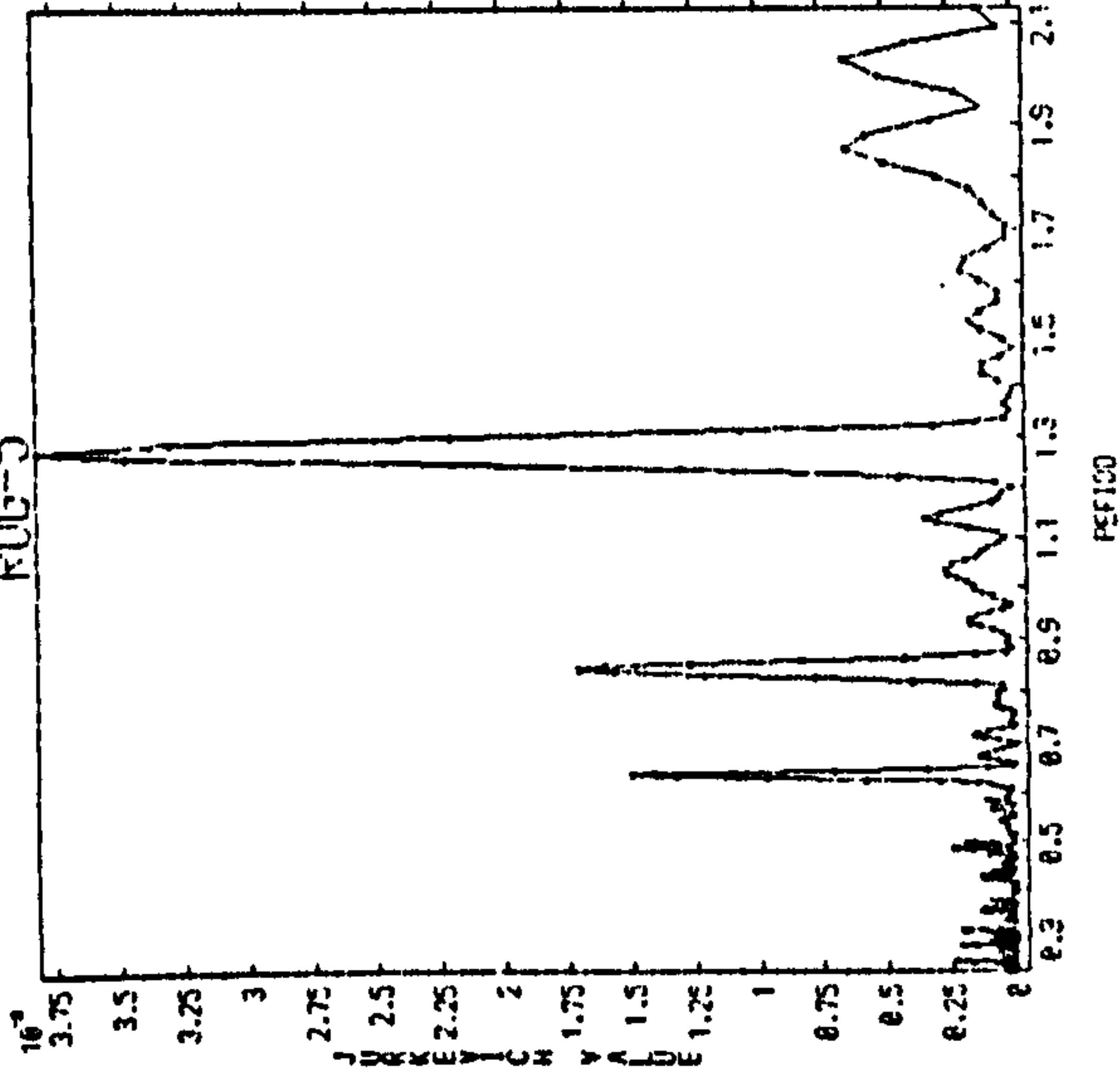
ROG-5 (run 1 2dp)



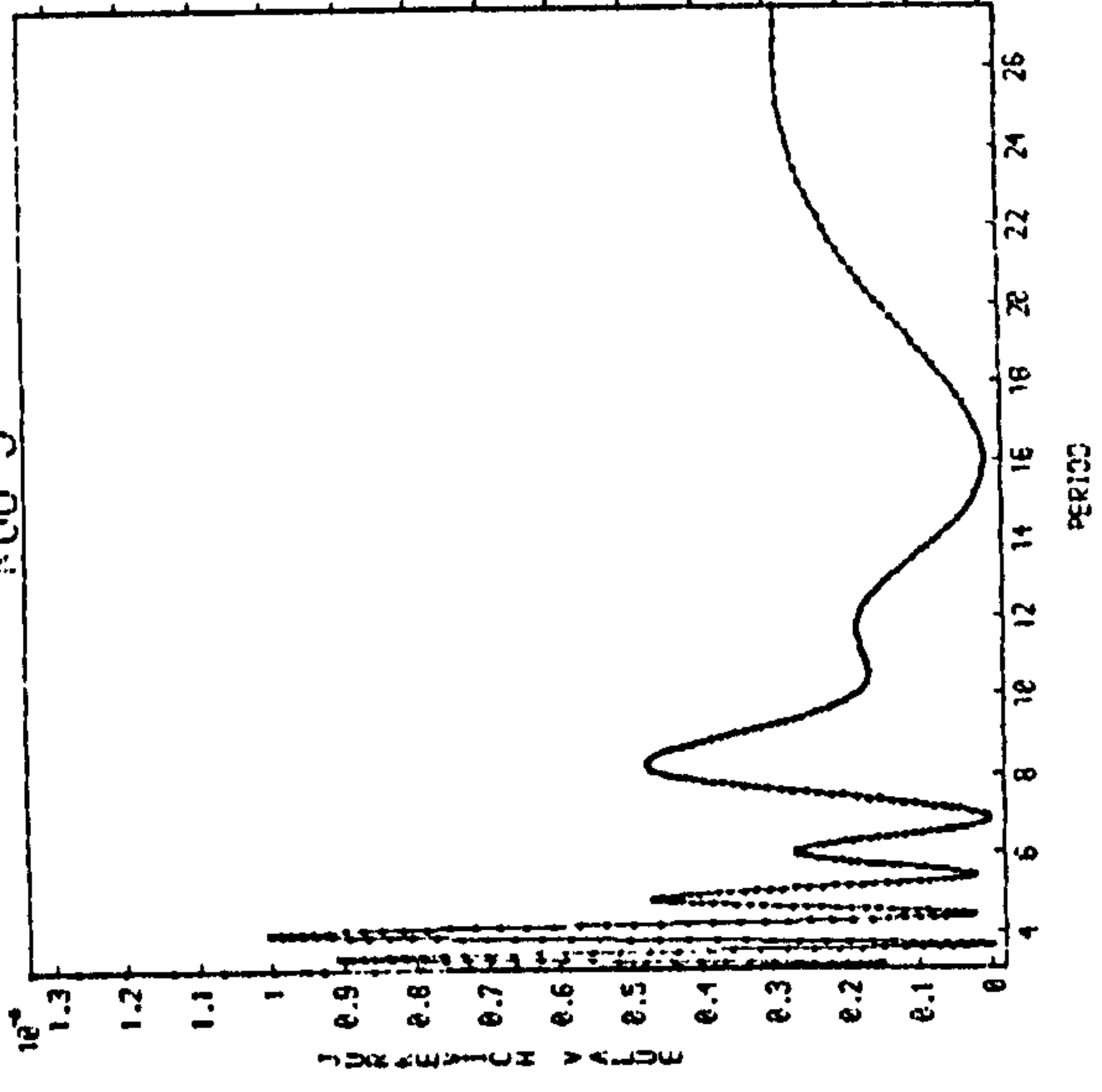
ROG-5 (run 2 2dp)



ROG-5



ROG-5





Characteristics:

Screw

Nut

Leng: 1.125"

Diameter: ~0.156"

Steel

Brass

Other:

Instrument Identification:

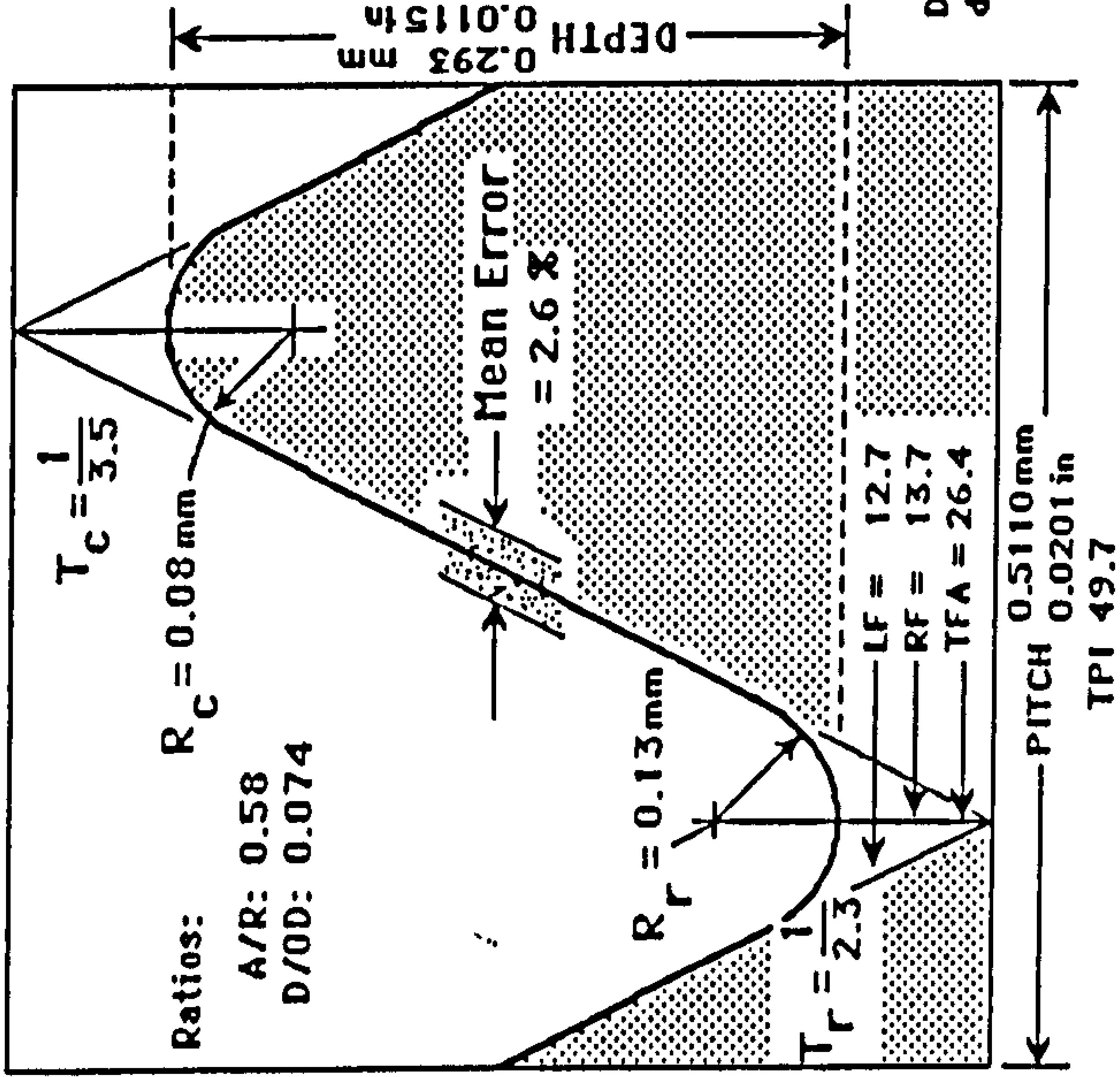
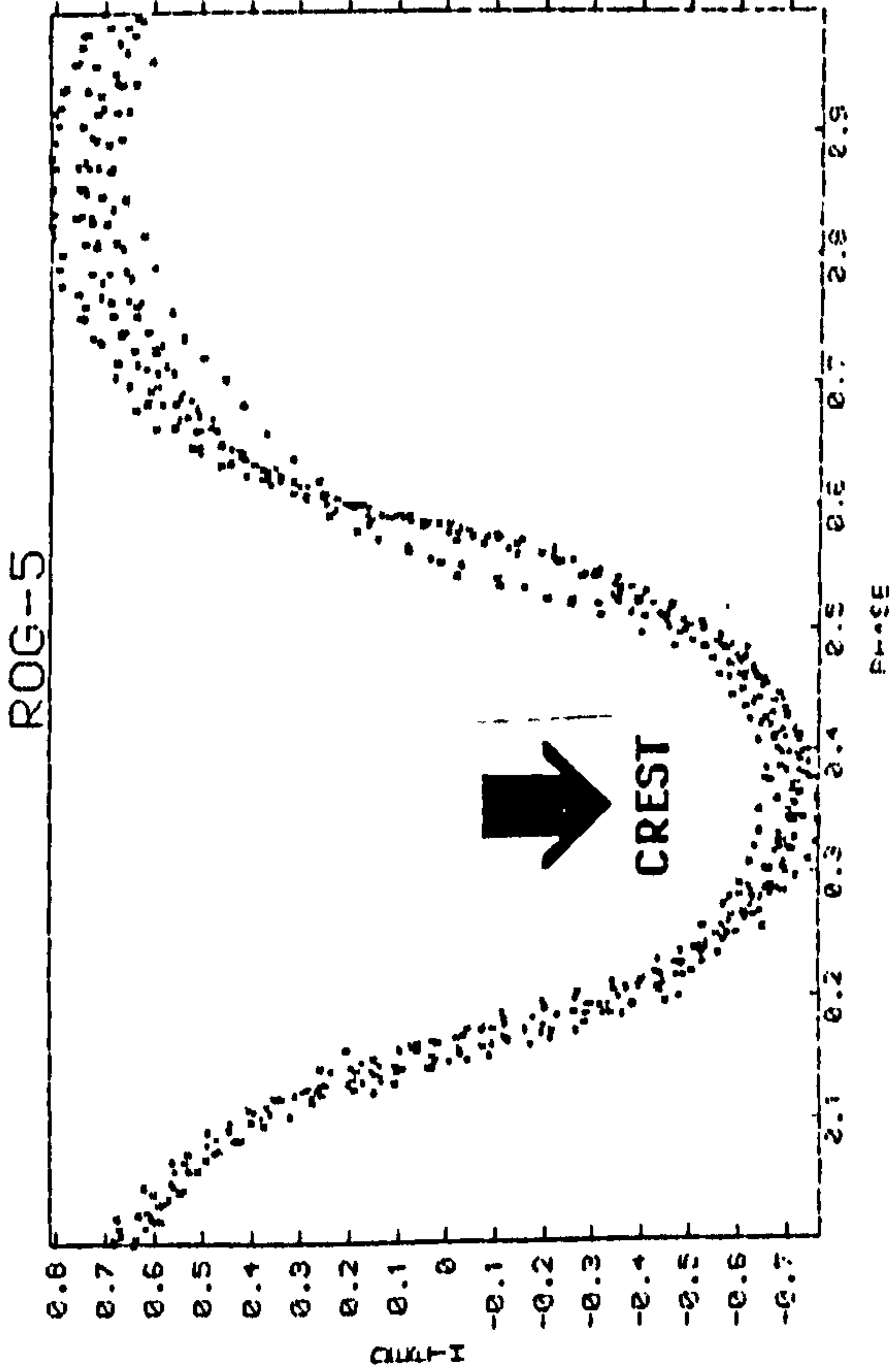
Study Code: ROG-5

Instrument: Dynamometer

Maker: M/S (T. Jones?)

Date: ca.1843

Ser./Acq. No. 0L-16



Mu

Filar

Scale

Bench

Div. Eng.

Adjust.

Leveling

Focus

Eye P.

Tube

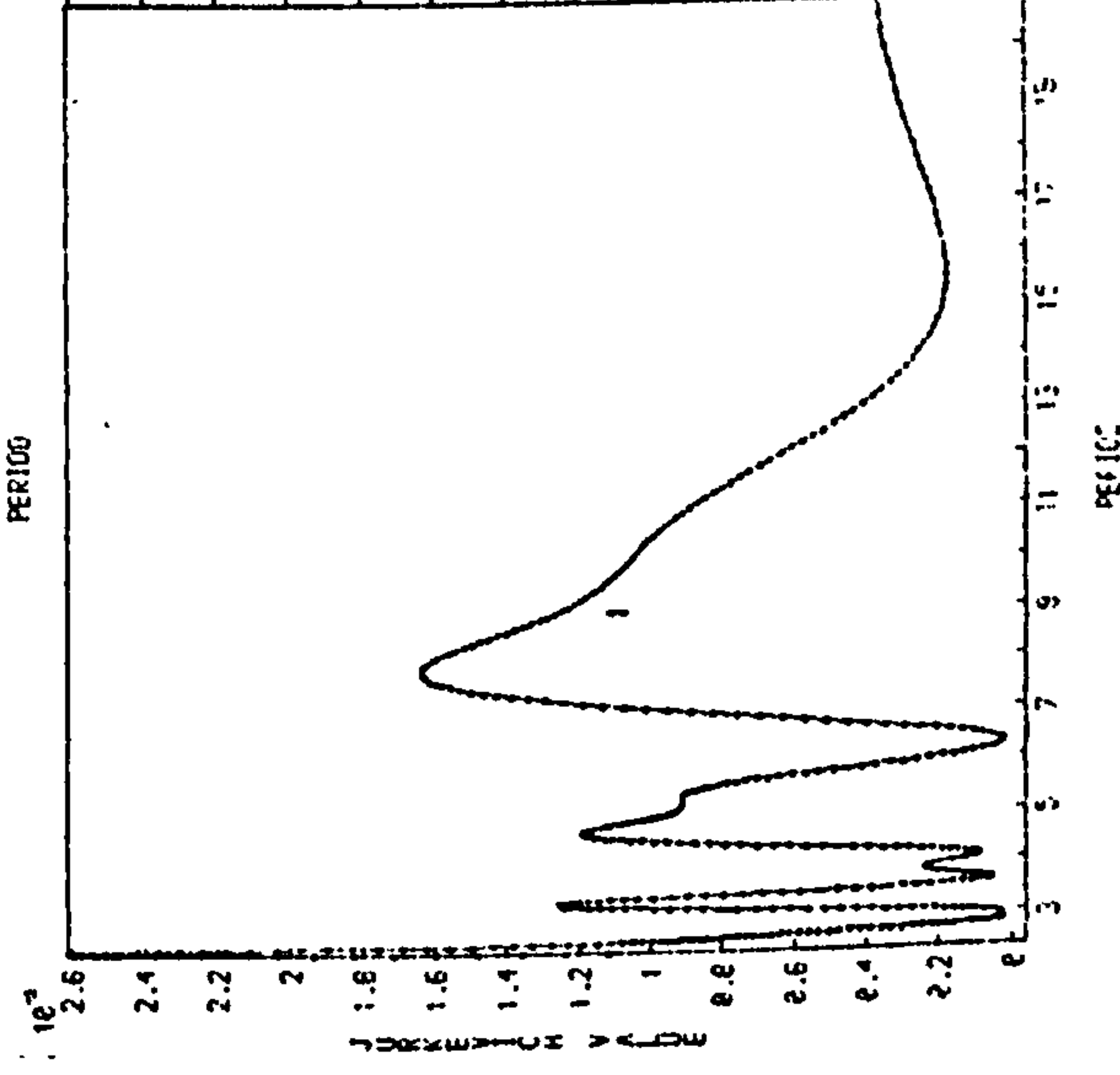
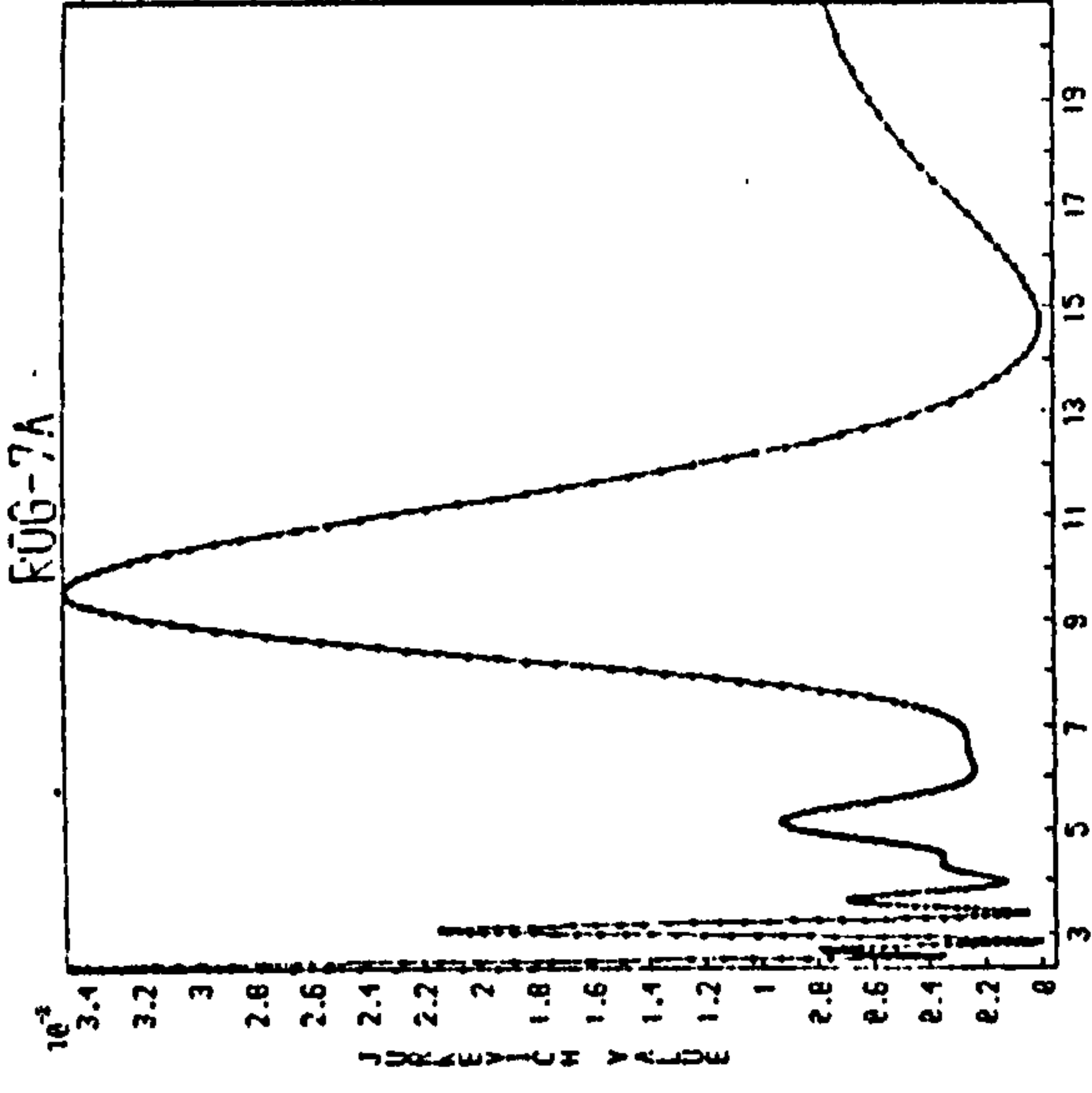
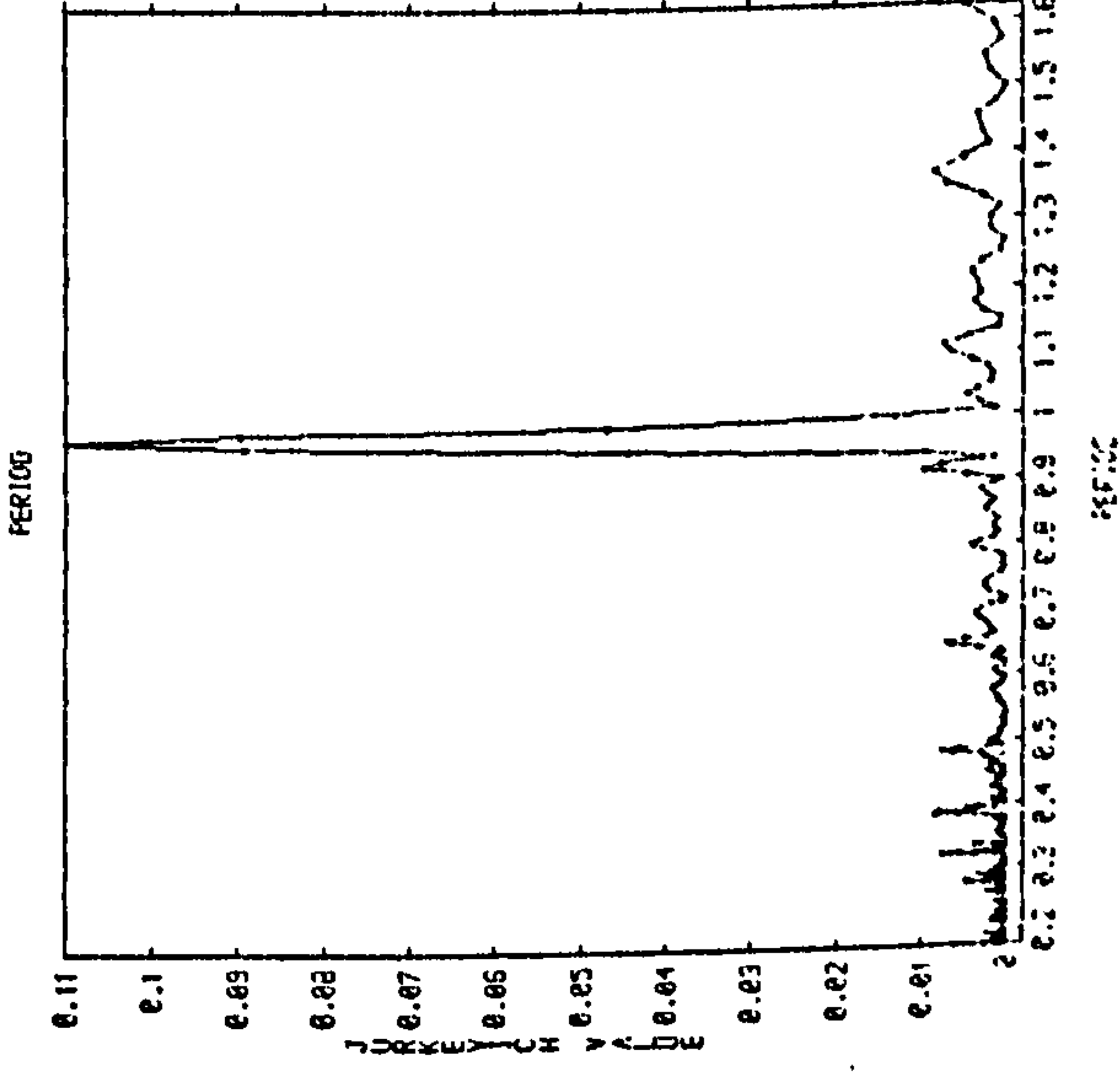
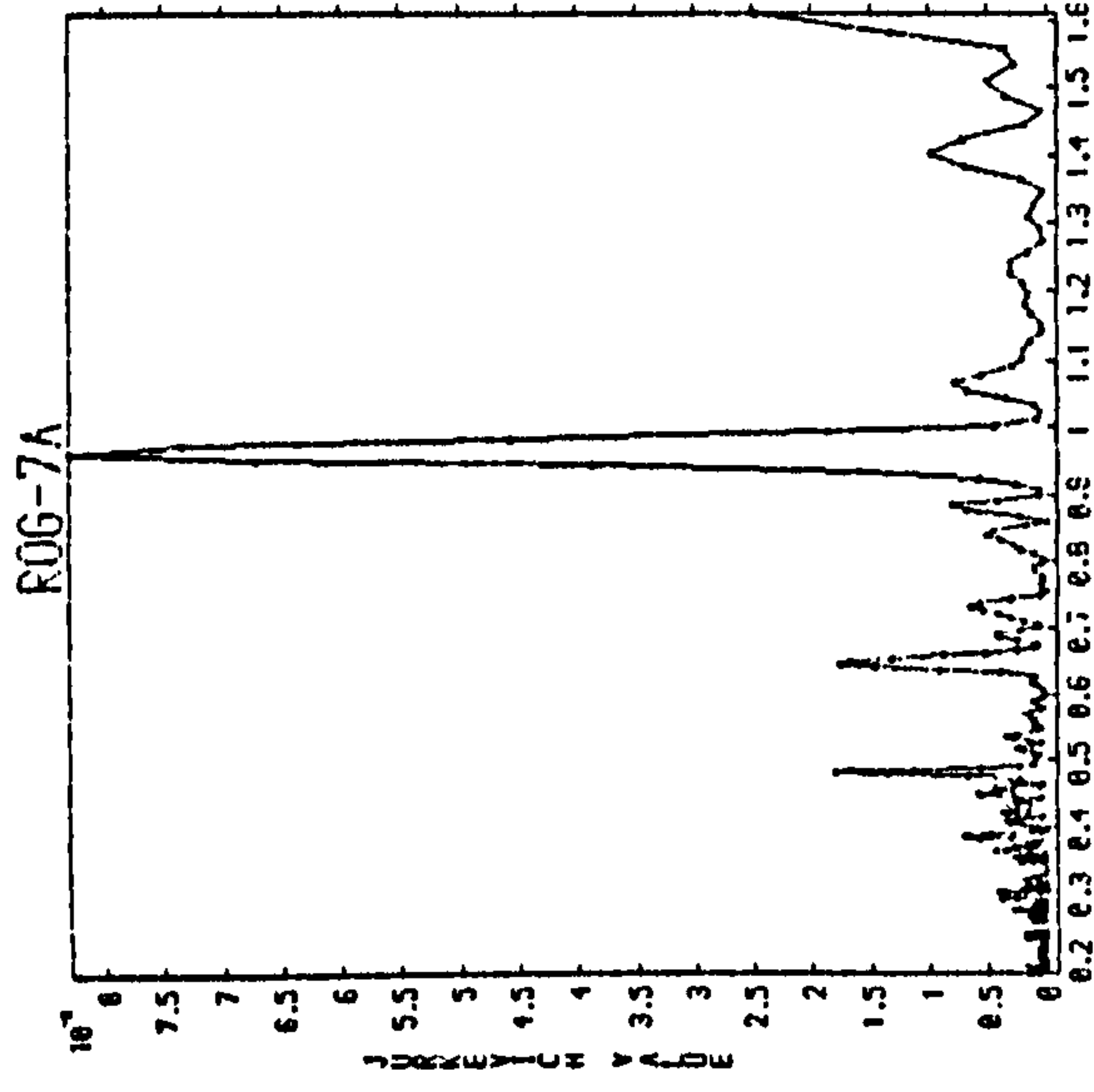
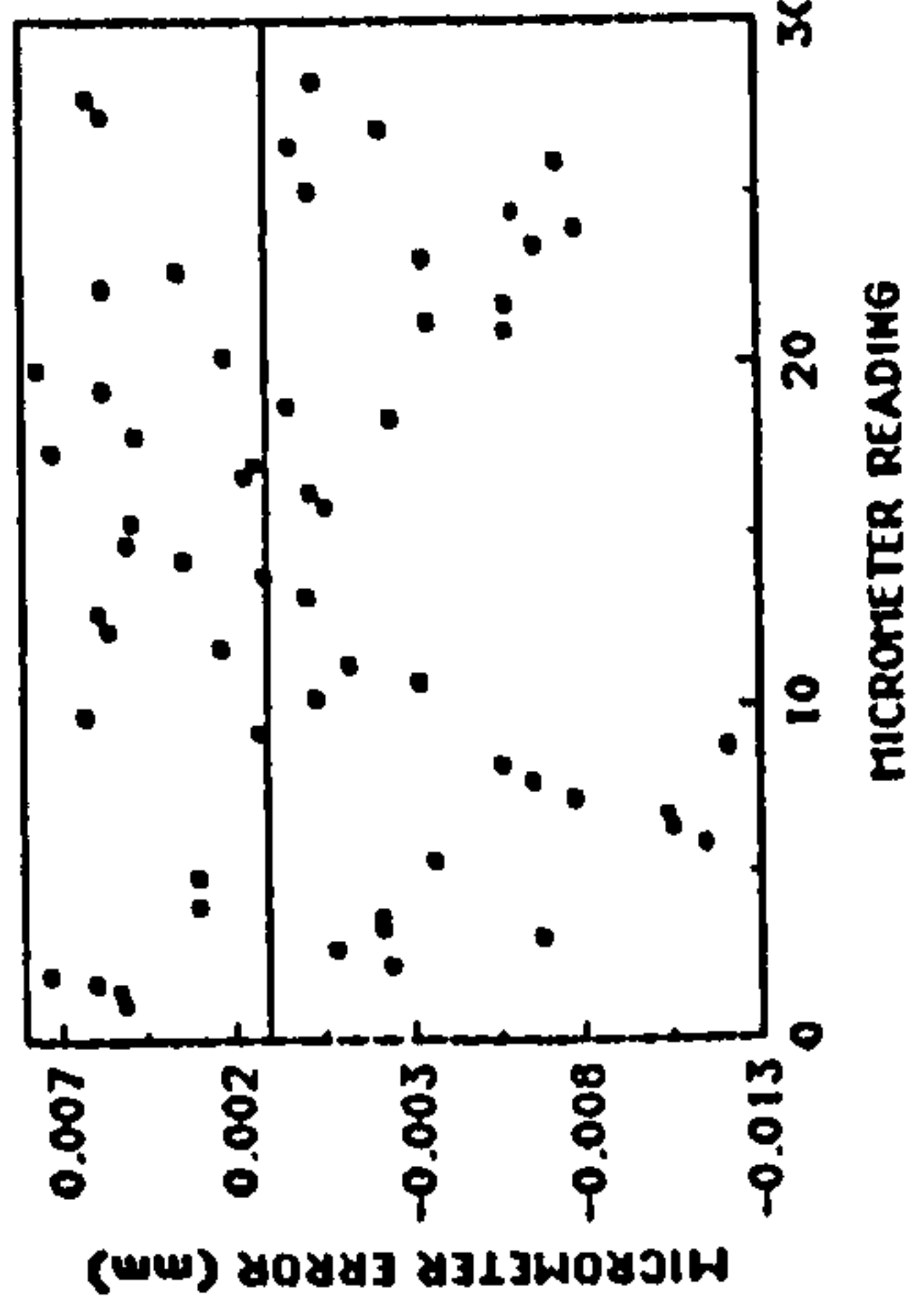
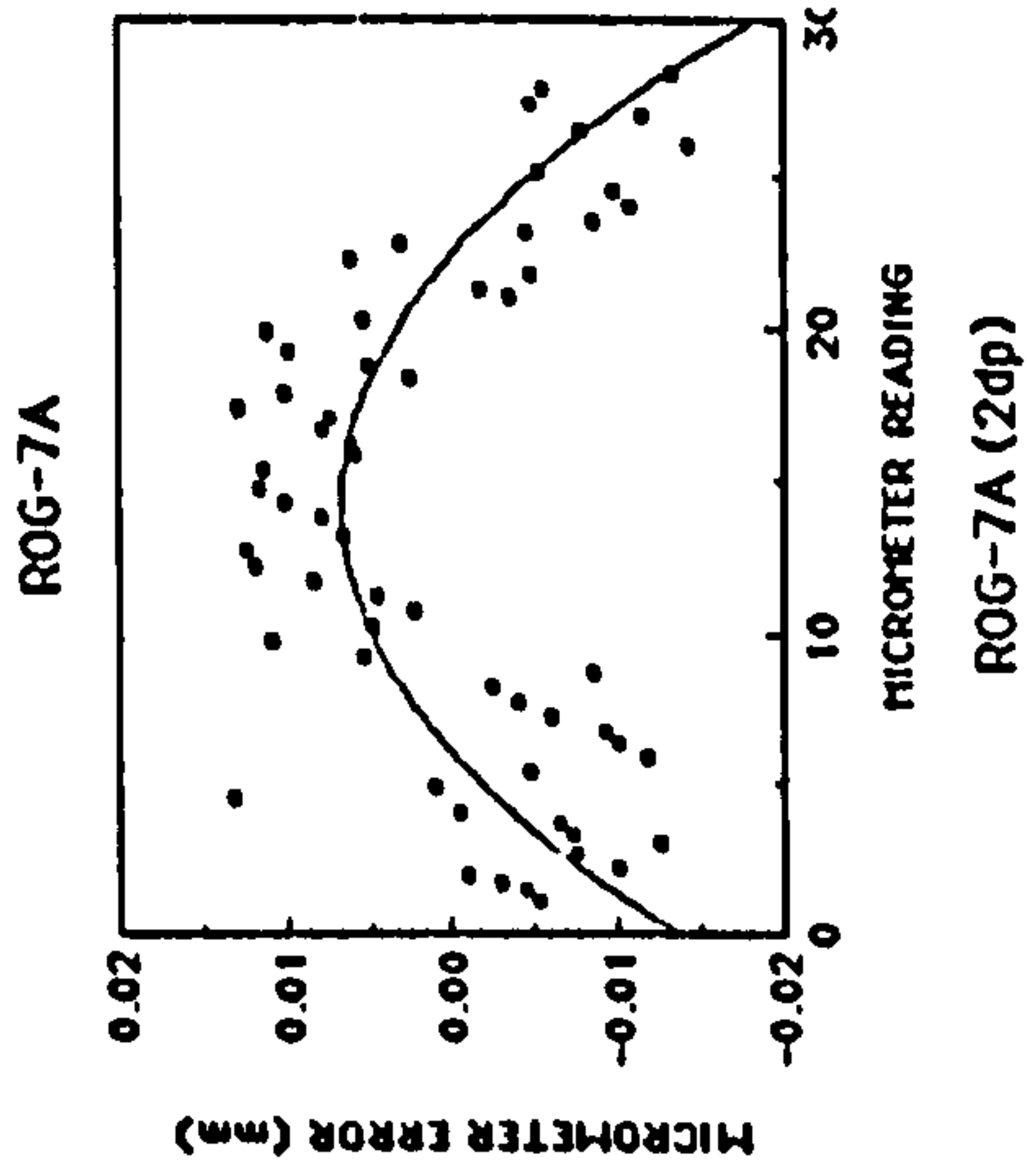
Tool

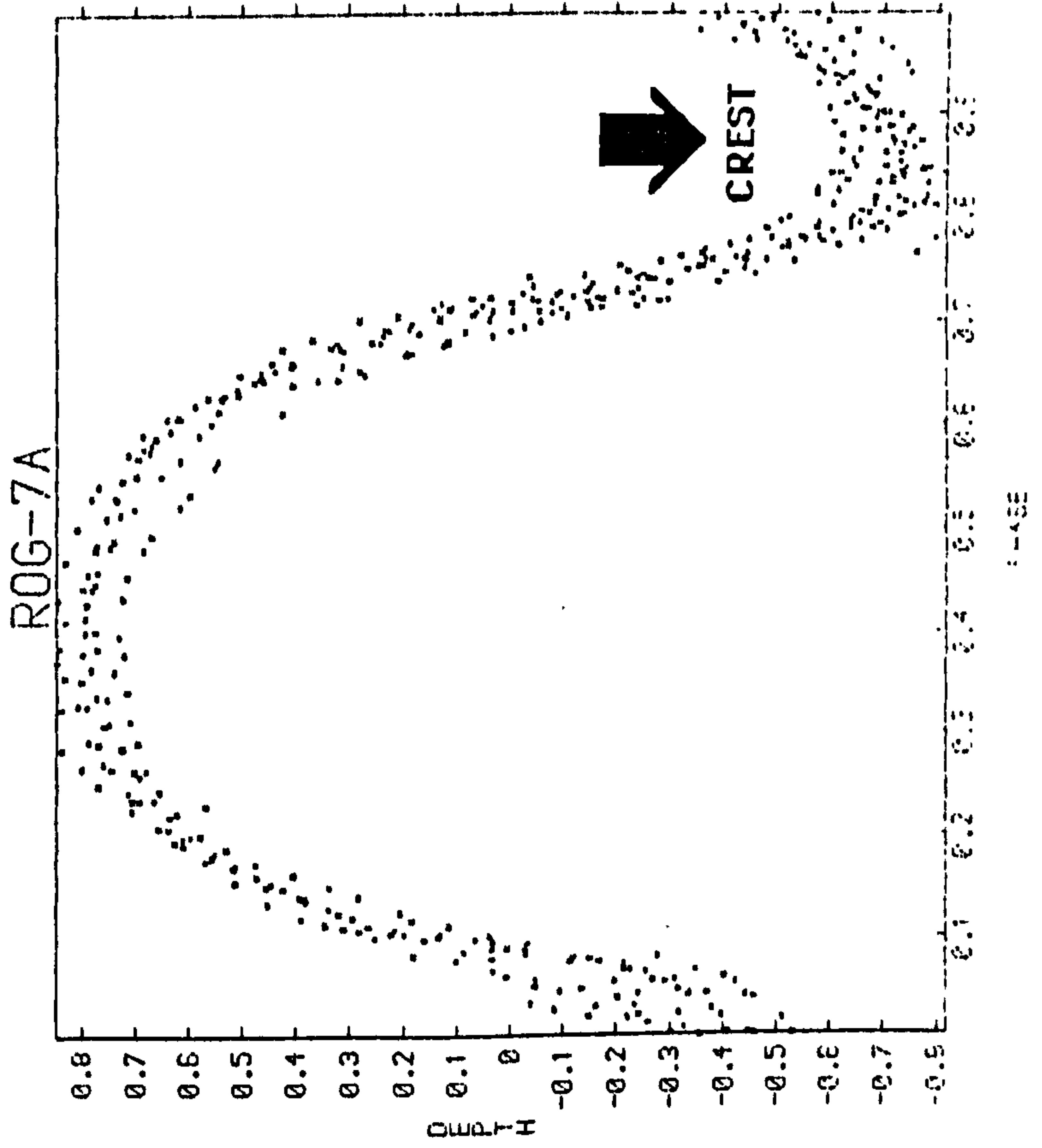
Gauge

Binding

Misc.

Drum: 1.25" diameter, 0-100 divisions with  $\pm 0.5 \text{ div.}$  resolution





Characteristics:

Screw ☒ Nut ☐

Leng: 0.875" / ~0.5"

Diameter: 0.1132"

Steel ☒ Brass ☐

Other:

Instrument Identification:

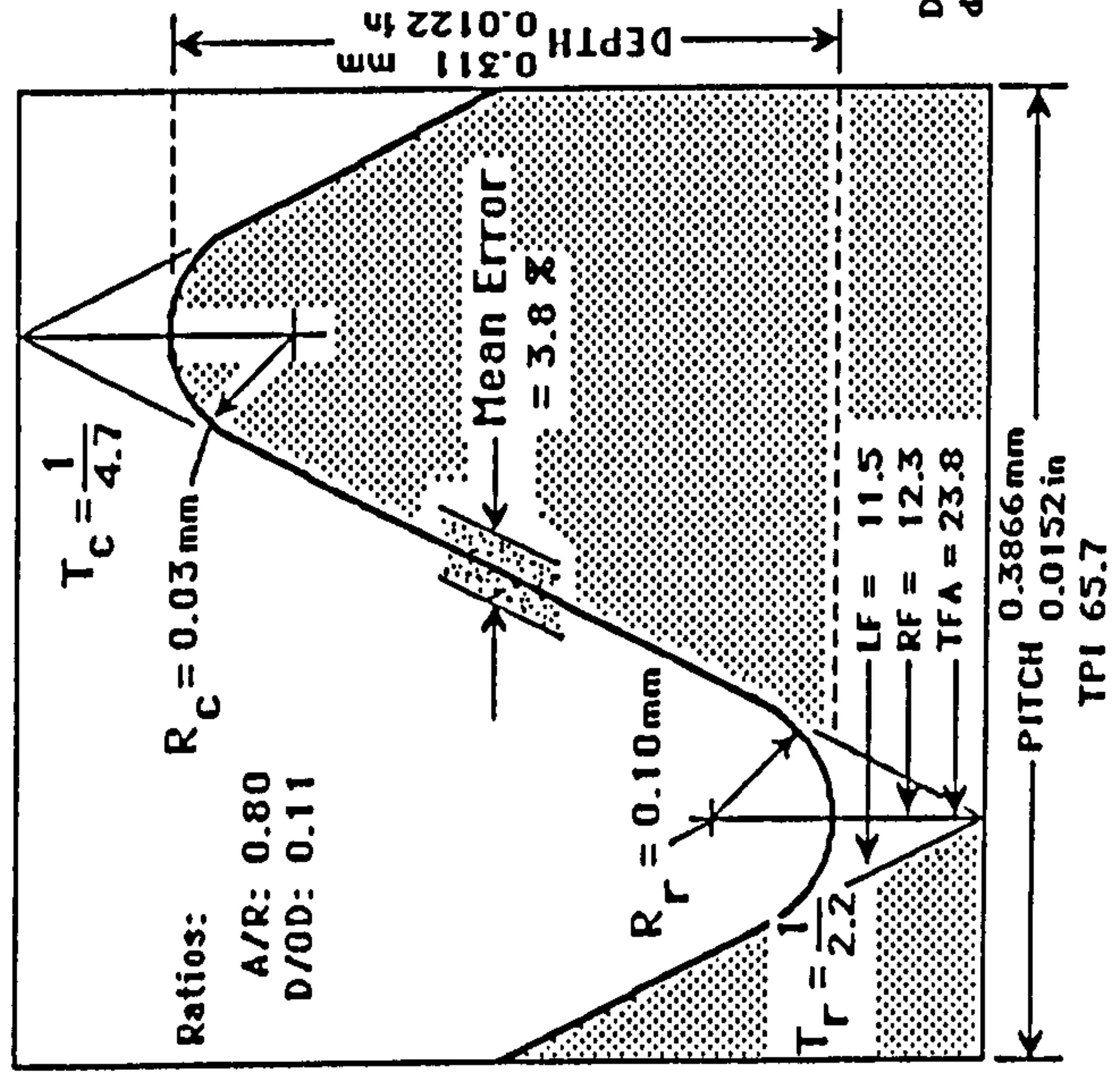
Study Code: R0G-7a

Instrument: Biflar micrometer

Maker: Dollond

Date: ca.1780

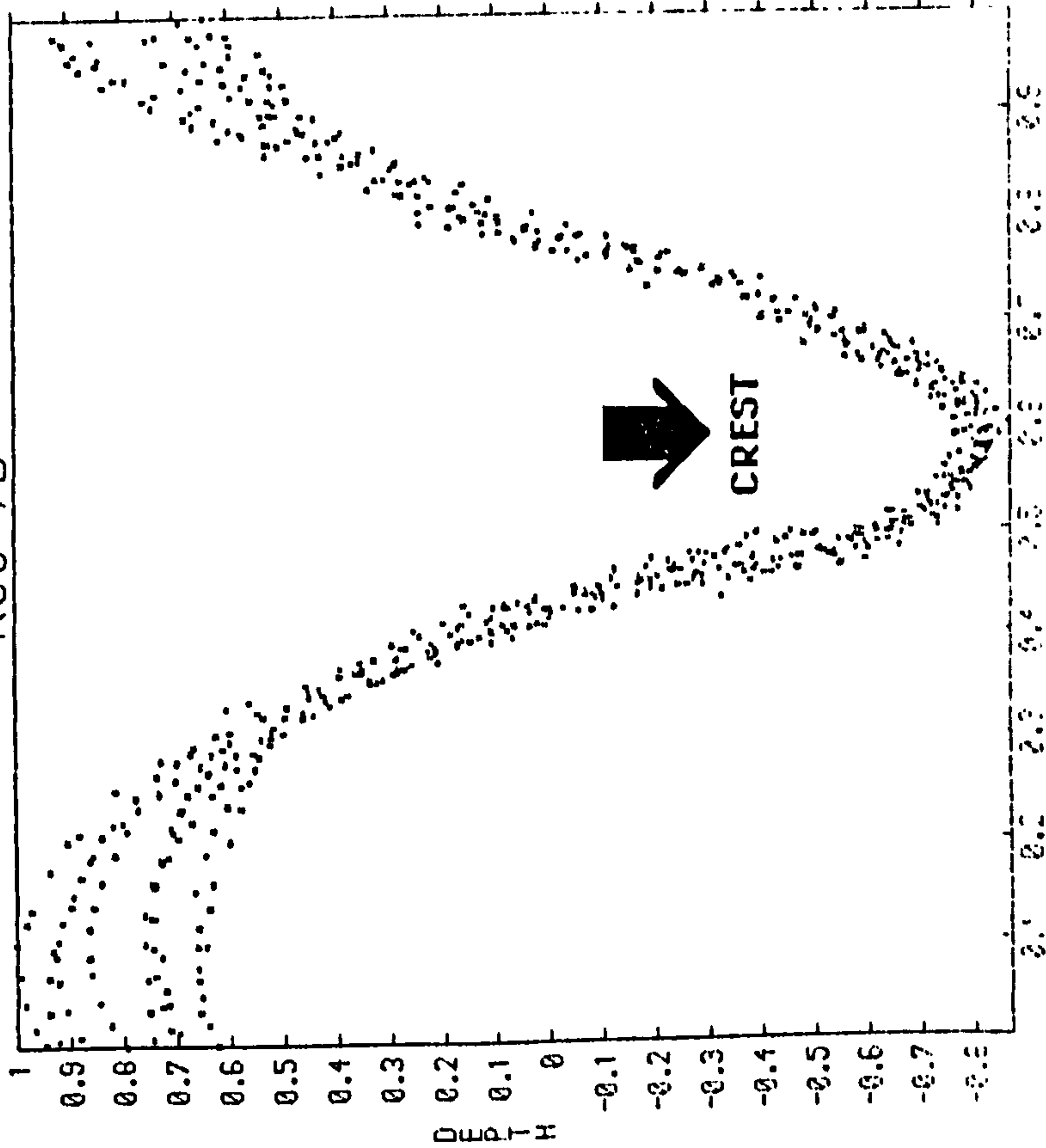
Ser./Acq. No. 00/R13=Gunter 200



- Mu — [ Filar Scale Bench Div. Eng. Adjust. Leveling Focus Eye P. Tube Tool Gauge Binding Misc. ]

Drum 1.125" diameter, 0-100 divisions with  $\pm 0.2\text{div.}$  resolution

R0G-7B



PAGE

Characteristics:

Screw ☒ Nut ☐

Length: 0.875" /  $\approx 0.5"$

Diameter: 0.1146"

Steel ☒ Brass ☐

Other:

Instrument Identification:

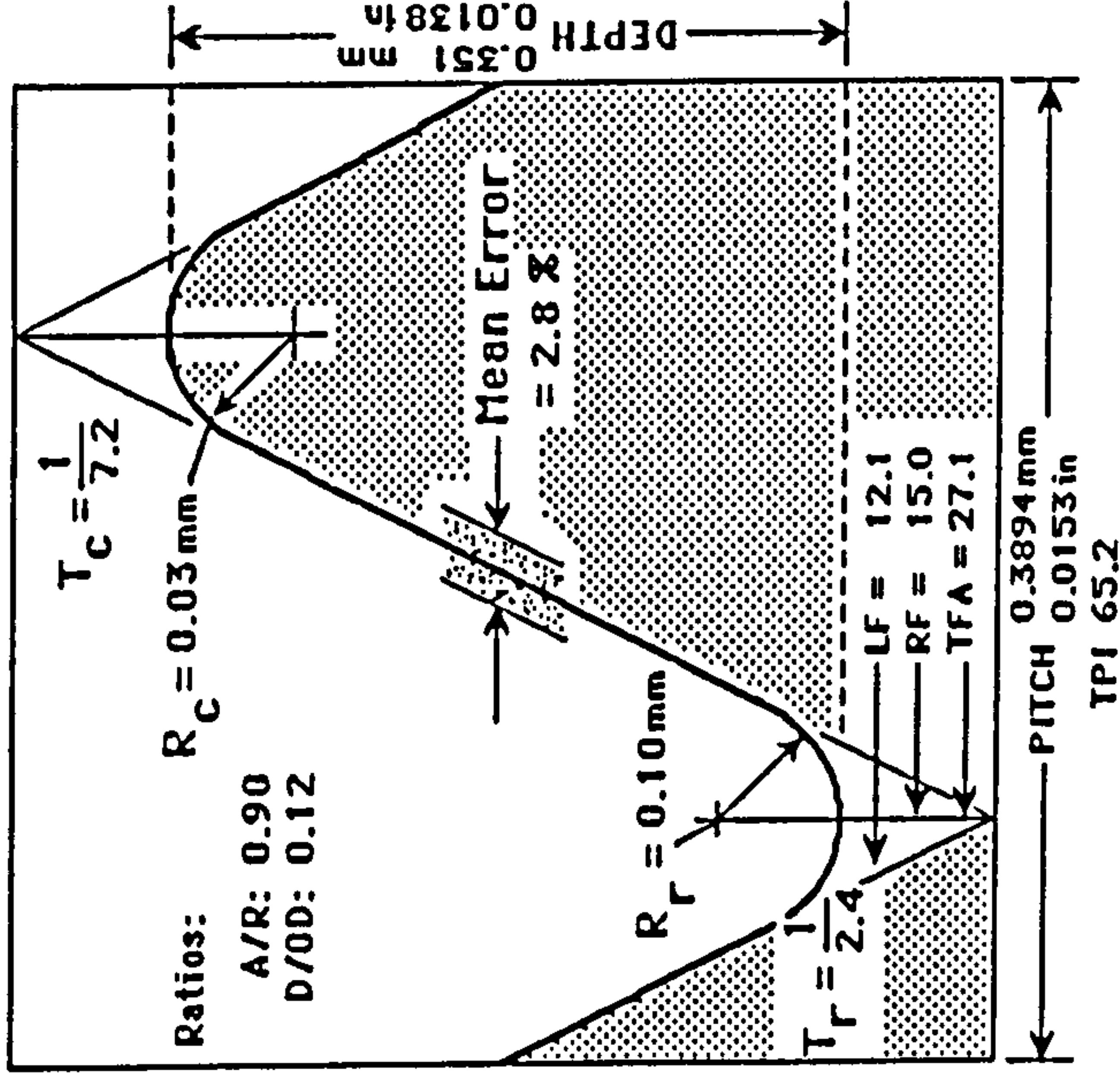
Study Code: R0G-7b

Instrument: Bifilar micrometer

Maker: Dollond

Date: ca.1780

Ser./Acq. No. 00/R13=Gunter 200

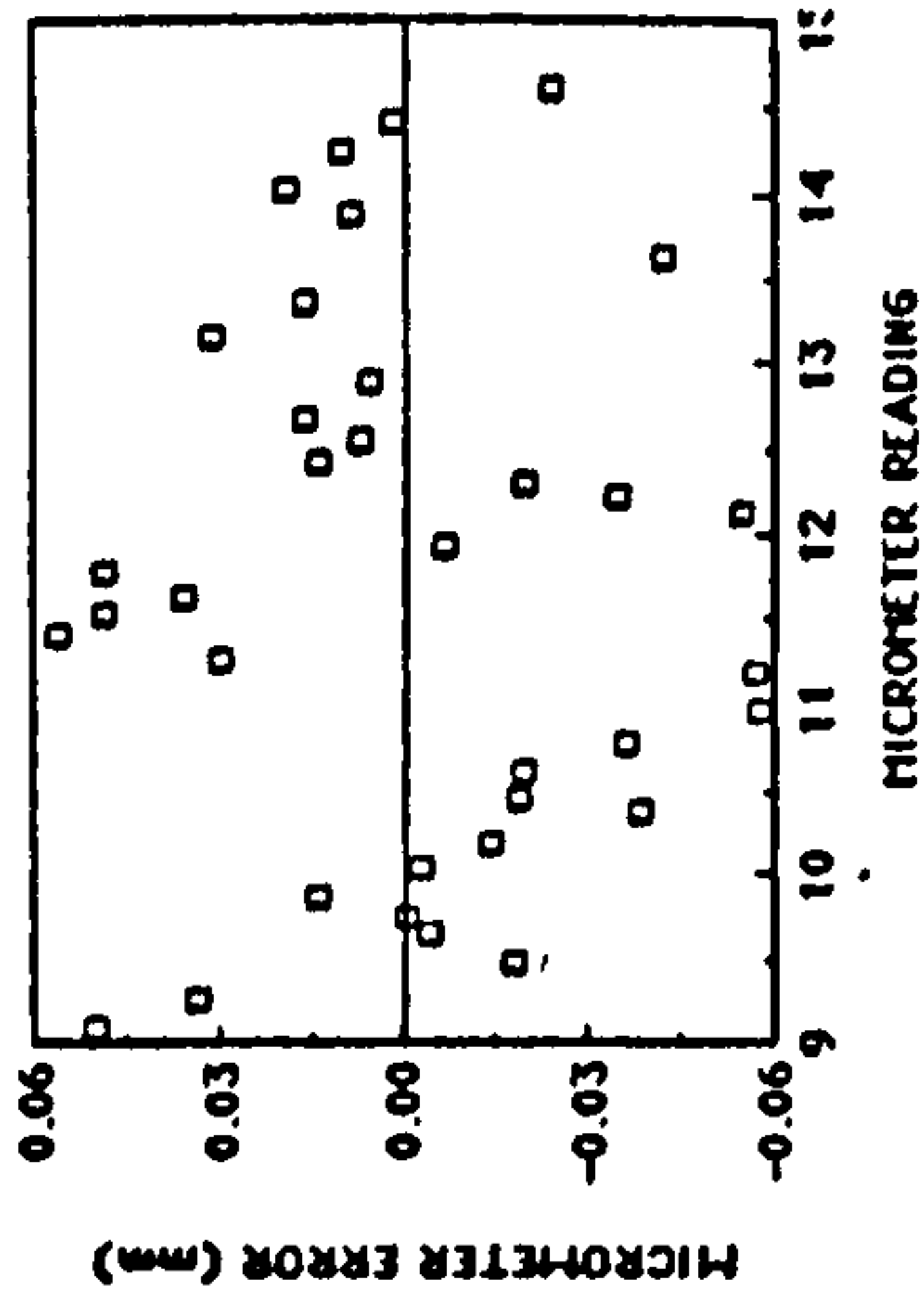


Mu — [ Filar  
Scale  
Bench  
Div. Eng.  
Adjust.  
Leveling  
Focus  
Eye P.  
Tube  
Tool  
Gauge  
Binding  
Misc.

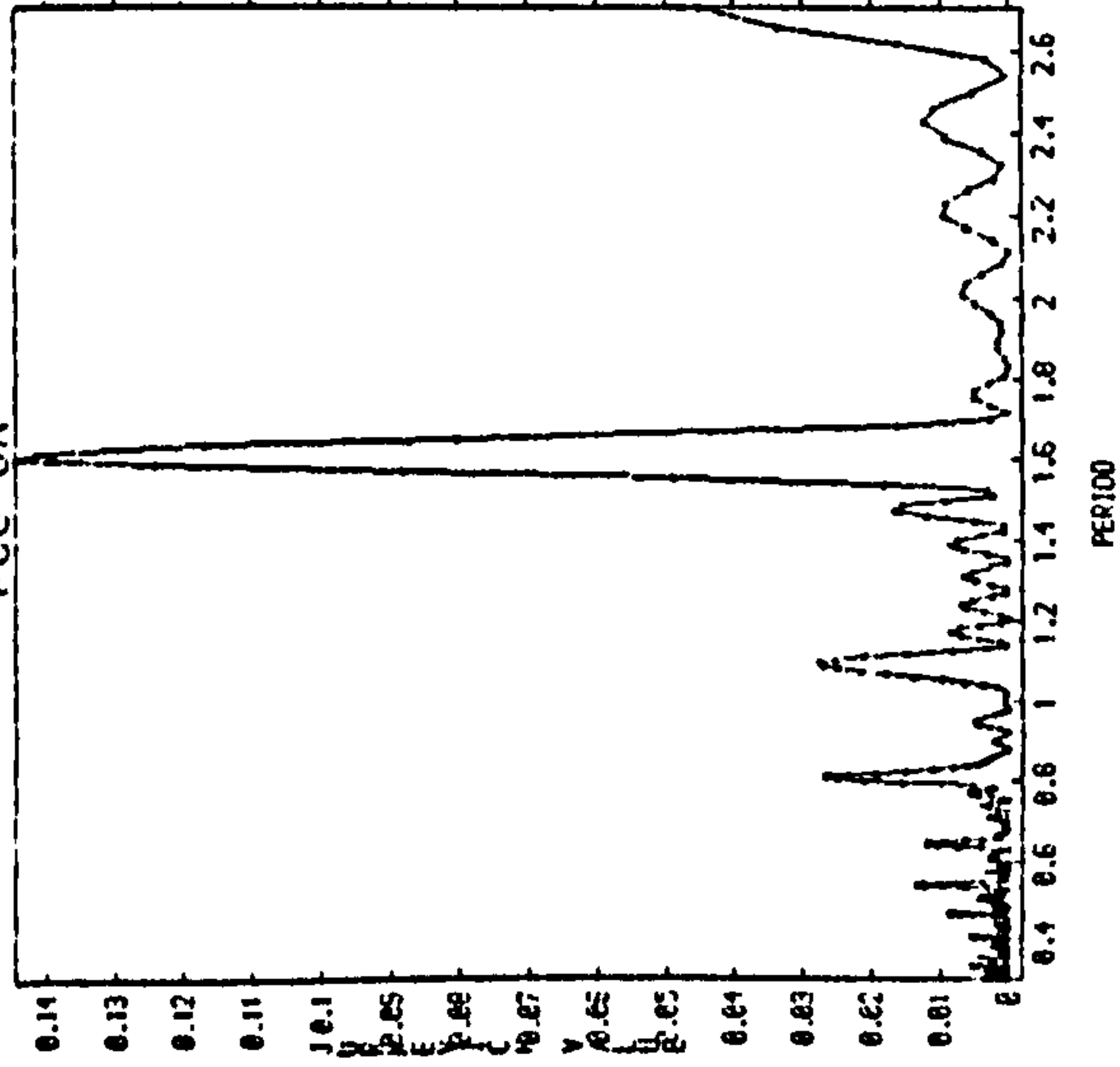
See R0G-7a for drum description



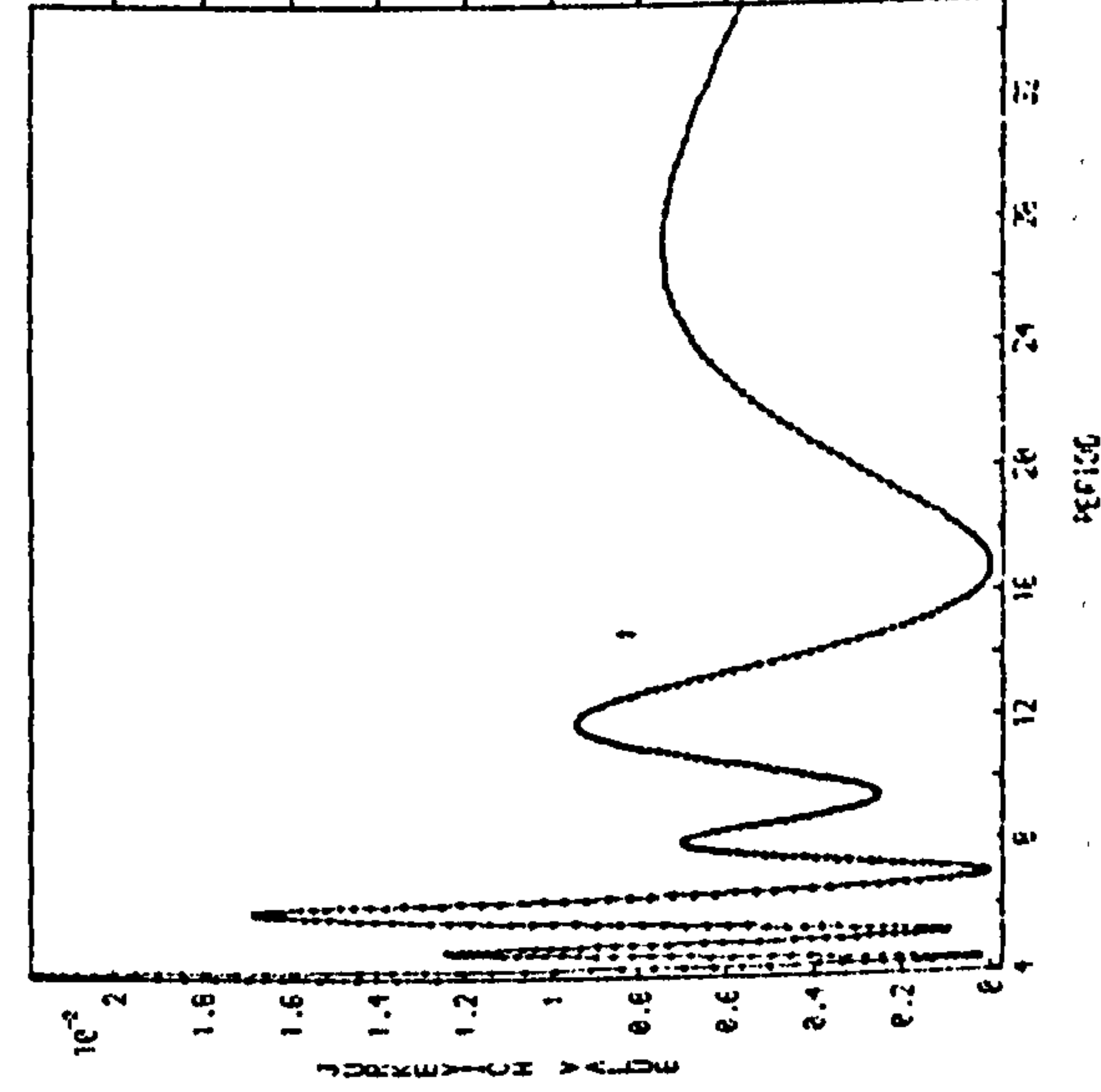
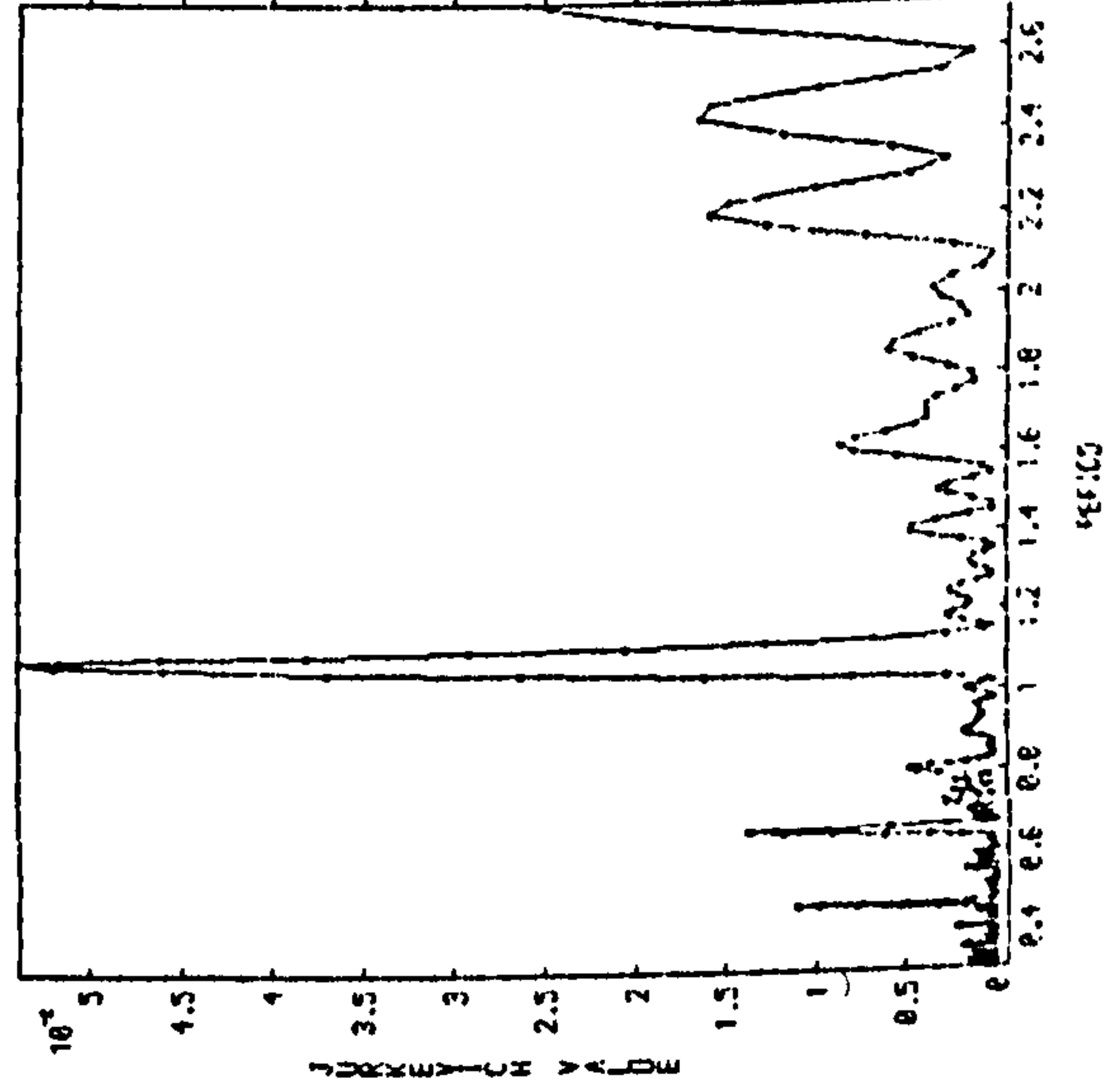
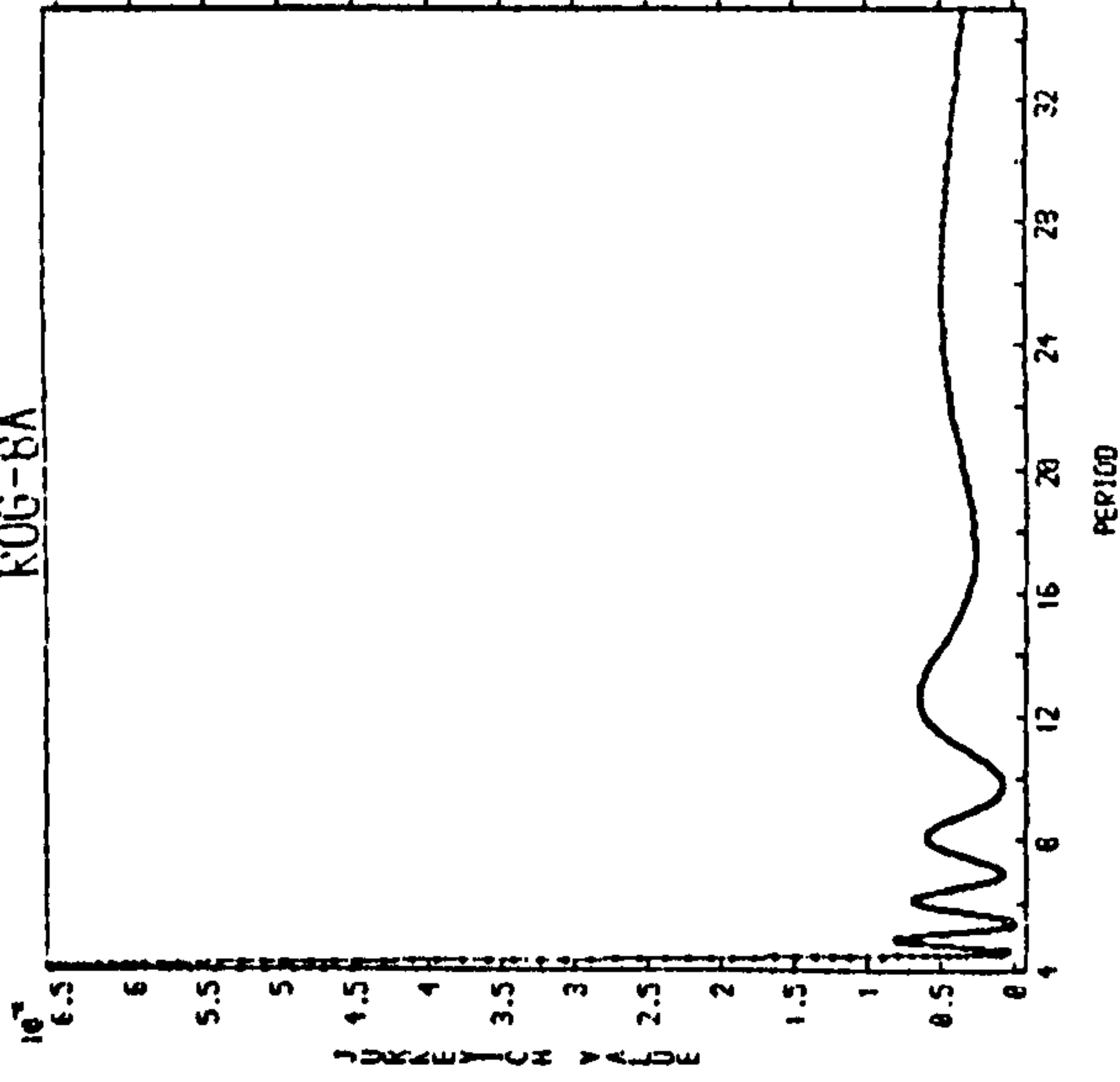
ROG-8

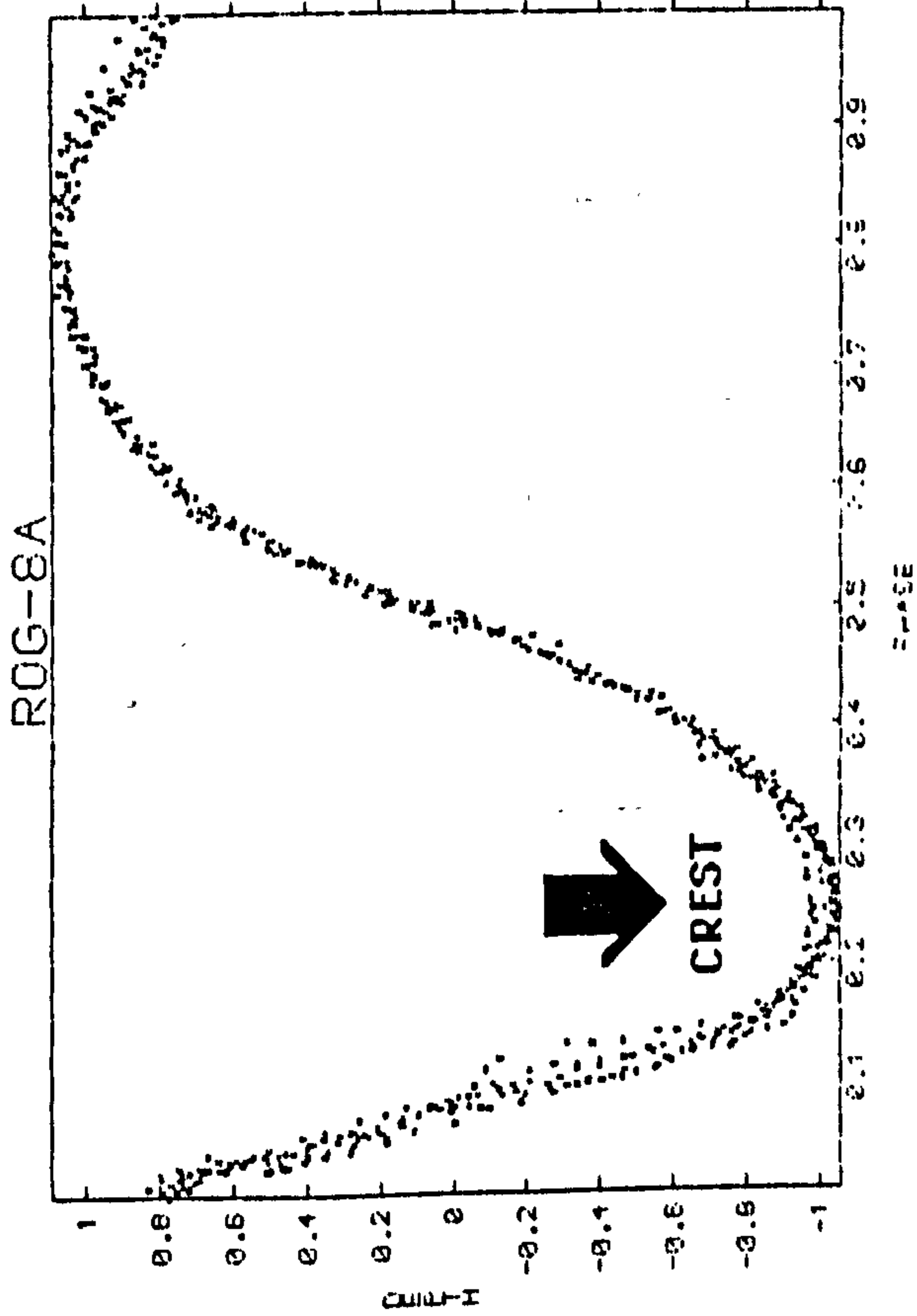


ROG-8A



ROG-8A





**Characteristics:**

Screw ☒ Nut ☐

Leng: 1.688" / 0.313"

Diameter: 0.2738"

Steel ☐ Brass ☐

Other: ☐

**Instrument Identification:**

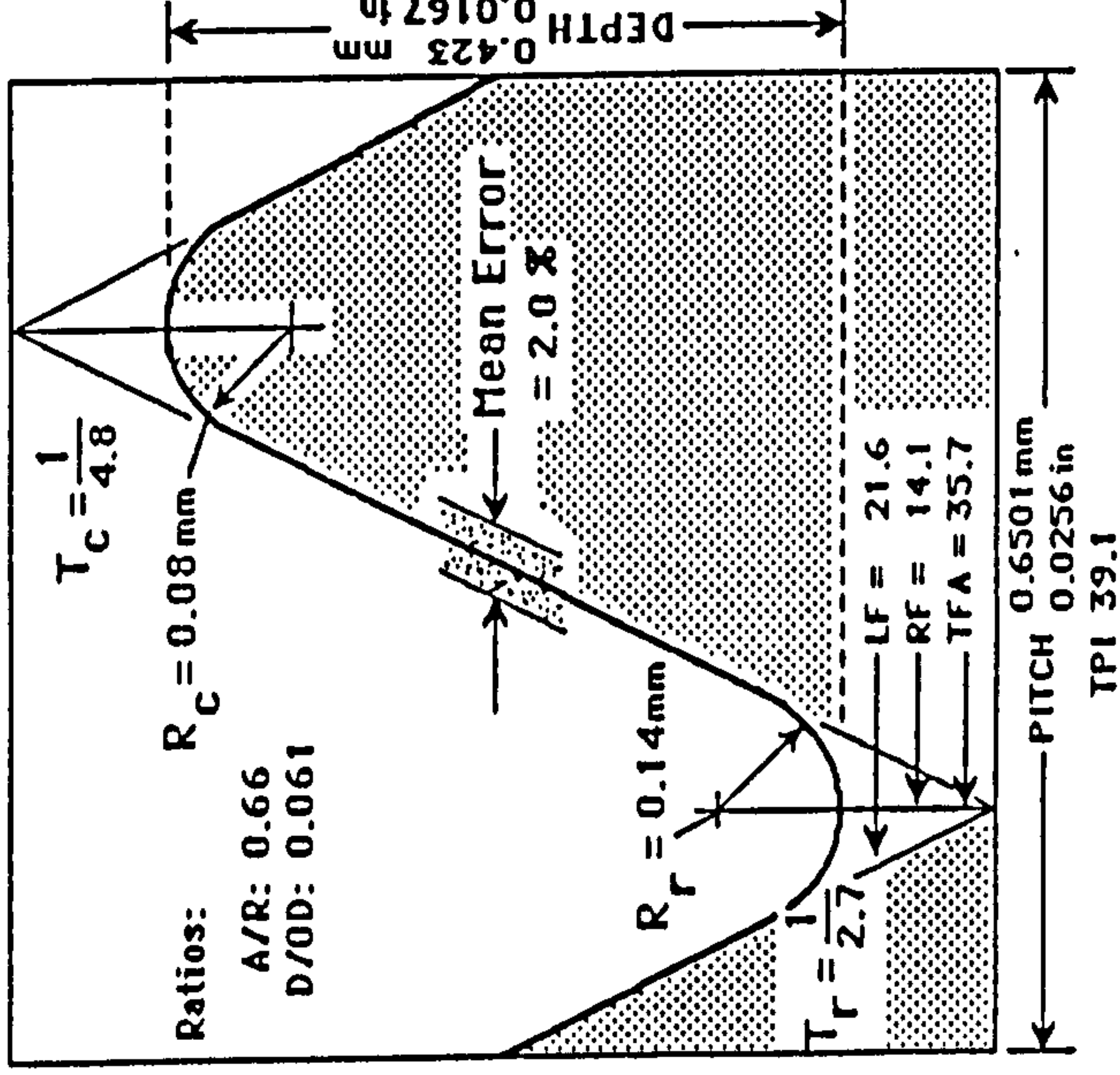
Study Code: ROG-8a

Instrument: Heliometer

Maker: Dollond & Son

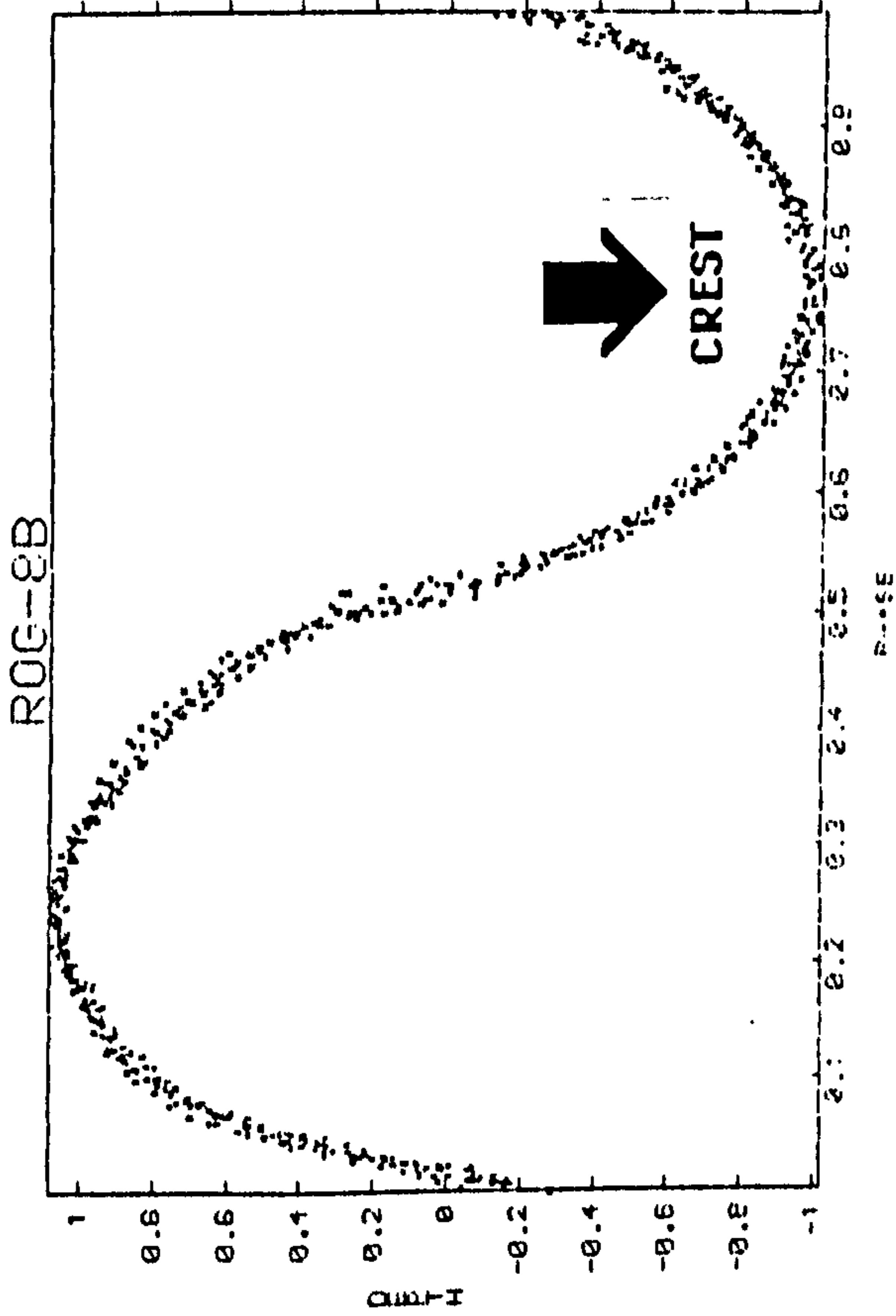
Date: ca.1755

Ser./Acq. No. 00/RF26



MU — [ Filar Scale Bench Div. Eng. Adjust. Leveling Focus Eye P. Tube Tool Gauge Binding Misc. ]

Drum: 1.125" diameter, 0-60 divisions with  $\pm 0.2 \text{ div.}$  resolution  
Scale: 0-25 divisions



**Characteristics:**

Screw ☒ Nut ☐

Leng: 1.688" / 0.313"

Diameter: 0.2766"

Steel ☒ Brass ☐

Other: ☐

**Instrument Identification:**

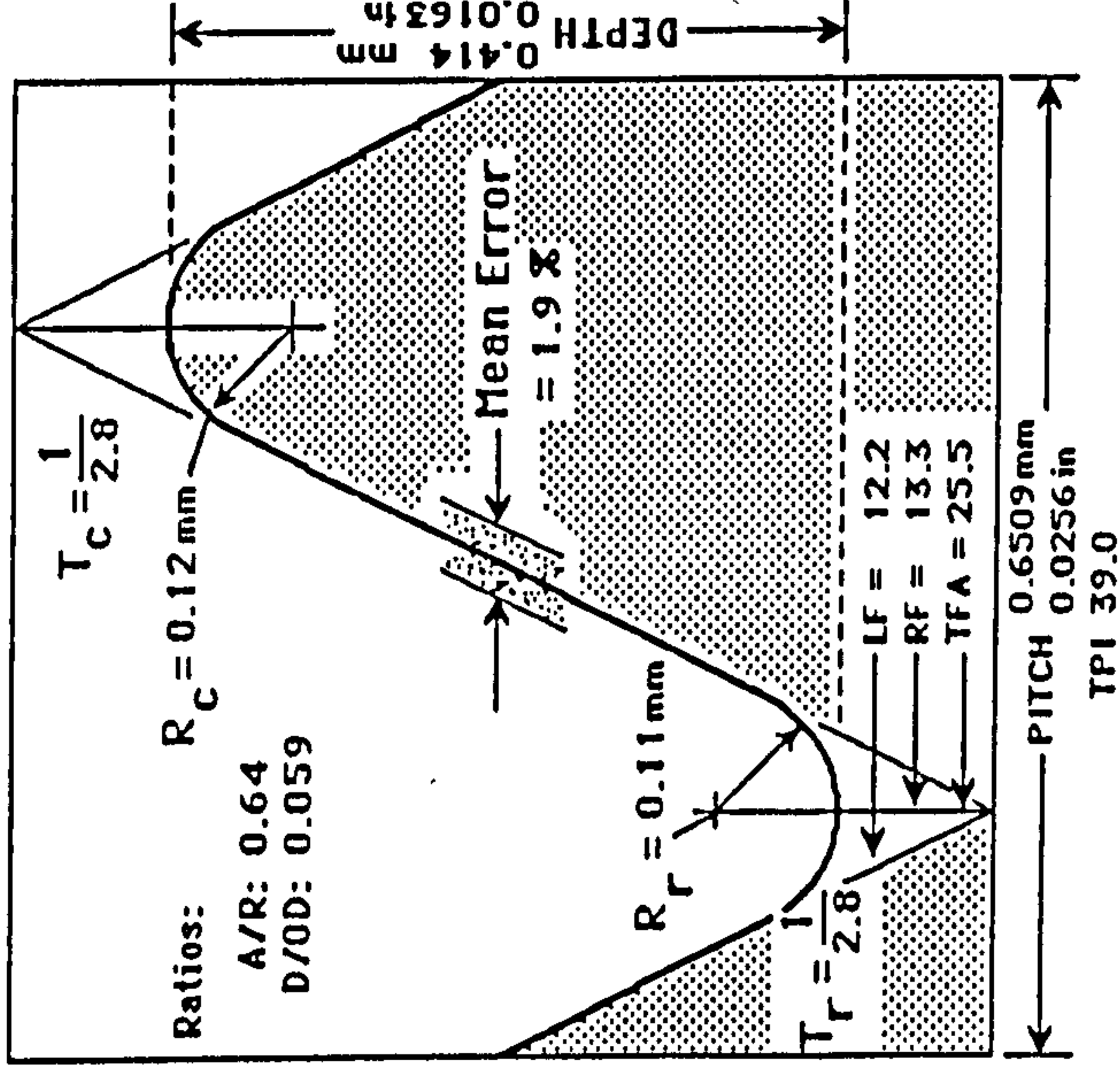
Study Code: ROG-8b

Instrument: Heliometer

Maker: Dollond & Son

Date: ca.1755

Ser./Acq. No. 00/RF26



Mu

Filar

Scale

Bench

Div. Eng.

Adjust.

Leveling

Focus

Eye P.

Tube

Tool

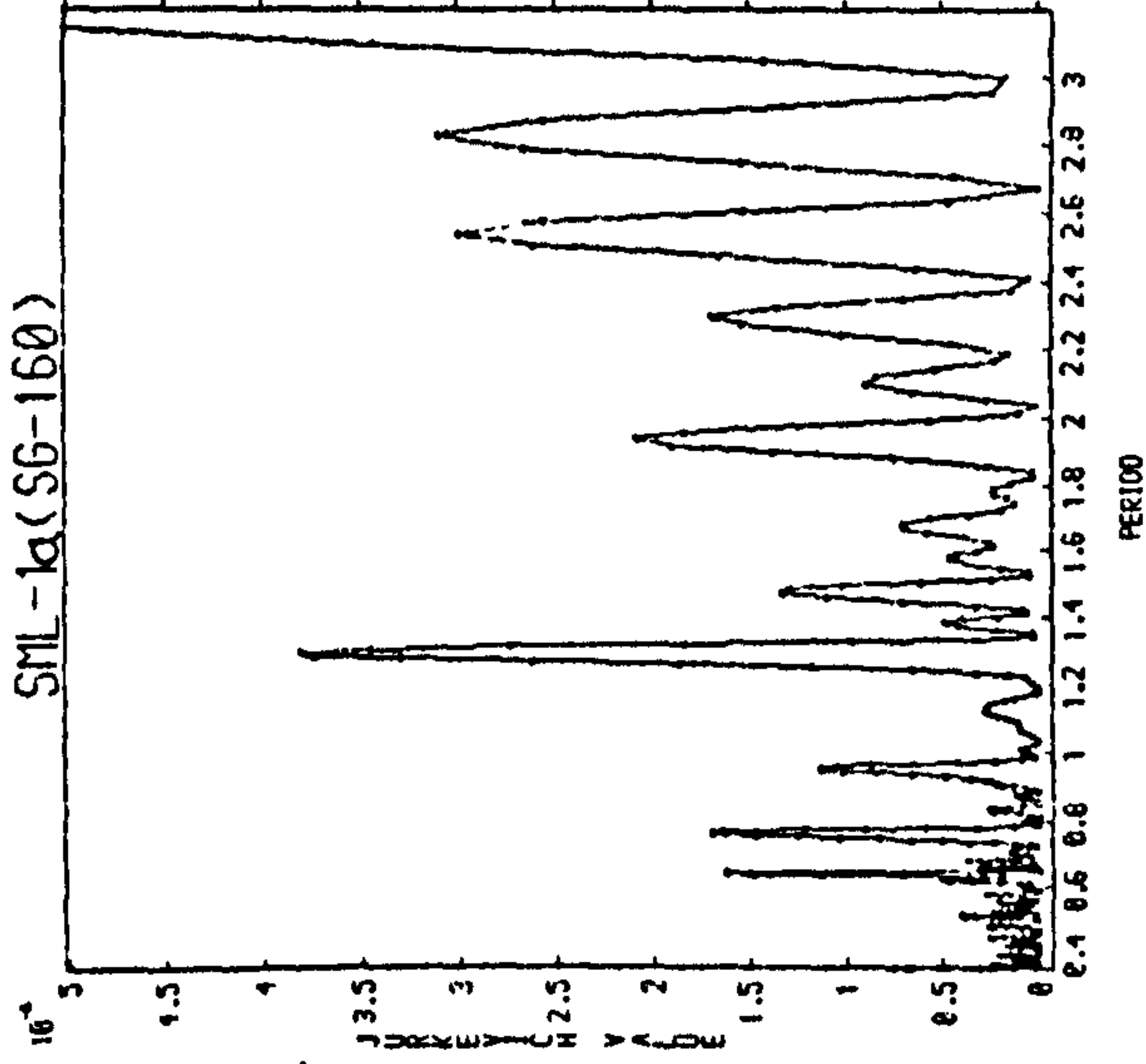
Gauge

Binding

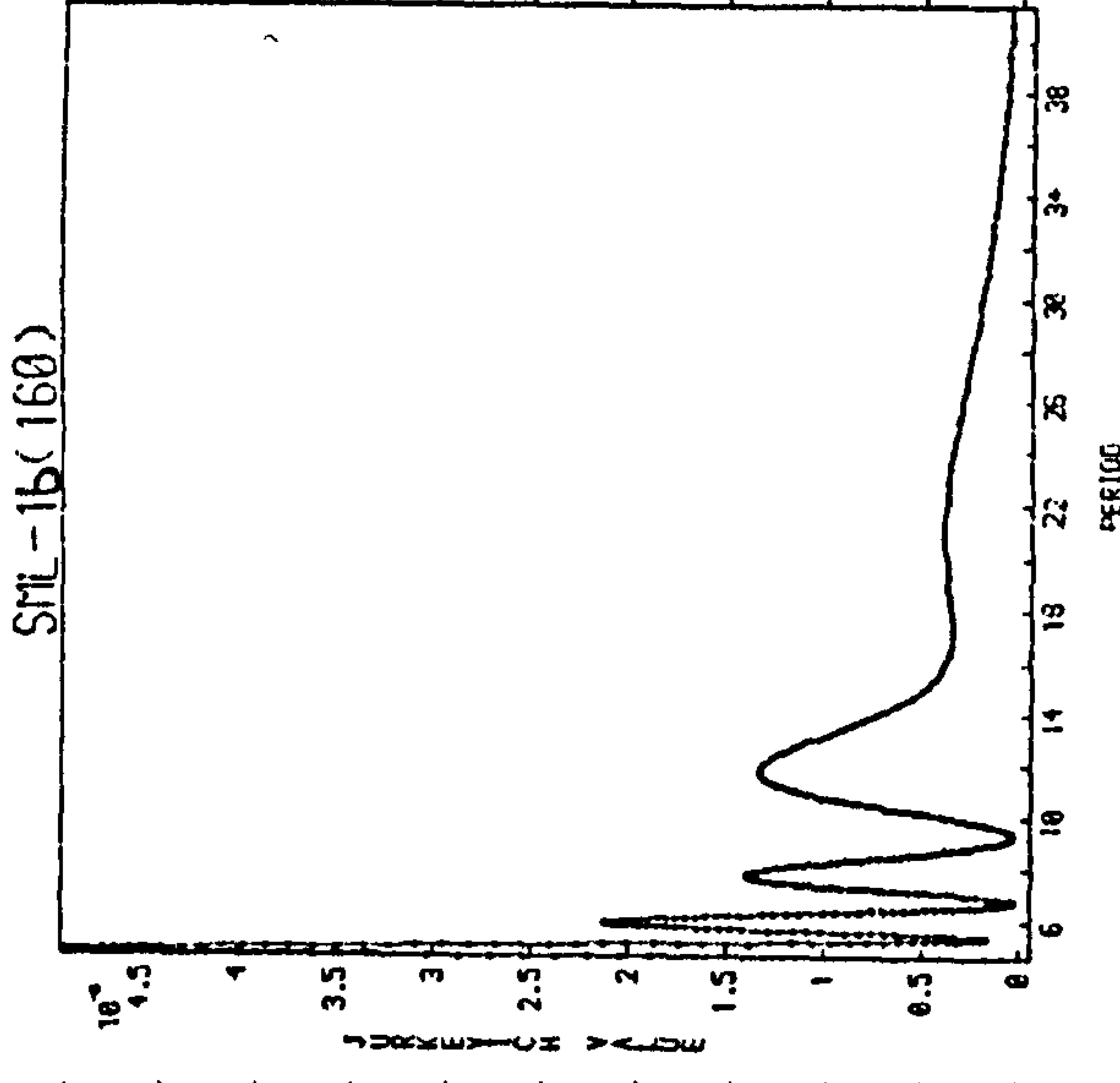
Misc.

See ROG-8a for drum description

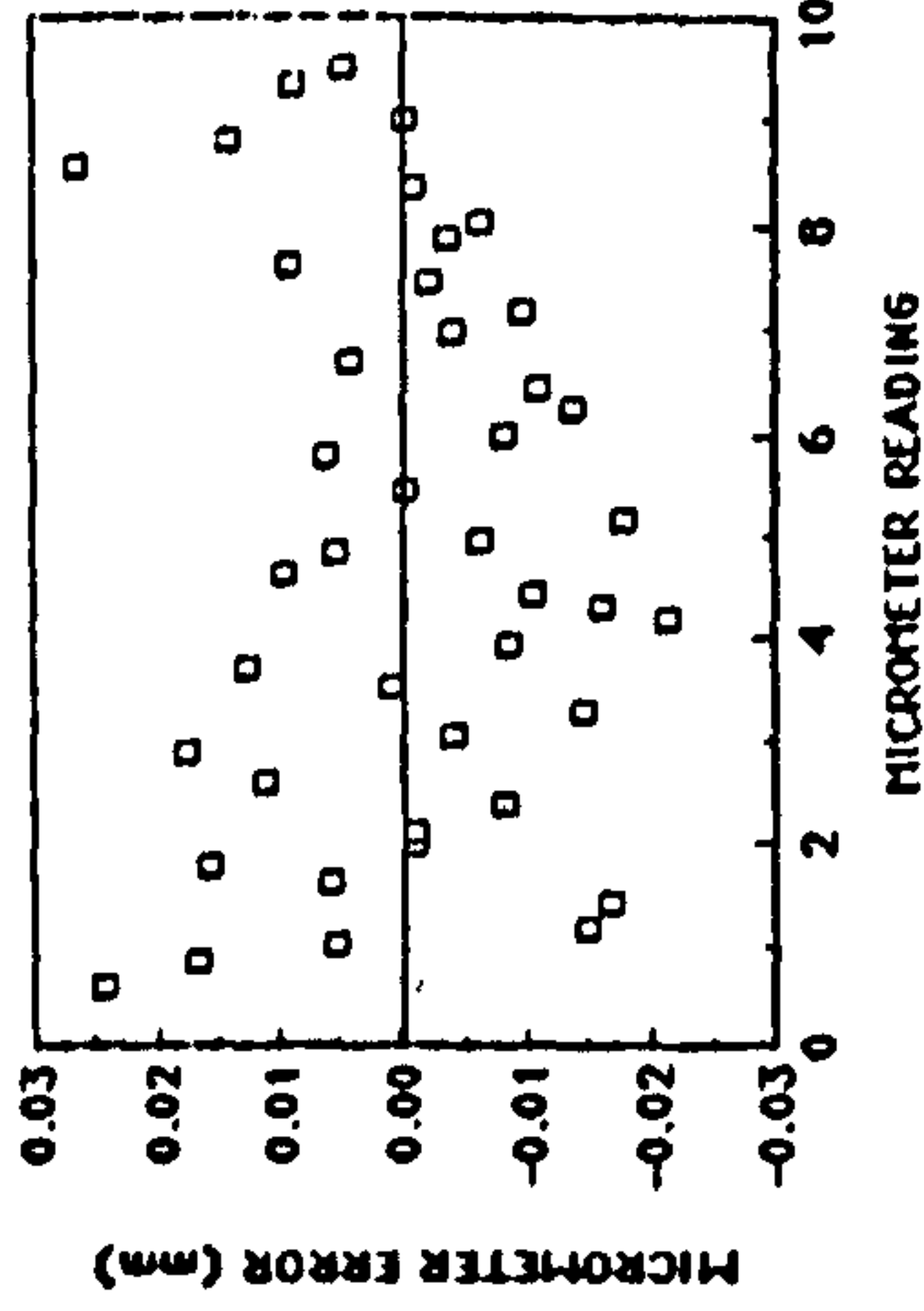
SML-1a(SG-160)



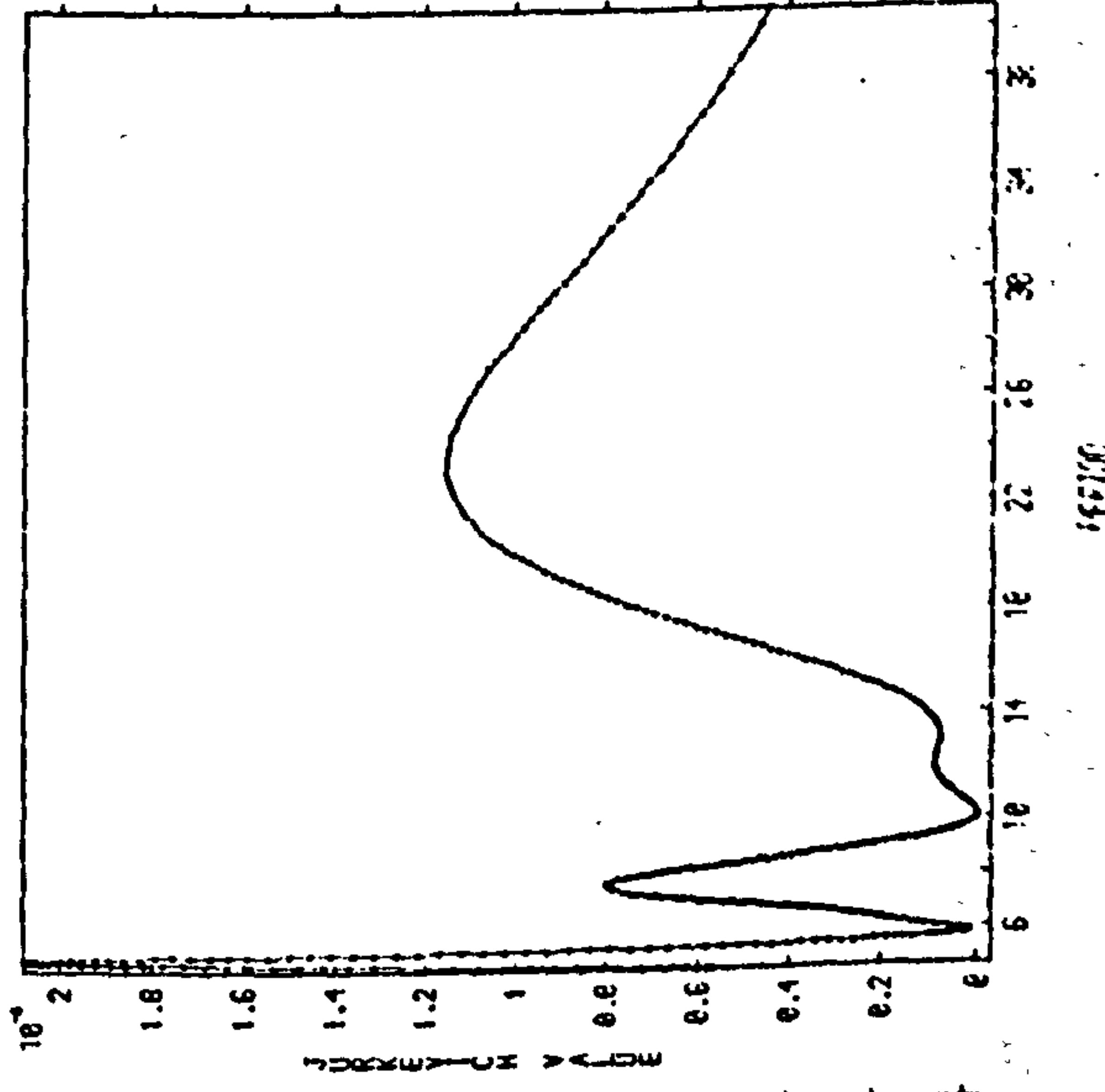
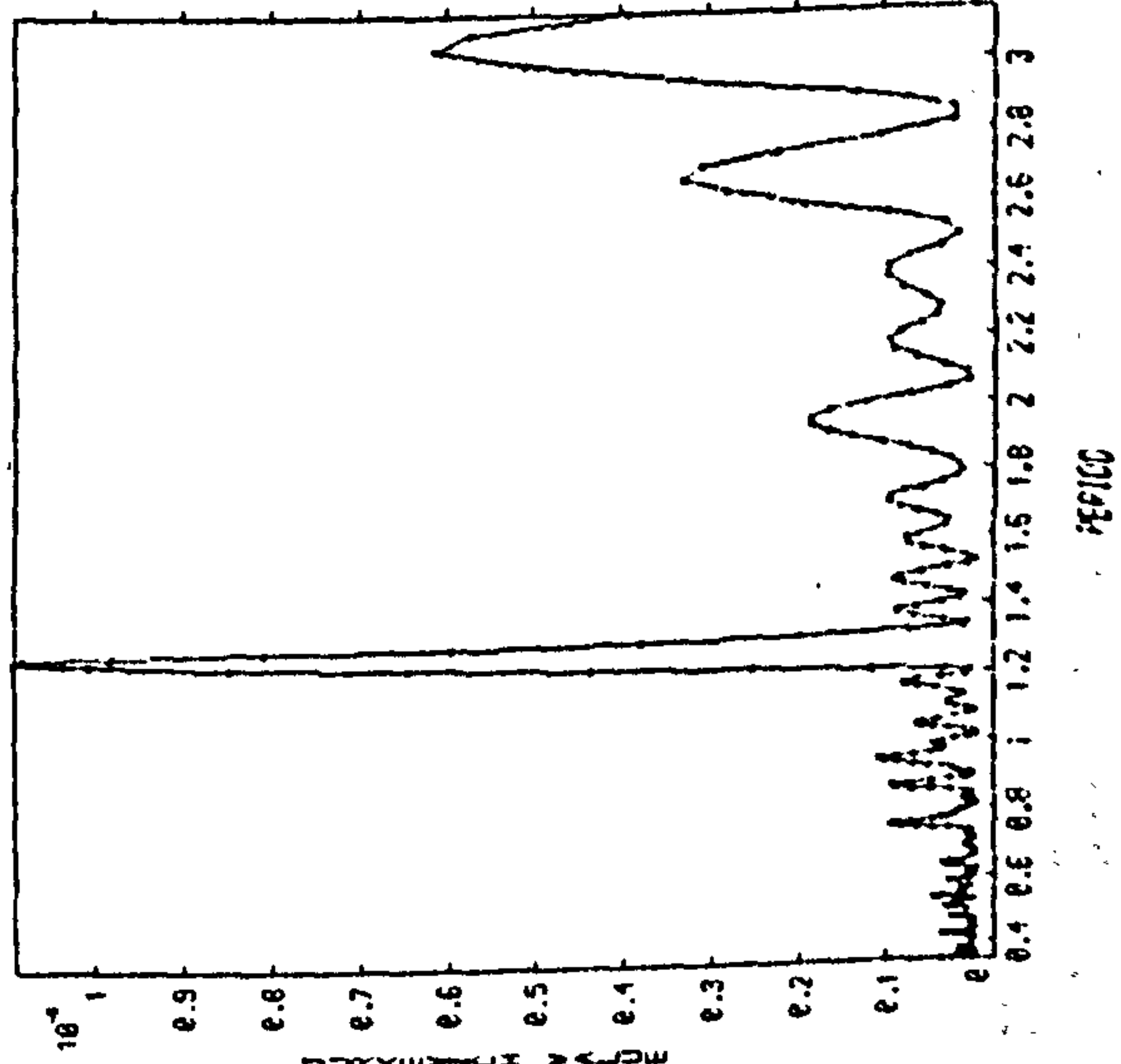
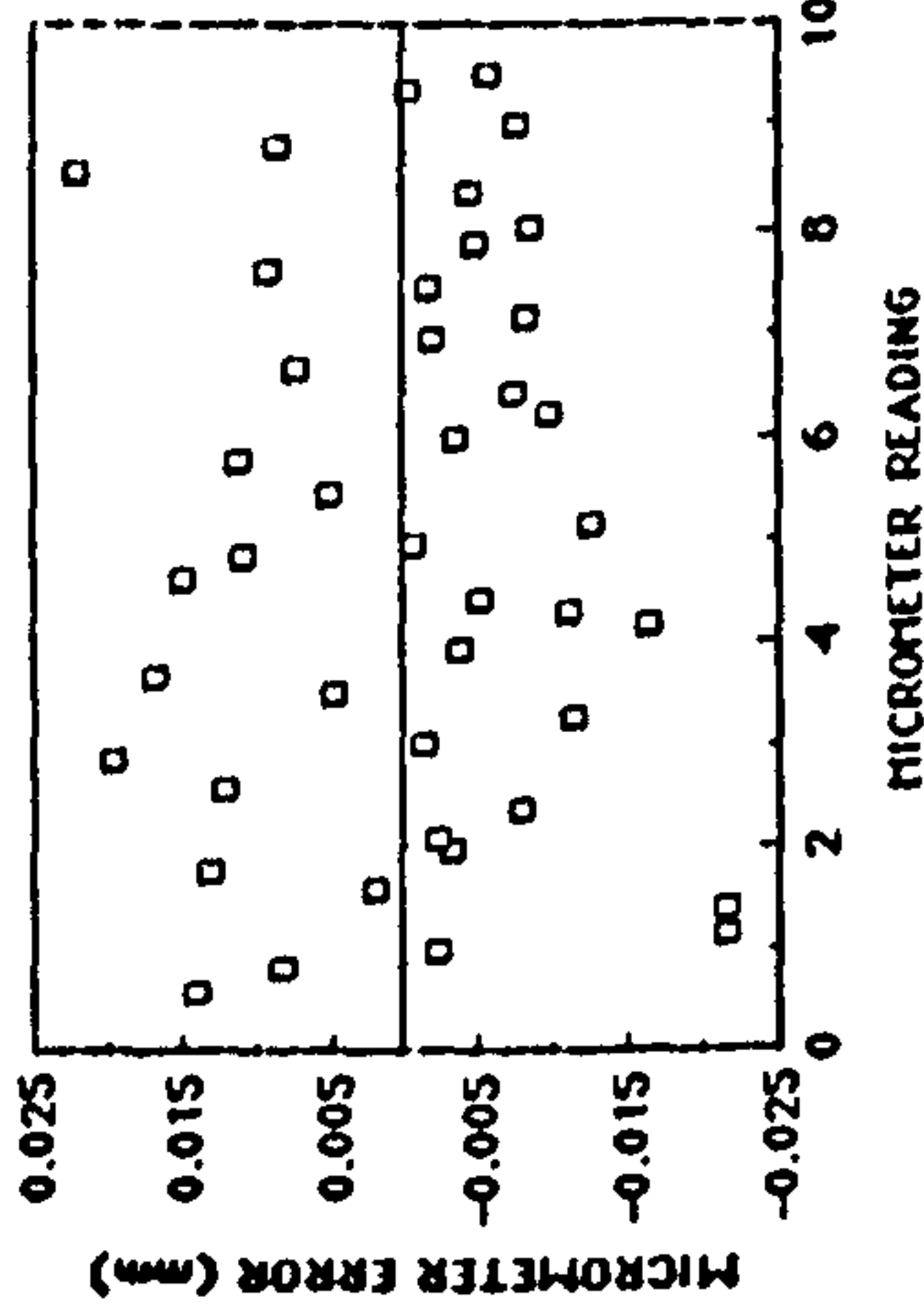
SML-1b(160)



SML-1



SML-1 (3dp)





Characteristics:

Screw

Nut

Leng: 1.125" / ~0.75"

Diameter: 0.219"

Steel

Brass

Other:

Instrument Identification:

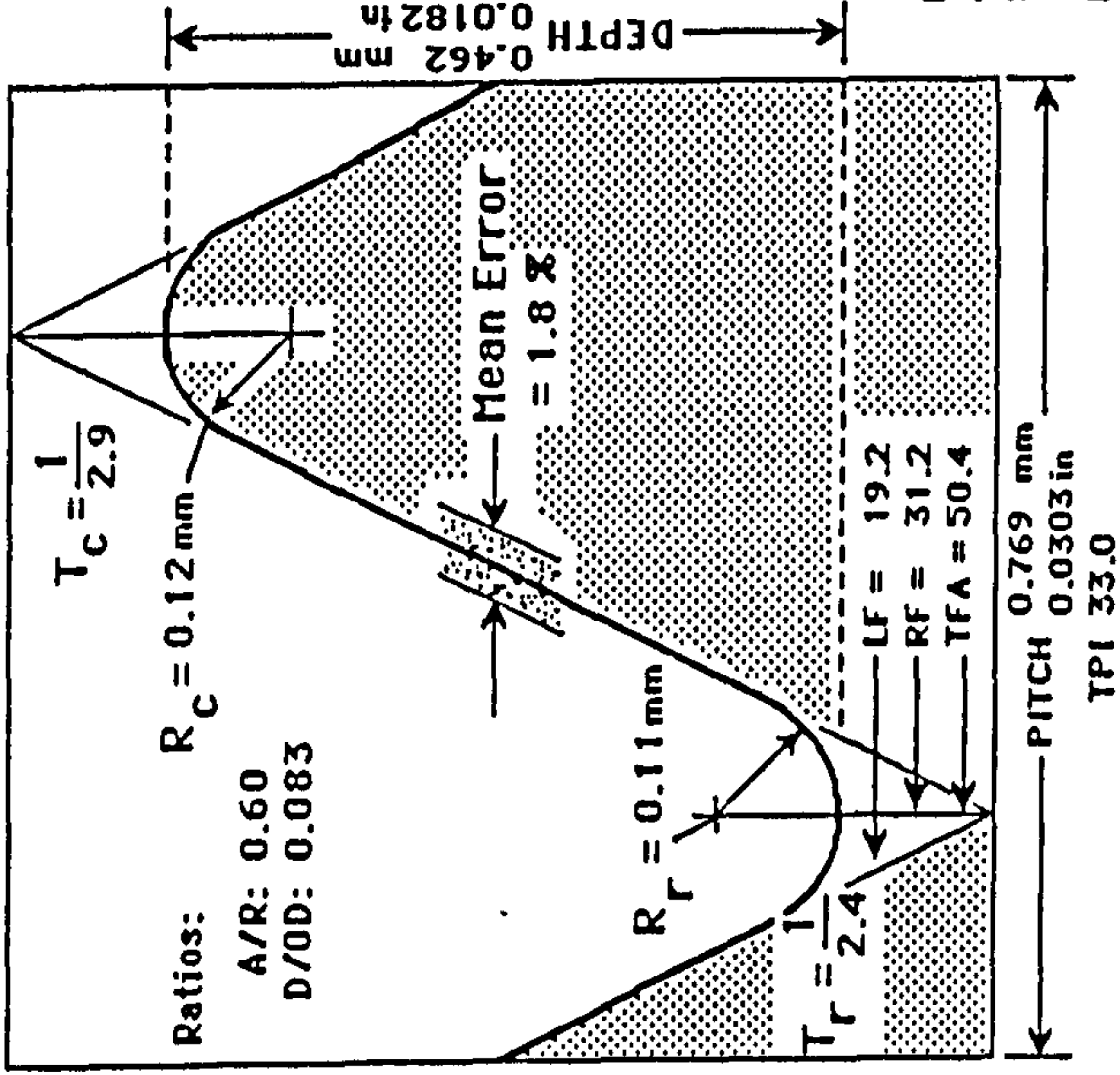
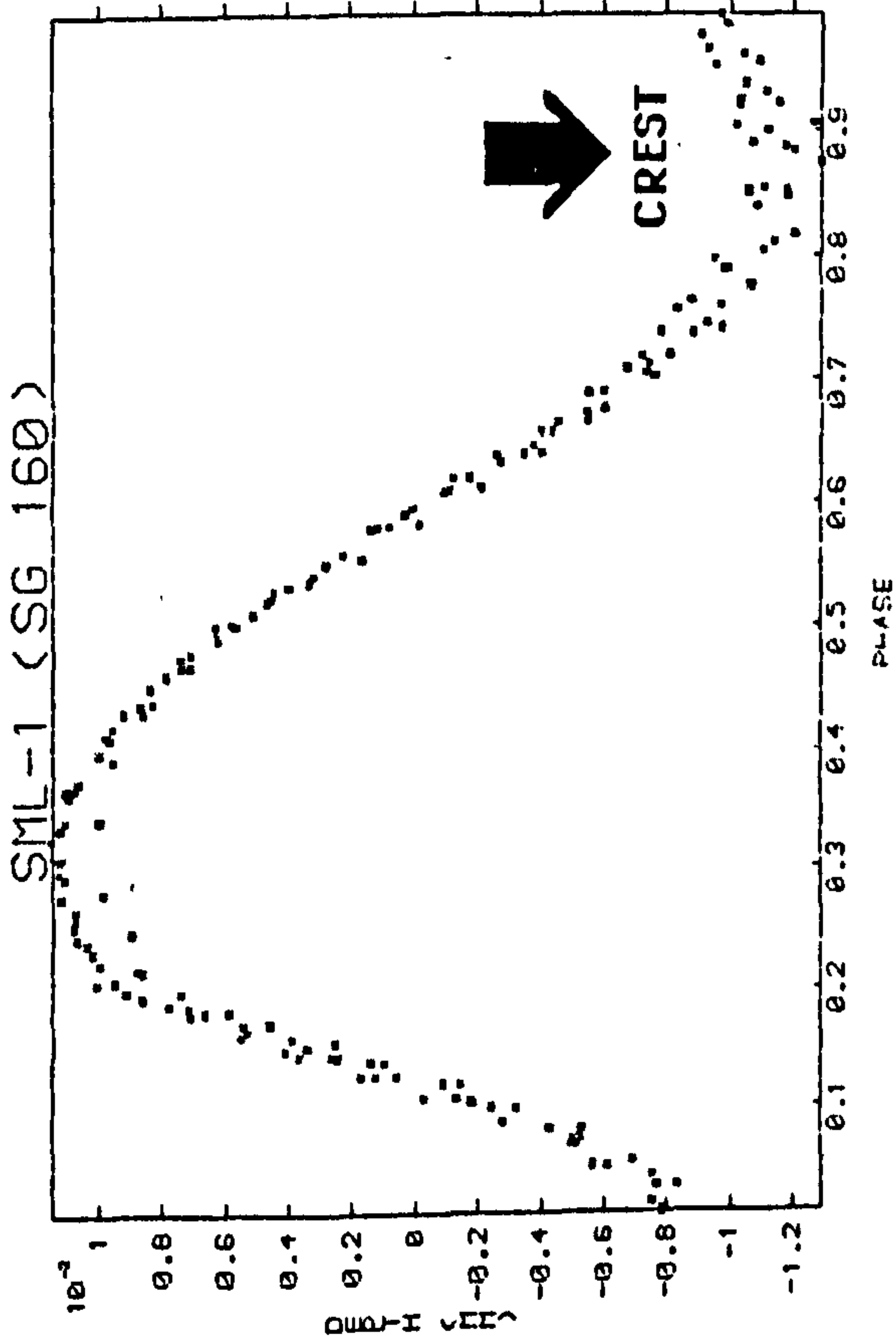
Study Code: SML-1a

Instrument: Bifilar micrometer

Maker: Heath & Wing

Date: ca.1760's

Ser./Acq. No. 1938-719



Mu	Filar
	Scale
	Bench
	Div. Eng.
	Adjust.
	Leveling
	Focus
	Eye P.
	Tube
	Tool
	Gauge
	Binding
	Misc.

Drum 1.06" diameter 0-40 divisions with  $\pm 0.3 \text{ div. resolution}$   
Scale:  $\pm 0.25"$  with  $1/32"$  div.

Micrometer suffers considerable backlash and binding in spots

Characteristics:

Screw

Nut

Leng: 1.125" / ~0.75"

Diameter: 0.219"

Steel

Brass

Other:

Instrument Identification:

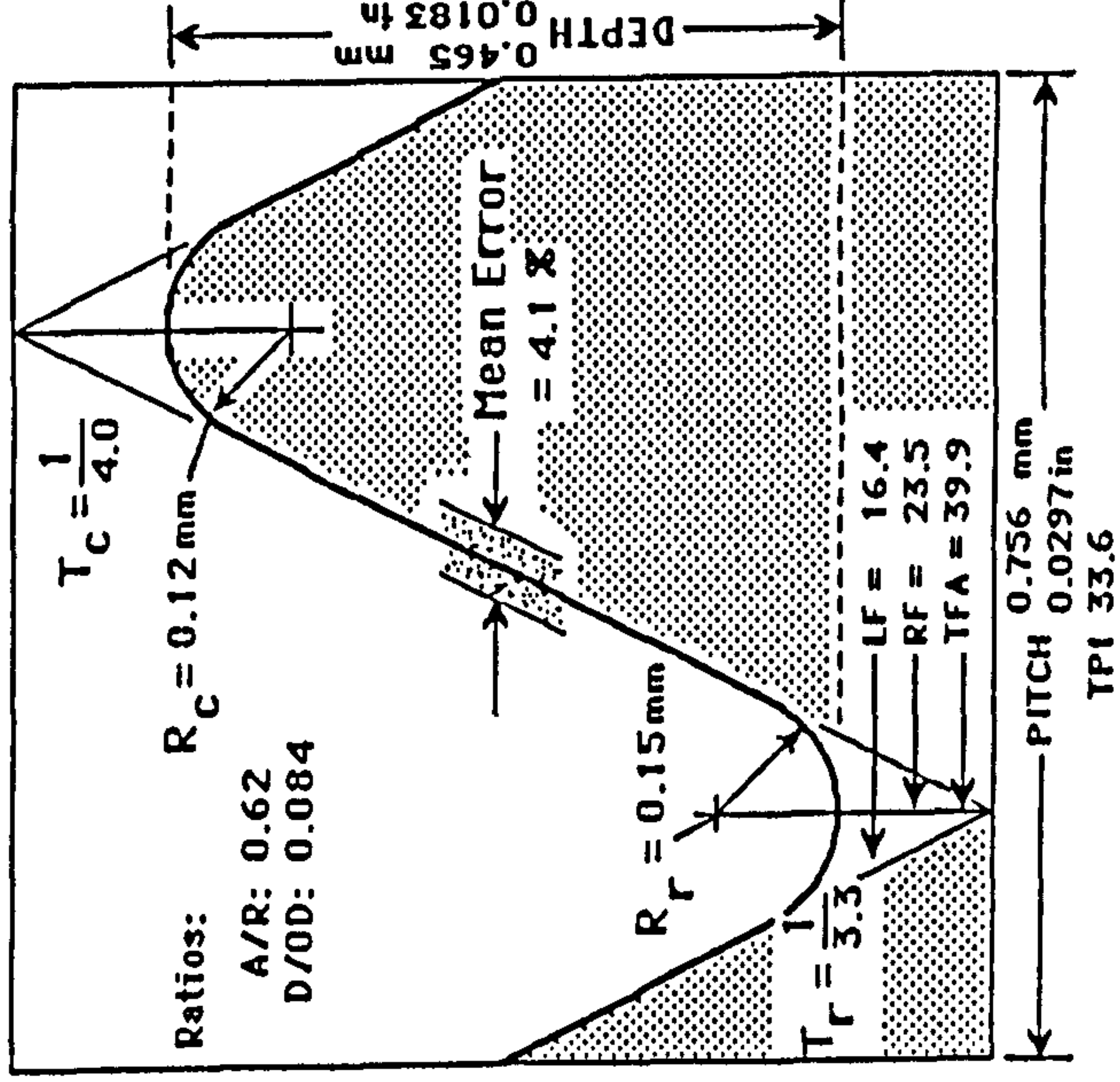
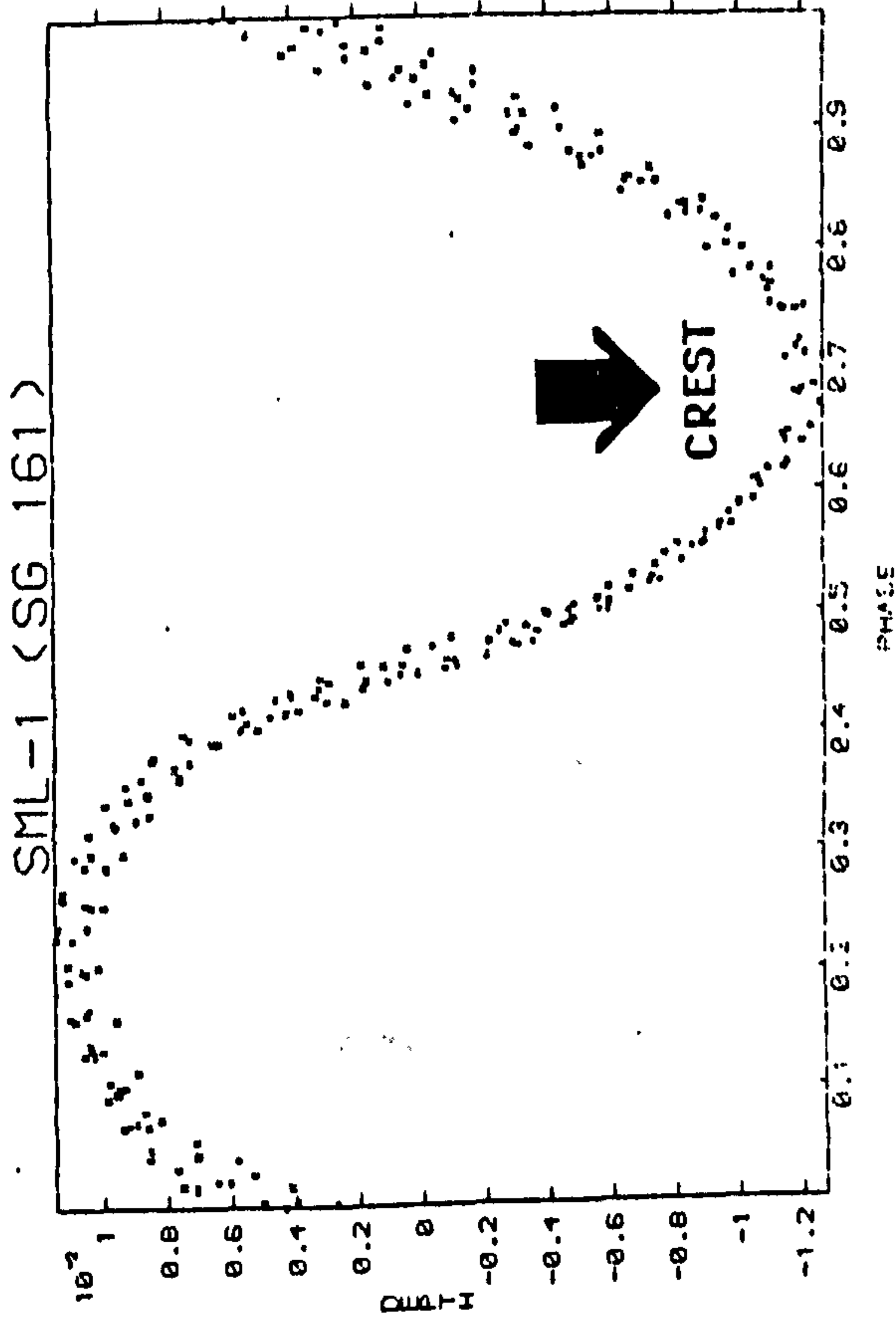
Study Code: SML-1b

Instrument: Bifilar micrometer

Maker: Heath & Wing

Date: ca.1760's

Ser./Acq. No. 1938-719



Mu

Filar

Scale

Bench

Div. Eng.

Adjust.

Leveling

Focus

Eye P.

Tube

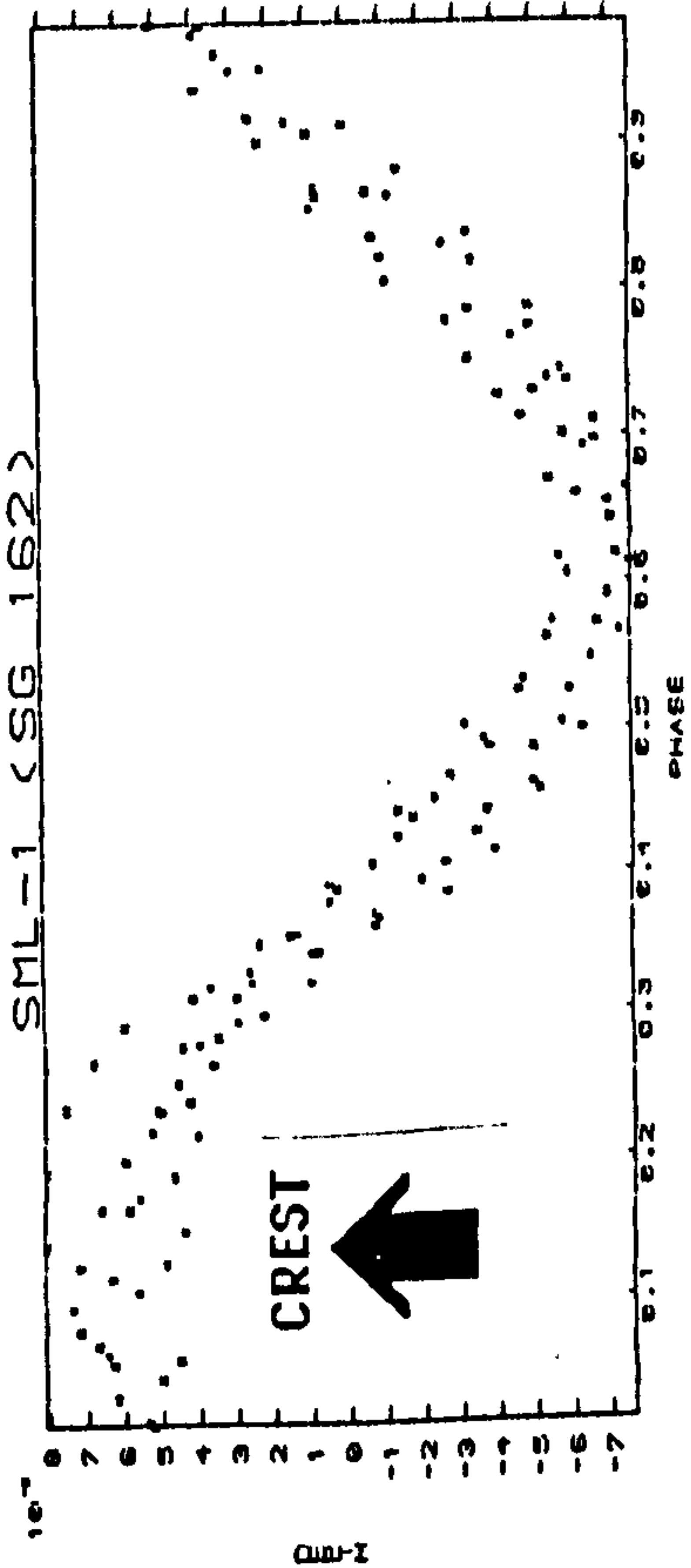
Tool

Gauge

Binding

Misc.

See SML-1a for drum description



**Characteristics:**

Screw ☐ Nut ☒

Leng: 1.125" /  $\approx 0.75$ "

Diameter: 0.219" nom.

Steel ☐ Brass ☒

Other:

**Instrument Identification:**

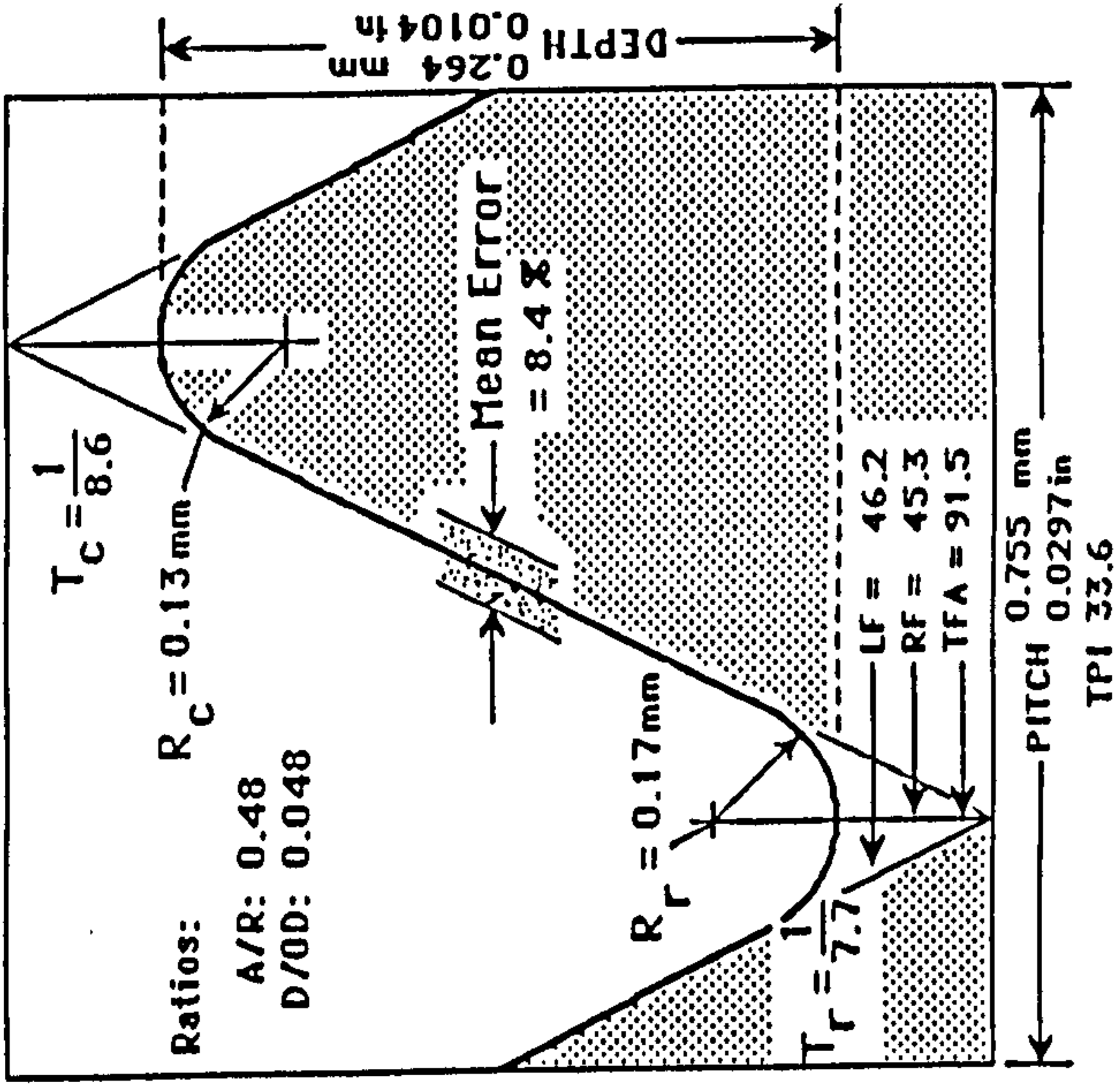
Study Code: SML-1c

Instrument: Biflar micrometer

Maker: Heath & Wing

Date: ca.1760's

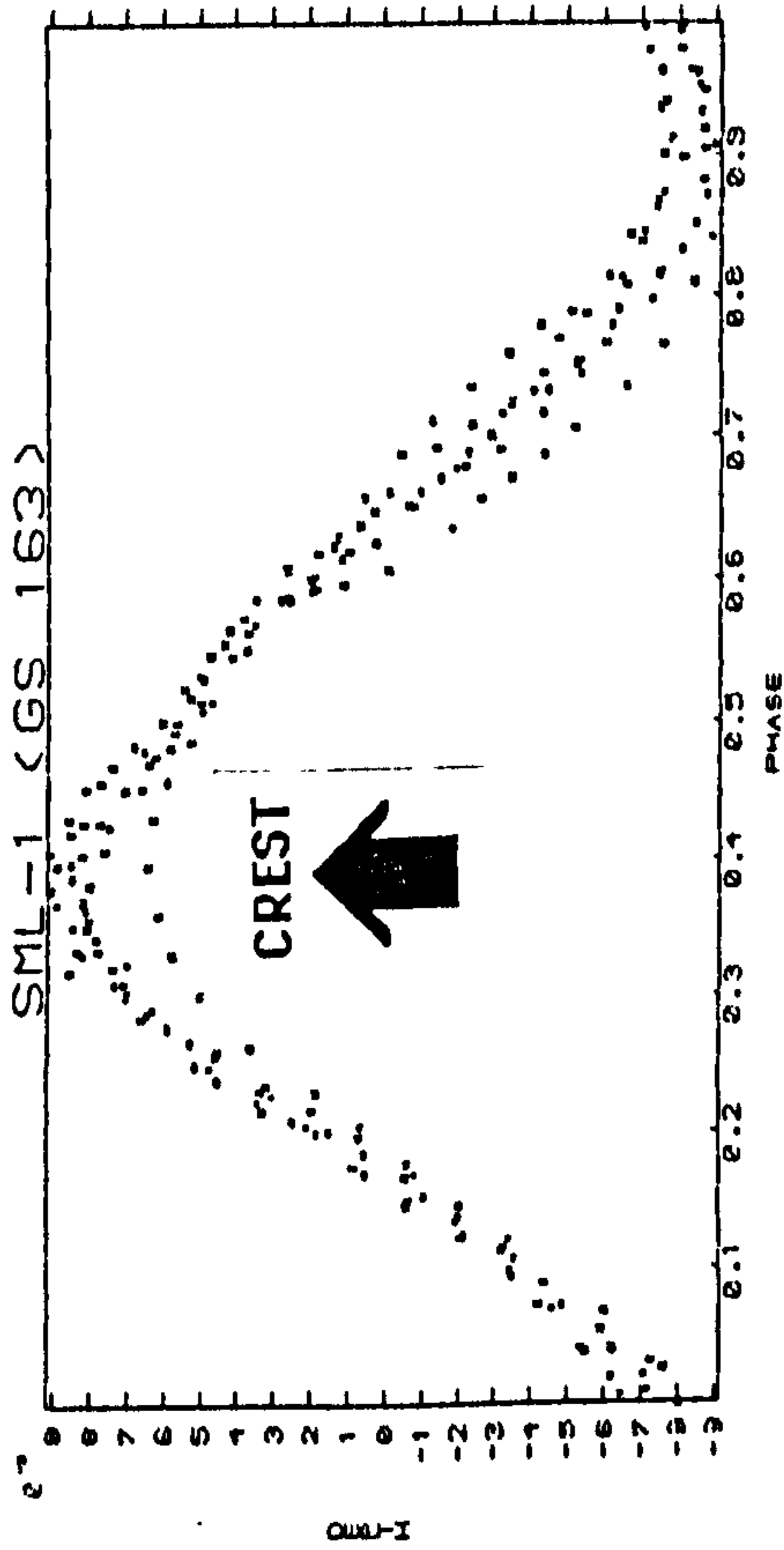
Ser./Acq. No. 1938-719



Mu — [ Filar Scale Bench Div. Eng. Adjust. Leveling Focus Eye P. Tube Tool Gauge Binding Misc.

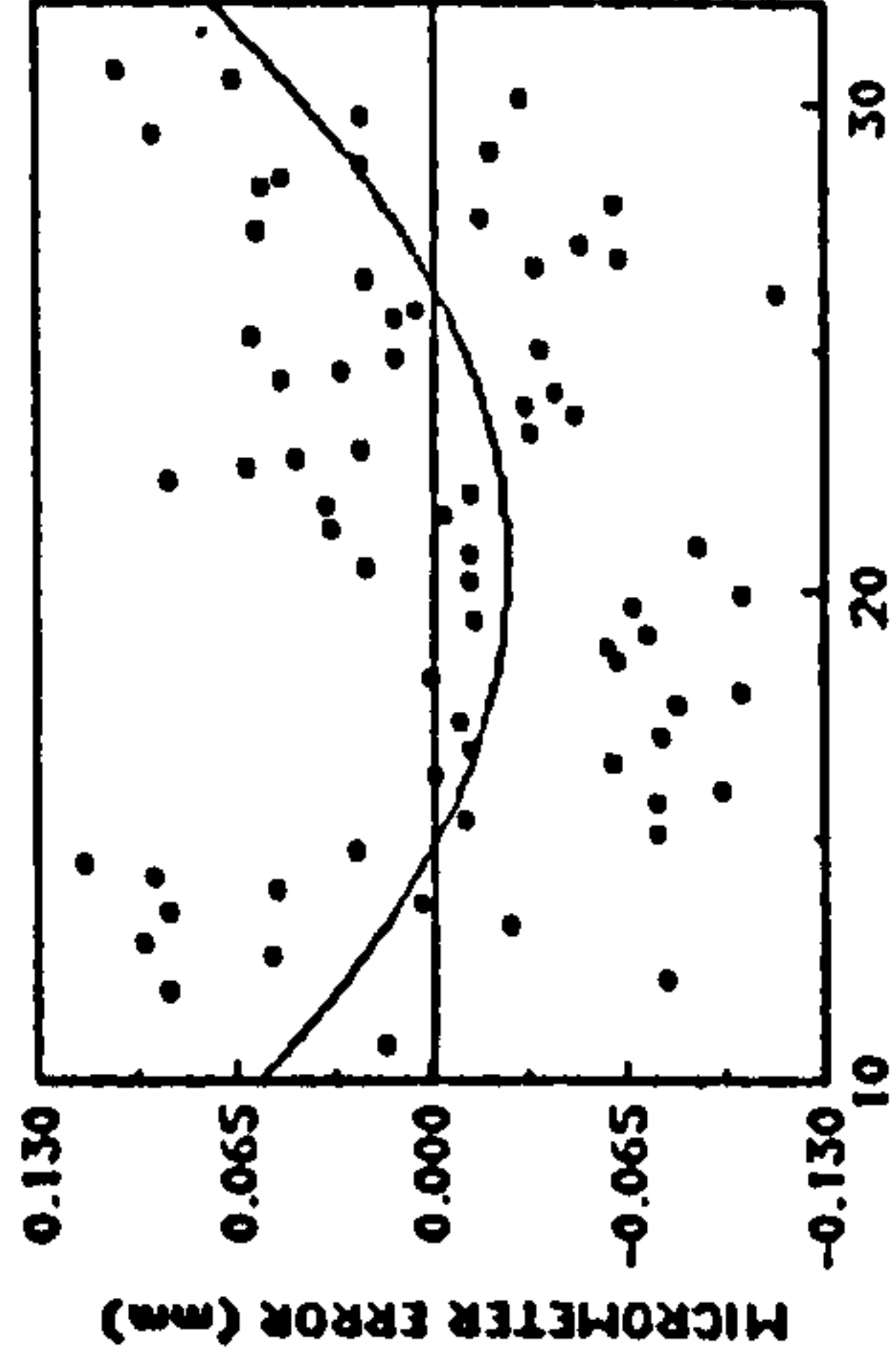
Nut for SML-1a



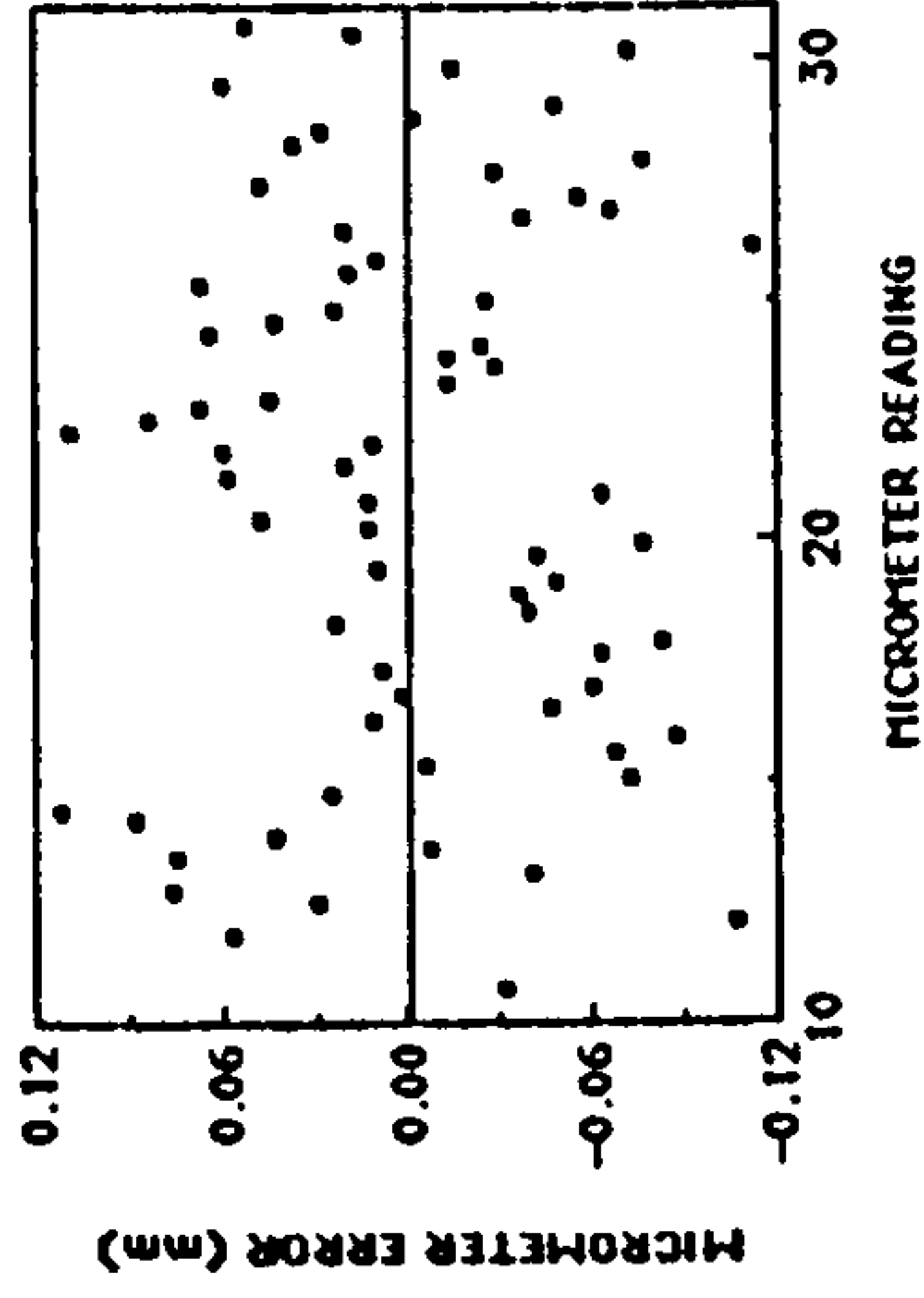




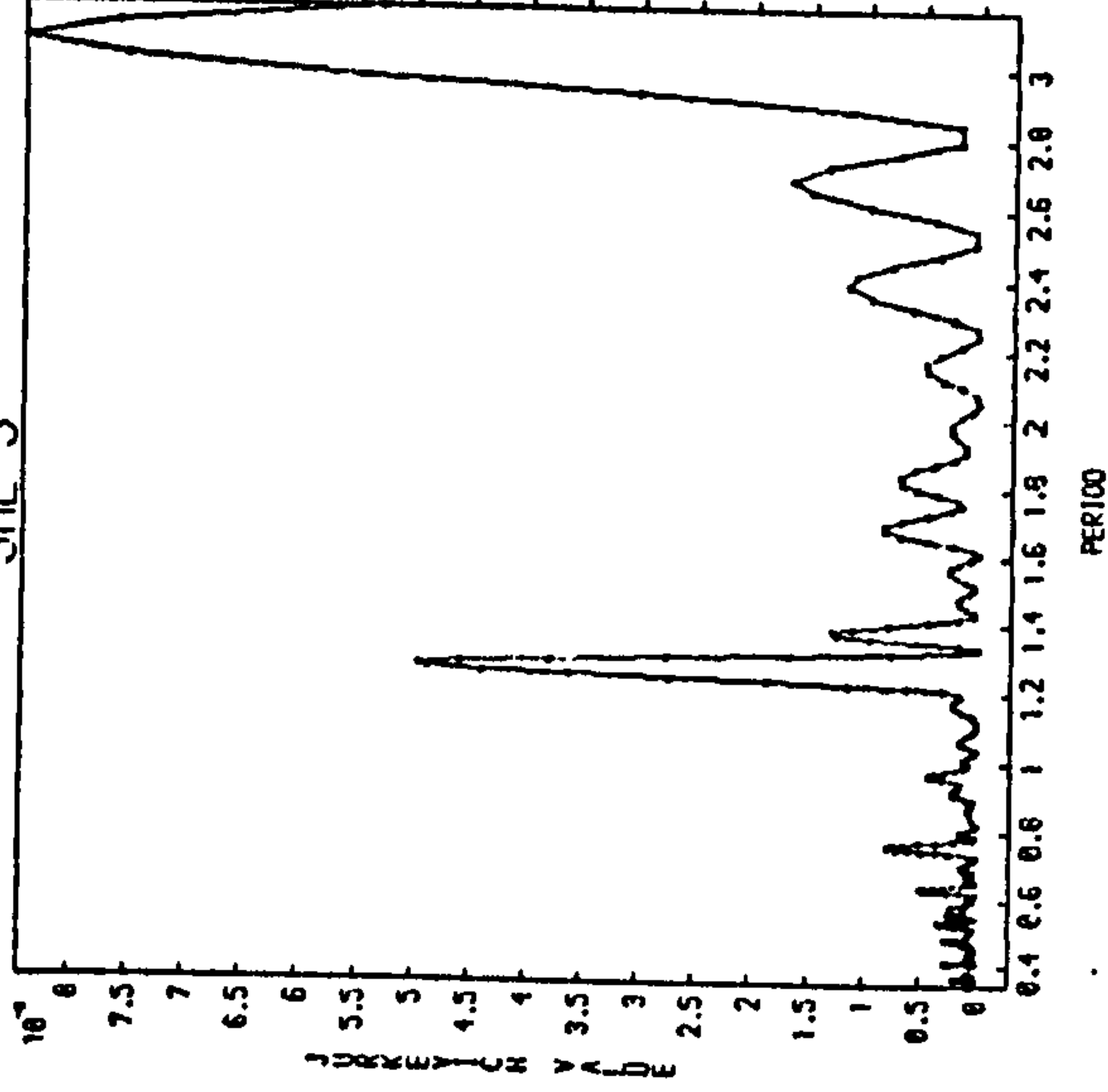
SML-3



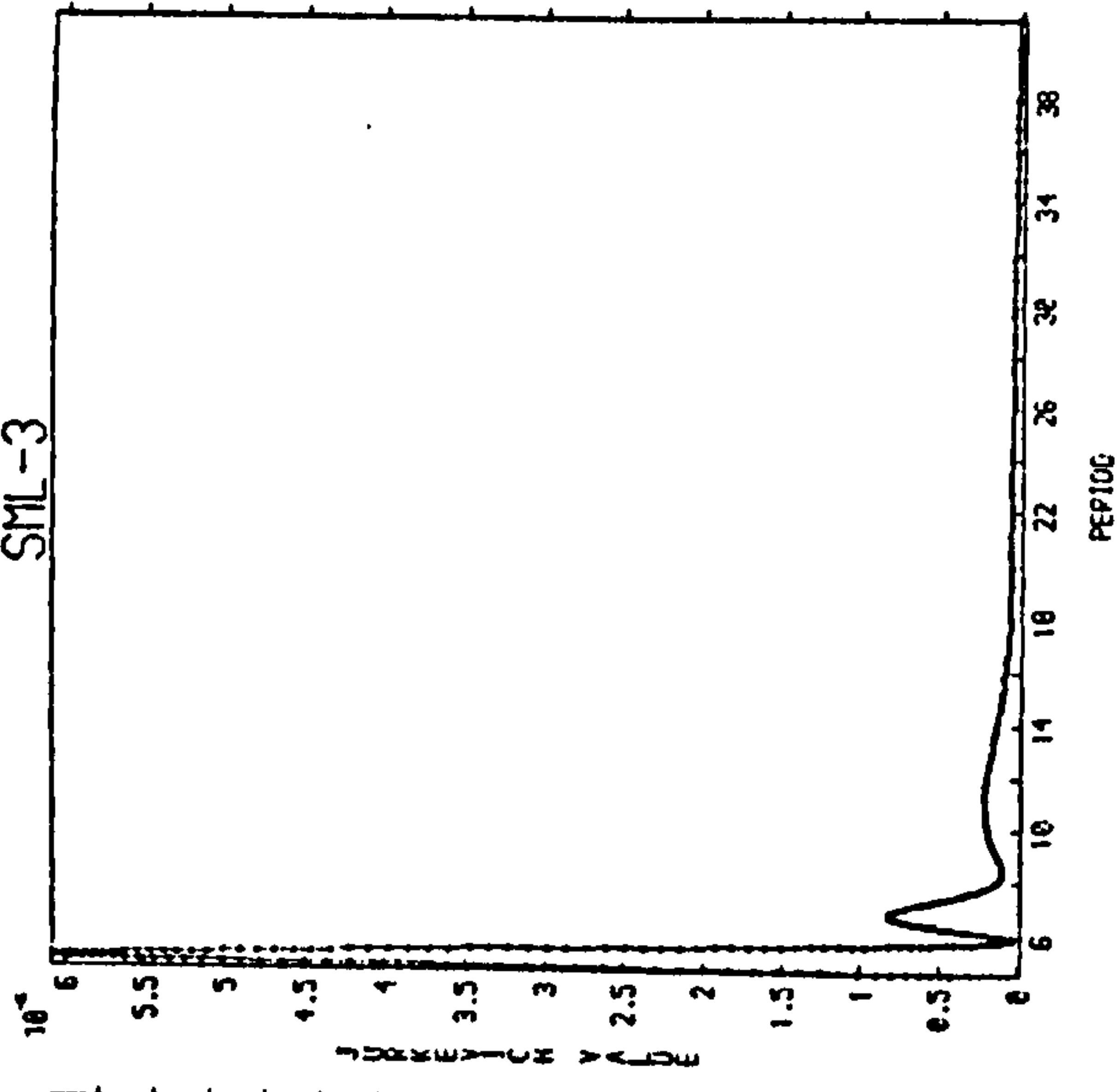
MICROMETER READING  
SML-3 (2DP)



SML-3



SML-3



Characteristics:

Screw

Nut

Leng: ~2.0" / ~0.5"

Diameter: 0.210"

Steel

Brass

Other:

Instrument Identification:

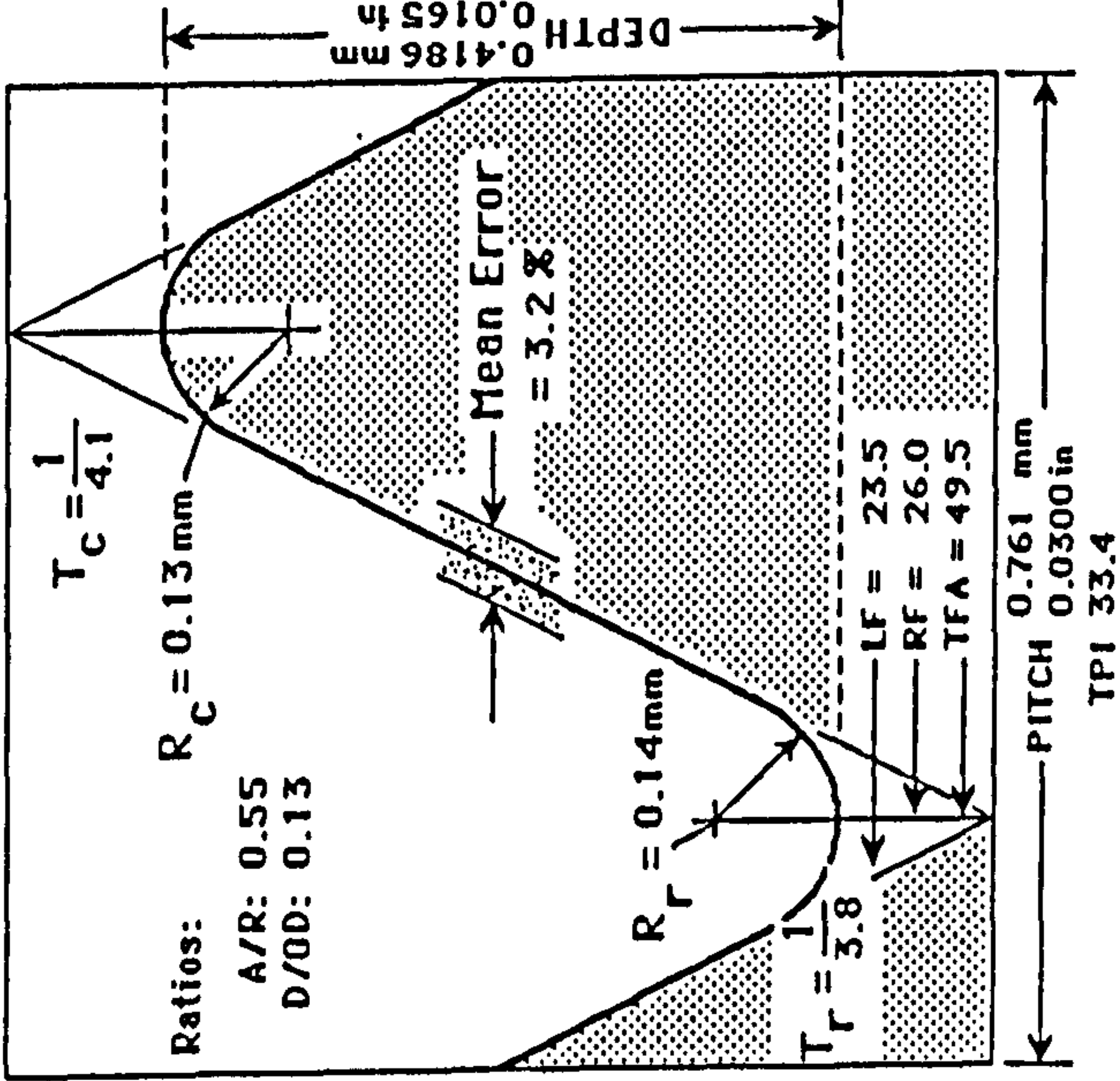
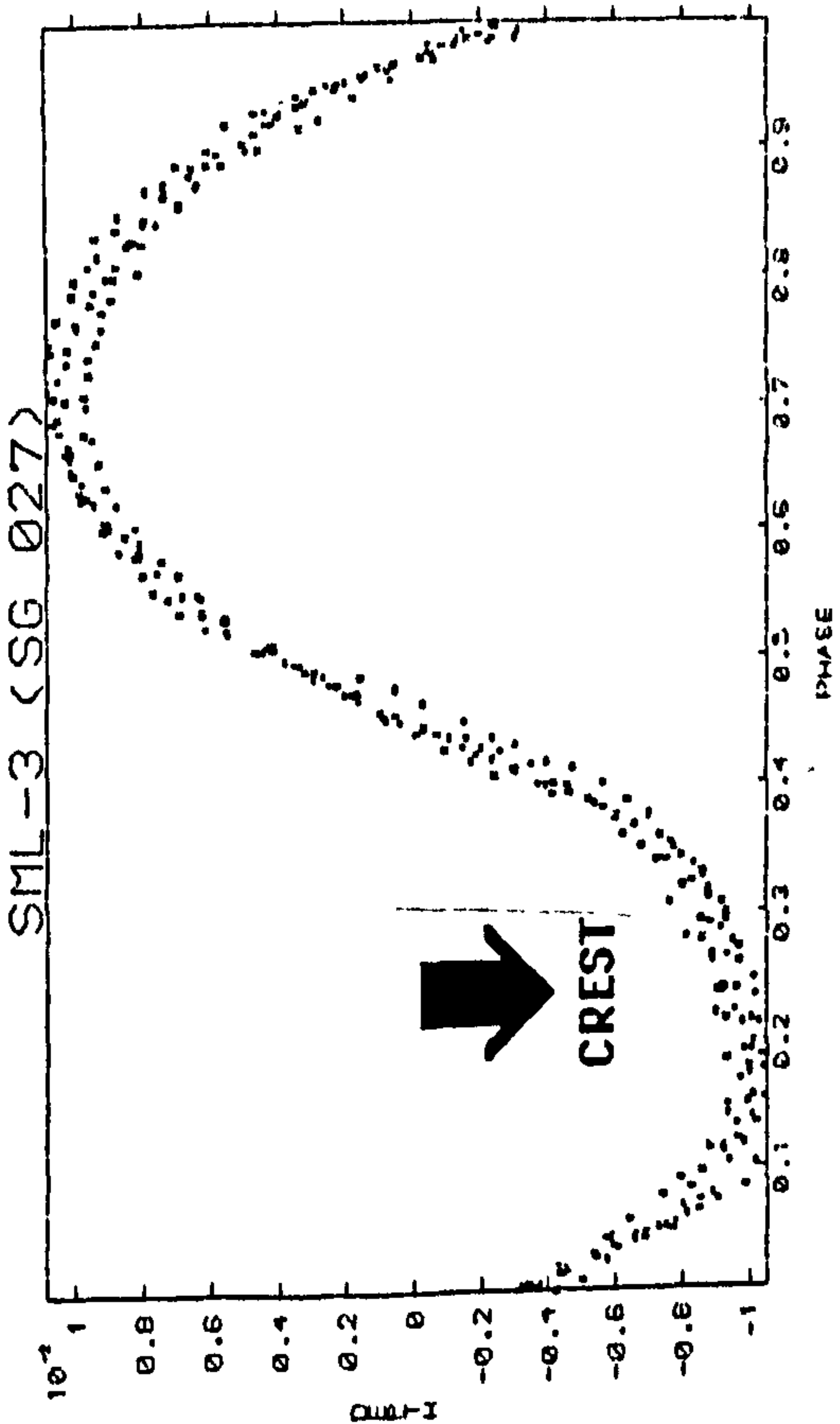
Study Code: SML-3

Instrument: Micrometer

Maker: Not signed (Italian?)

Date: ca.1700

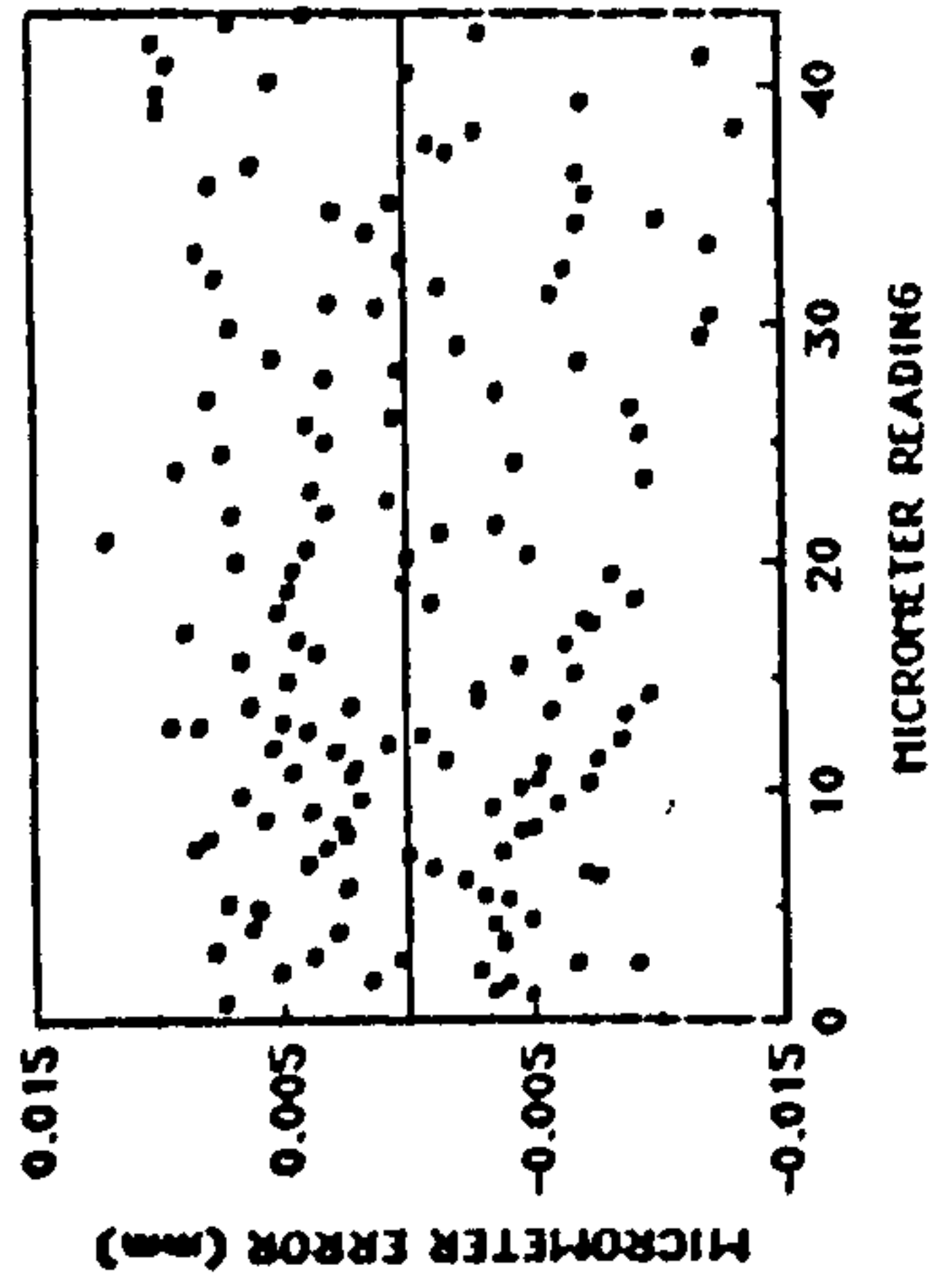
Ser./Acq. No. 1800-57



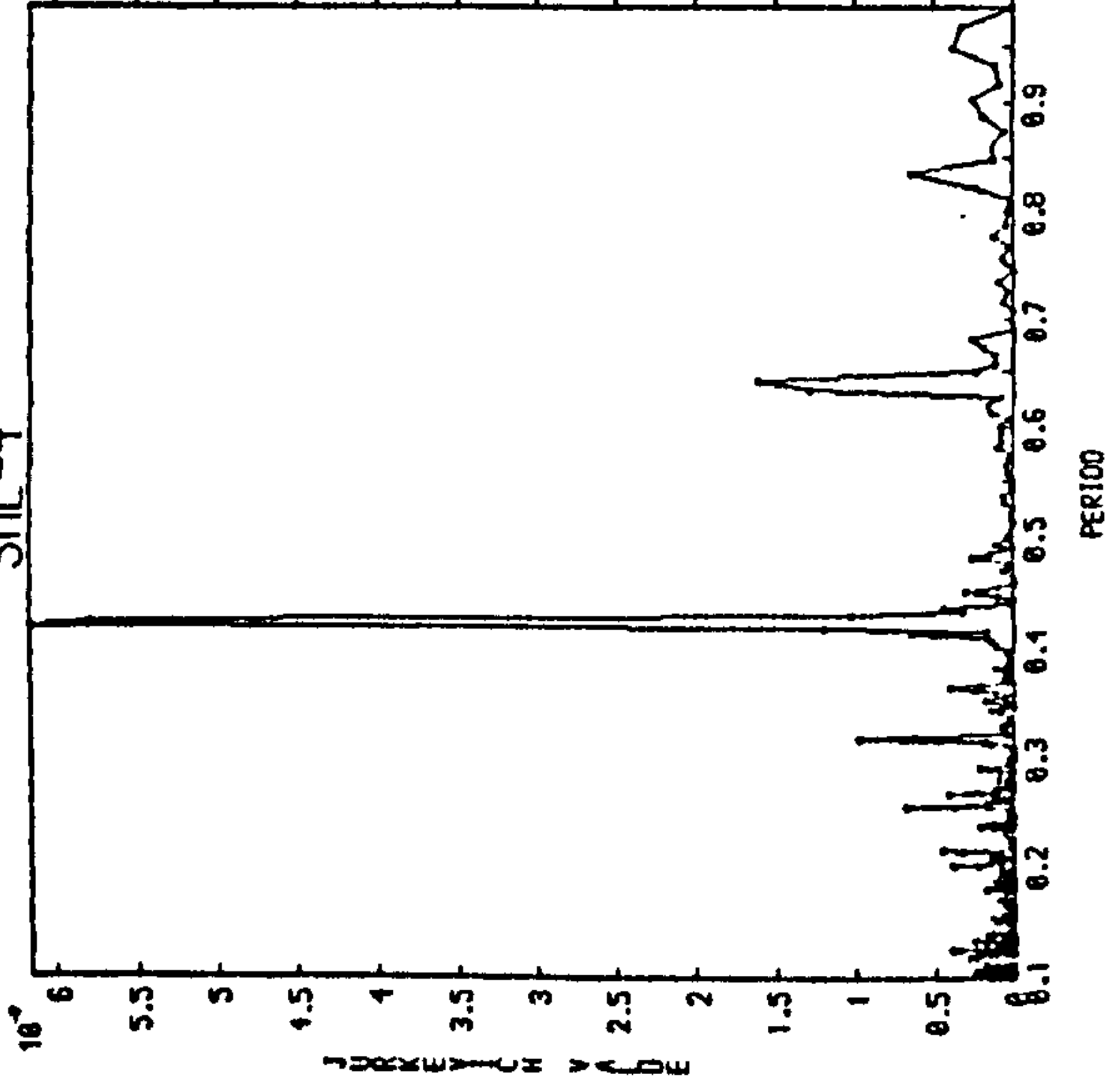
MU	Filar
	Scale
	Bench
	Div. Eng.
	Adjust.
	Leveling
	Focus
	Eye P.
	Tube
	Tool
	Gauge
	Binding
	Misc.

Drum: 1.75" diameter, 0-100 divisions with  $\pm 0.3 \text{ div.}$  resolution  
 Scale: 1.19" long with 0-40 div.  
 End of screw has file marks which are about 0.005" wide  
 Similar to micrometer illustrated by Balthasar (1704)

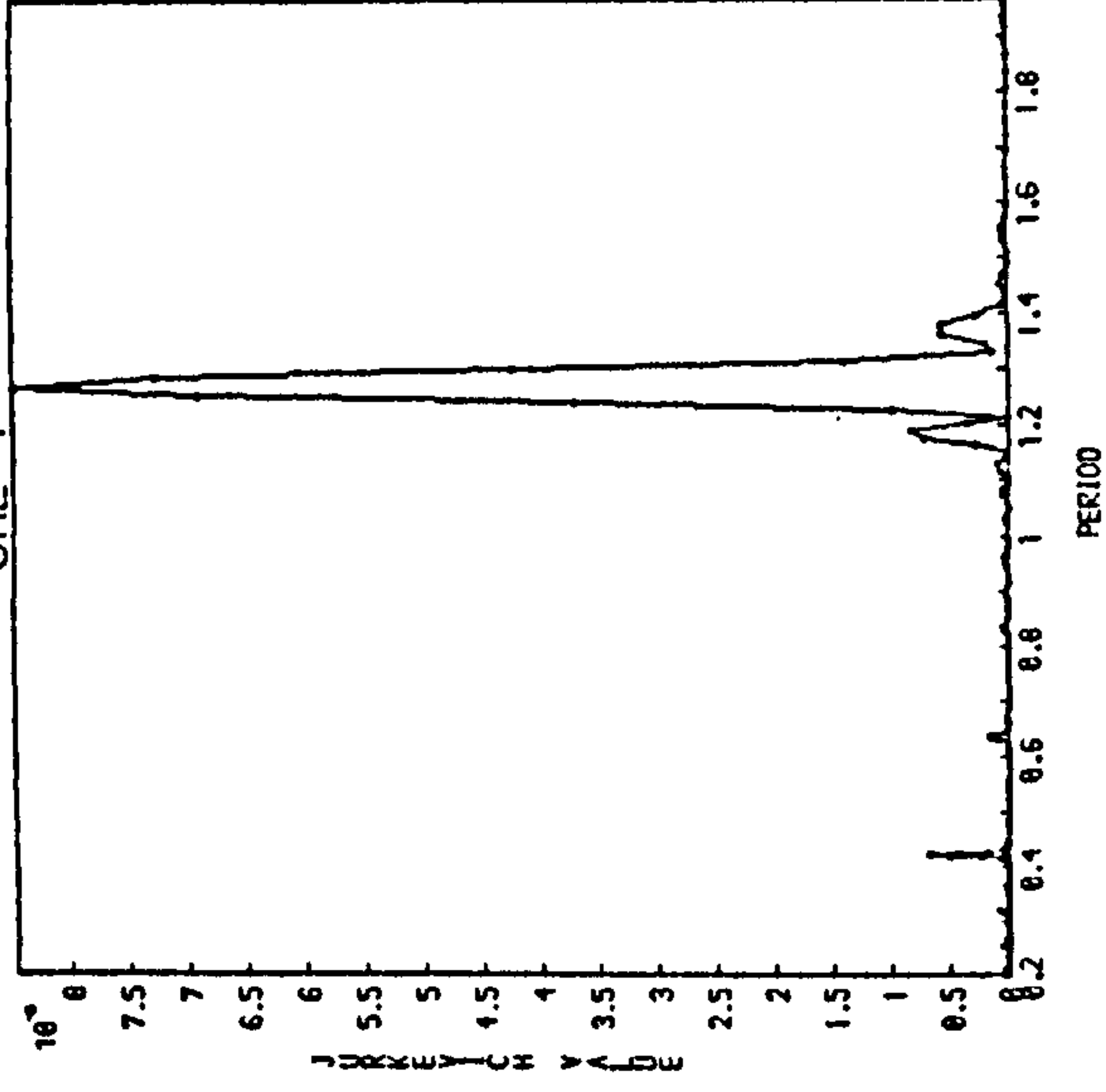
SML-4



SML-4



SML-4



Characteristics:

Screw

Nut

Leng: 1.313"

Diameter: 0.156"

Steel

Brass

Other:

Instrument Identification:

Study Code: SML-4

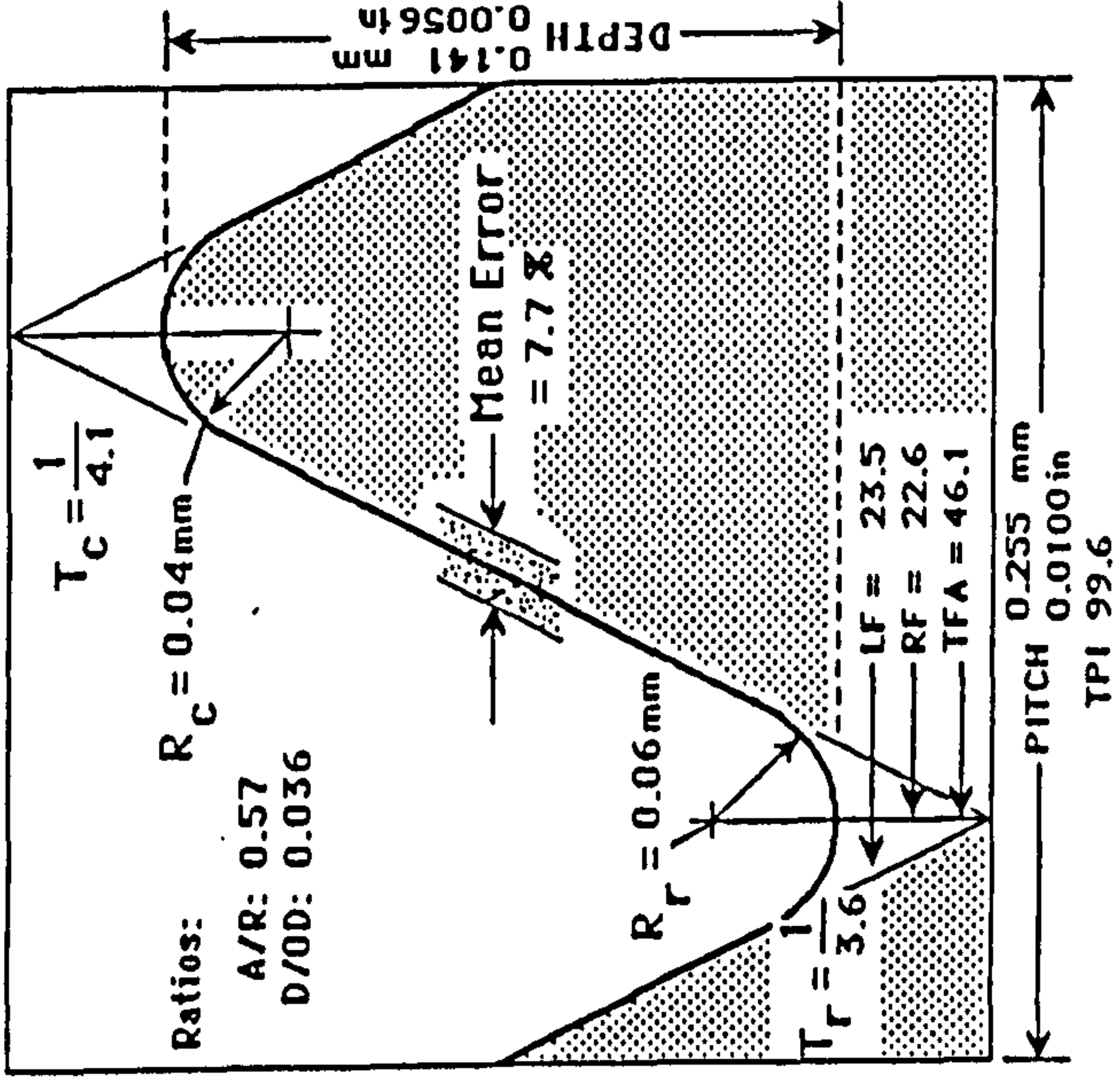
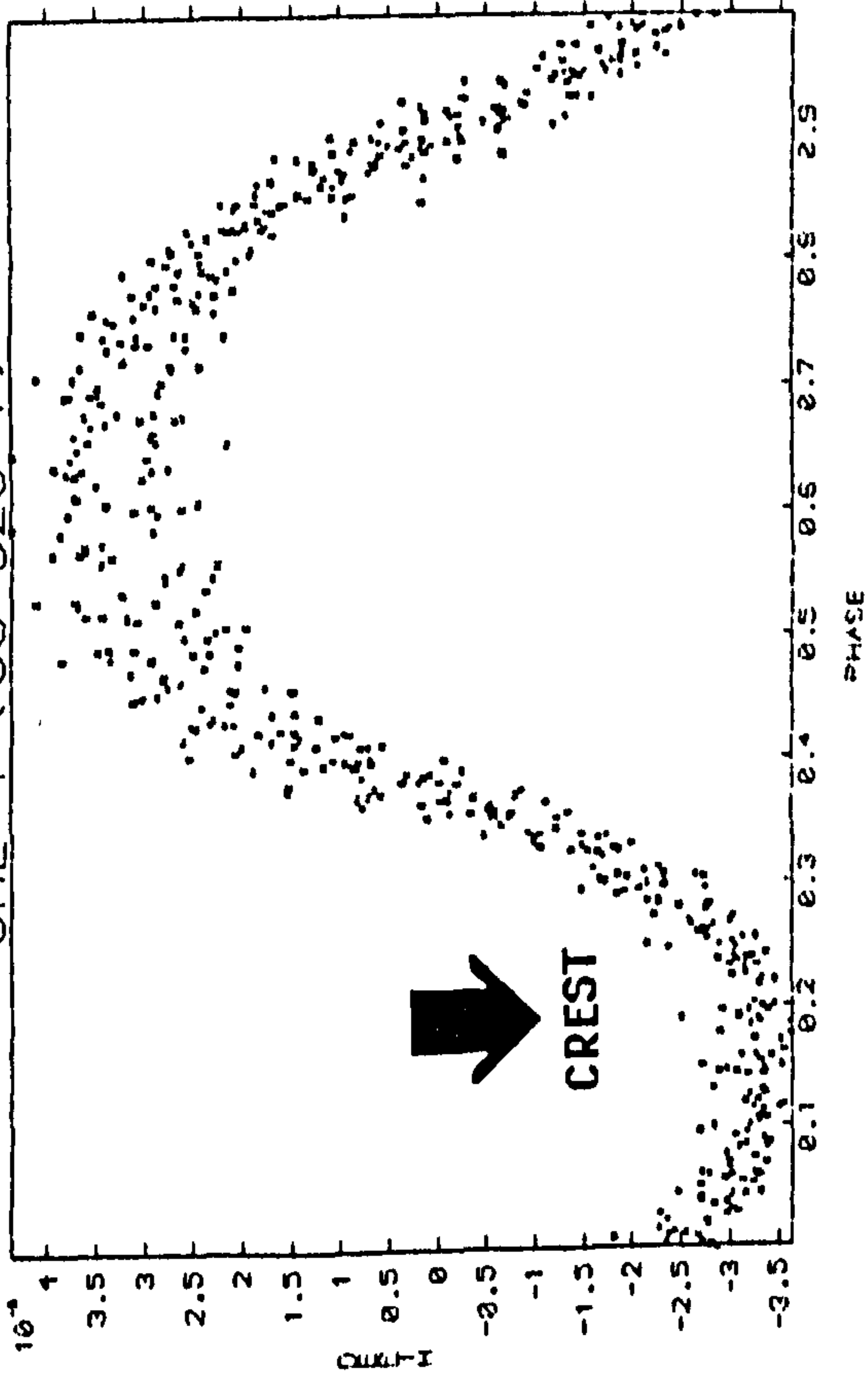
Instrument: Bifilar micrometer

Maker: John Browning

Date: 1878

Ser./Acq. No. 1984-174

SML-4 (SG 028-1)



Mu

Filar

Scale

Bench

Div. Eng.

Adjust.

Leveling

Focus

Eye P.

Tube

Tool

Gauge

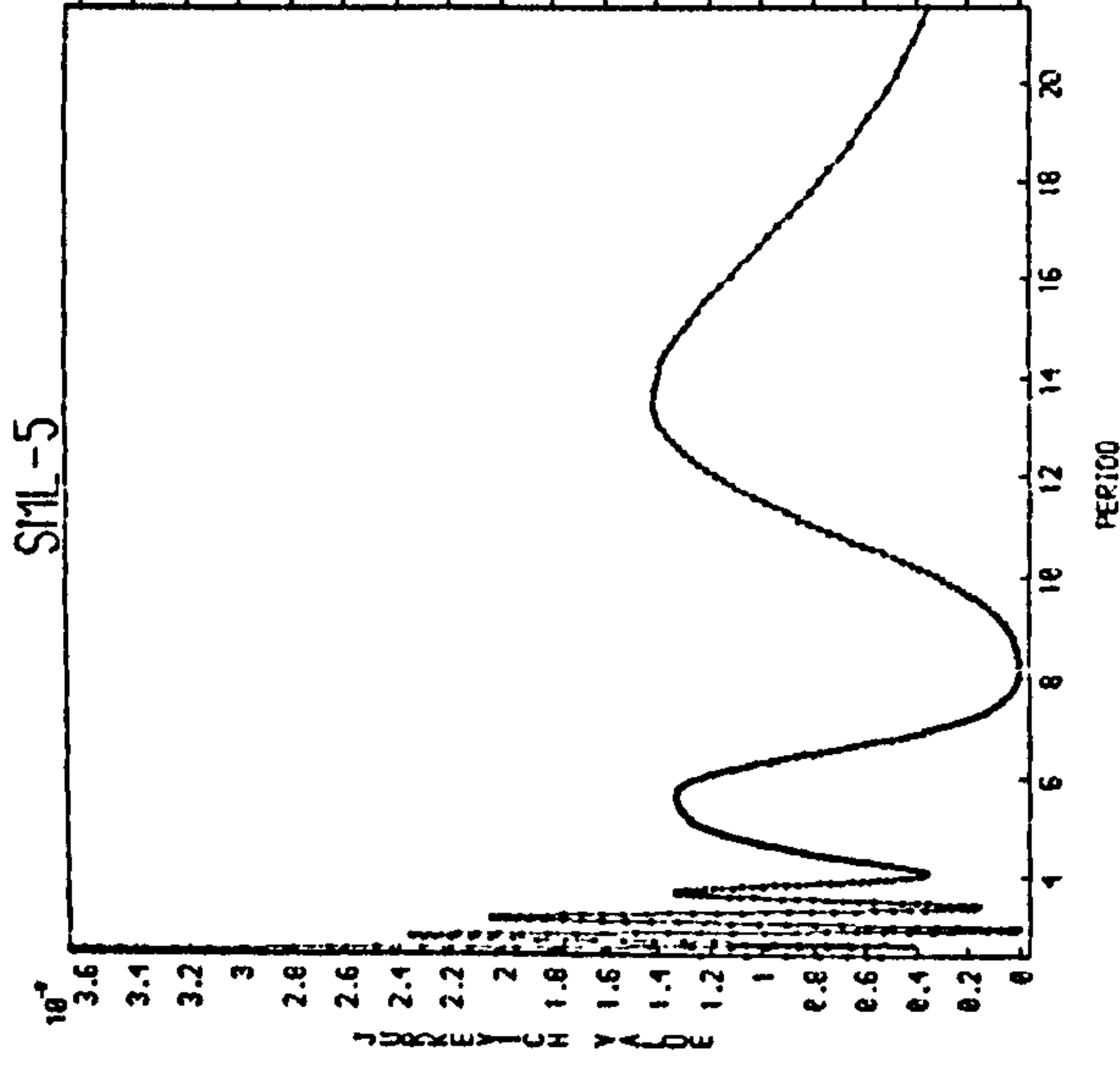
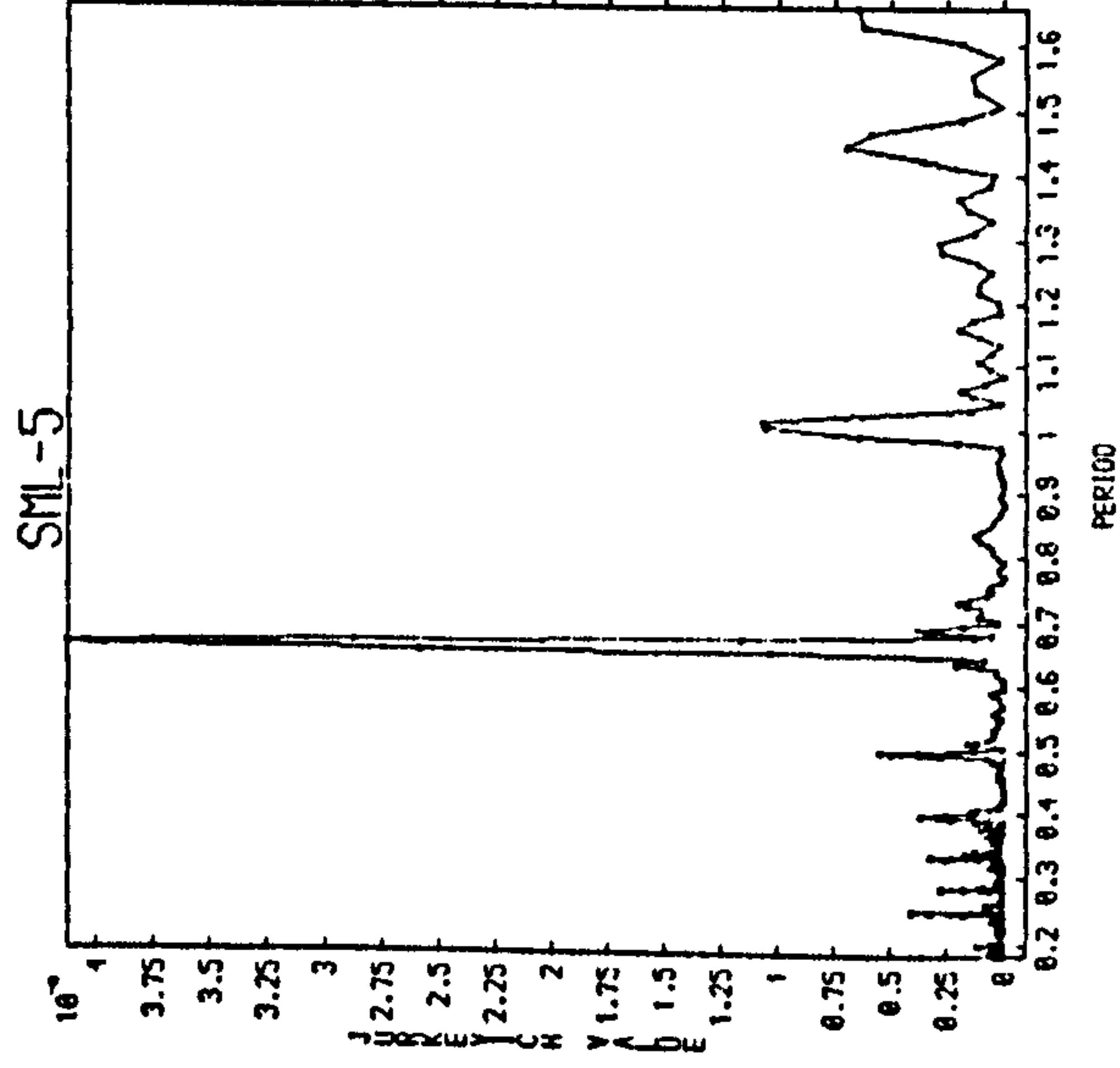
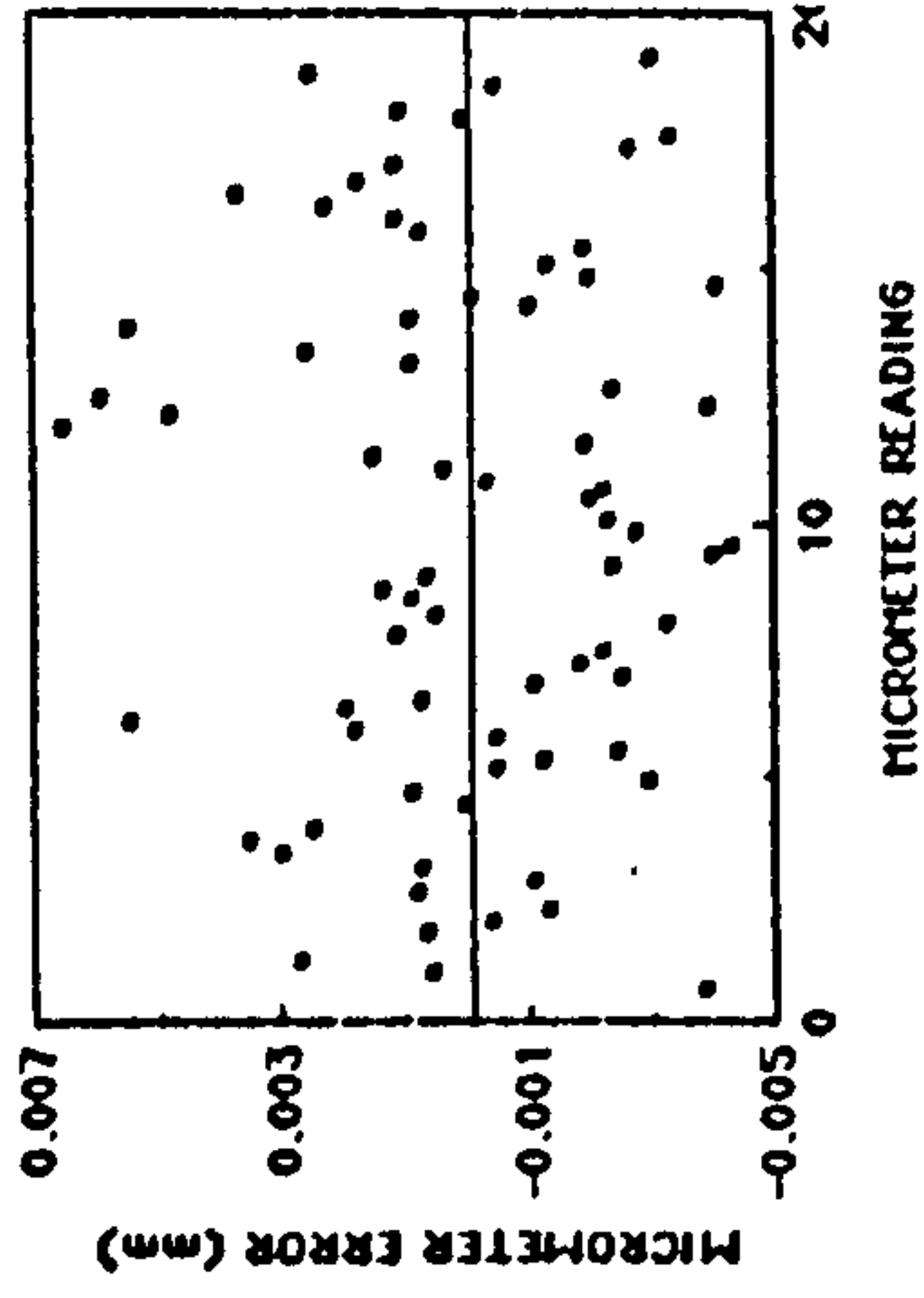
Binding

Misc.

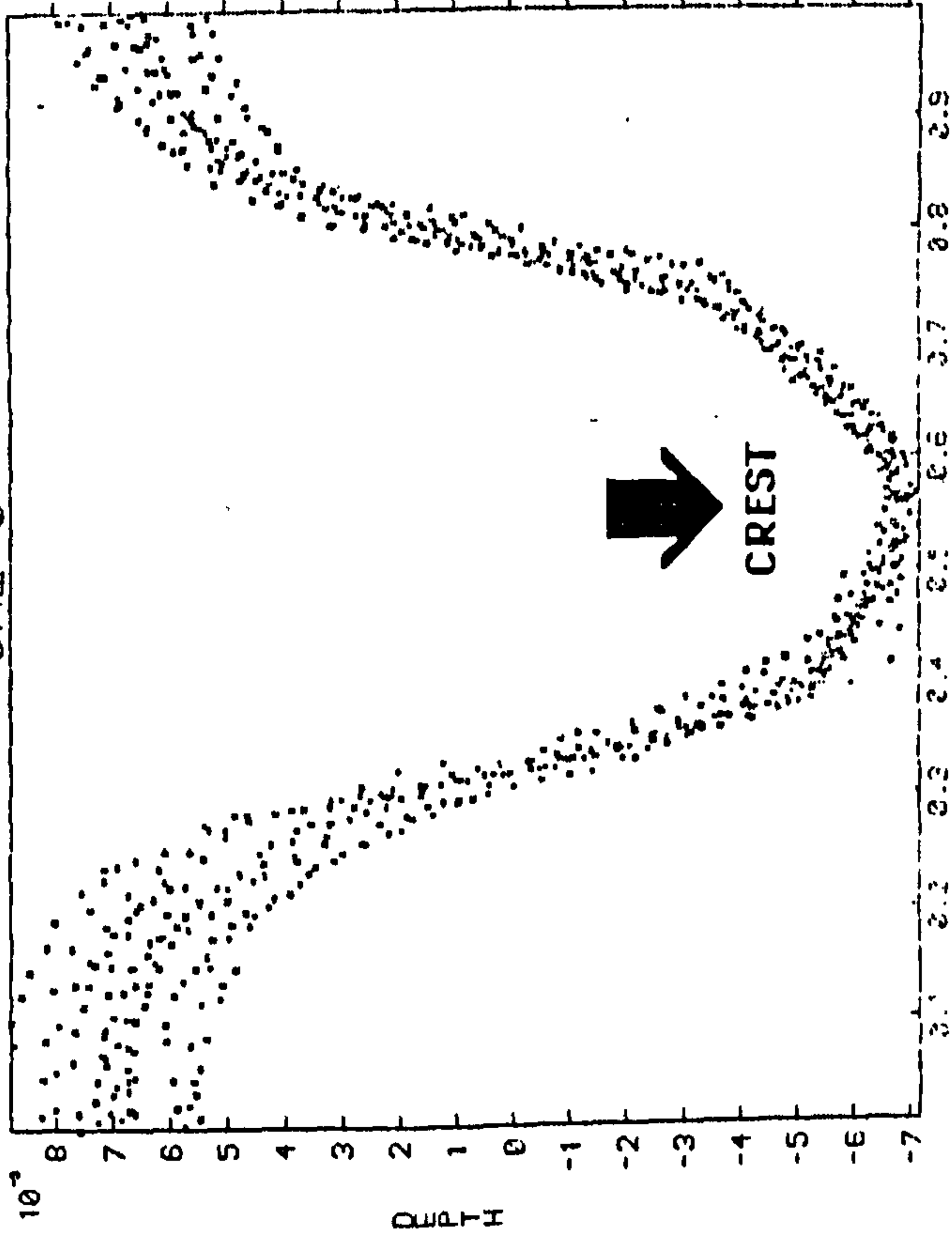
Drum: 0.94" diameter, 0-100 divisions with  $\pm 0.1 \text{ div.}$  resolution  
Scale: 10 div. wheel with detent  
Cost in 1878 was £10 divided on platinum



Data from "SML-5"



SML-5



Page 2

### Characteristics:

Screw ☒ Nut ☐

Length: 3.00"

Diameter: 0.351"

Steel ☒ Brass ☐

Other: ☐

### Instrument Identification:

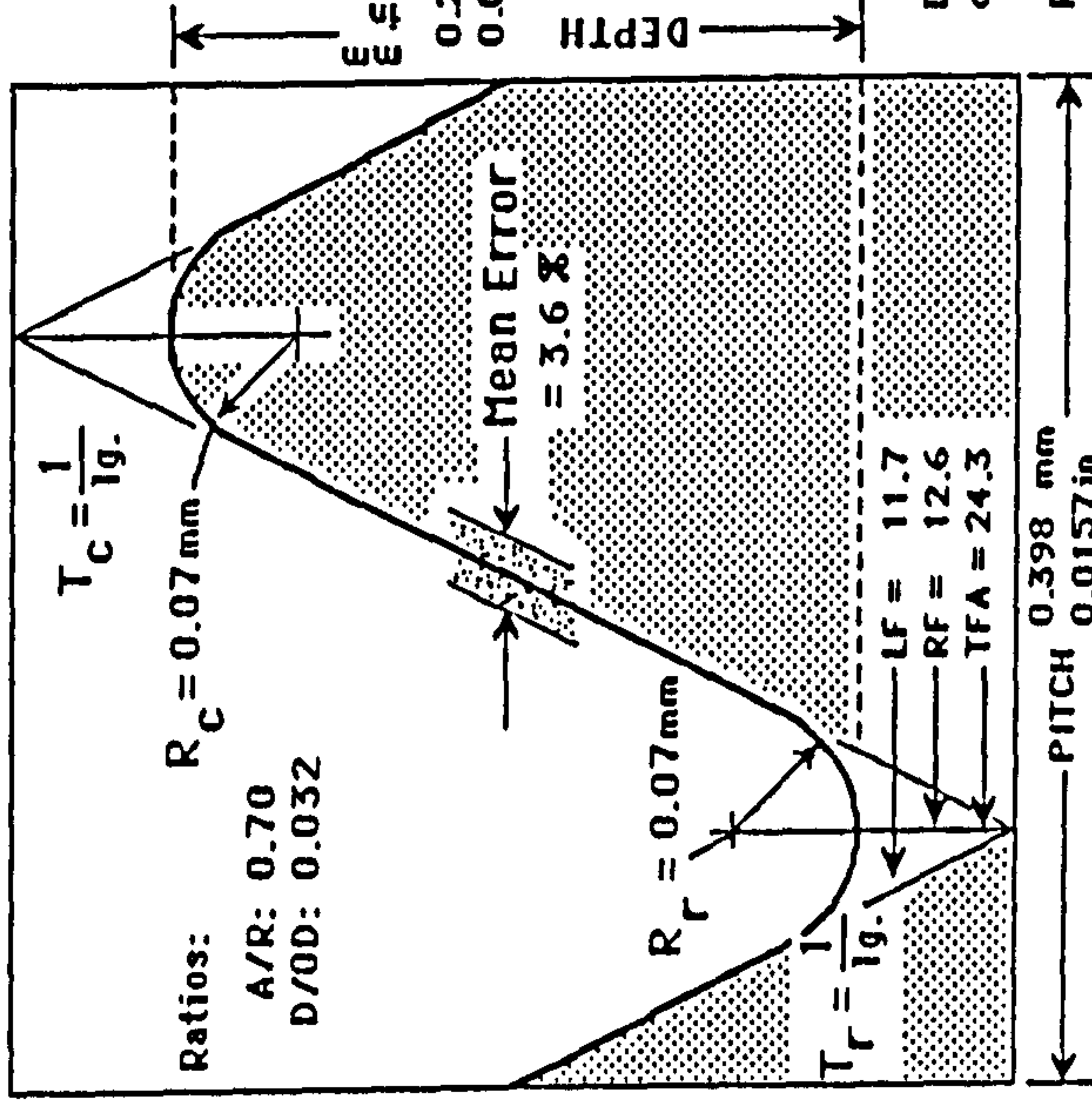
Study Code: SML-5

Instrument: Bifilar micrometer

Maker: Not signed (French)

Date: 3rd q 19th c

Ser./Acq. No. 1986-377



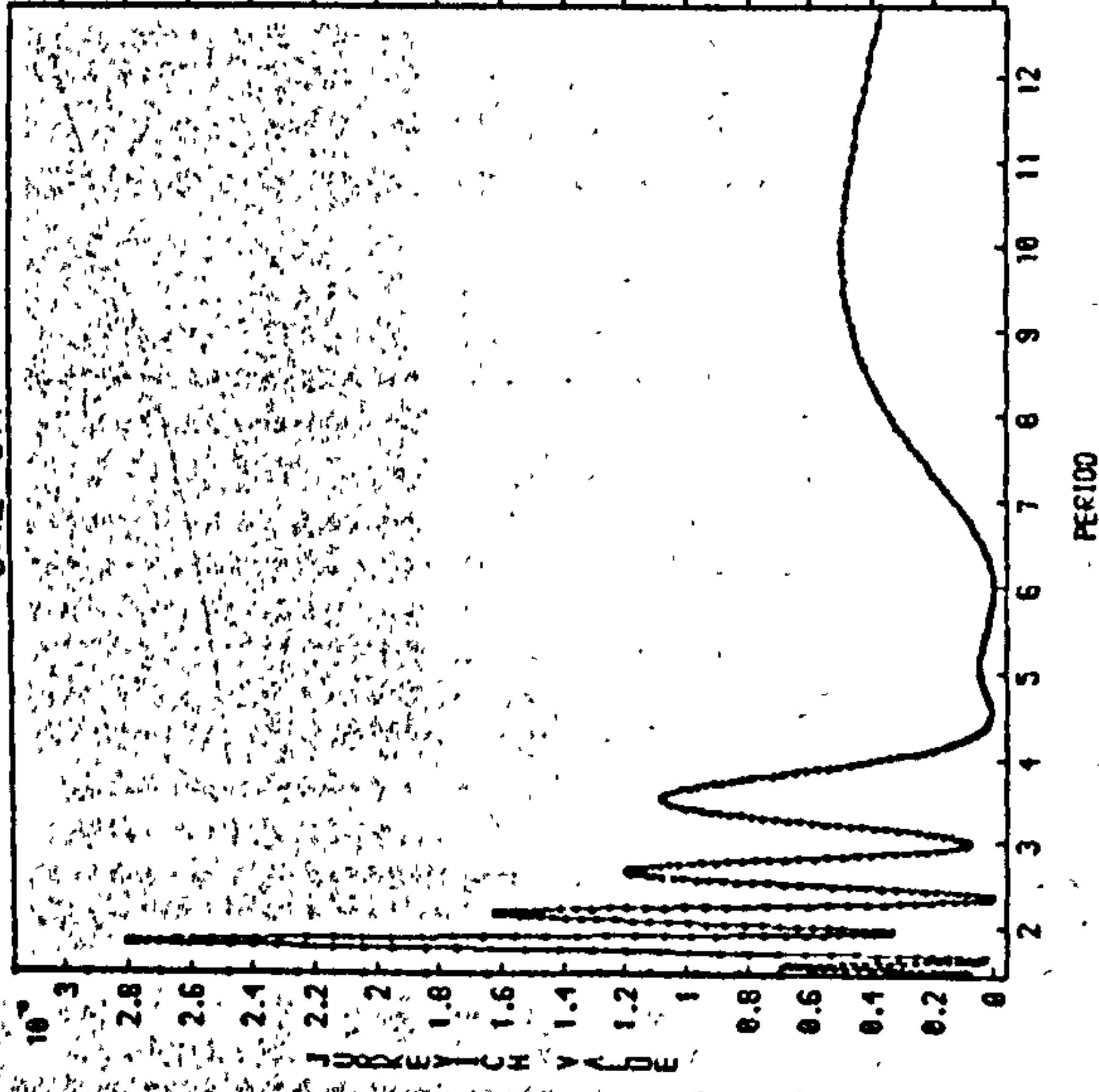
DEPTH  
0.284  
0.0112

Mu — Filar Scale Bench Div. Eng. Adjust. Leveling Focus Eye P. Tube Tool Gauge Binding Misc.

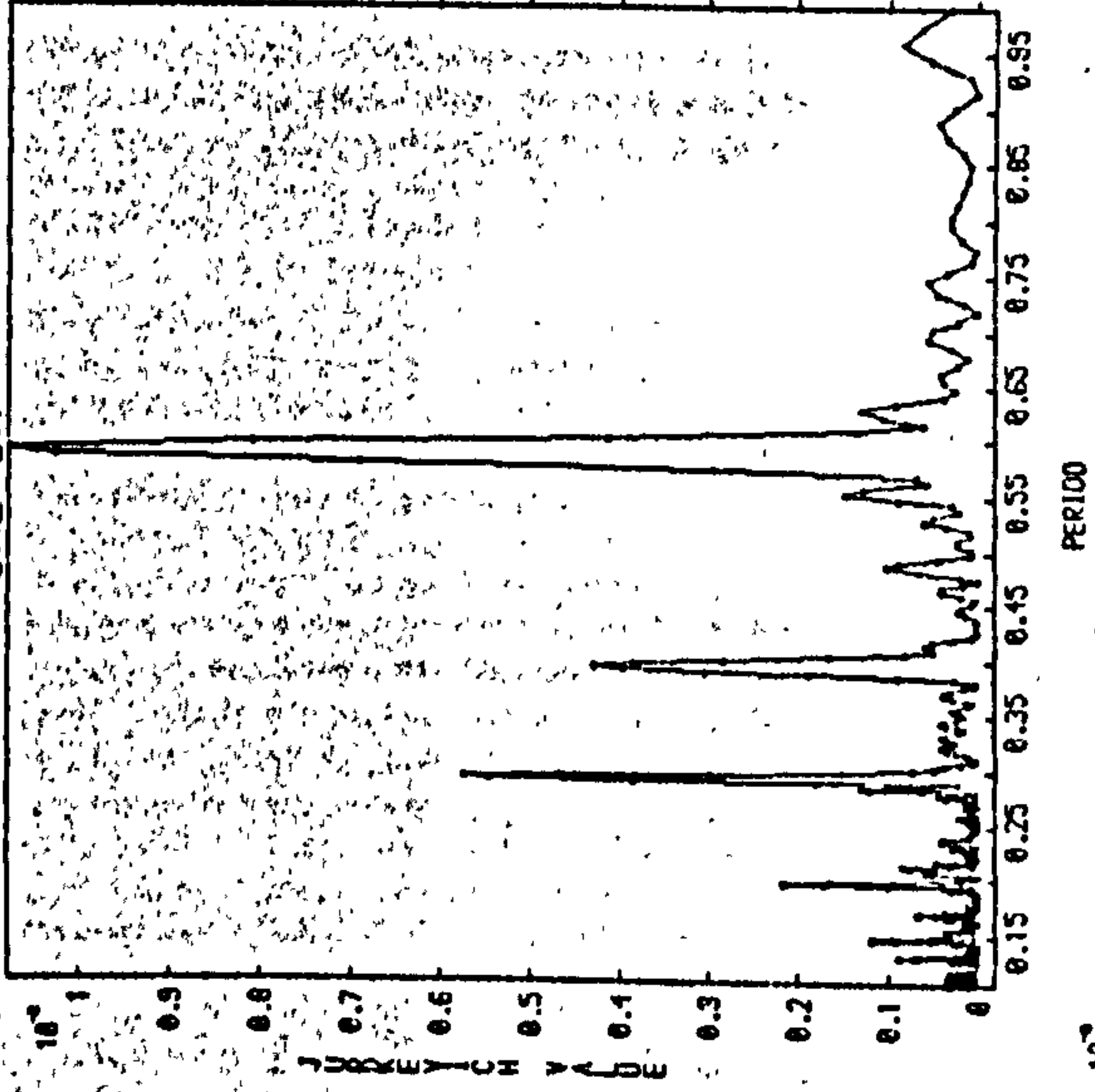
Drum: 2.625" diameter, 0-400 divisions with  $\pm 0.5 \text{ div.}$  resolution

Roots very uneven in depth

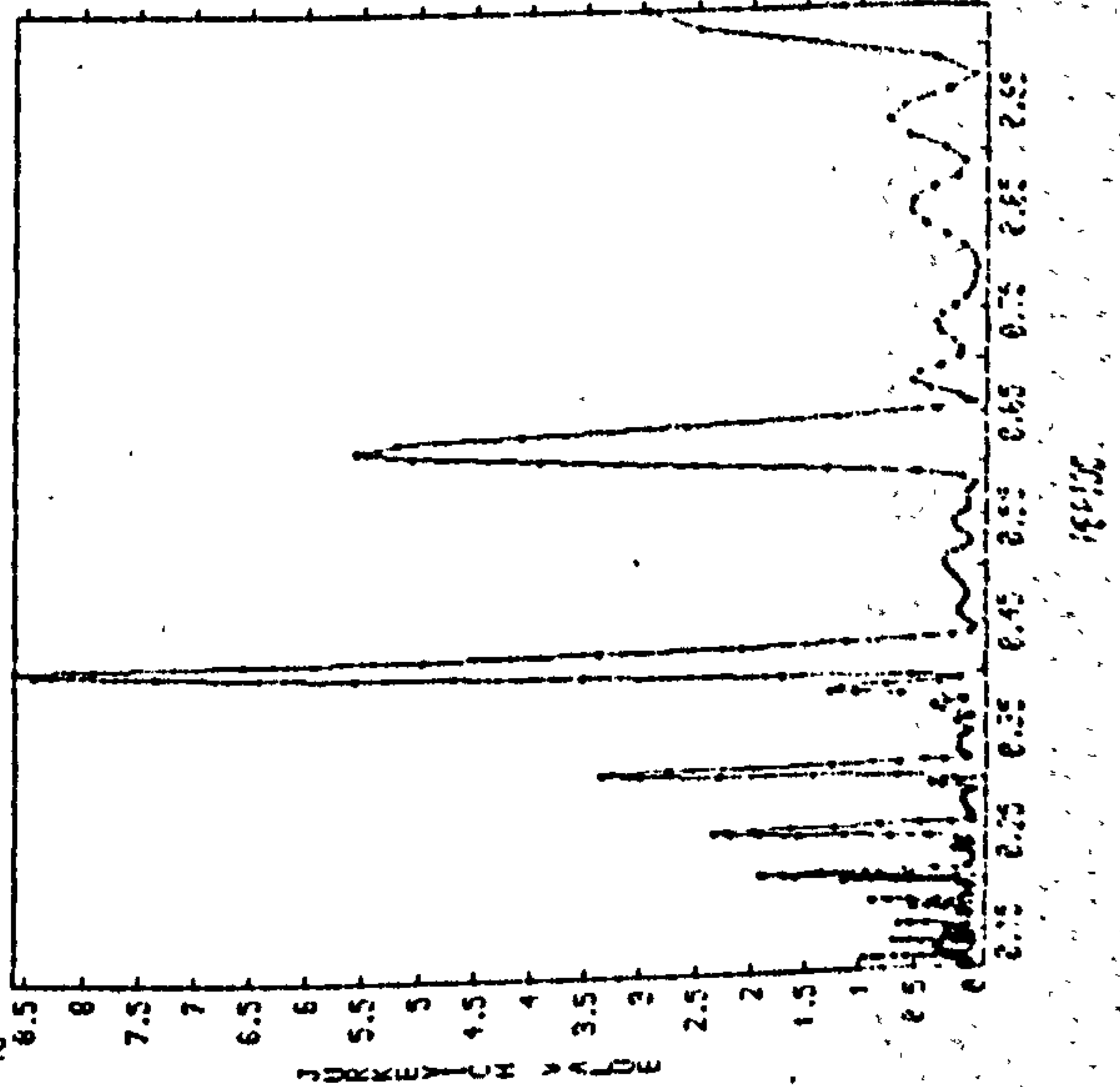
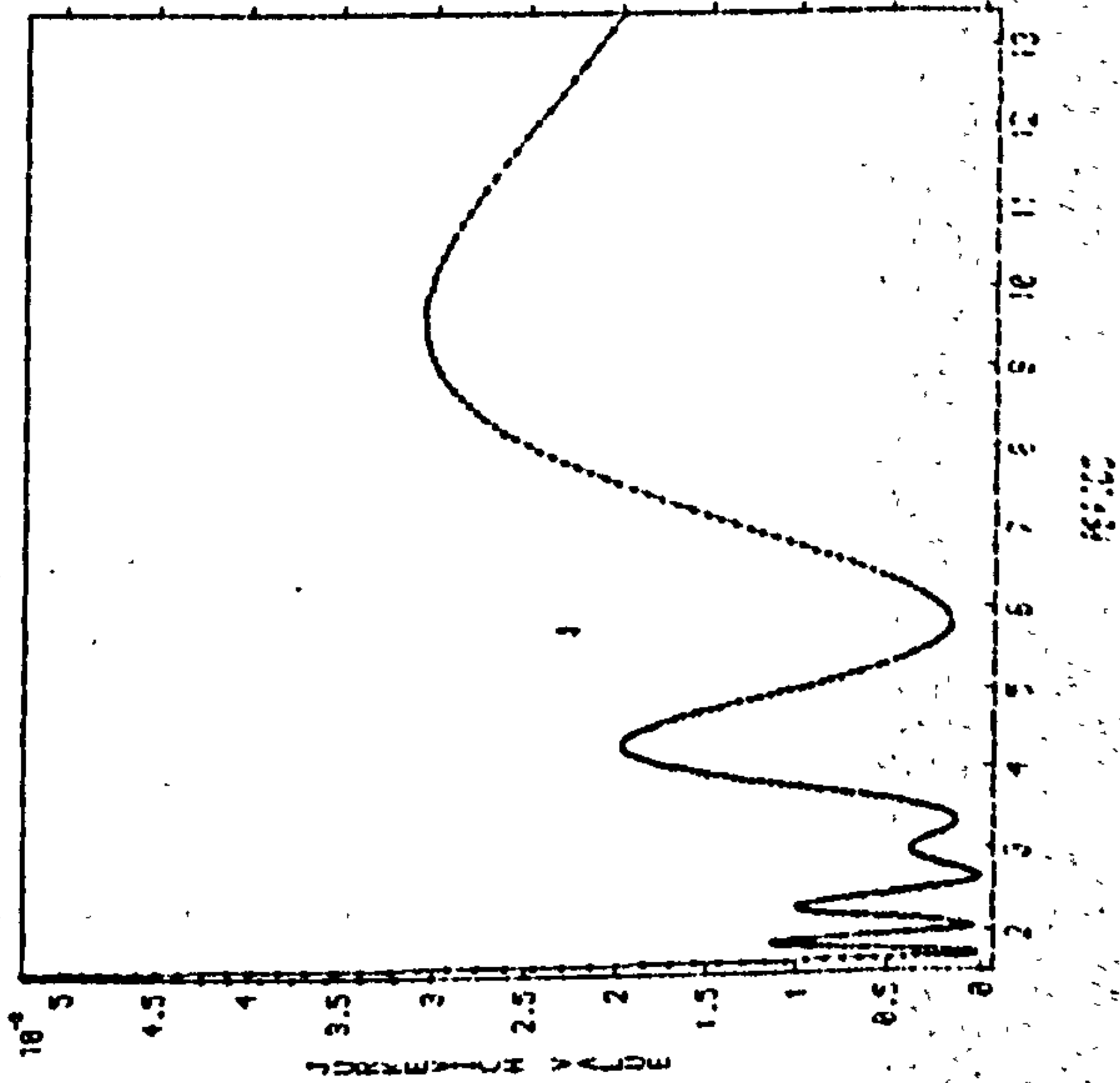
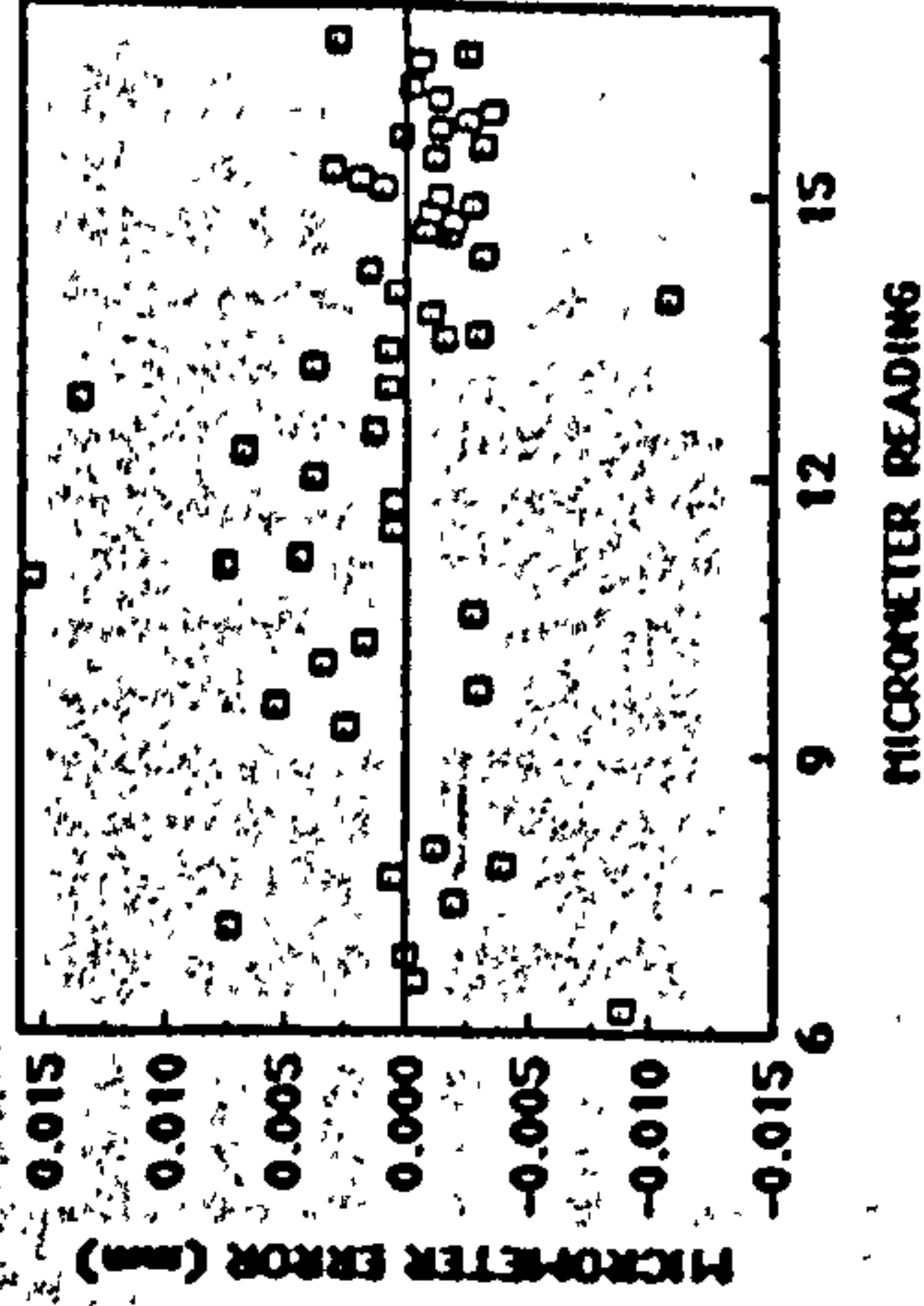
SML-6A



SML-6A



SML-6.





Characteristics:

Screw

Nut

Leng: 1.00" / 0.50

Diameter: 0.1532"

Steel

Brass

Other:

Instrument Identification:

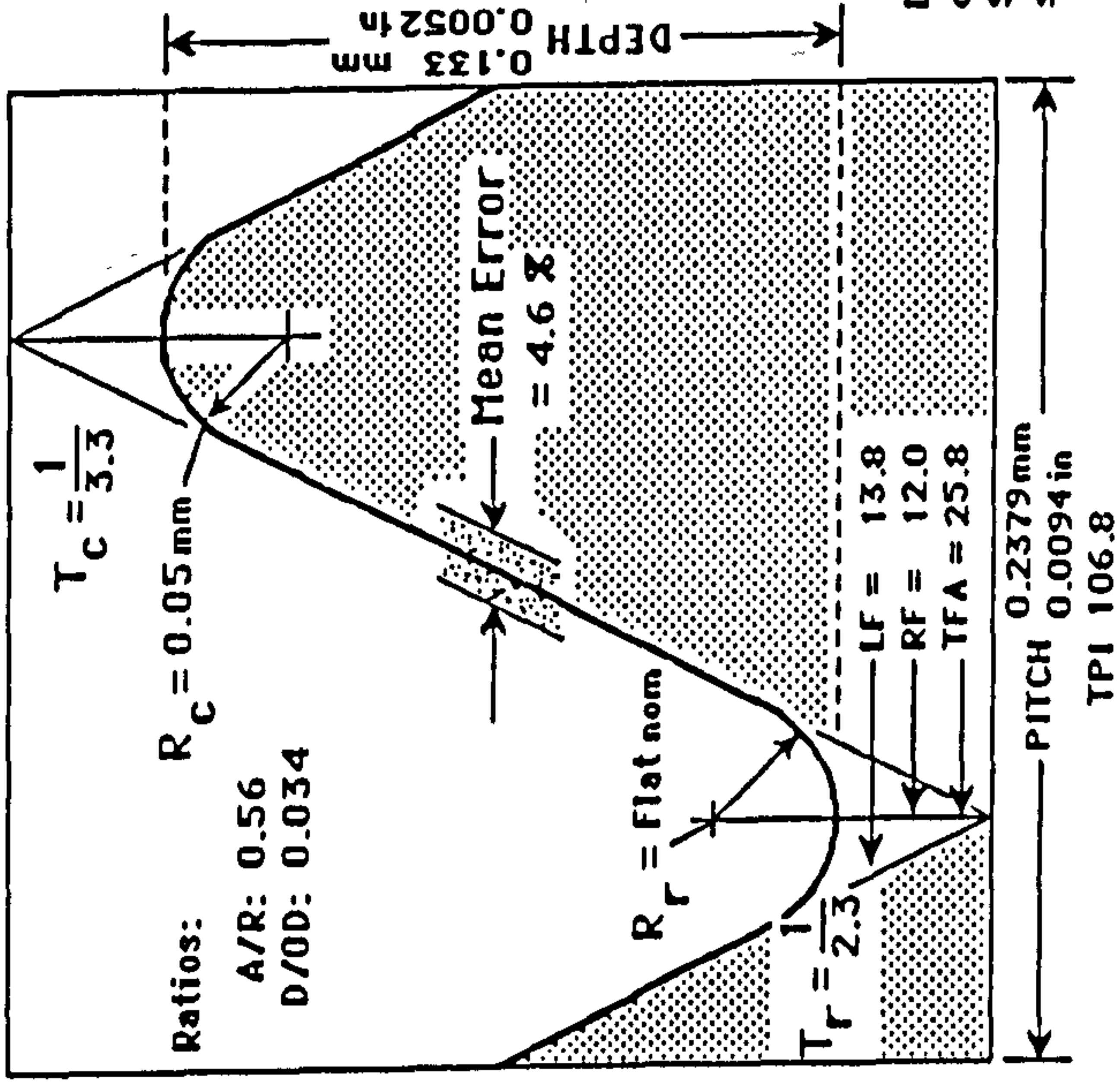
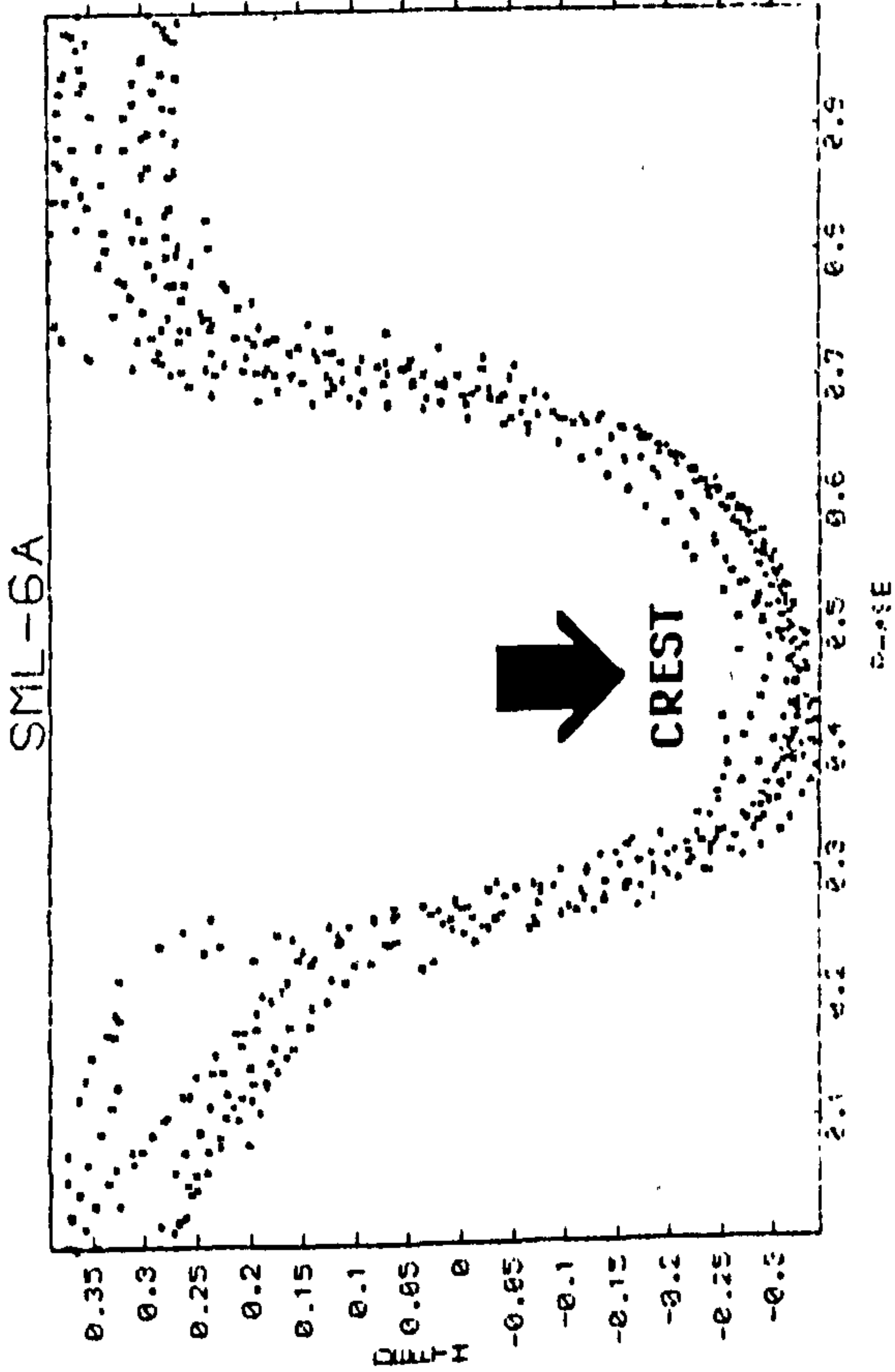
Study Code: SML-6a

Instrument: Bifilar micrometer

Maker: Ramsden

Date: 1791

Ser./Acq. No. 1929-979



Mu

Filar

Scale

Bench

Div. Eng.

Adjust.

Leveling

Focus

Eye P.

Tube

Tool

Gauge

Binding

Misc.

Drum: 1.22" diameter, 0-100 divisions with  $\pm 0.4 \text{ div. resolution}$   
Scale: comb 1" long, 21 divisions subdivided into 5 divisions



Characteristics:

Screw

Nut

Leng: 1.00" / 0.50"

Diameter: 0.1550"

Steel

Brass

Other:

Instrument Identification:

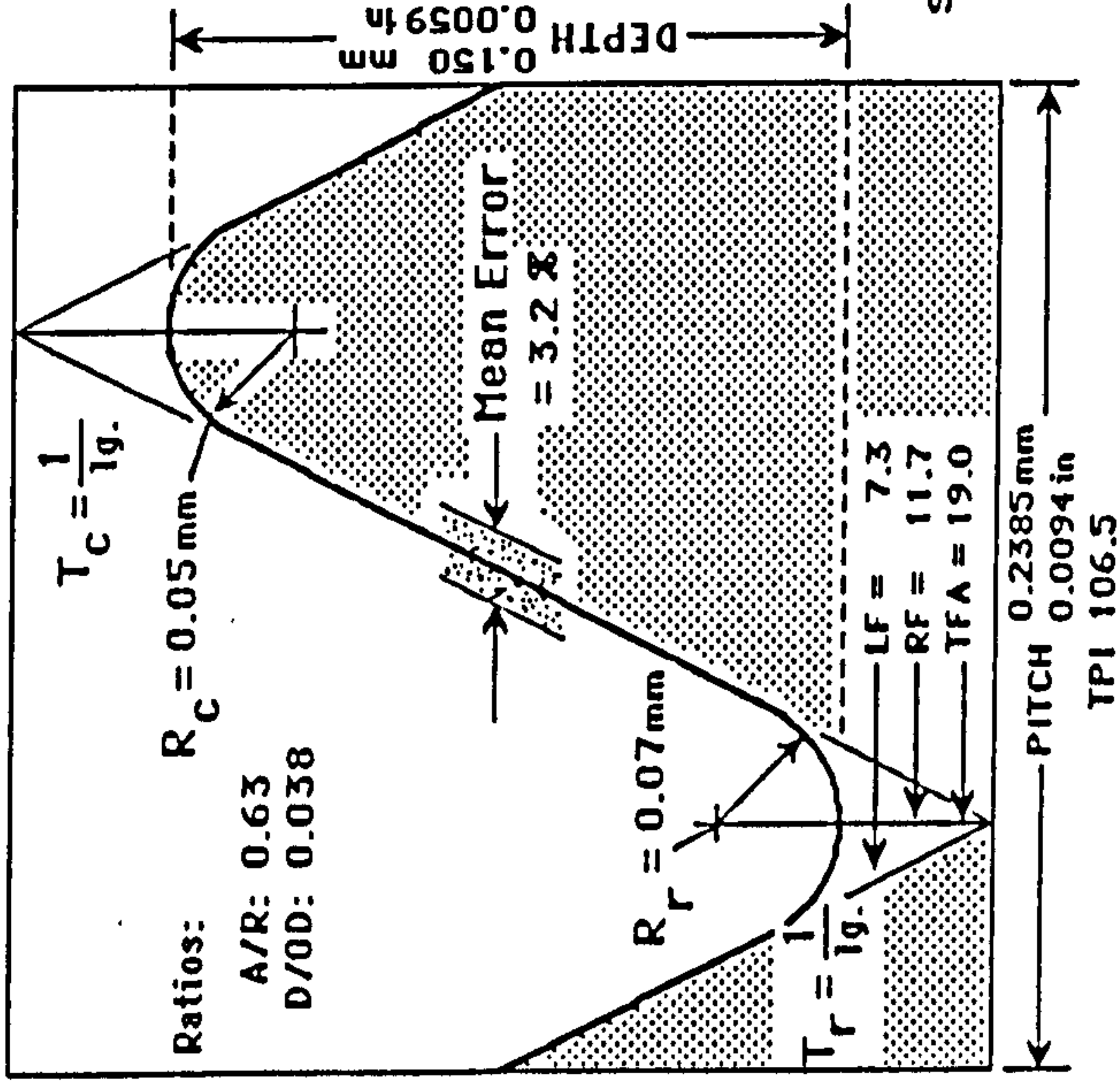
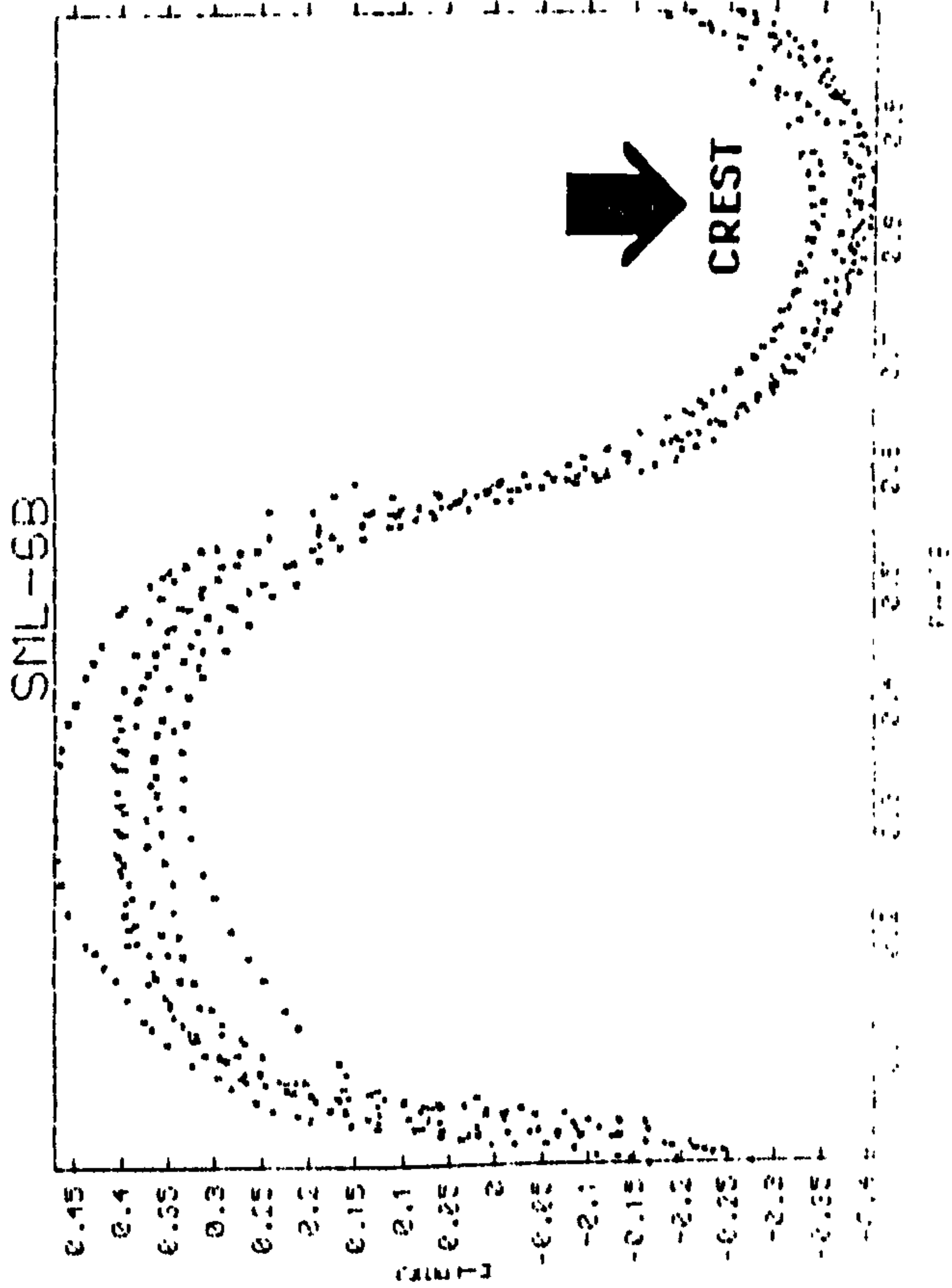
Study Code: SML-6b

Instrument: Bifilar micrometer

Maker: Ramsden

Date: 1791

Ser./Acq. No. 1929-979



MU

Filar

Scale

Bench

Div. Eng.

Adjust.

Leveling

Focus

Eye P.

Tube

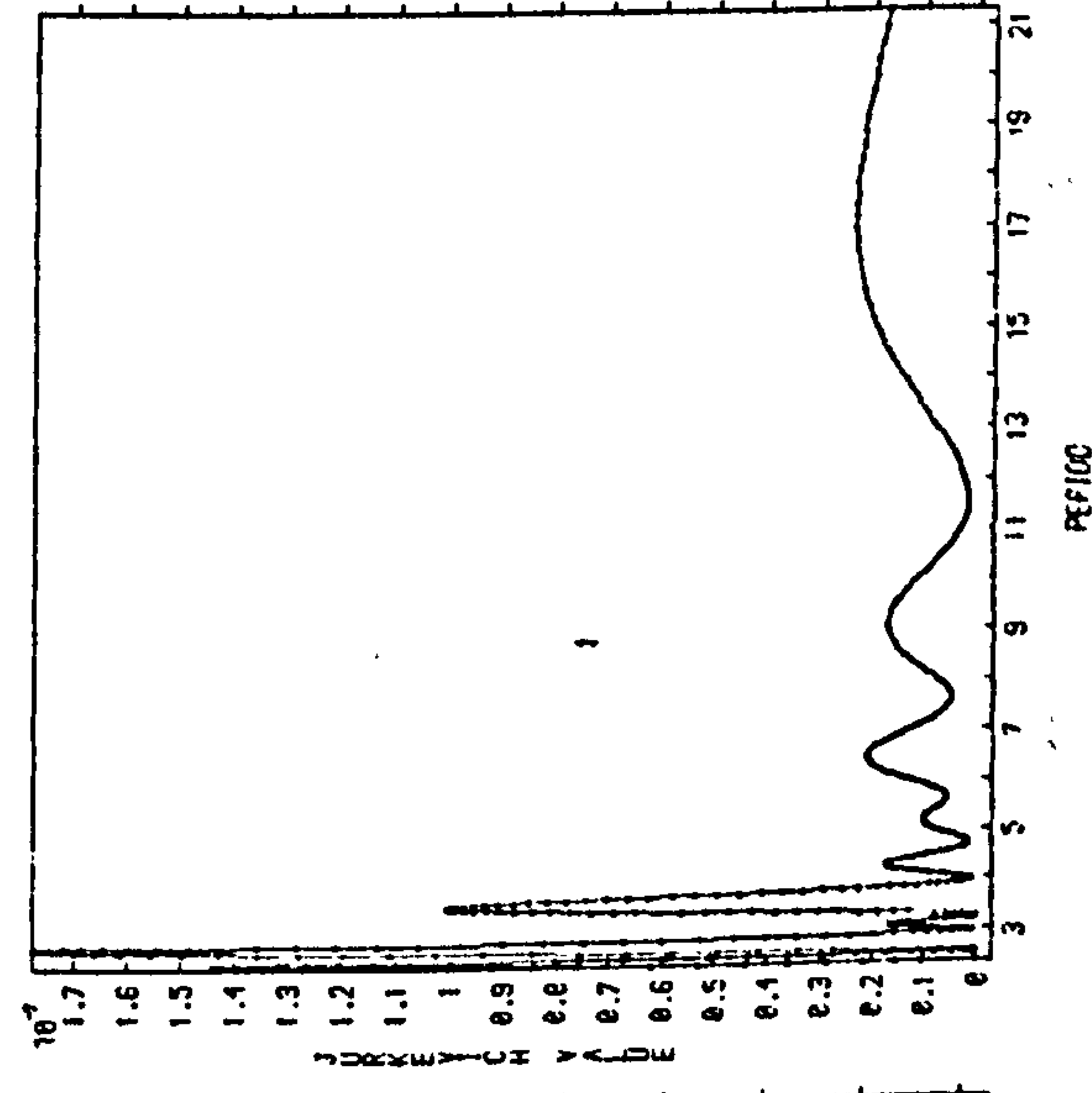
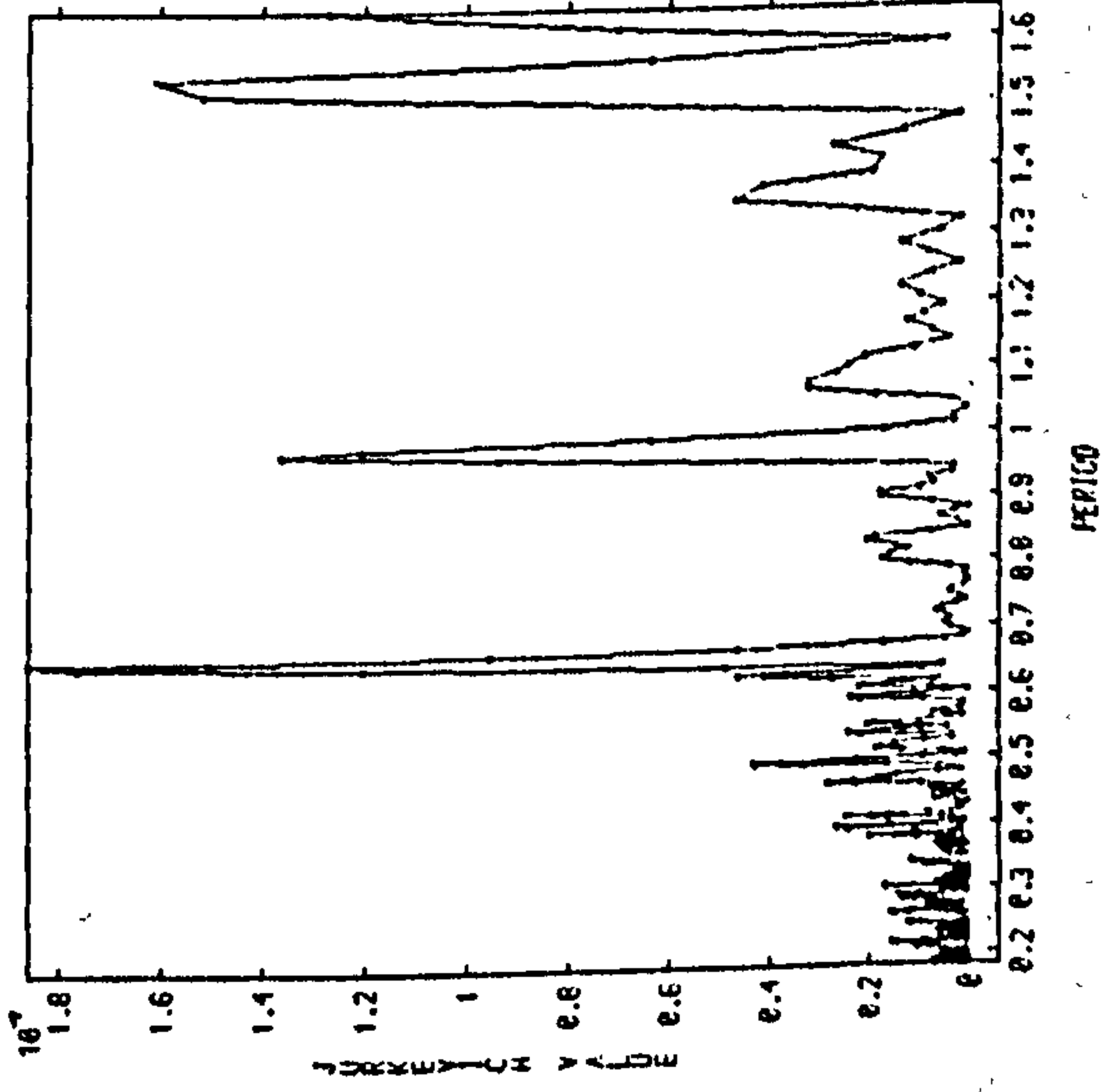
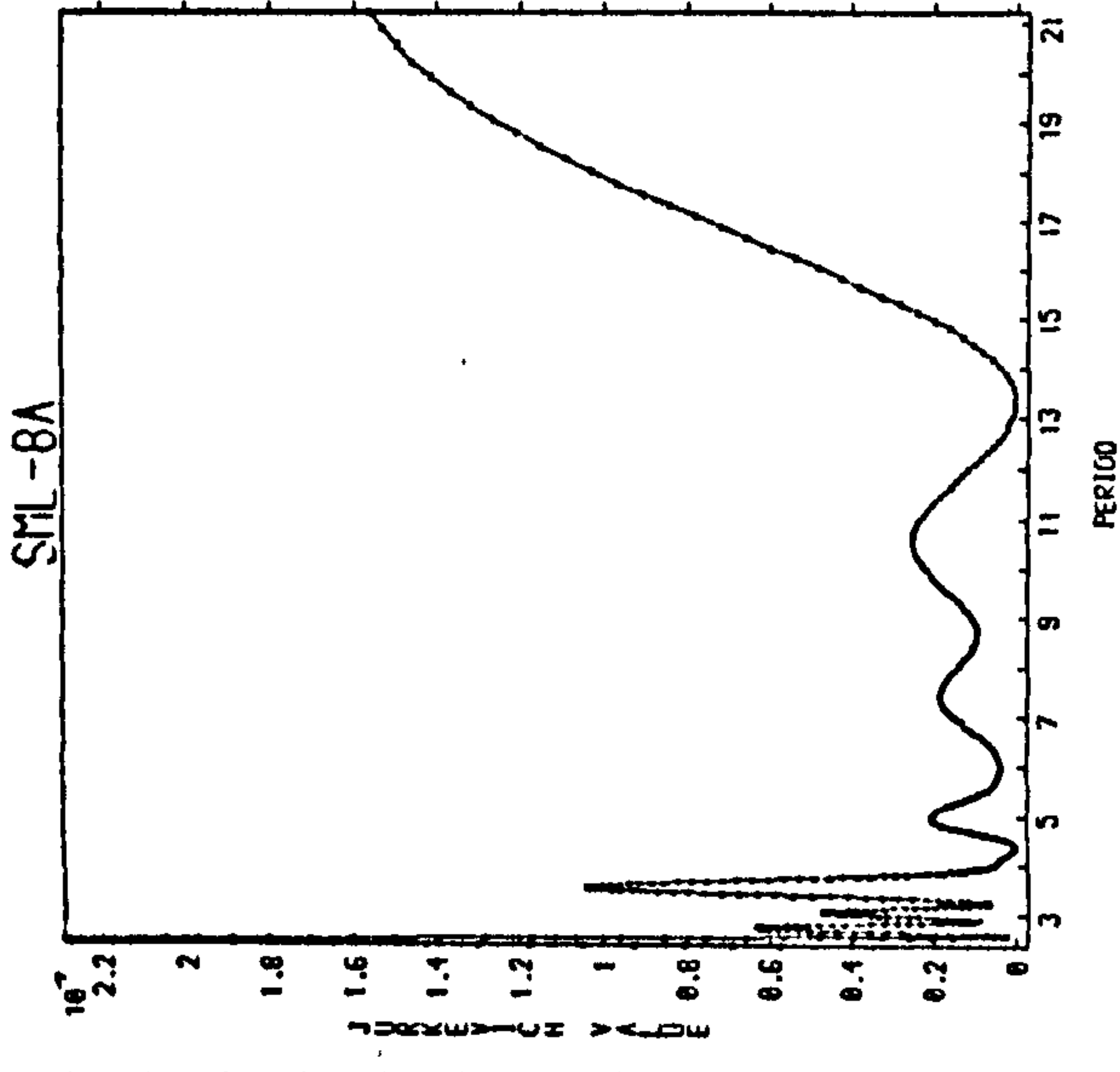
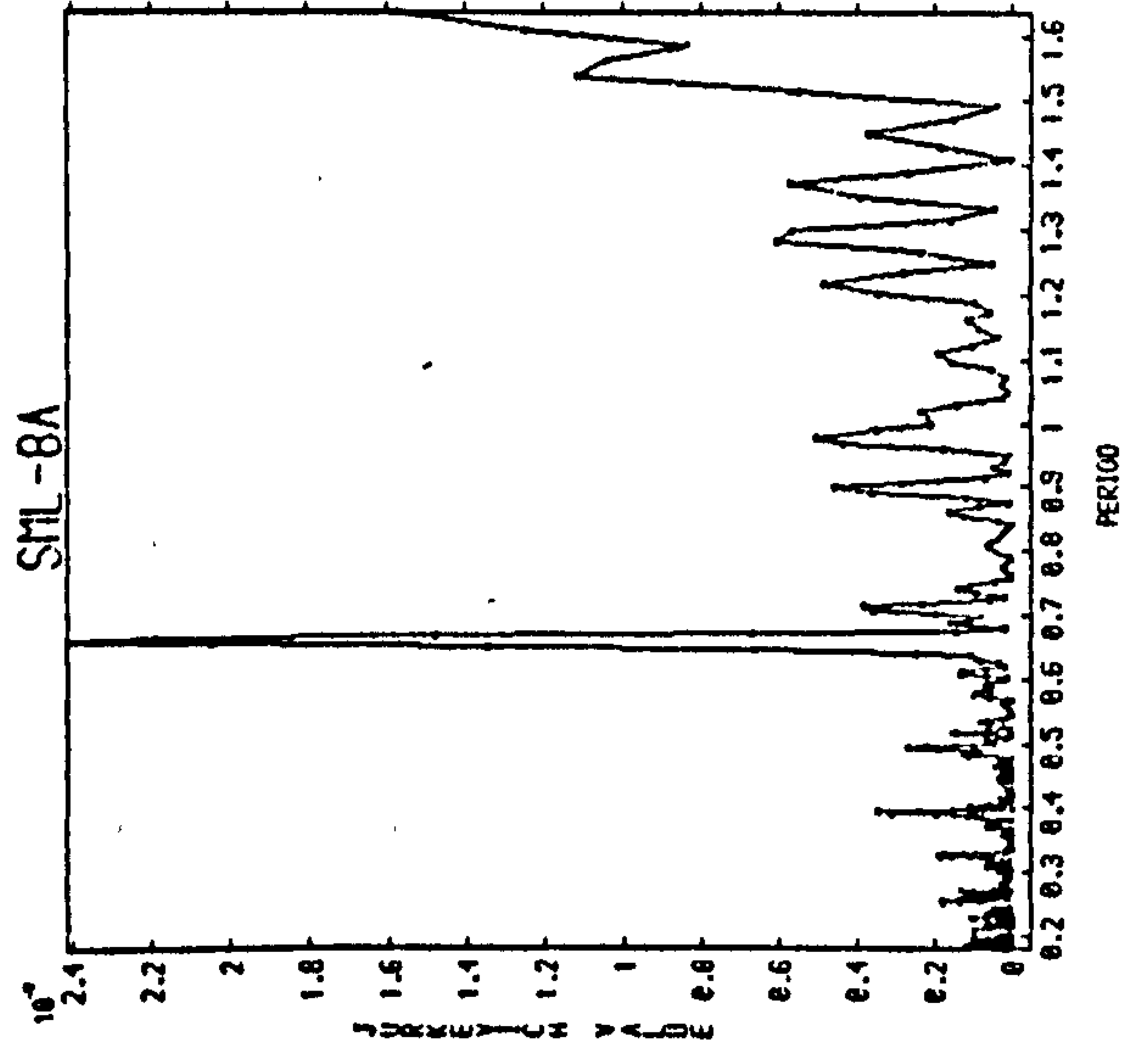
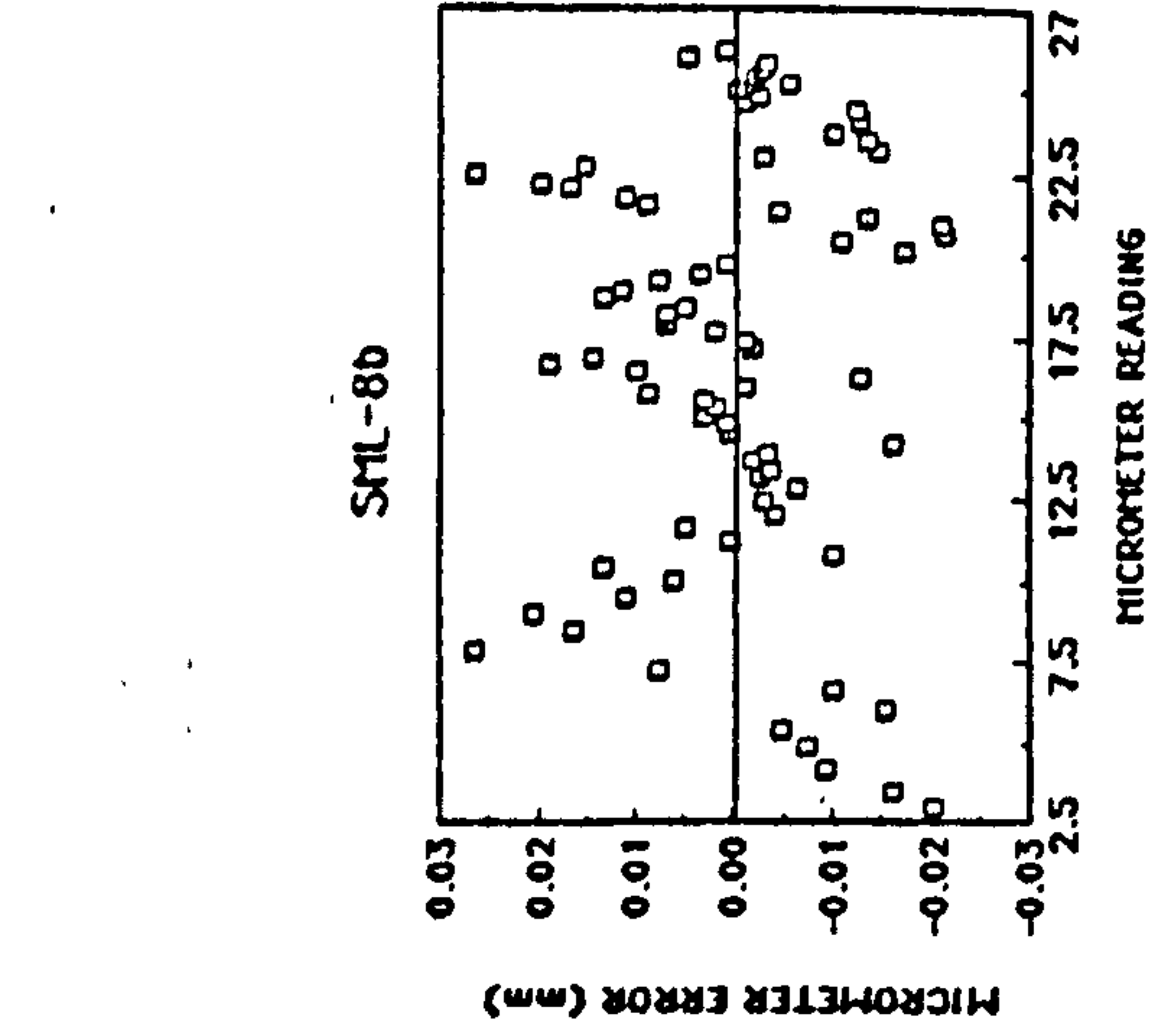
Tool

Gauge

Binding

Misc.

See SML-6a form drum description



Characteristics:

Screw ☒ Nut ☐

Leng: 0.75" / ~0.50"

Diameter: 0.228"

Steel ☒ Brass ☐

Other:

Instrument Identification:

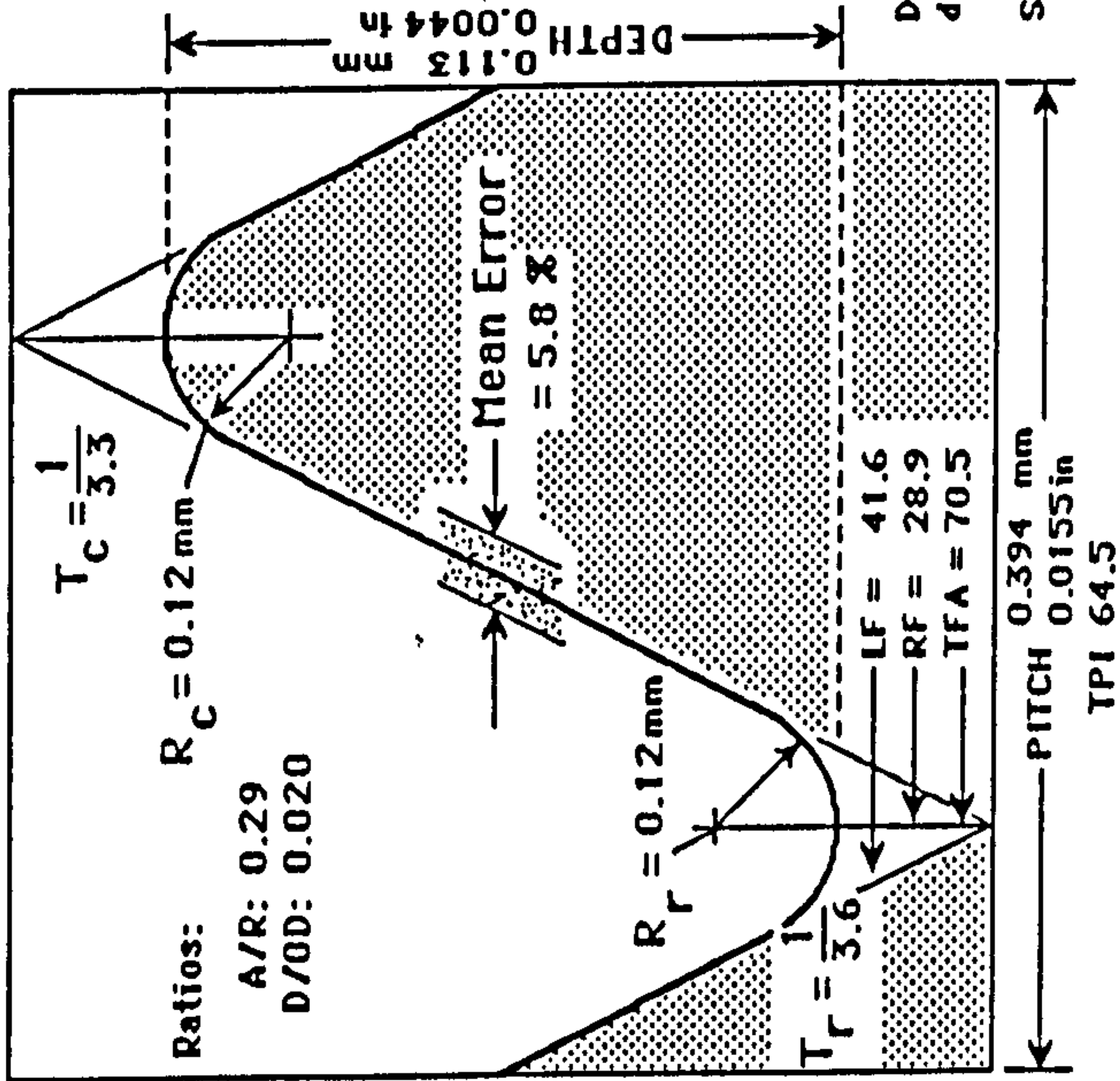
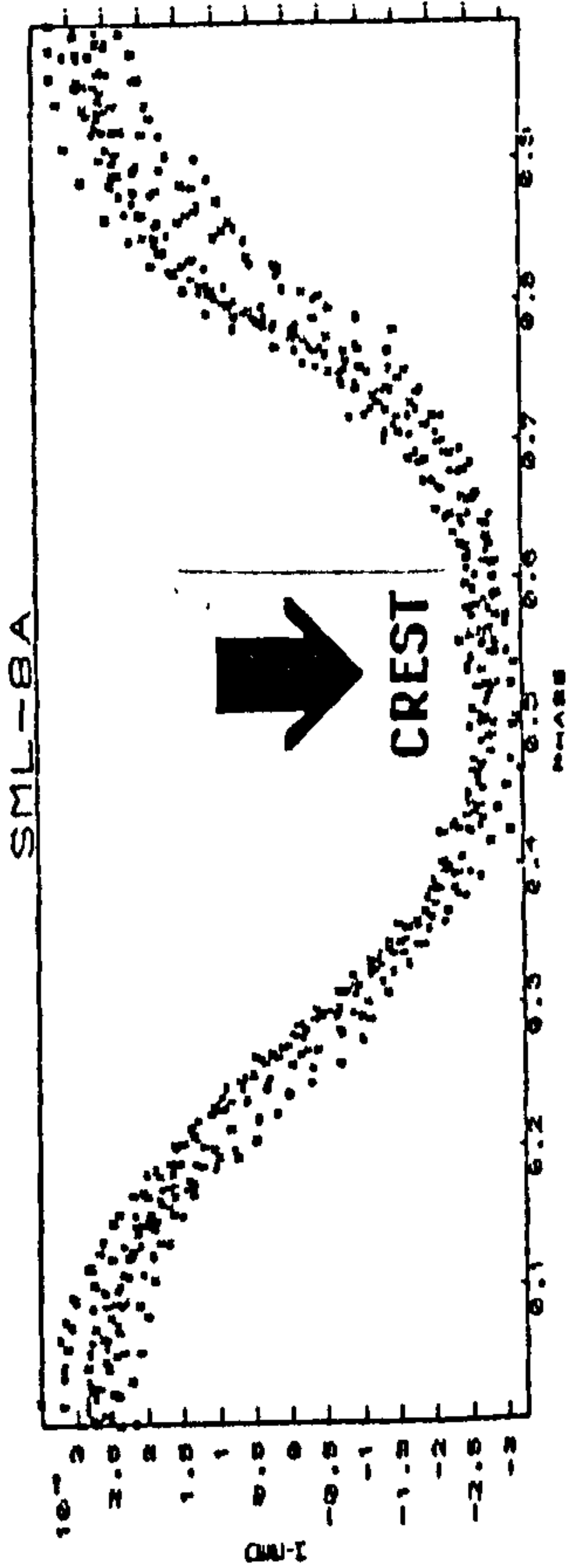
Study Code: SML-8a

Instrument: Portable equatorial refracting telescope

Maker: John Smeaton

Date: ca.1770

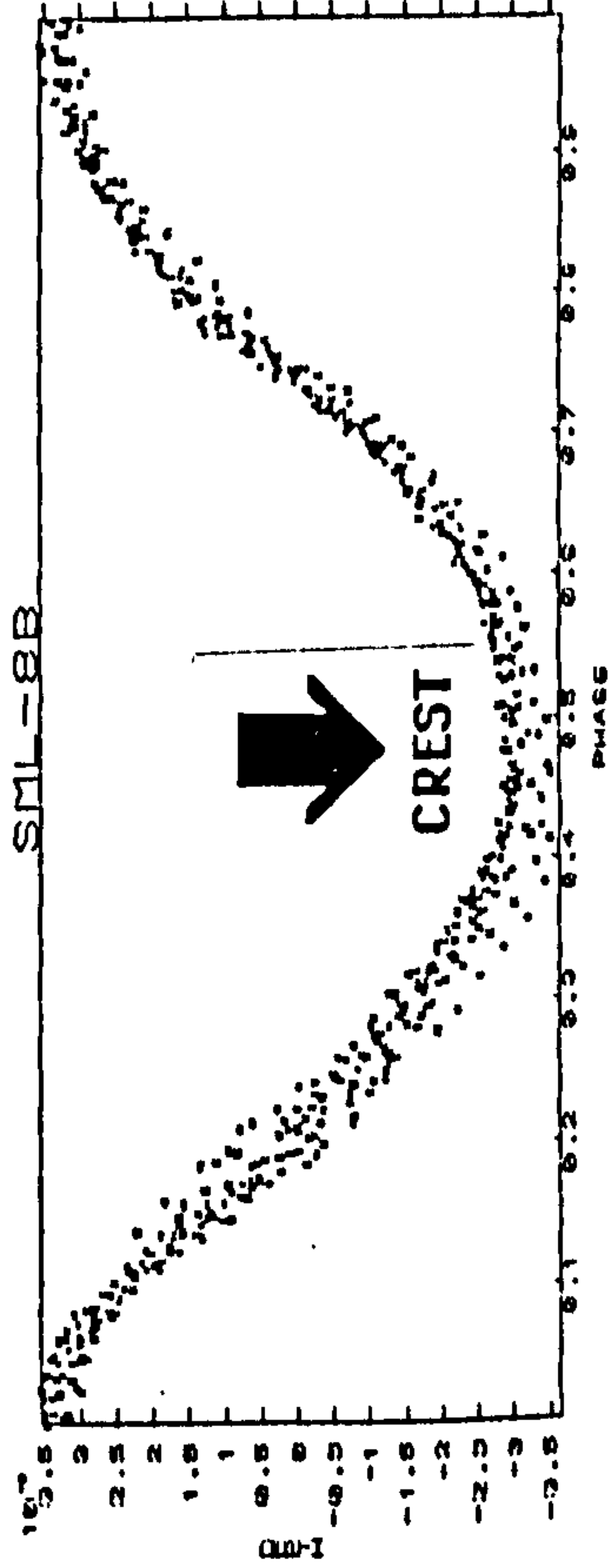
Ser./Acq. No. 1931-347



Mu	Filar
	Scale
	Bench
	Div. Eng.
	Adjust.
	Leveling
	Focus
	Eye P.
	Tube
	Tool
	Gauge
	Binding
	Misc.

Drum: 2.375" diameter, 0-100 divisions with  $\pm 0.2\text{div.}$  resolution

Screws show evidence of tempering



Characteristics:

Screw ☒ Nut ☐

Leng: 0.75" /  $\approx 0.50"$

Diameter: 0.228"

Steel ☒ Brass ☐

Other: ☐

Instrument Identification:

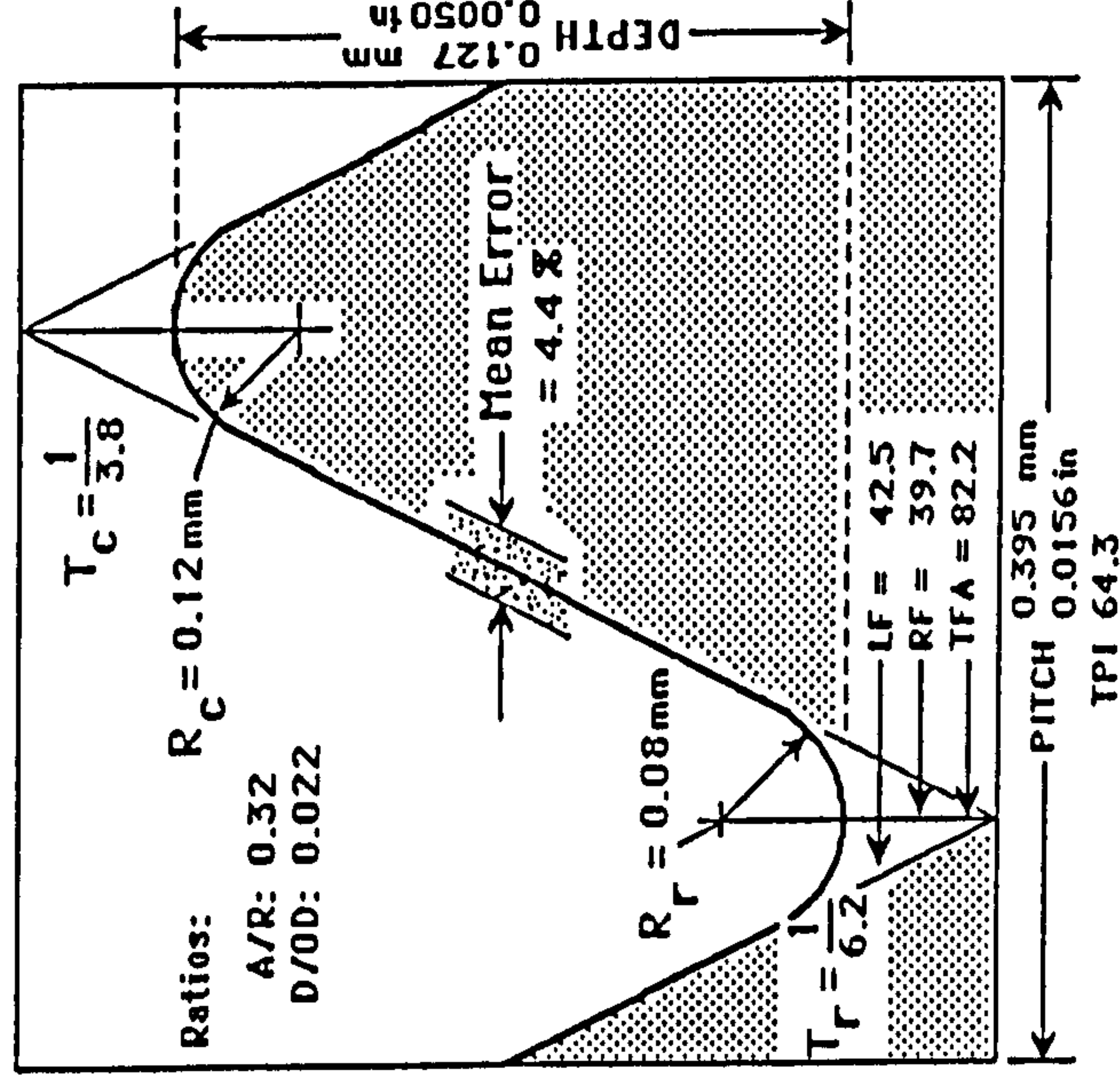
Study Code: SML-8b

Instrument: Bifilar micrometer

Maker: John Smeaton

Date: ca.1770

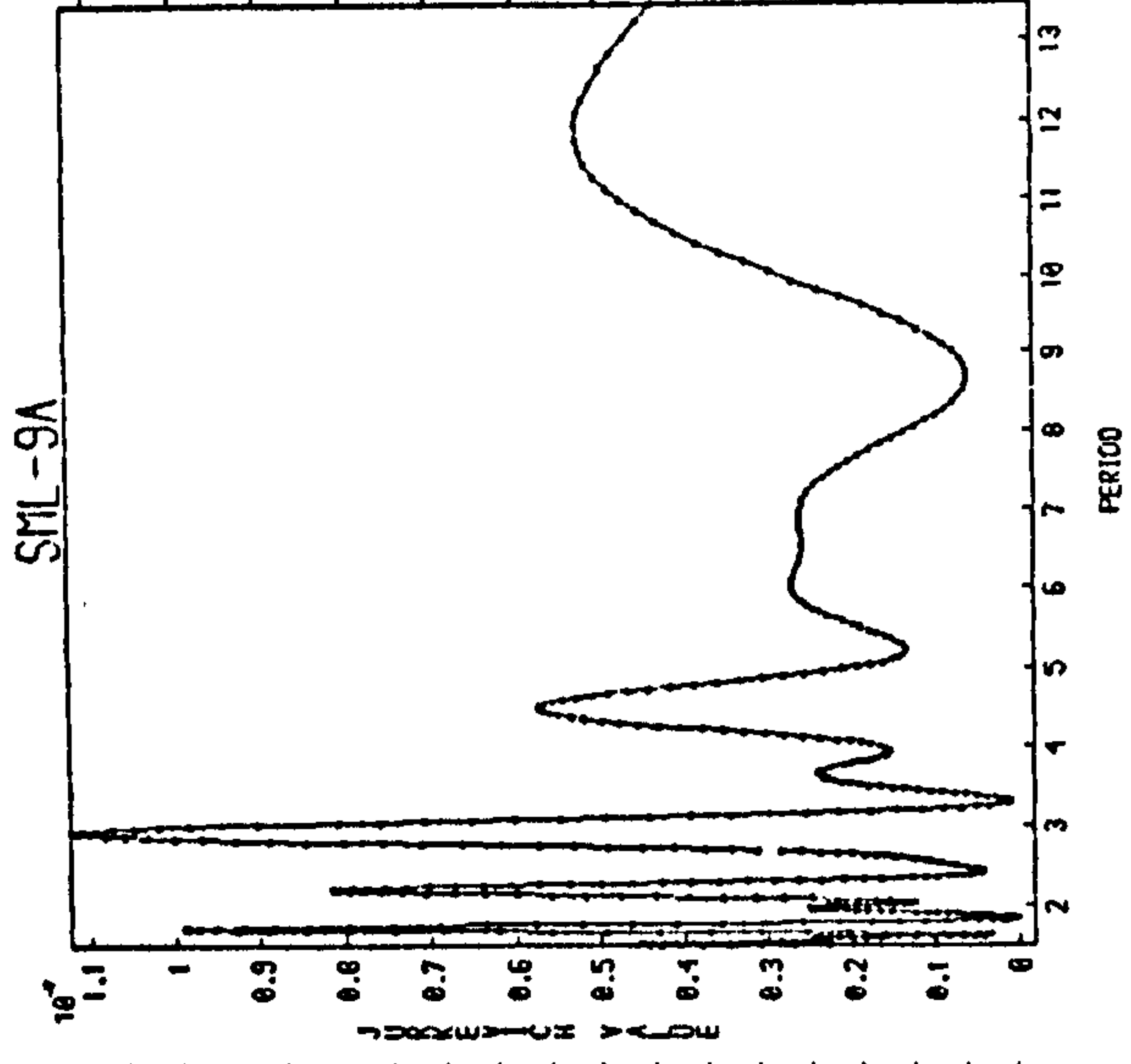
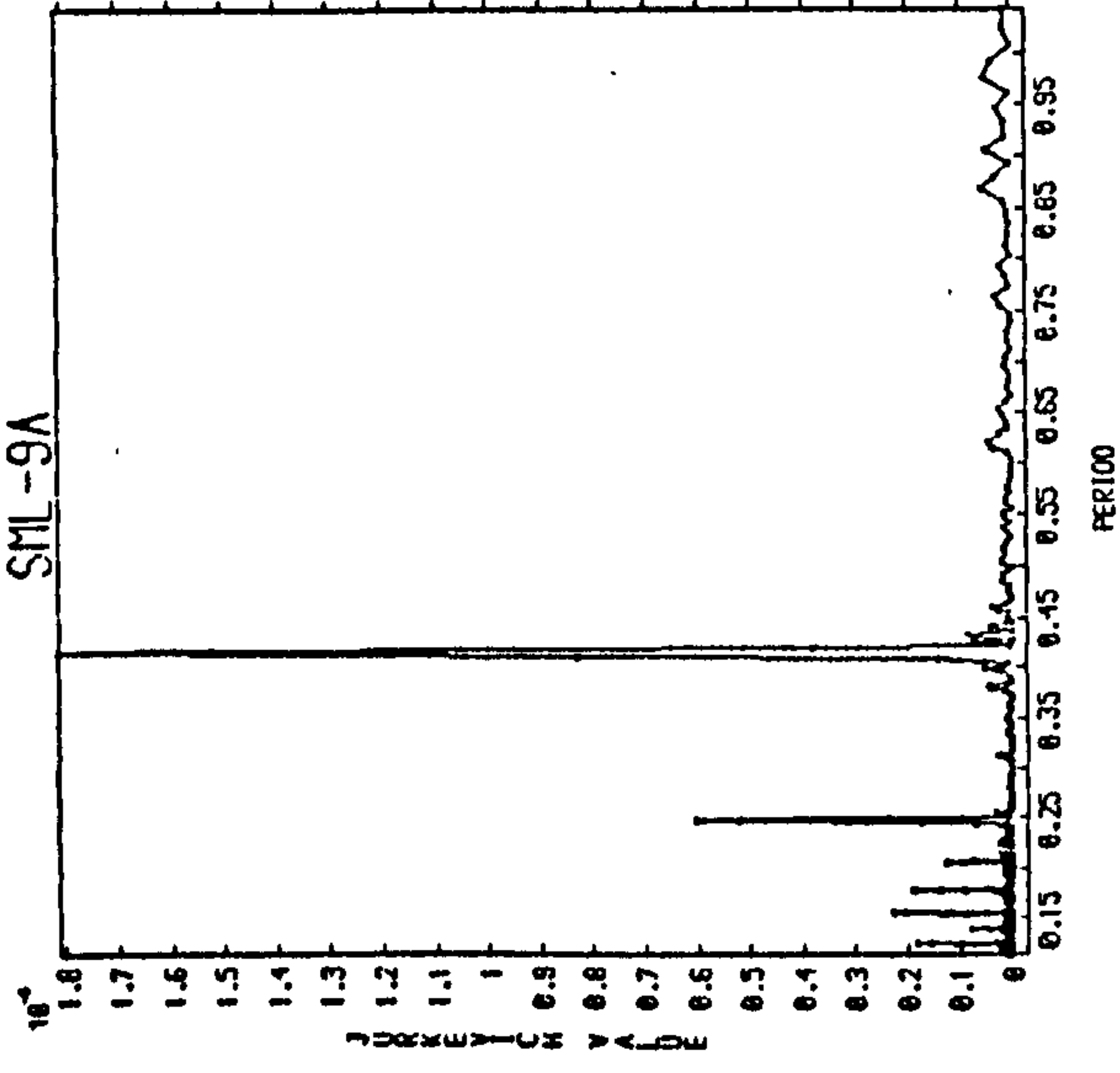
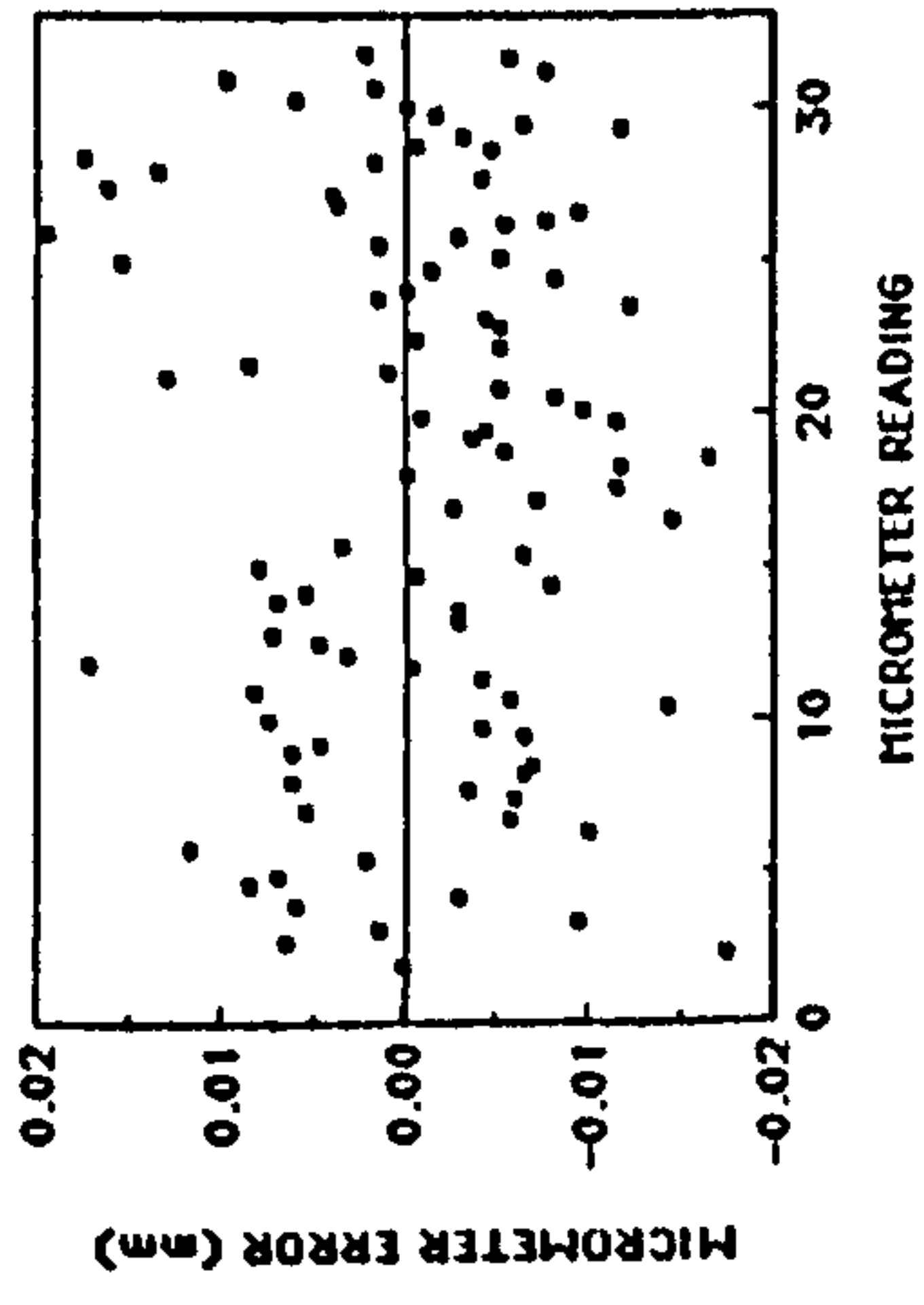
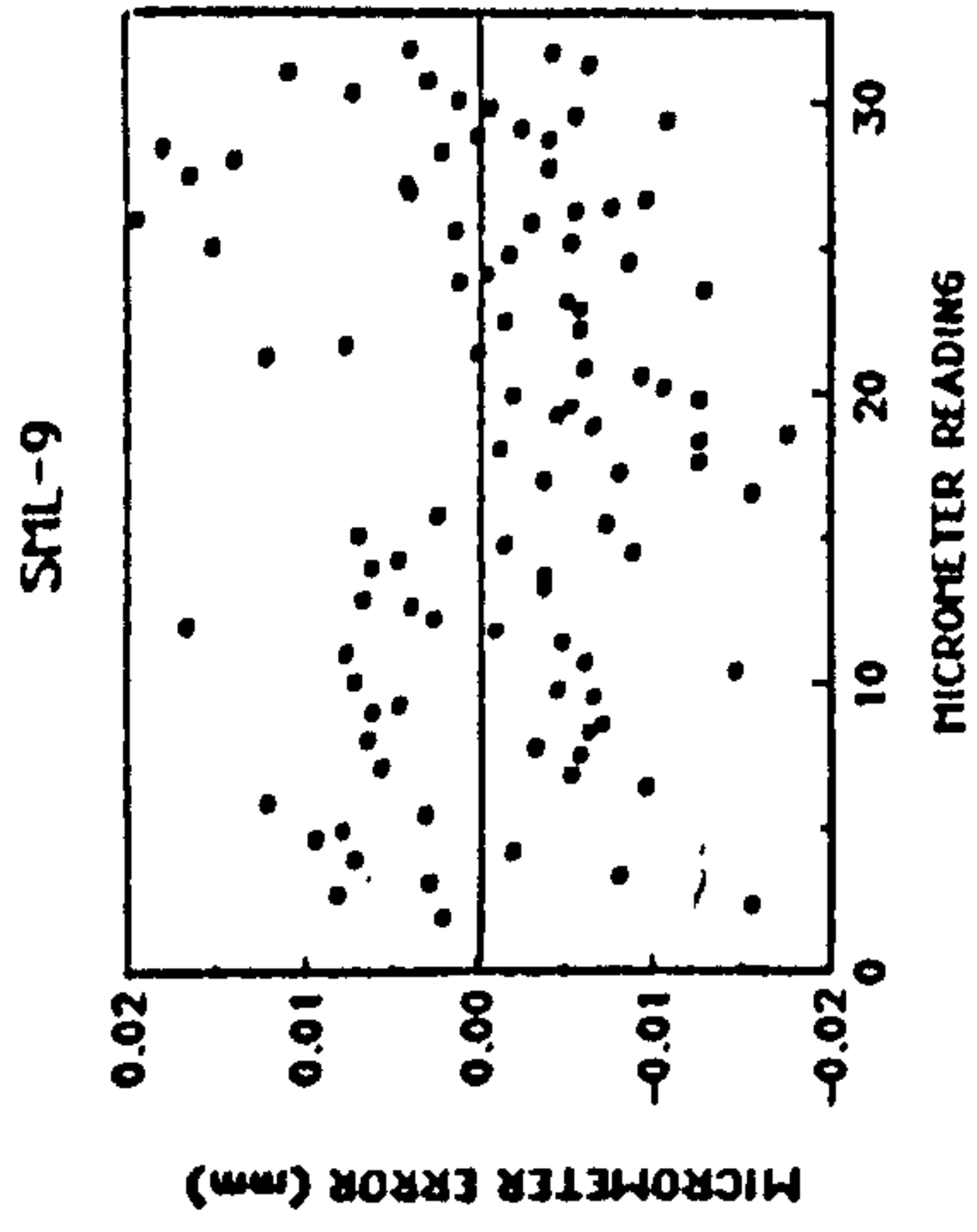
Ser./Acq. No. 1931-347



MU — [ Filar Scale Bench Div. Eng. Adjust. Leveling Focus Eye P. Tube Tool Gauge Binding Misc. ]

See SML-8a for drum description





Characteristics:

Screw

Nut

Leng: 0.438" /  $\approx 0.10"$

Diameter: 0.104"

Steel

Brass

Other:

Instrument Identification:

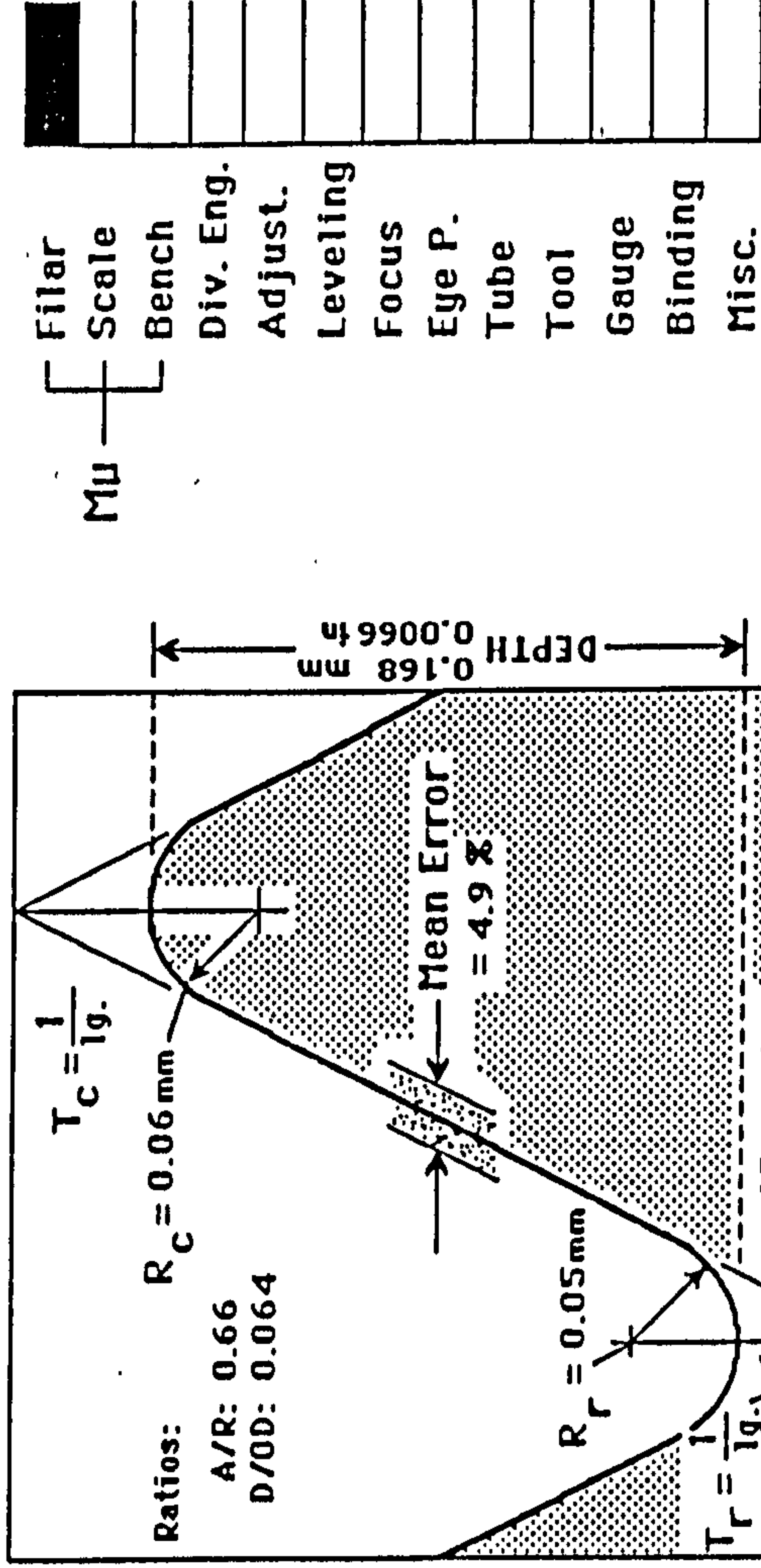
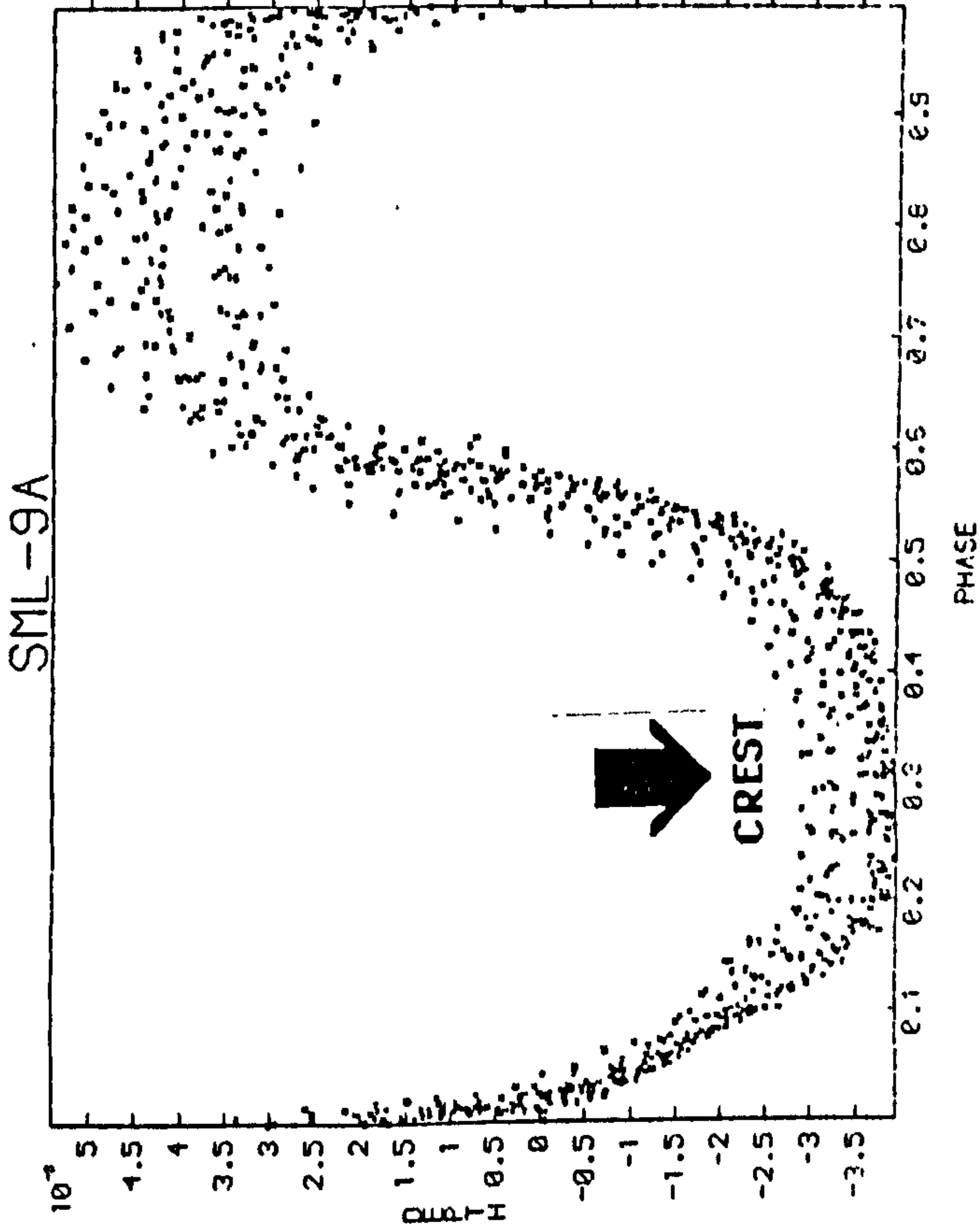
Study Code: SML-9a

Instrument: Portable equatorial refracting telescope

Maker: Ramsden

Date: 1775

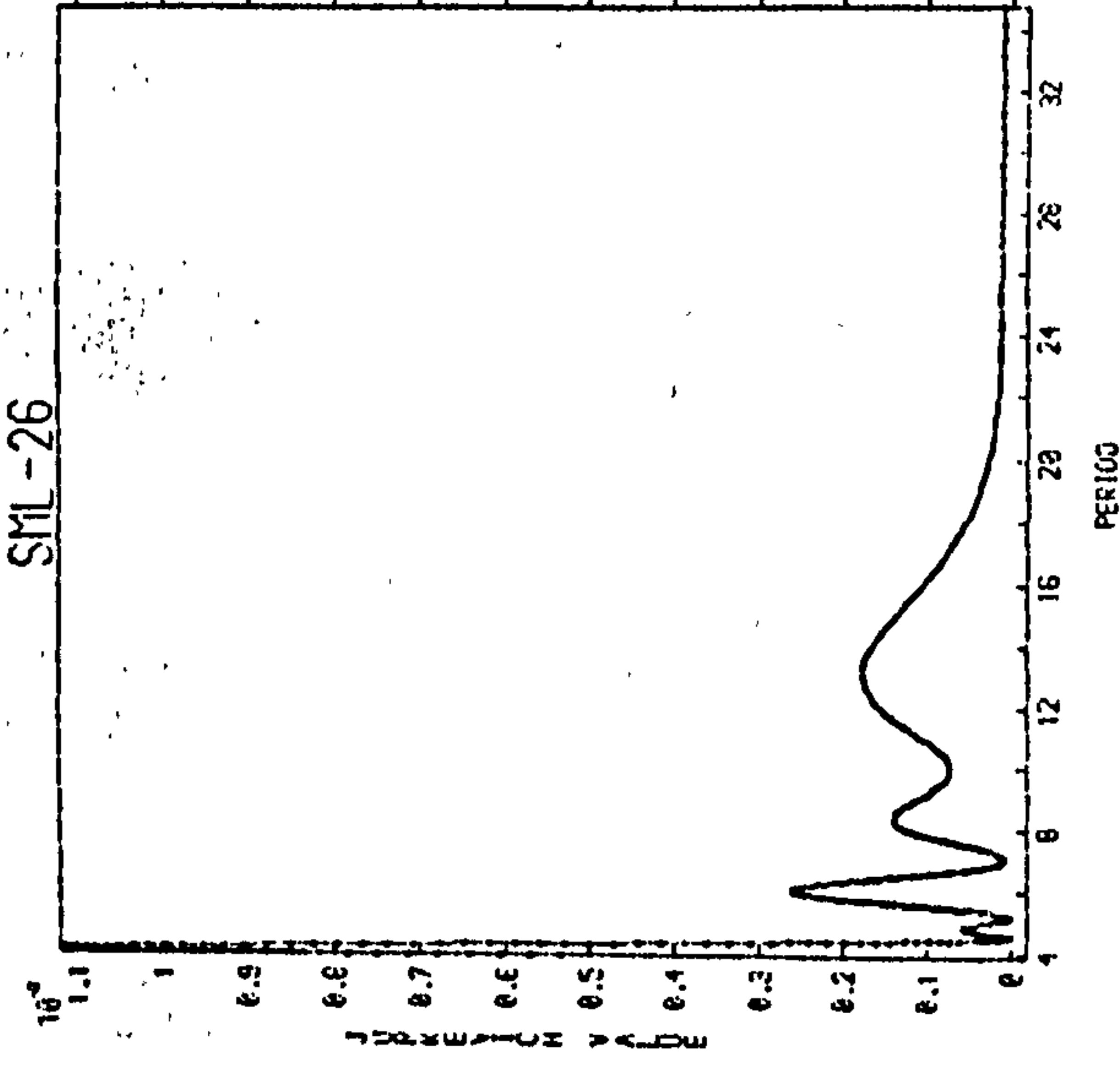
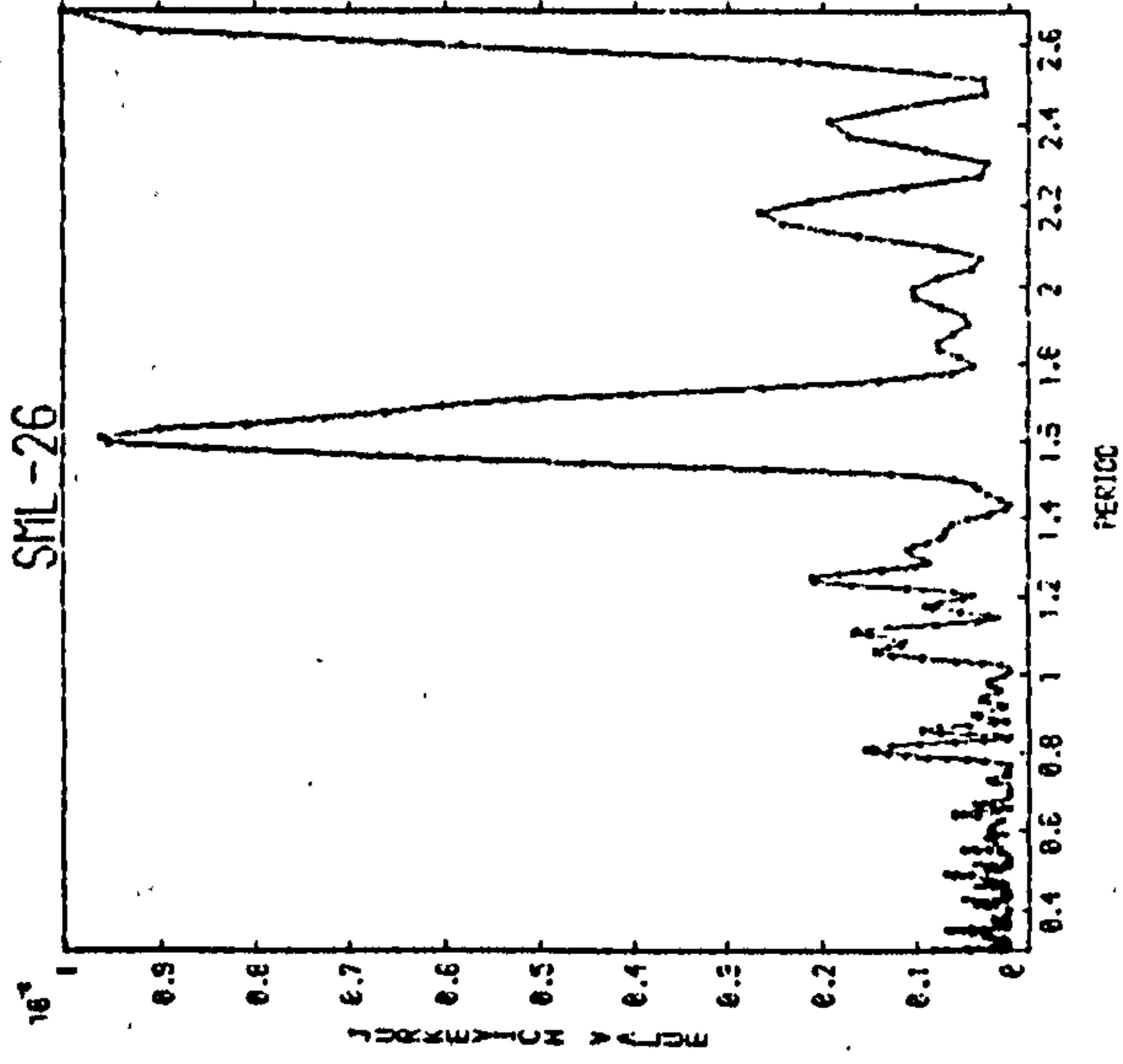
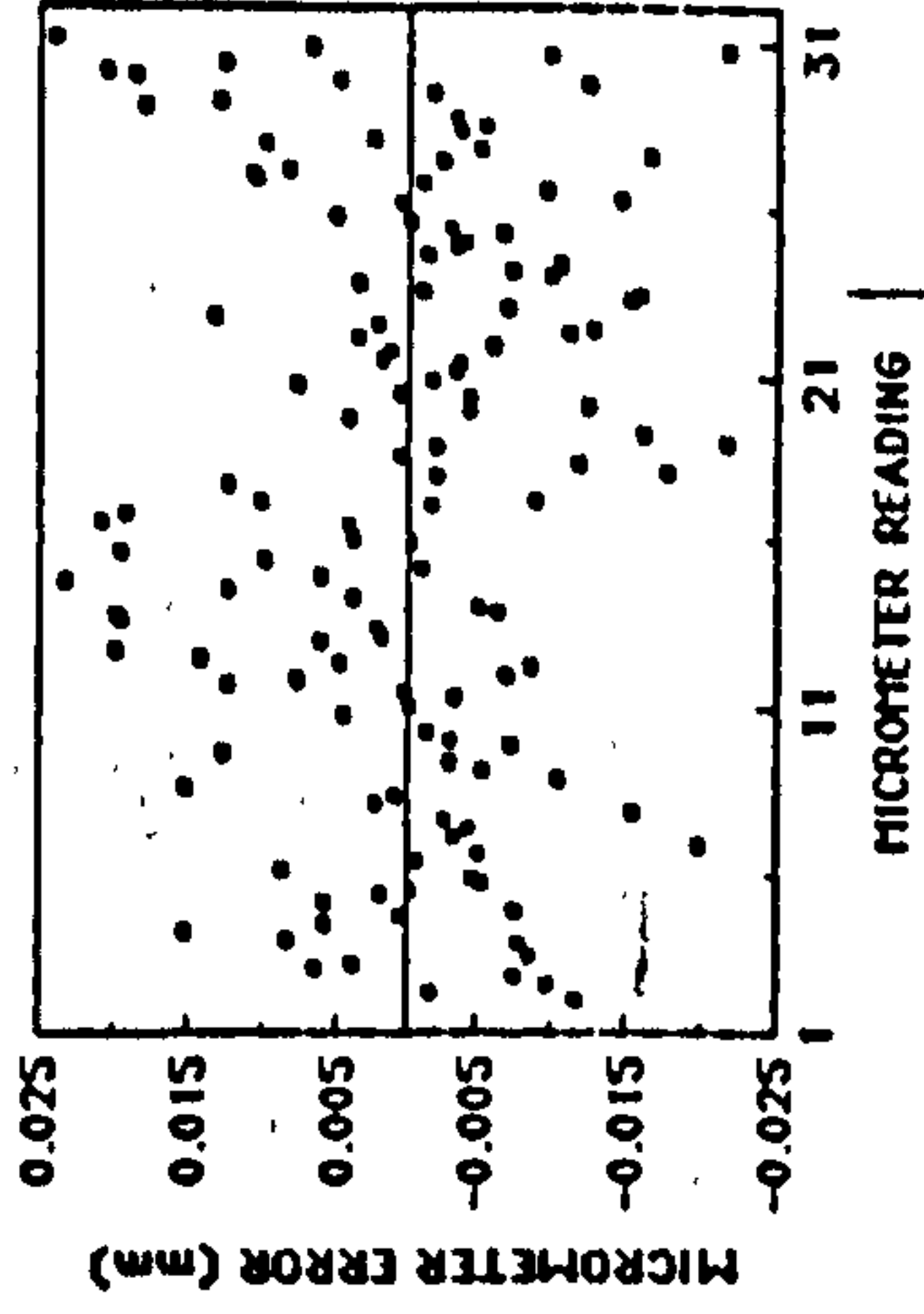
Ser./Acq. No. 1928-1329

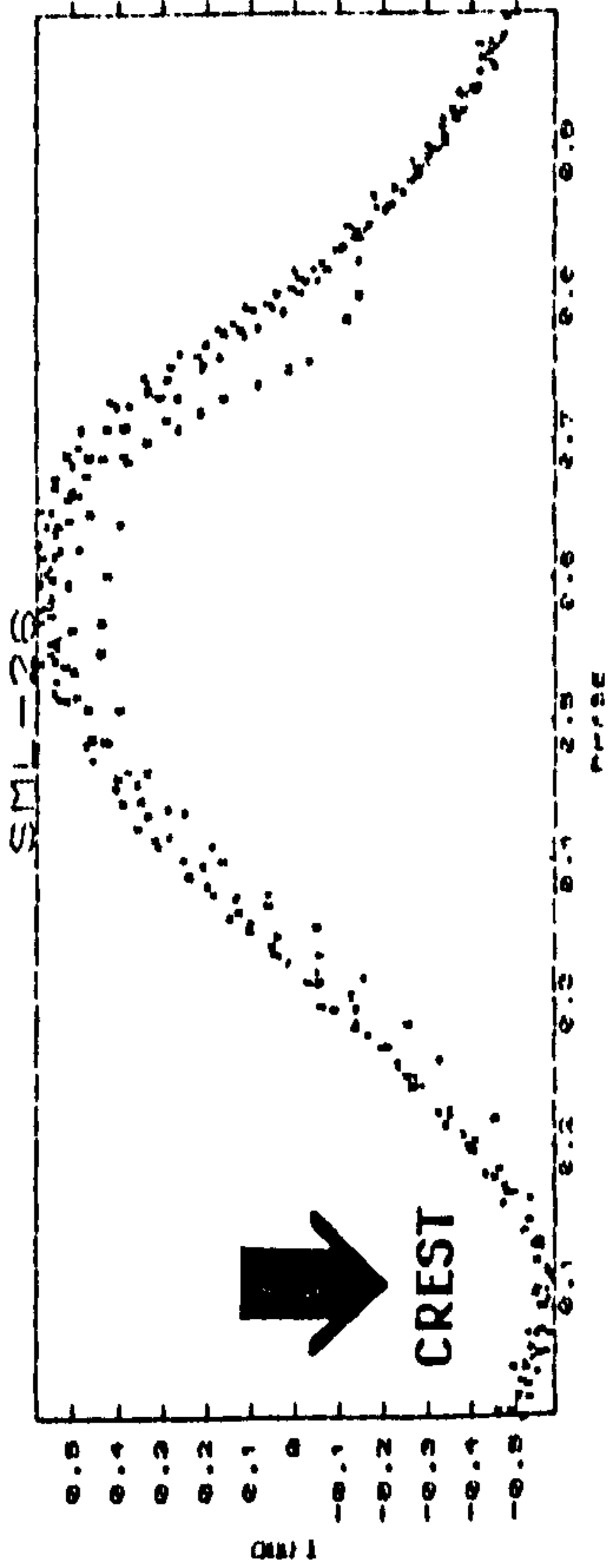


Drum: 0.81" diameter, 0-100 divisions with  $\pm 0.5 \text{ div.}$  resolution

Mu	Filar
	Scale
	Bench
	Div. Eng.
	Adjust.
	Leveling
	Focus
	Eye P.
	Tube
	Tool
	Gauge
	Binding
	Misc.

Data from "SML-26"





**Characteristics:**

Screw ☒ Nut ☐

Leng: 5.25" /  $\approx 0.5^\circ$

Diameter: 0.25" nom.

Steel ☒ Brass ☐

Other: ☐

**Instrument Identification:**

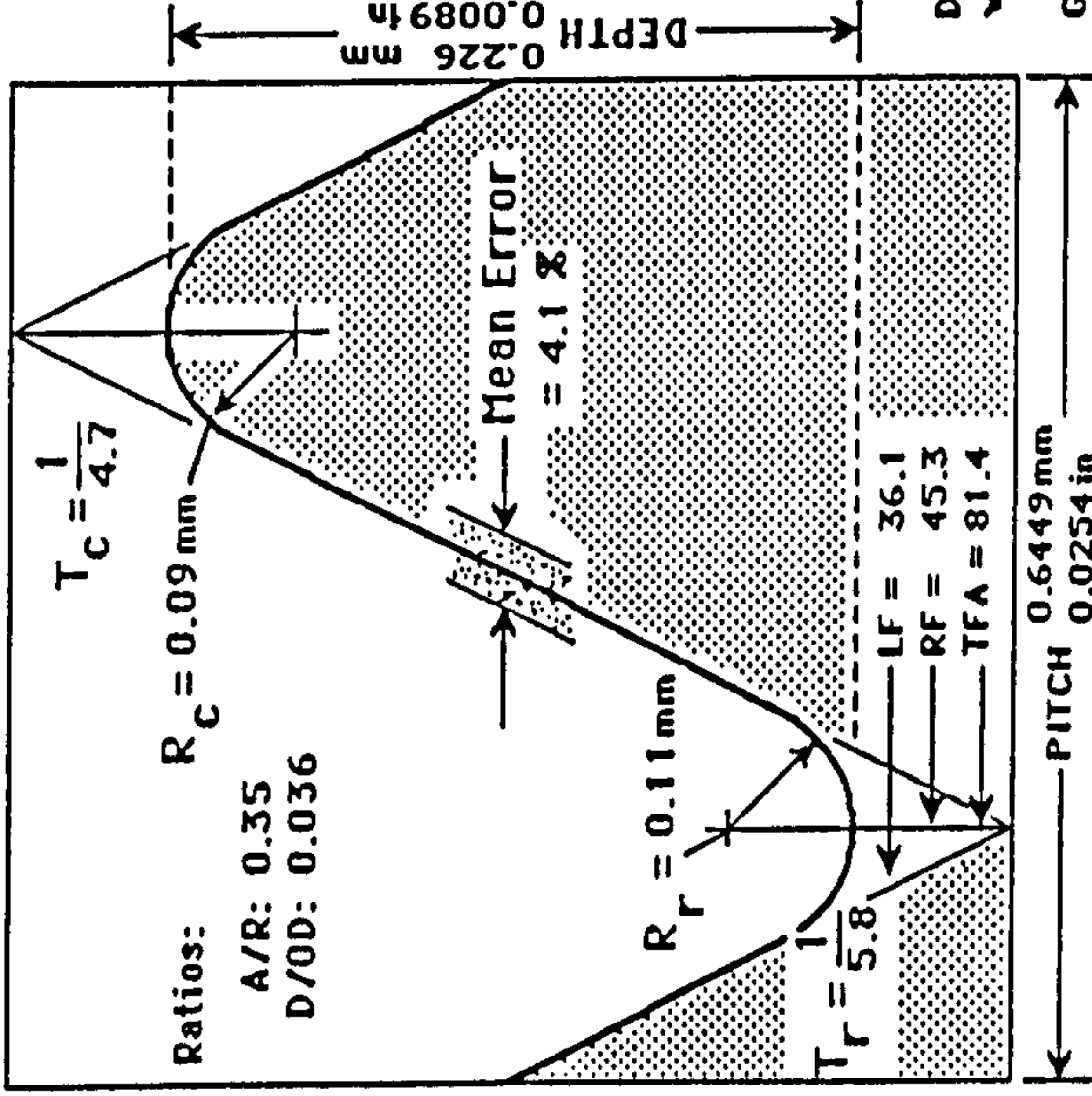
Study Code: SML-26

Instrument: Bifilar micrometer

Maker: Jerimah Sisson

Date: ca.1780

Ser./Acq. No. 1927-1491

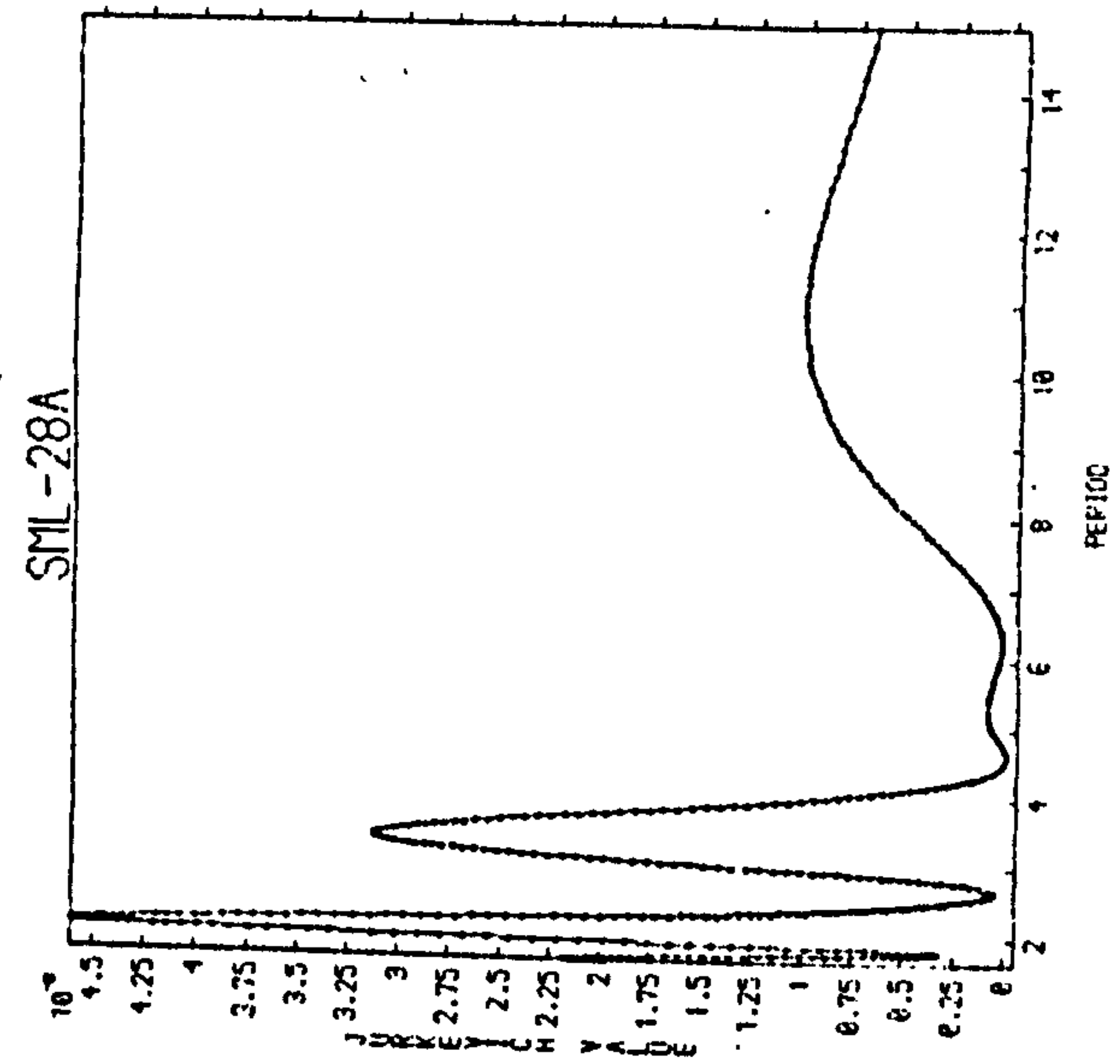
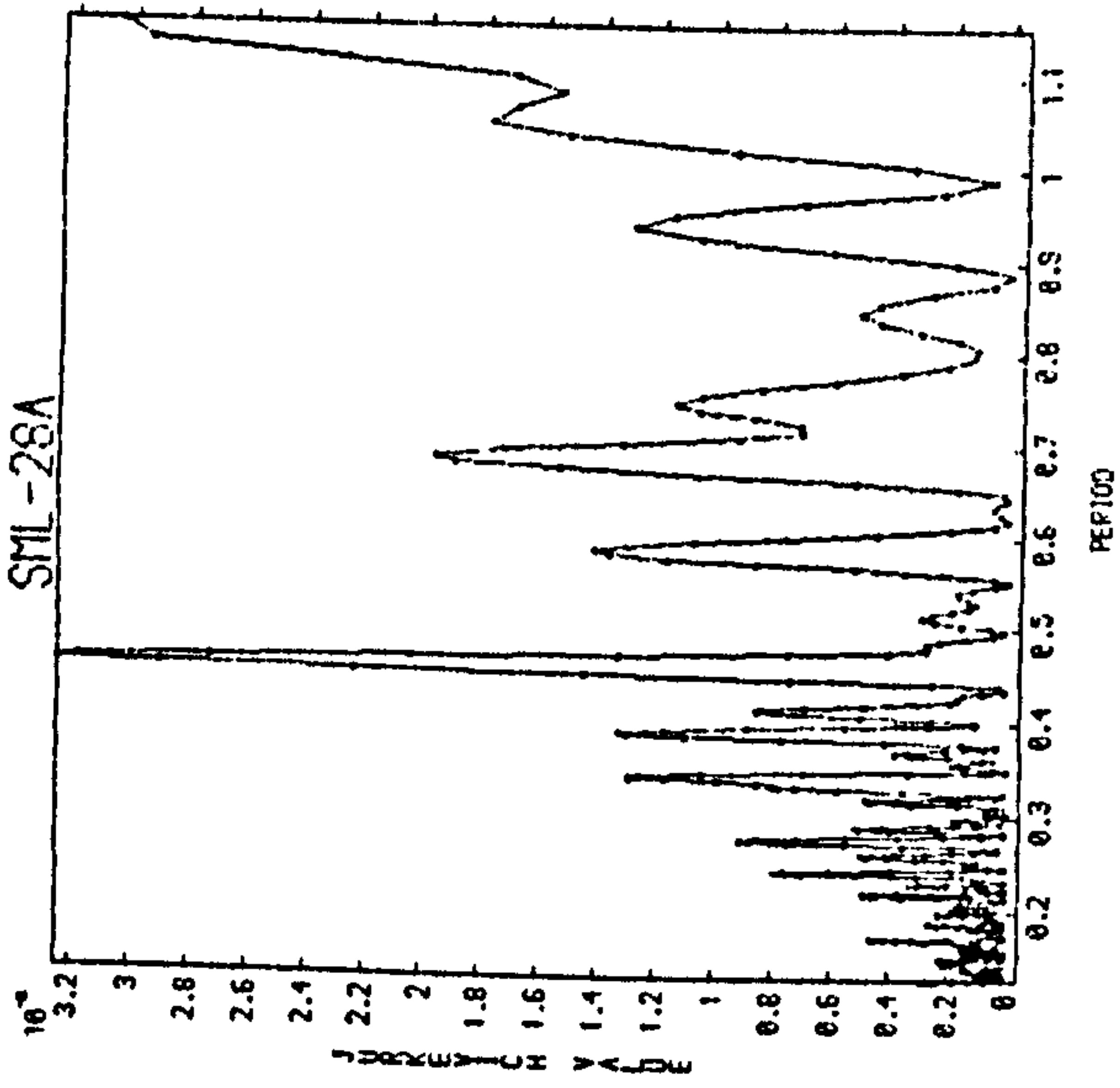


Mu	Filar	
	Scale	
Bench	Div. Eng.	
	Adjust.	
Leveling	Focus	
	Eye P.	
Tube	Tool	
	Gauge	
Binding	Misc.	

Drum: 2.5" diameter, 0-40 divisions  
With  $\pm 0.1$  div. resolution

Graham-type micrometer in the King  
George III Collection





Characteristics:

Screw

Nut

Leng: 0.188" / 0.094"

Diameter: 0.0542"

Steel

Brass

Other:

Instrument Identification:

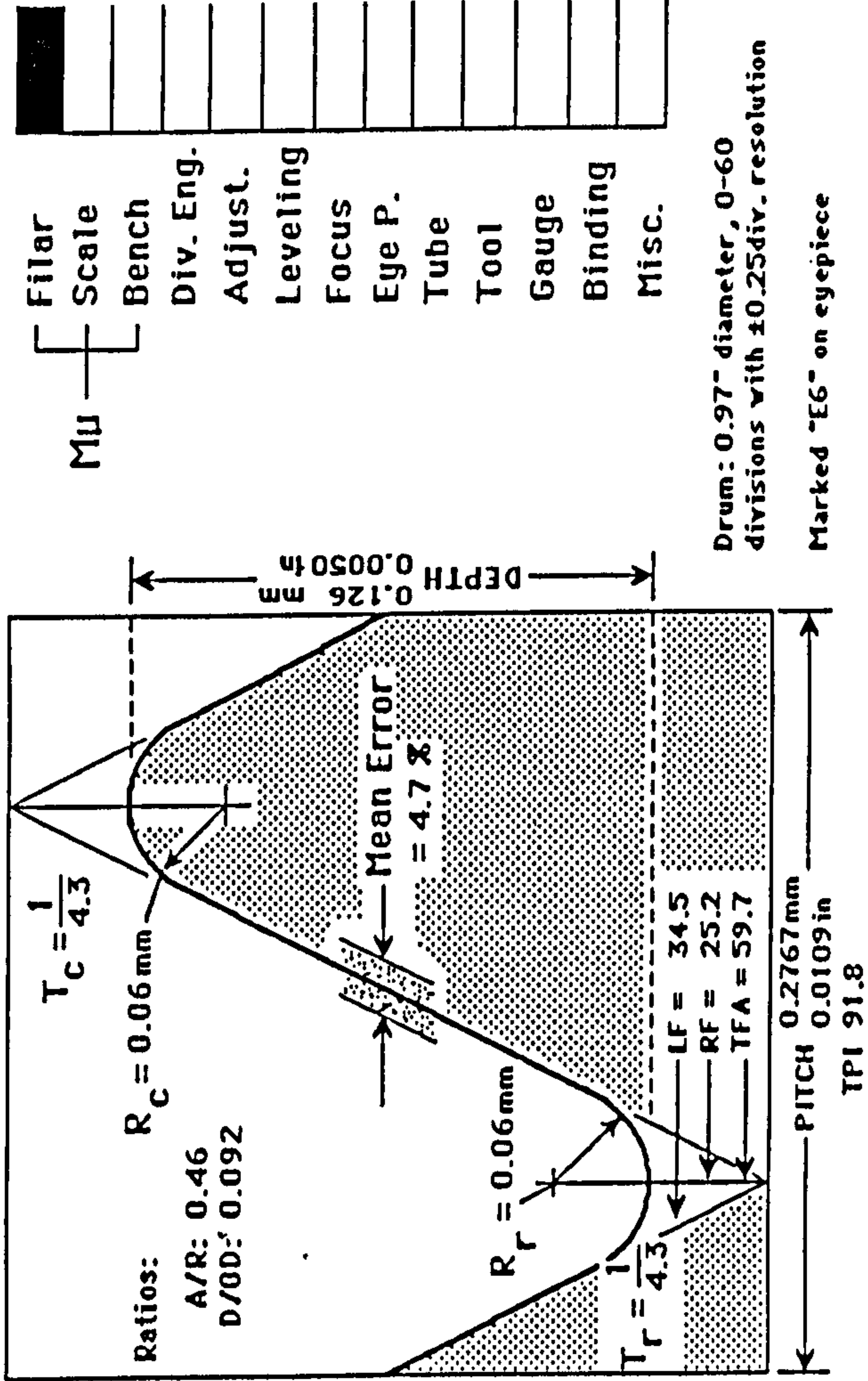
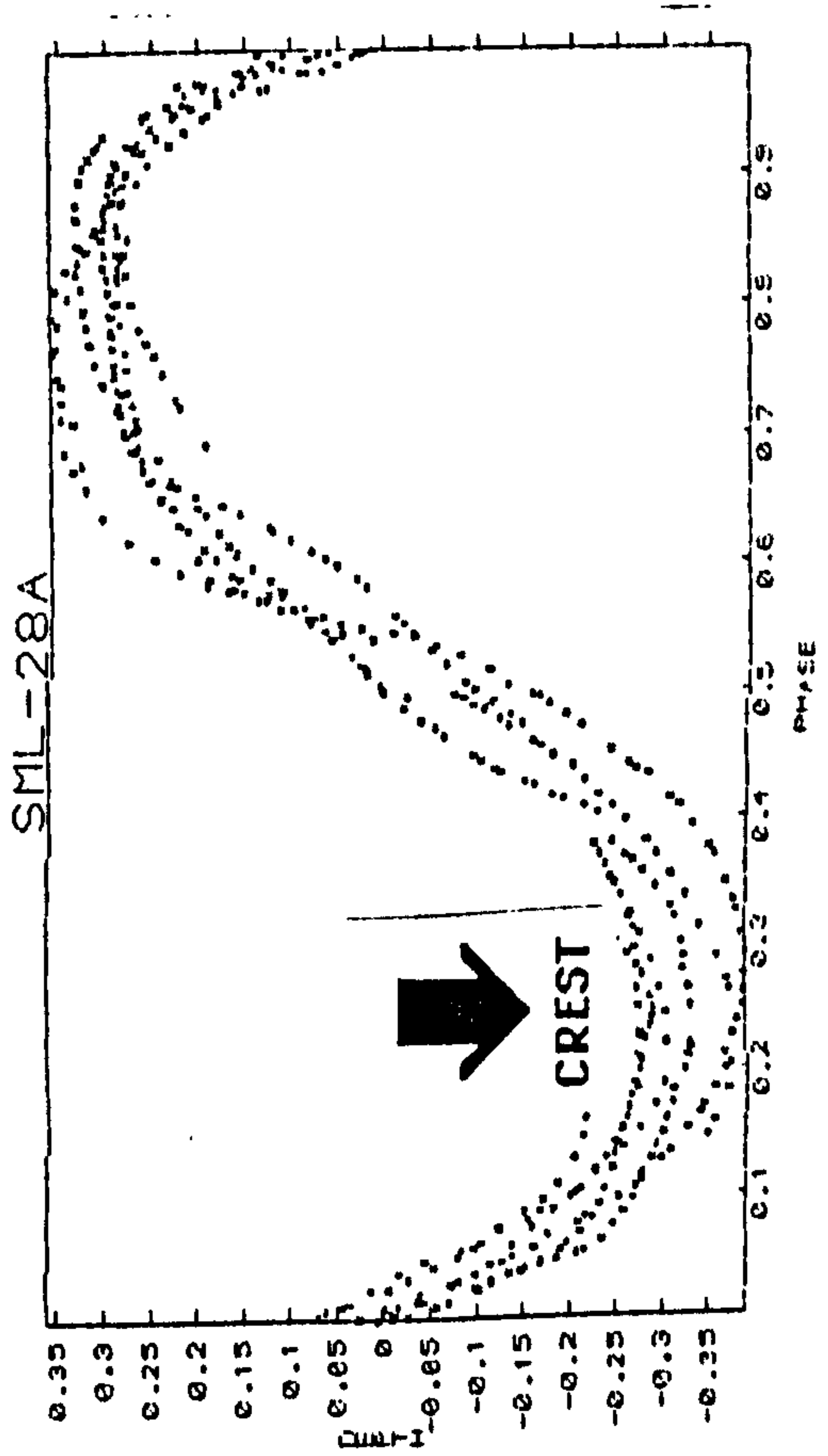
Study Code: SML-28a

Instrument: Eyepiece micrometer

Maker: Wm. or A. Herschel

Date: ca.1780

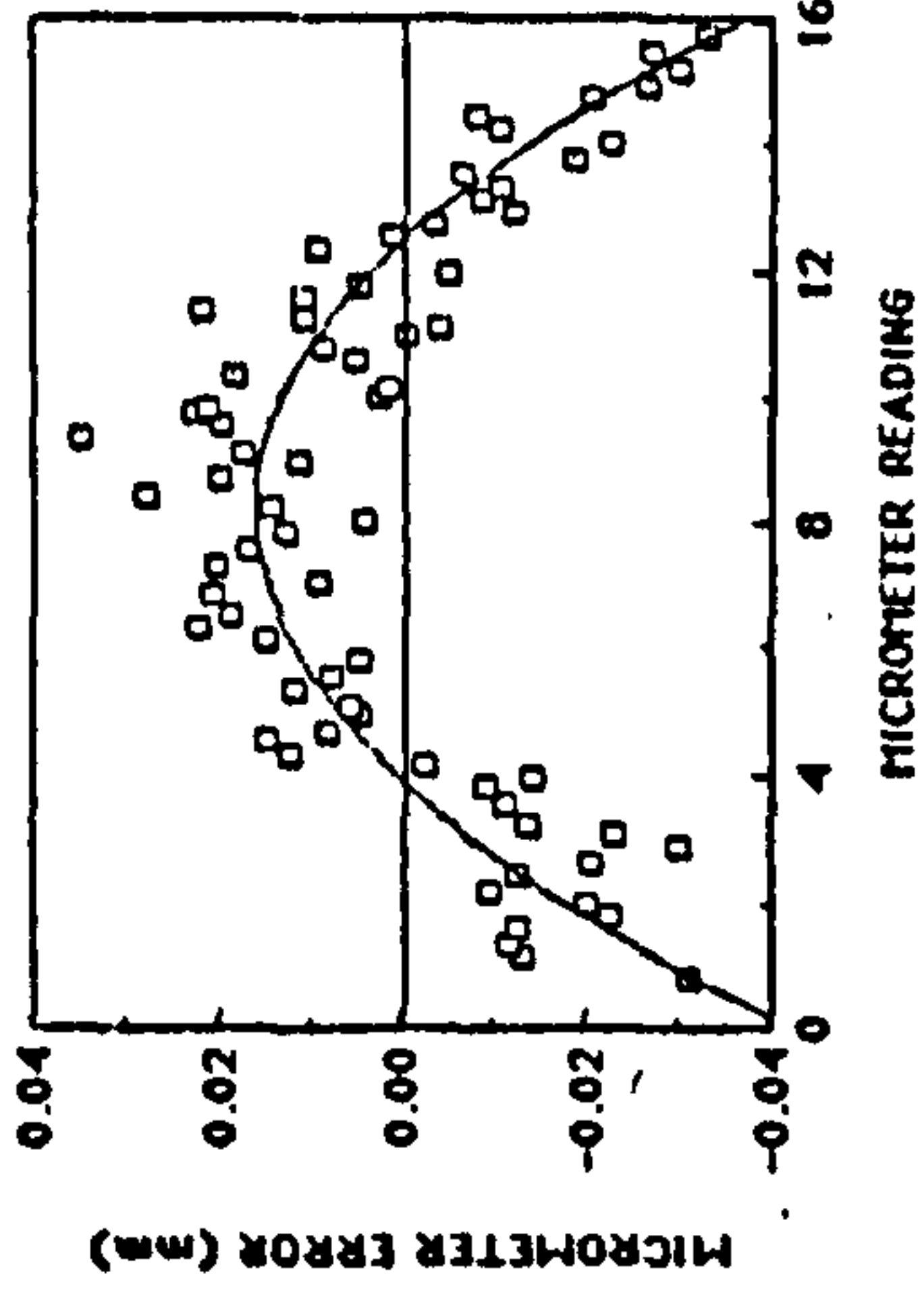
Ser./Acq. No. 1925-468 E6



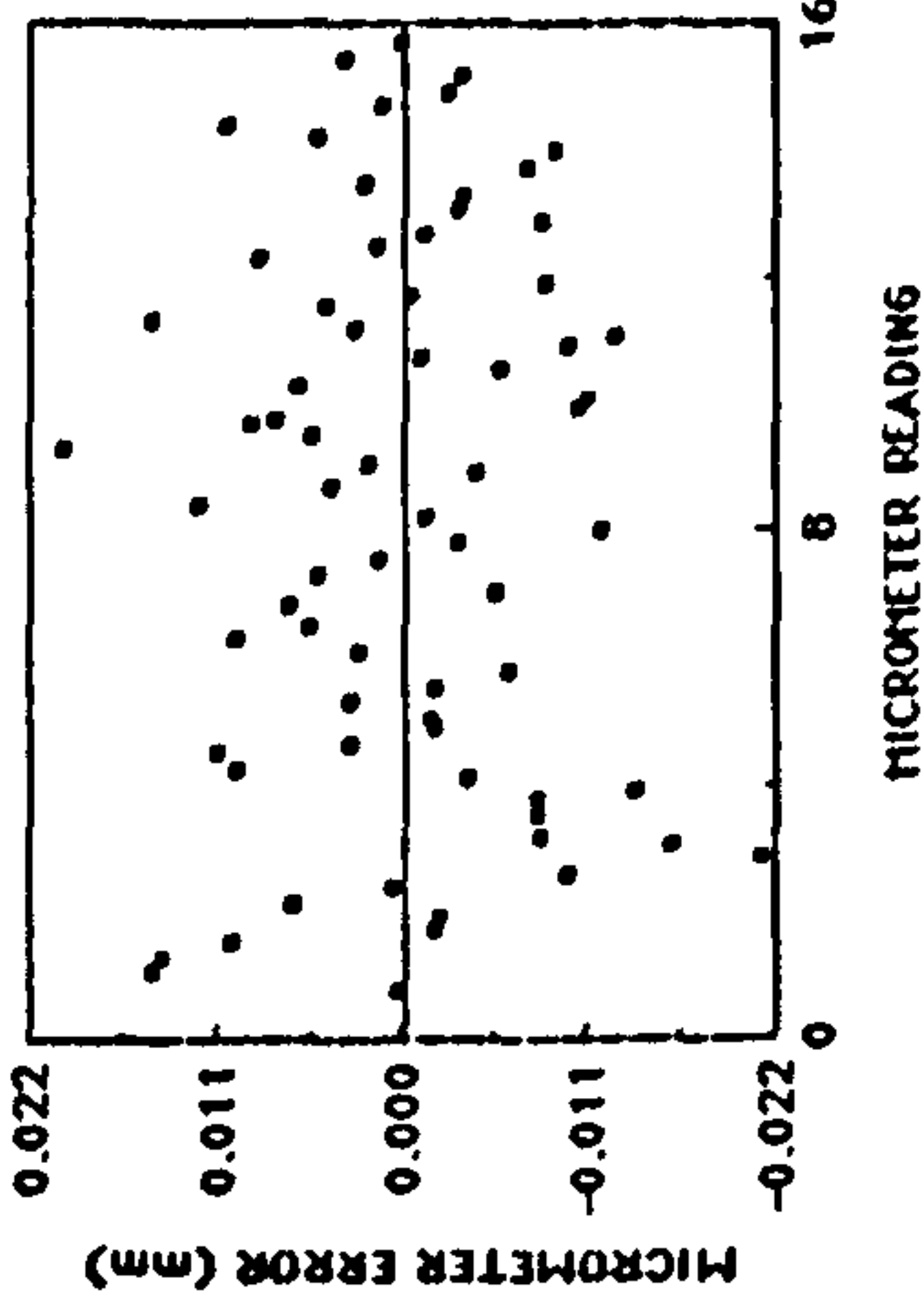
Drum: 0.97" diameter, 0-60 divisions with  $\pm 0.25 \text{ div. resolution}$

Marked "E6" on eyepiece

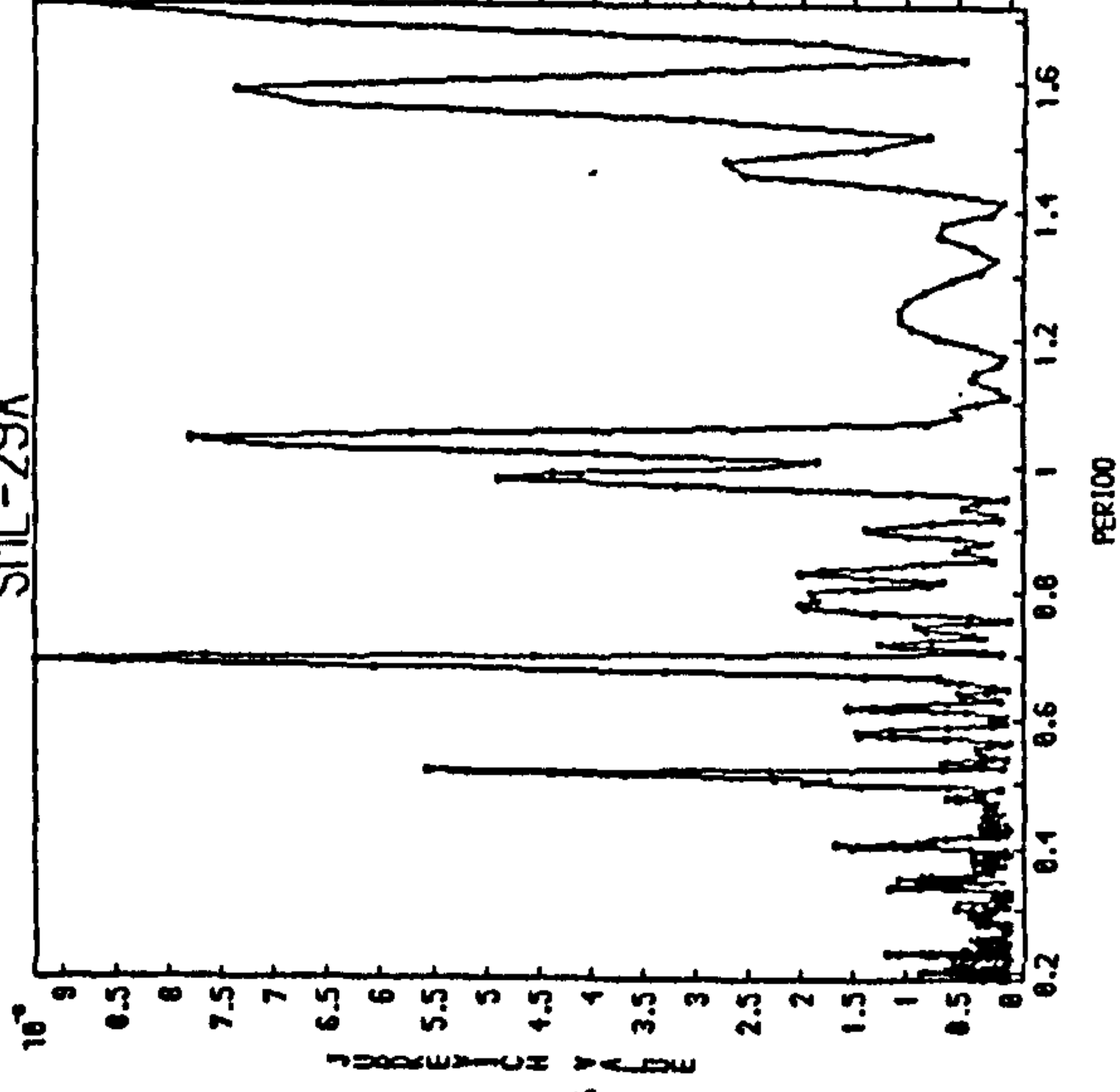
SML-29



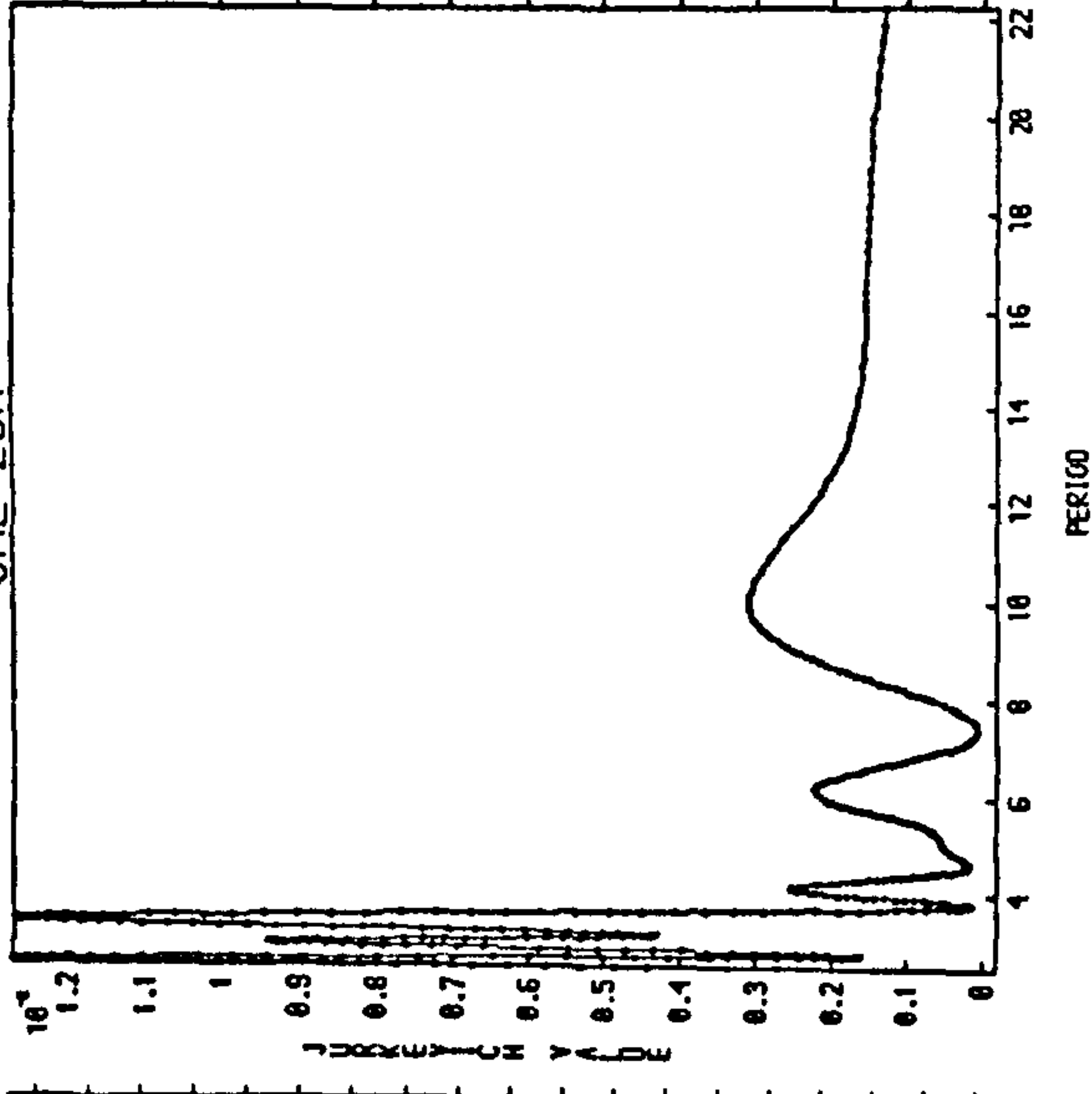
SML-29

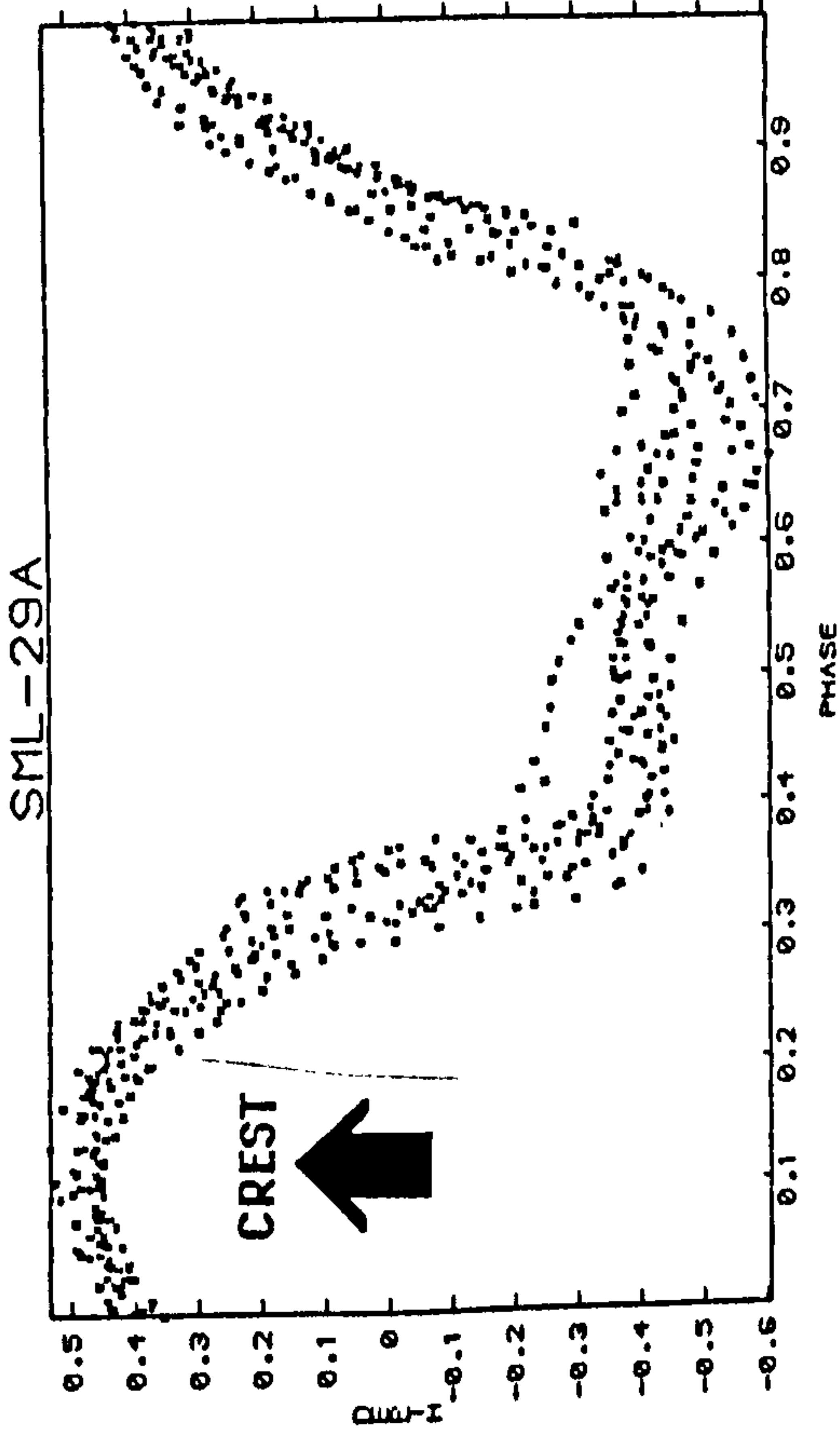


SML-29A



SML-29A





### Characteristics:

Screw ☒ Nut ☐

Leng: 0.438" / 0.047"

Diameter: 0.0720"

Steel ☒ Brass ☐

Other:

### Instrument Identification:

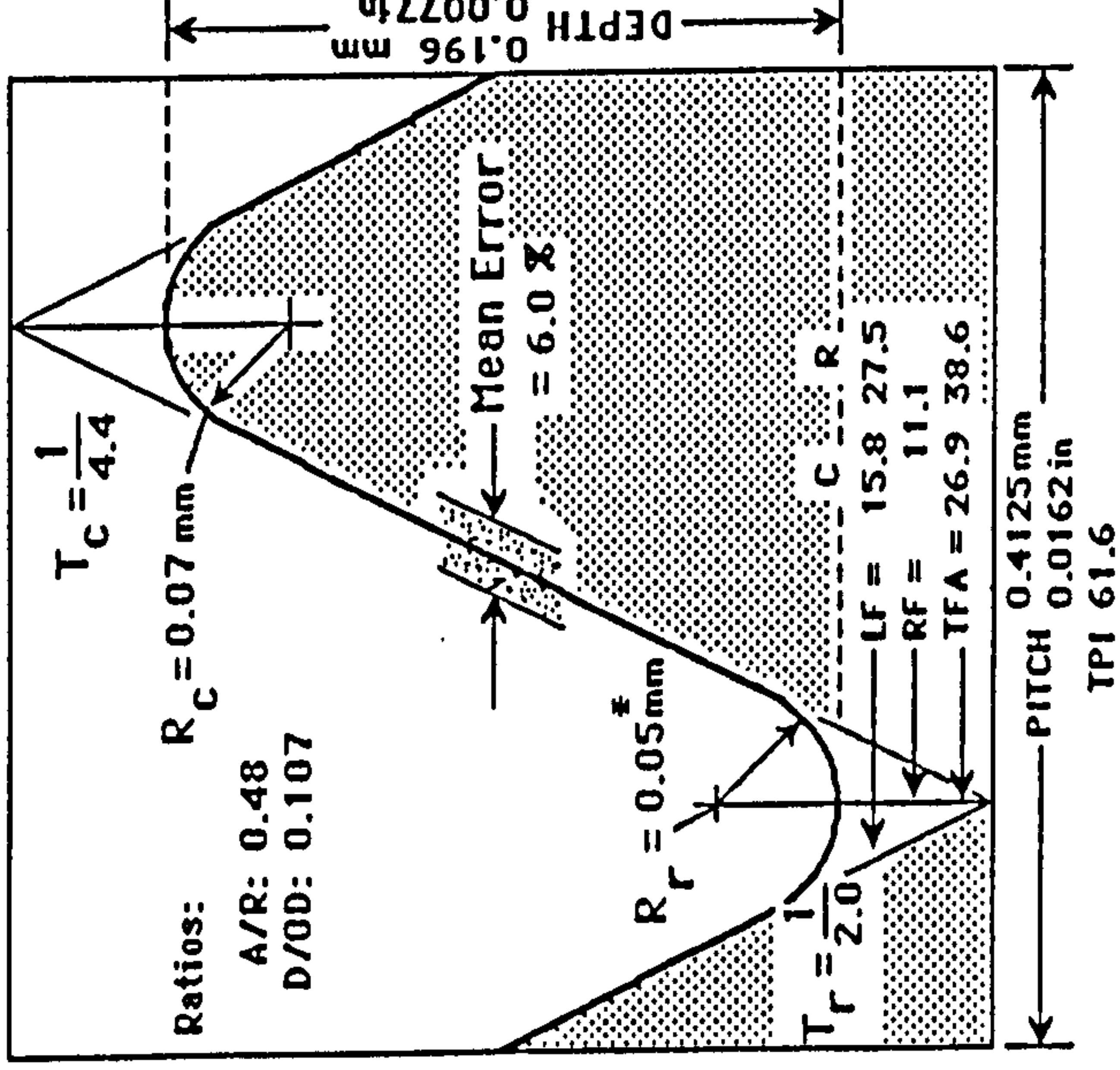
Study Code: SML-29a

Instrument: Eyepiece micrometer

Maker: Wm. or A. Herschel

Date: ca.1780

Ser./Acq. No. 1925-469 #E2



Mu	Filar
	Scale
	Bench
	Div. Eng.
	Adjust.
	Leveling
	Focus
	Eye P.
	Tube
	Tool
	Gauge
	Binding
	Misc.

Drum: 1.125" diameter, 0-60 divisions with half divisions marked and with -0.5div. resolution

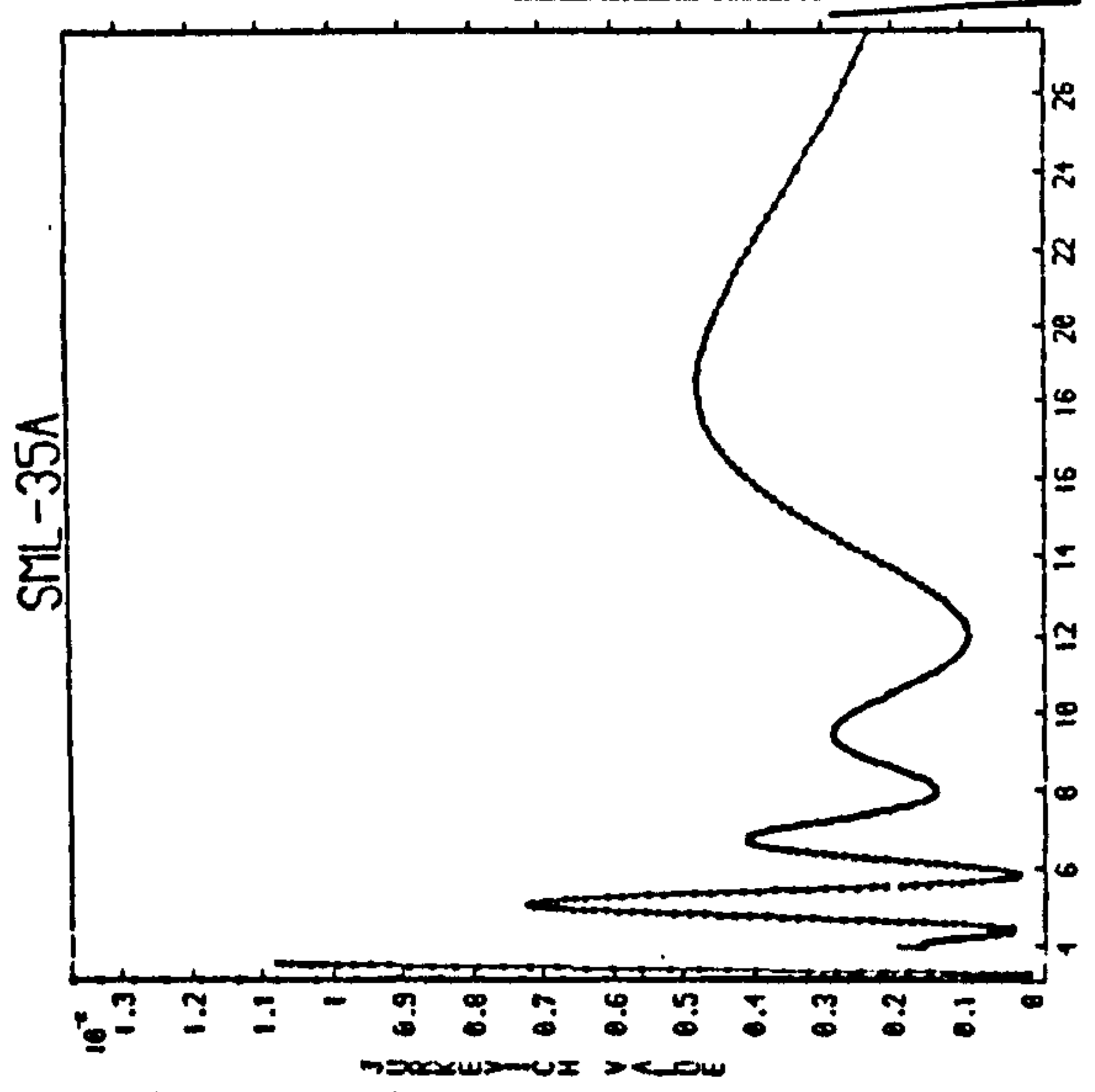
Shadowgram made with mould

Marked "E2" and "55 (154)"

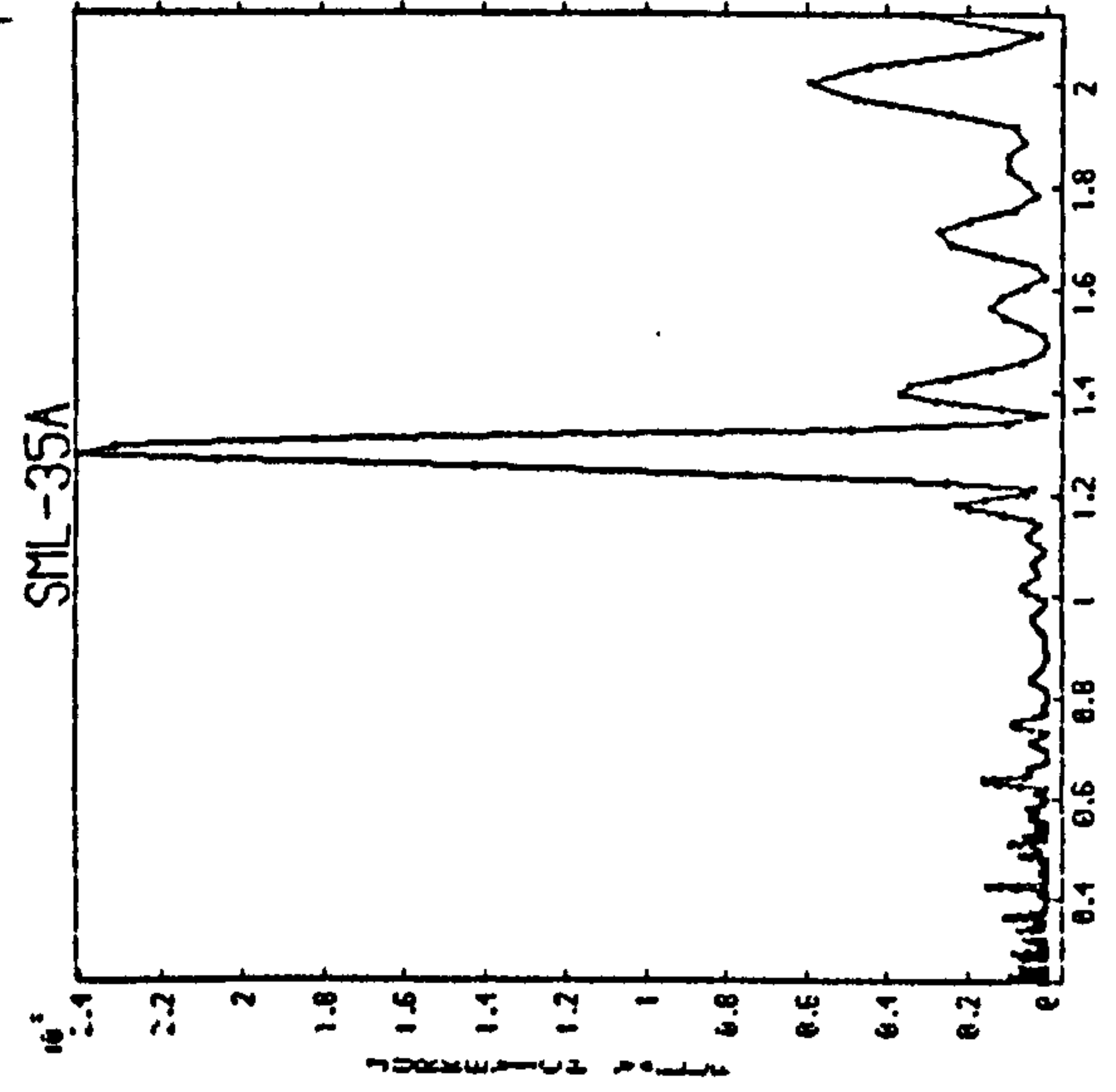
\* R = diameter of point of cutting tool



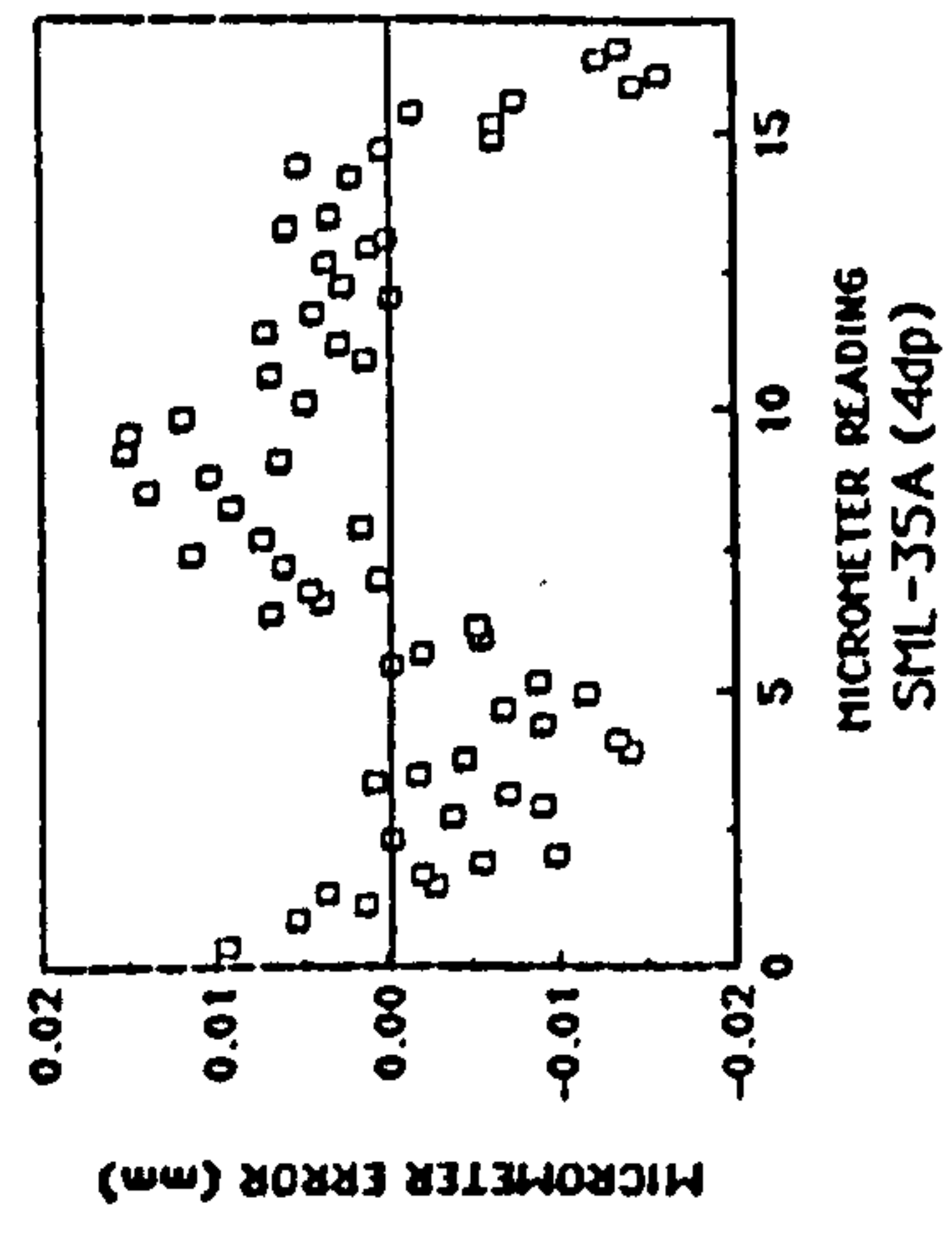
SML-35A



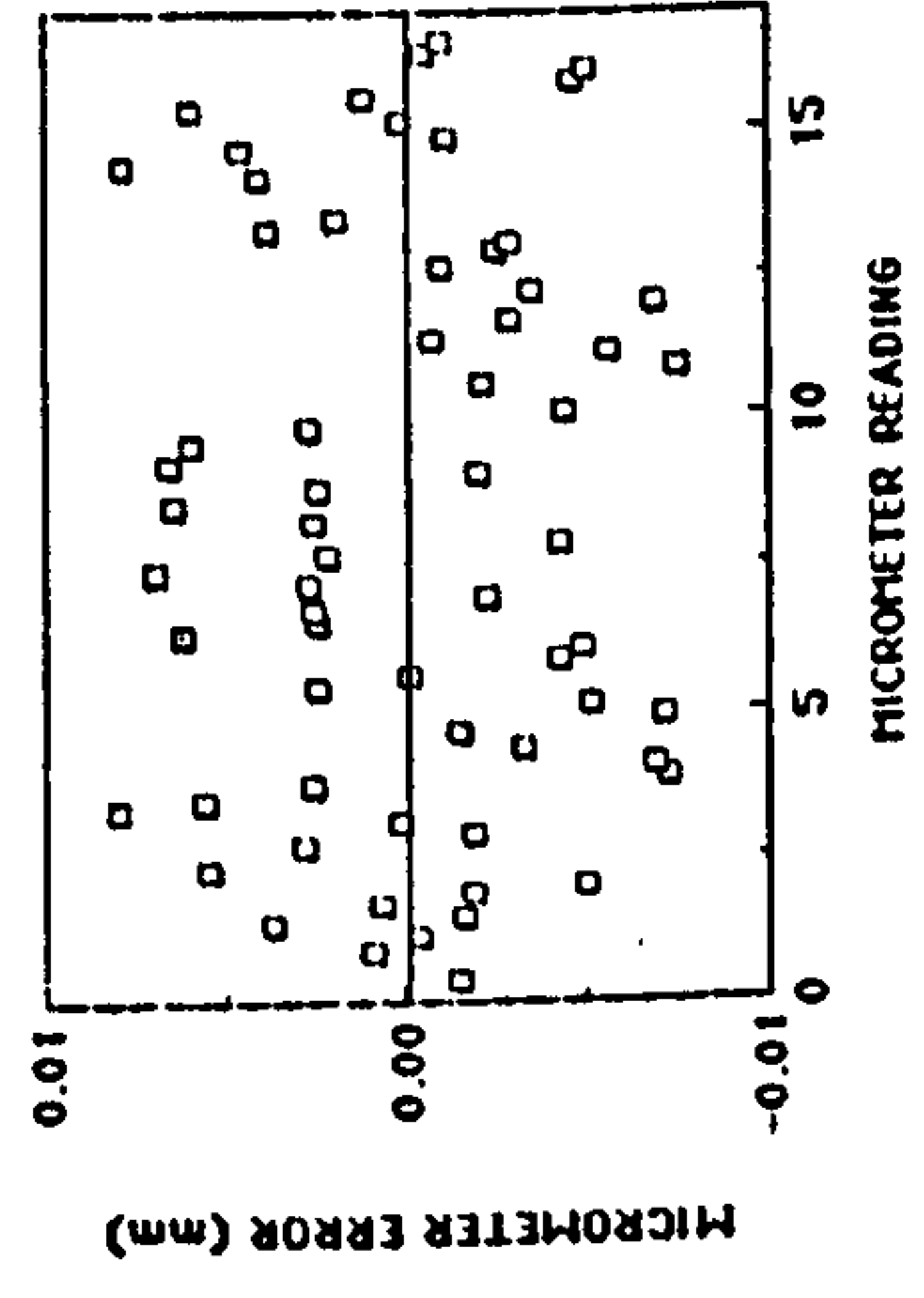
SML-35A



SML-35a



SML-35A (4dp)

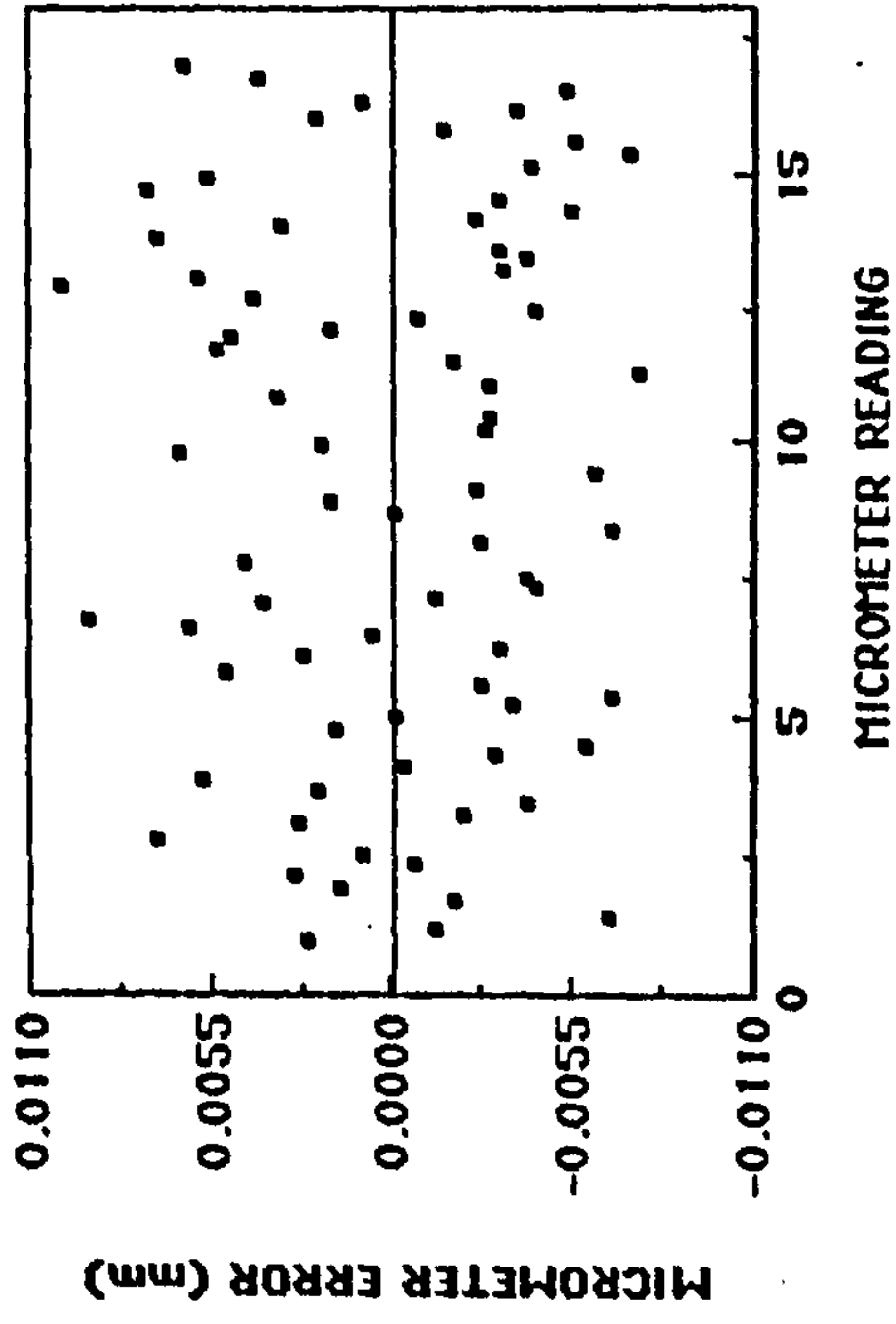


PERIOD

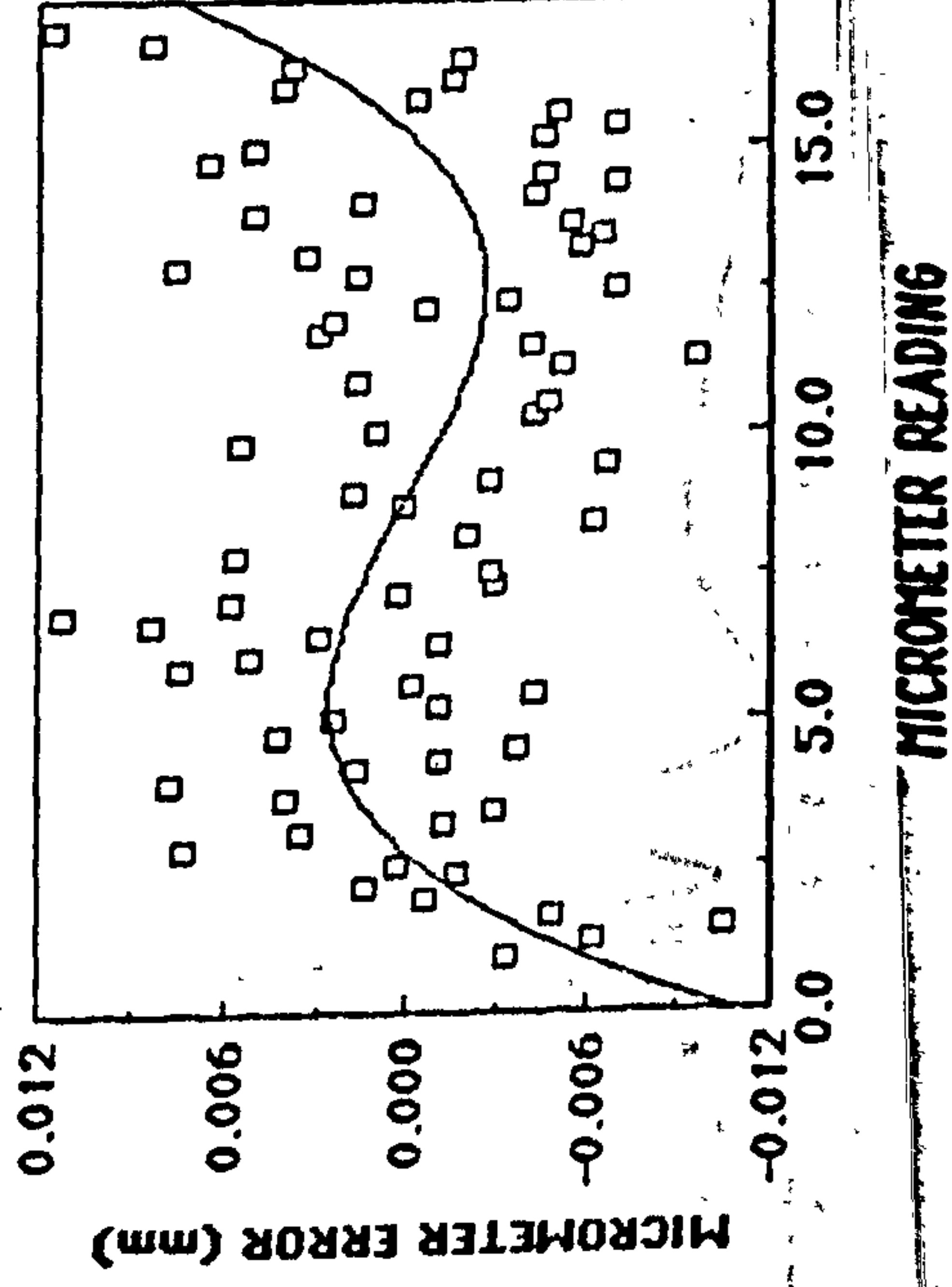
PERIOD

MICROMETER READING

SML-35b



SML-35b



Characteristics:

Screw

Nut

Leng: 0.938" / 0.109"

Diameter: 0.1387"

Steel

Brass

Other:

Instrument Identification:

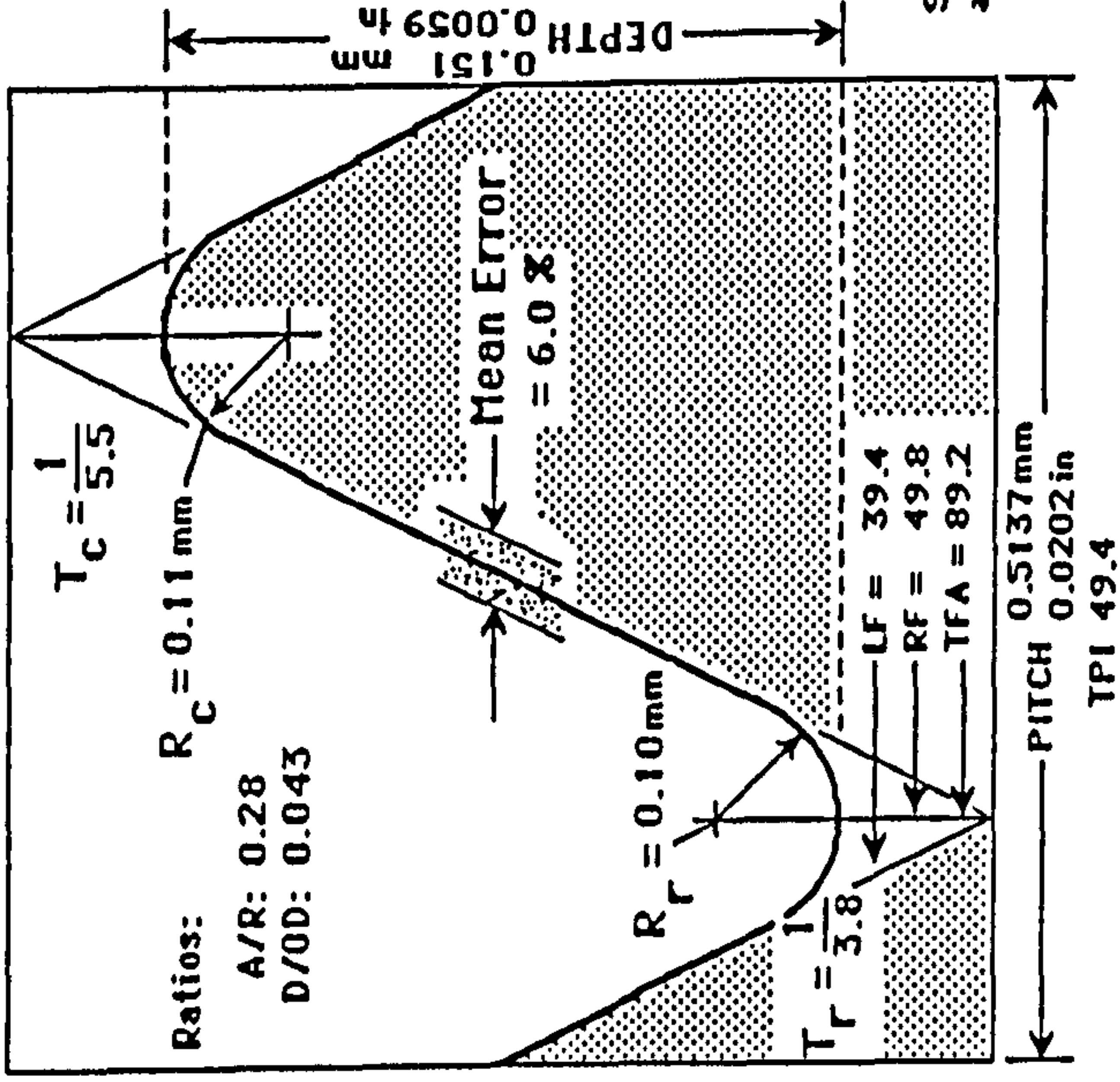
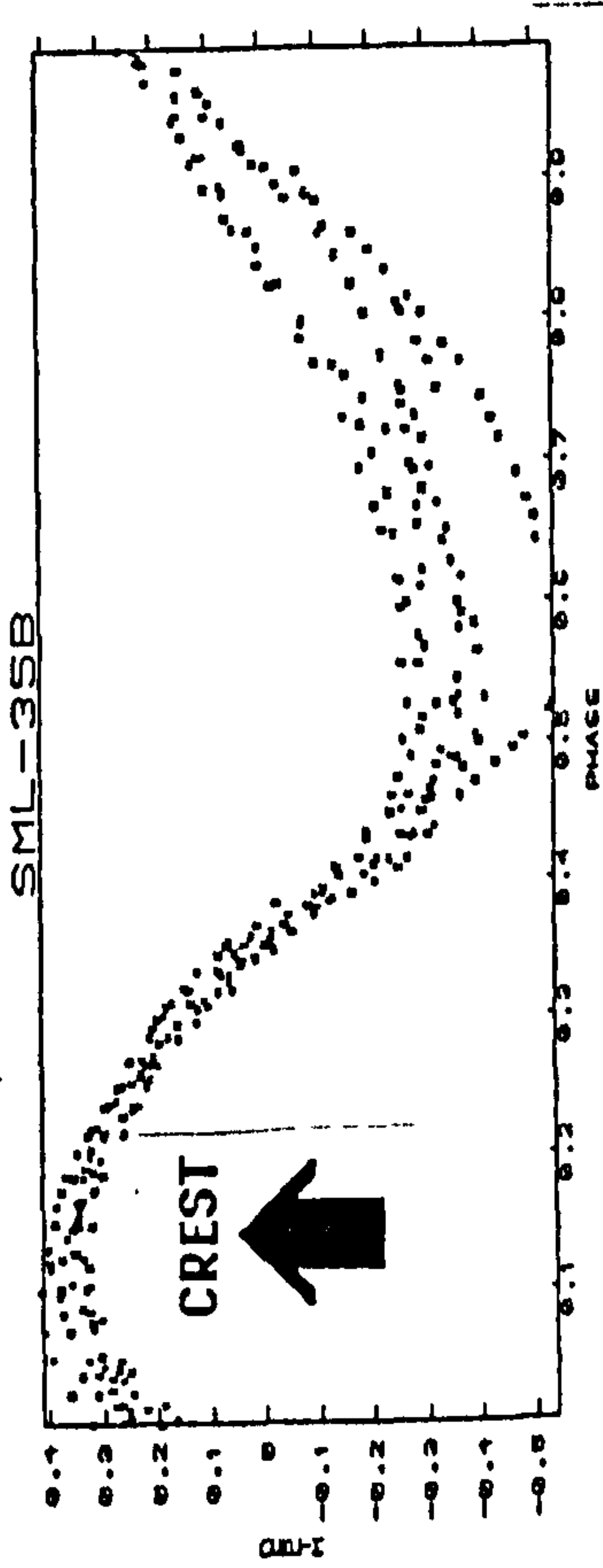
Study Code: SML-35b

Instrument: Divided eyepiece micrometer

Maker: Dollond

Date: ca.1820

Ser./Acq. No. 1987-?? = RAS #4



Mu

Filar

Scale

Bench

Div. Eng.

Adjust.

Leveling

Focus

Eye P.

Tube

Tool

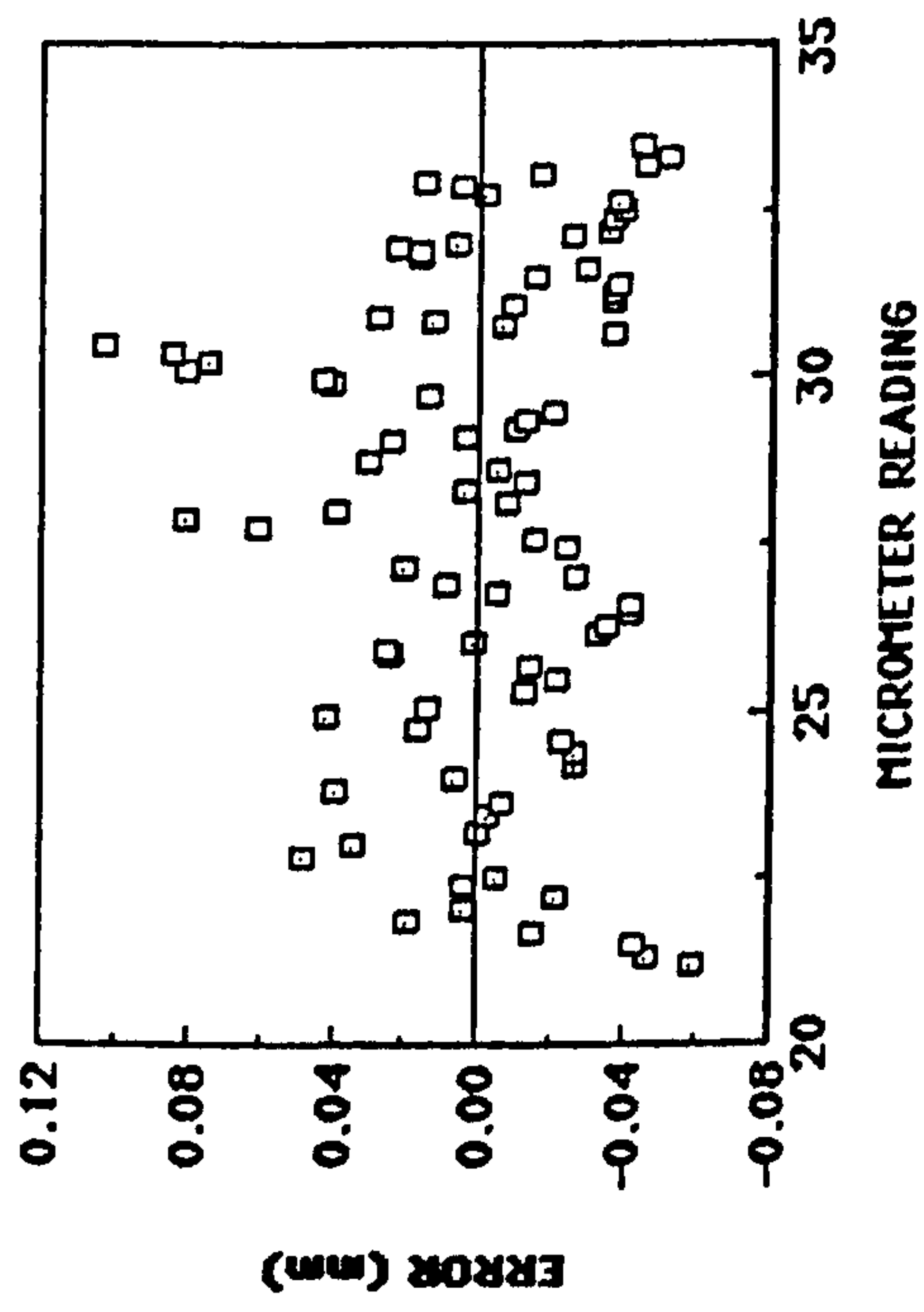
Gauge

Binding

Misc.

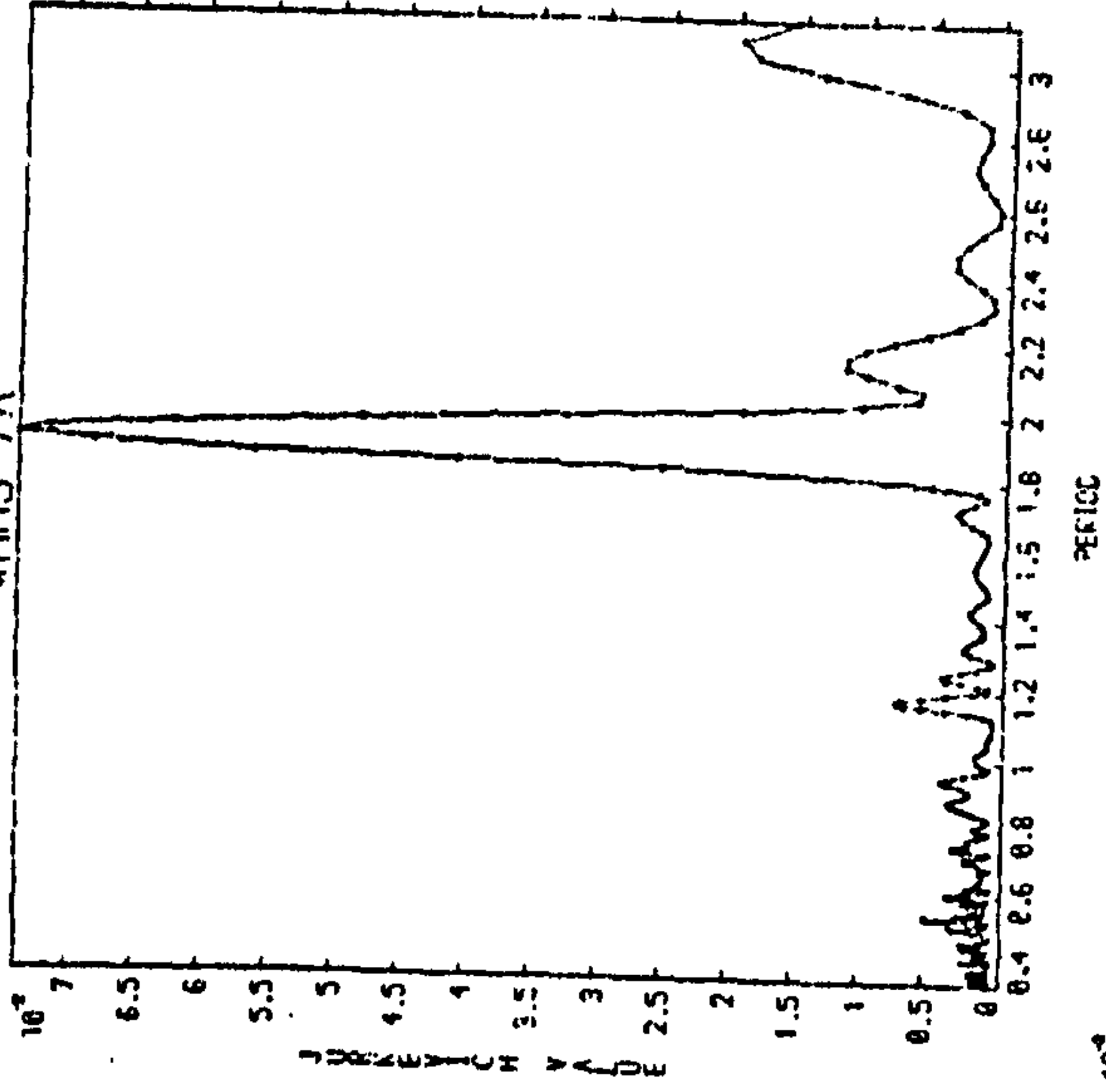
See SML-35a form drum description and other information

SML-42

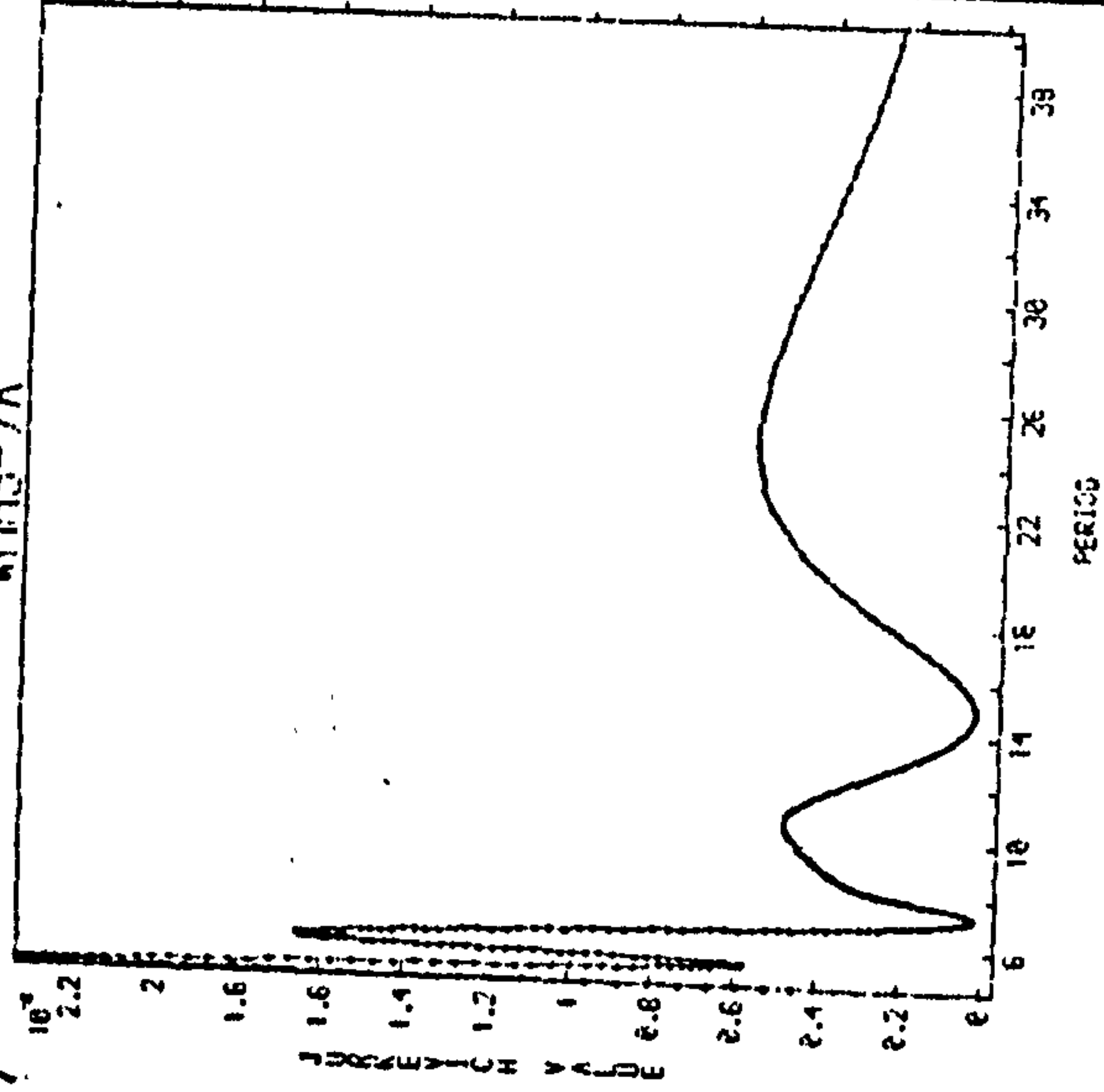




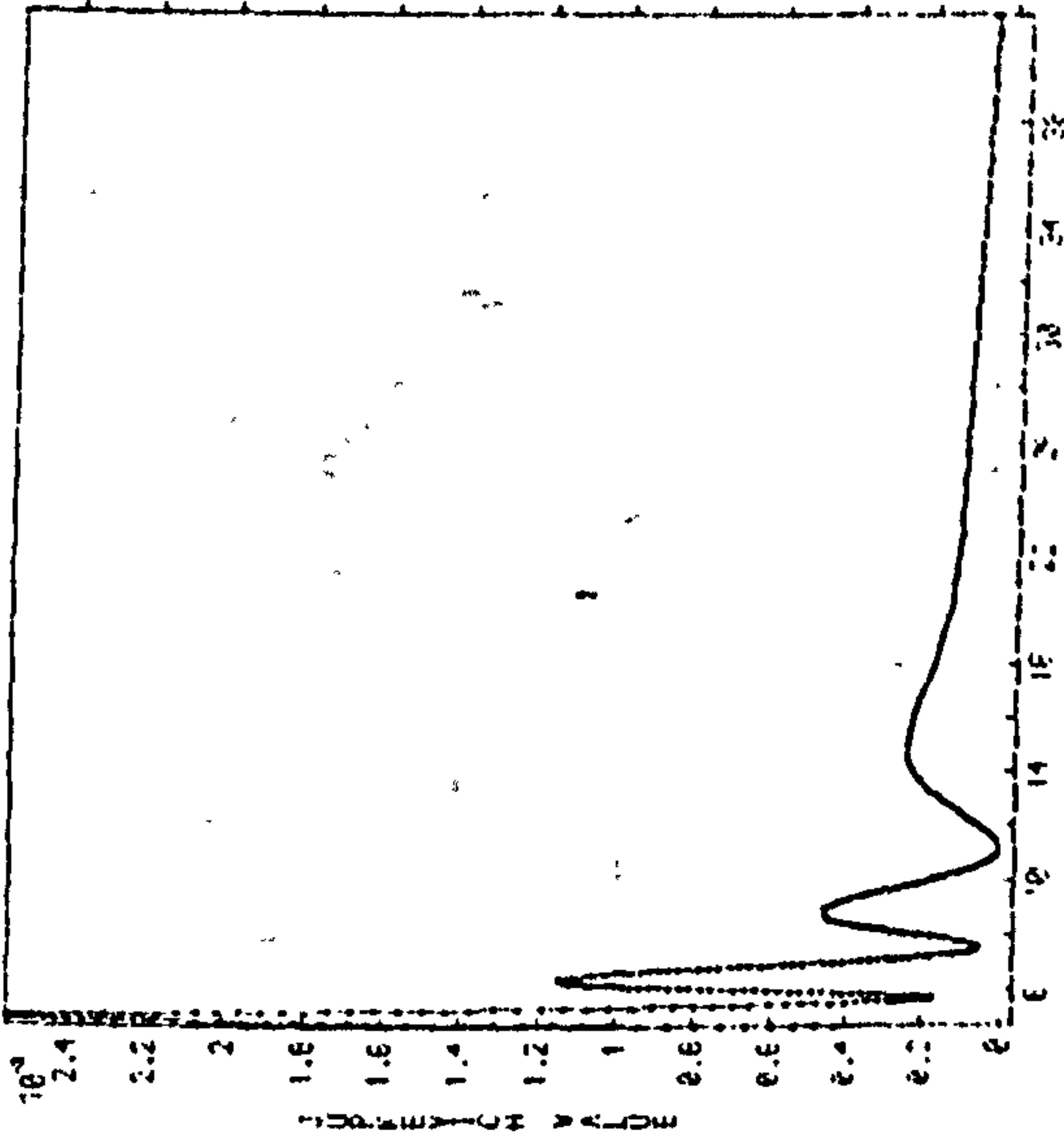
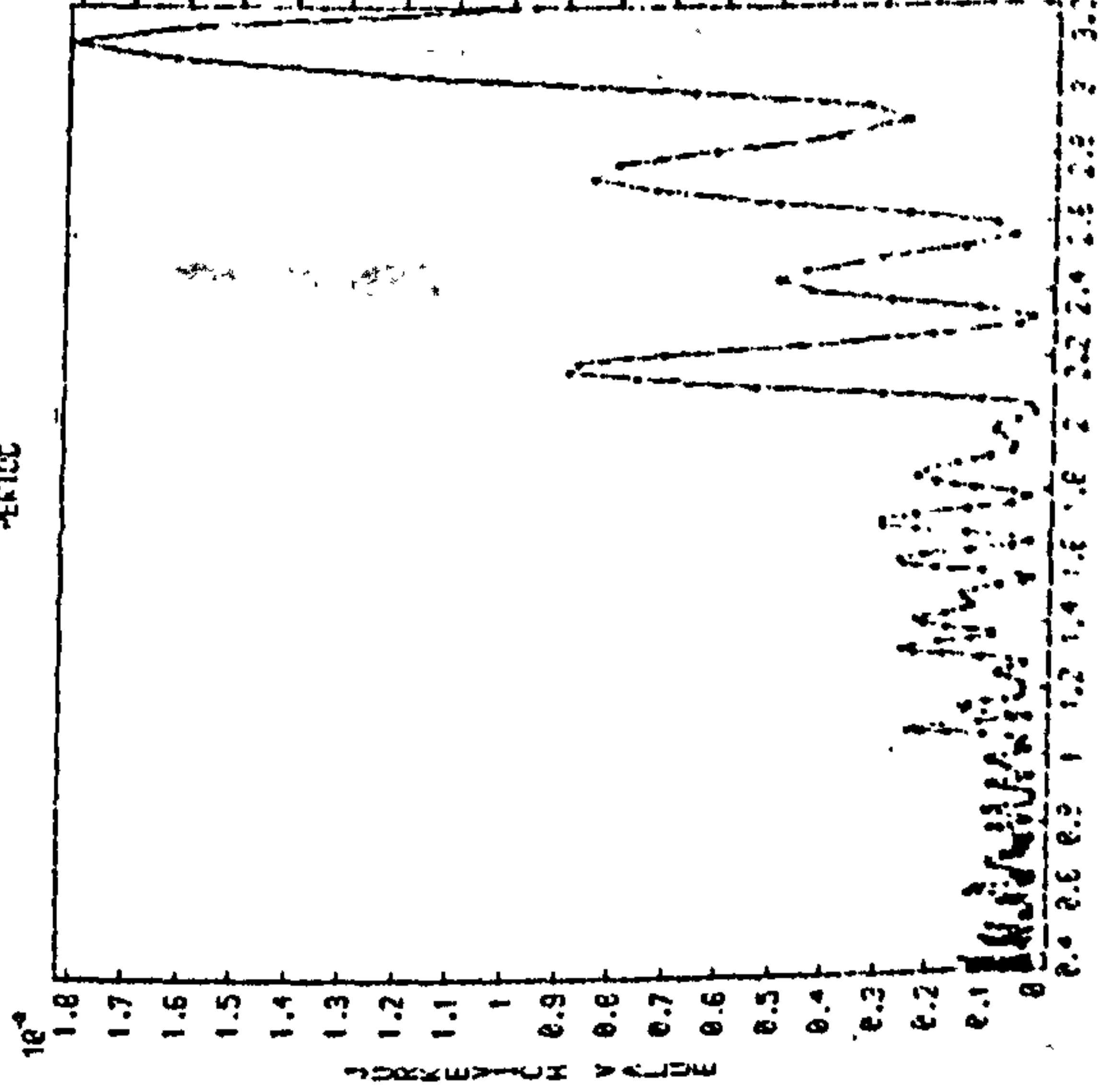
WMHS-7A



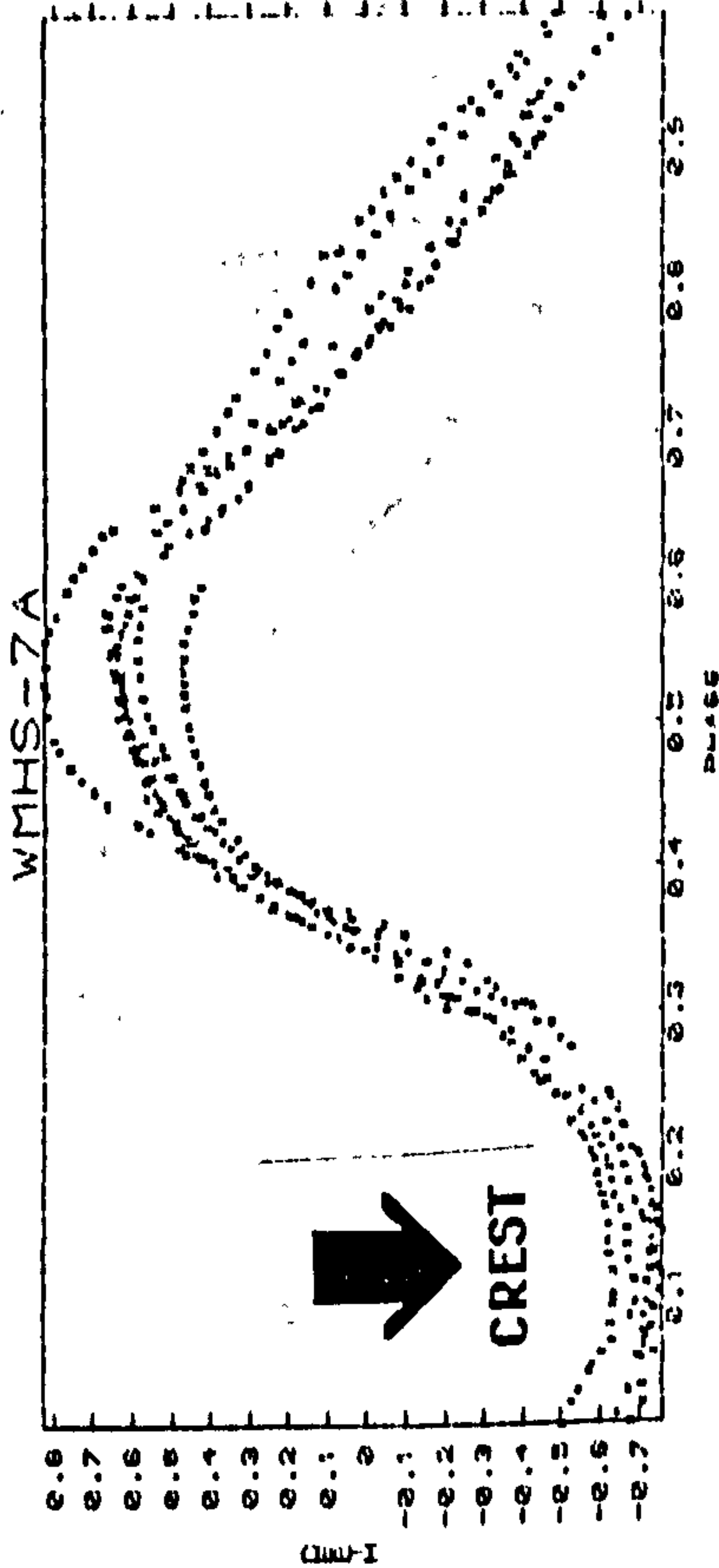
WMHS-7A



PERIOD



PERIOD



**Characteristics:**

Screw ☒ Nut ☐

Leng: 2.0" / 0.094"

Diameter:  $\approx 0.215$ "

Steel ☒ Brass ☐

Other:

**Instrument Identification:**

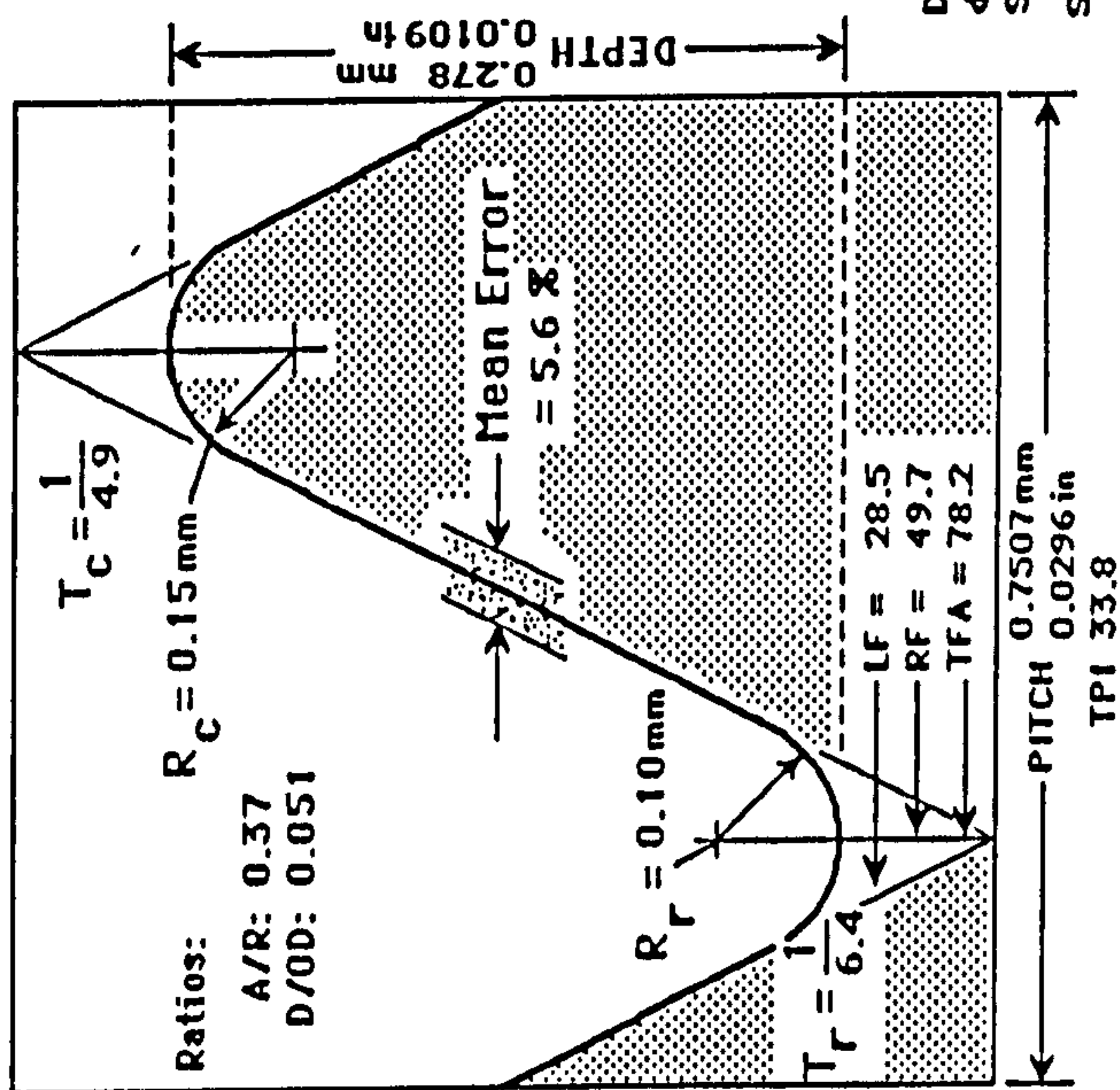
Study Code: WMHS-7a

Instrument: Micrometer

Maker: John Rowley

Date: ca.1703

Ser./Acq. No. 1004



Mu	Filar	
	Scale	Bench
	Div. Eng.	Adjust.
	Leveling	Focus
	Eye P.	Tube
	Tool	Gauge
	Binding	Misc.

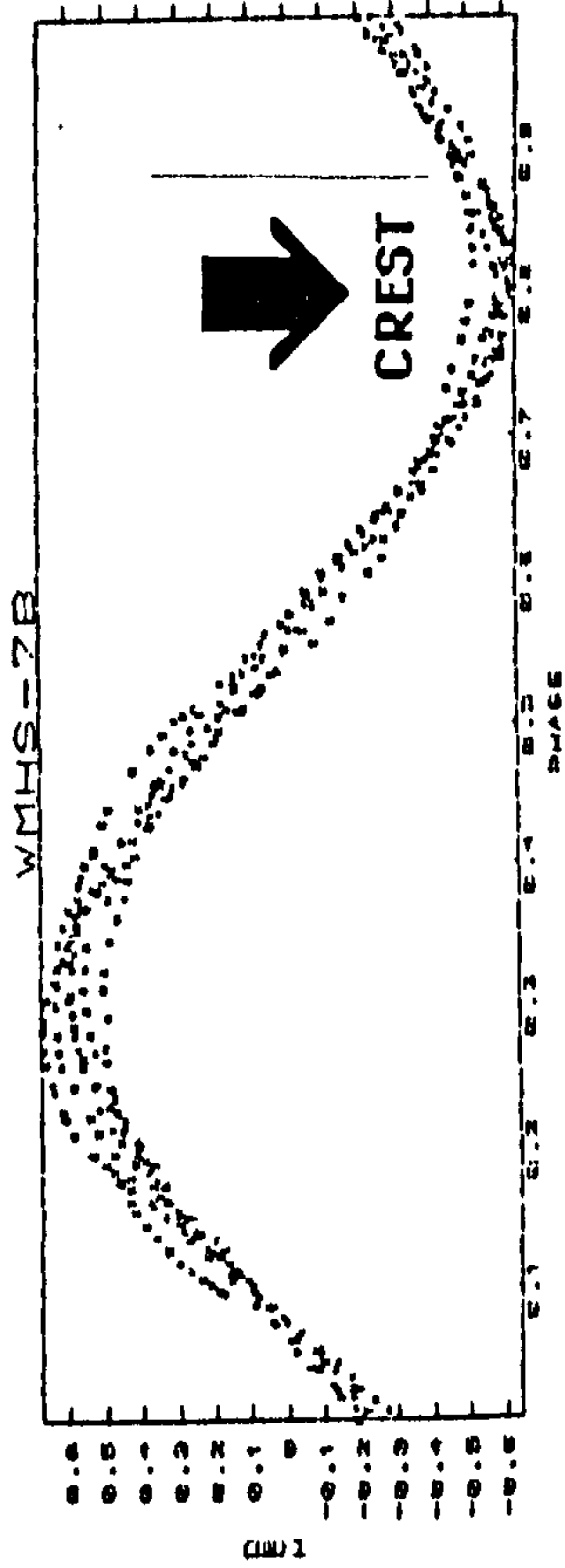
Drum: 2.5" diameter, 0-100 divisions with  $\pm 0.2 \text{ div.}$  resolution

Scale: 1.78" long, 0-60 divisions

Screw has light corrosion

Minimum wire separation  $\approx 0.09$ "

Covers slide in 0.1" wide slots



**Characteristics:**

Screw ☒ Nut ☐

Leng: 3.0" / 0.125"

Diameter:  $\approx 0.215$ "

Steel ☒ Brass ☐

Other: ☐

**Instrument Identification:**

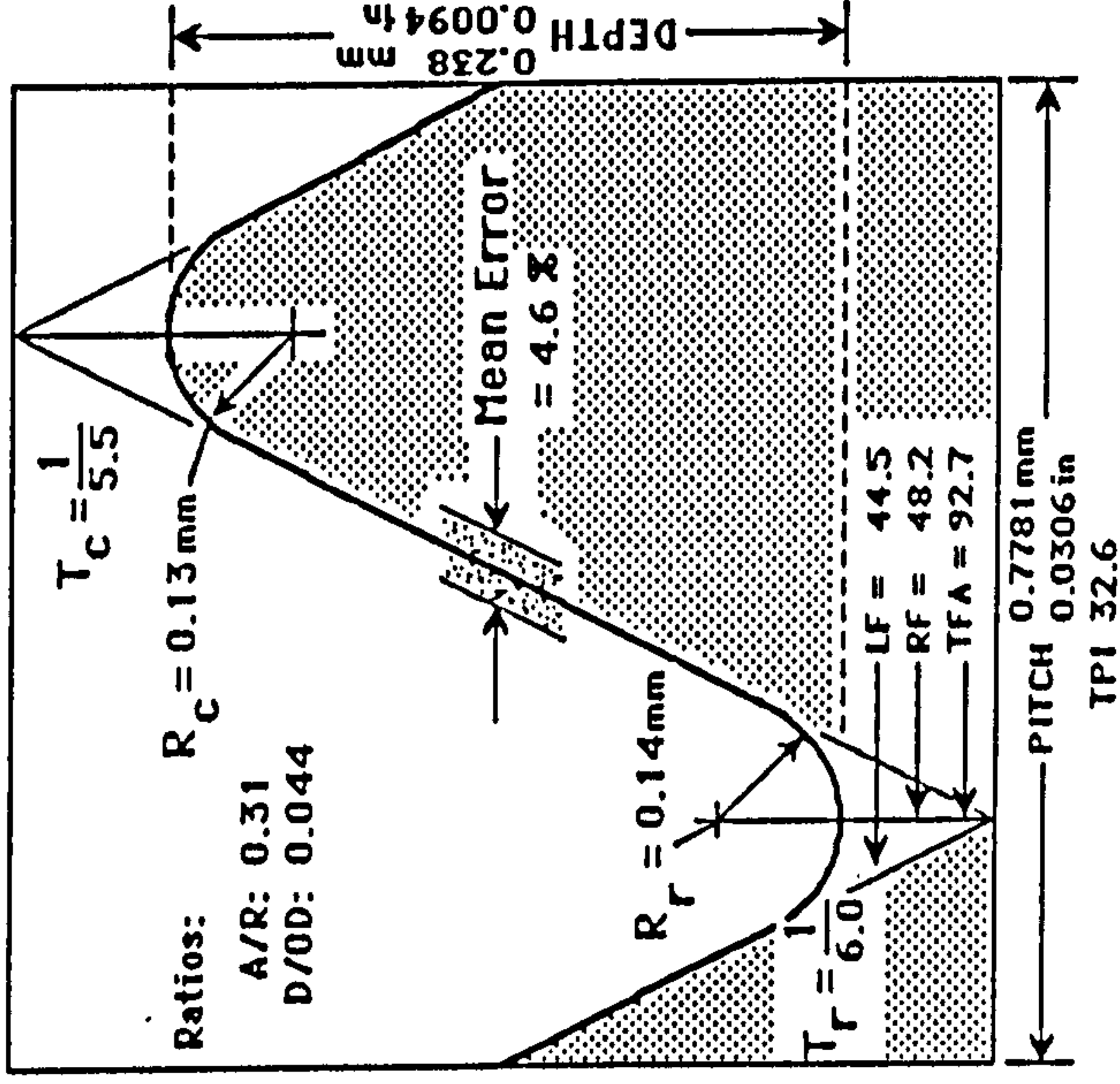
Study Code: WMHS-7b

Instrument: Micrometer

Maker: John Rowley

Date: ca.1703

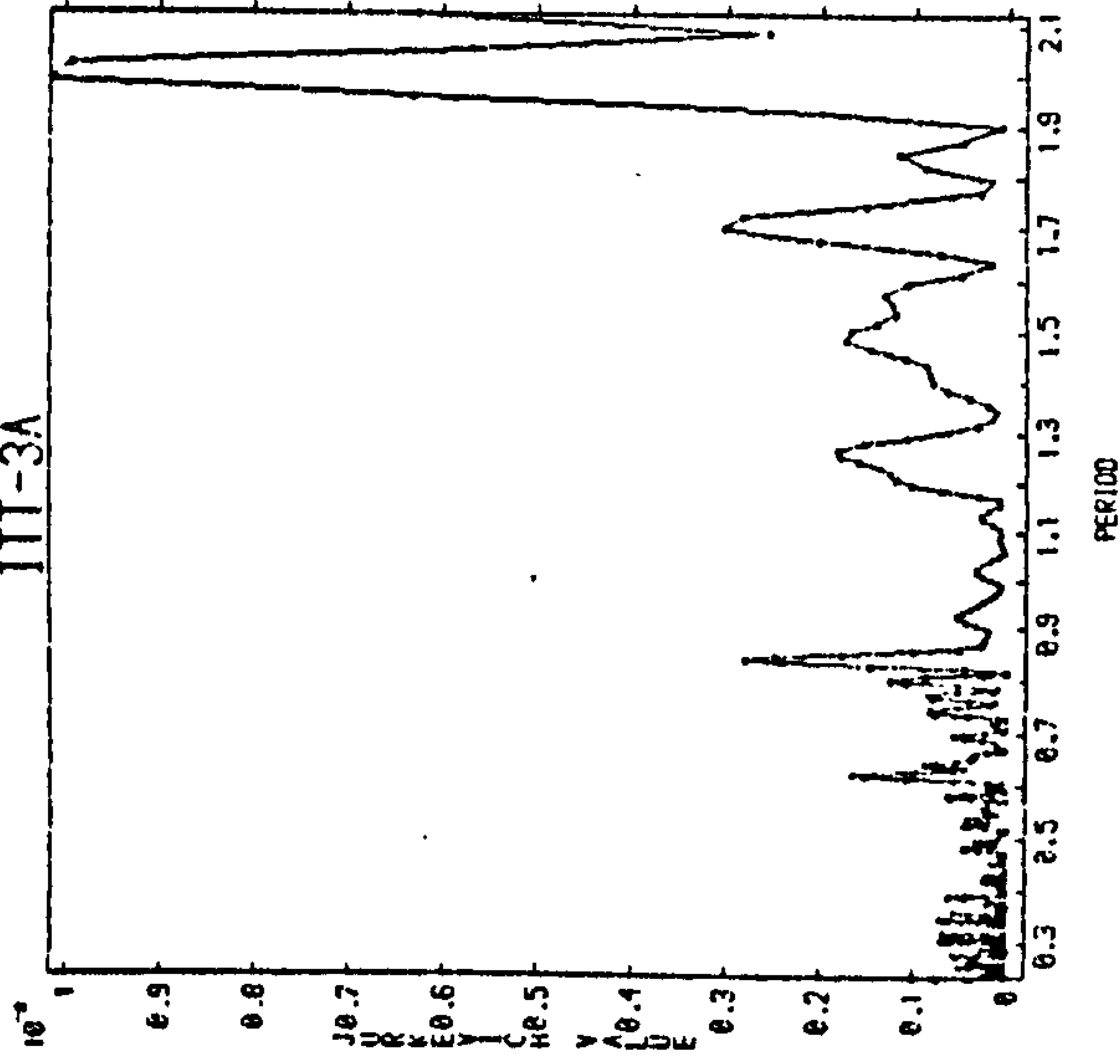
Ser./Acq. No. 1004



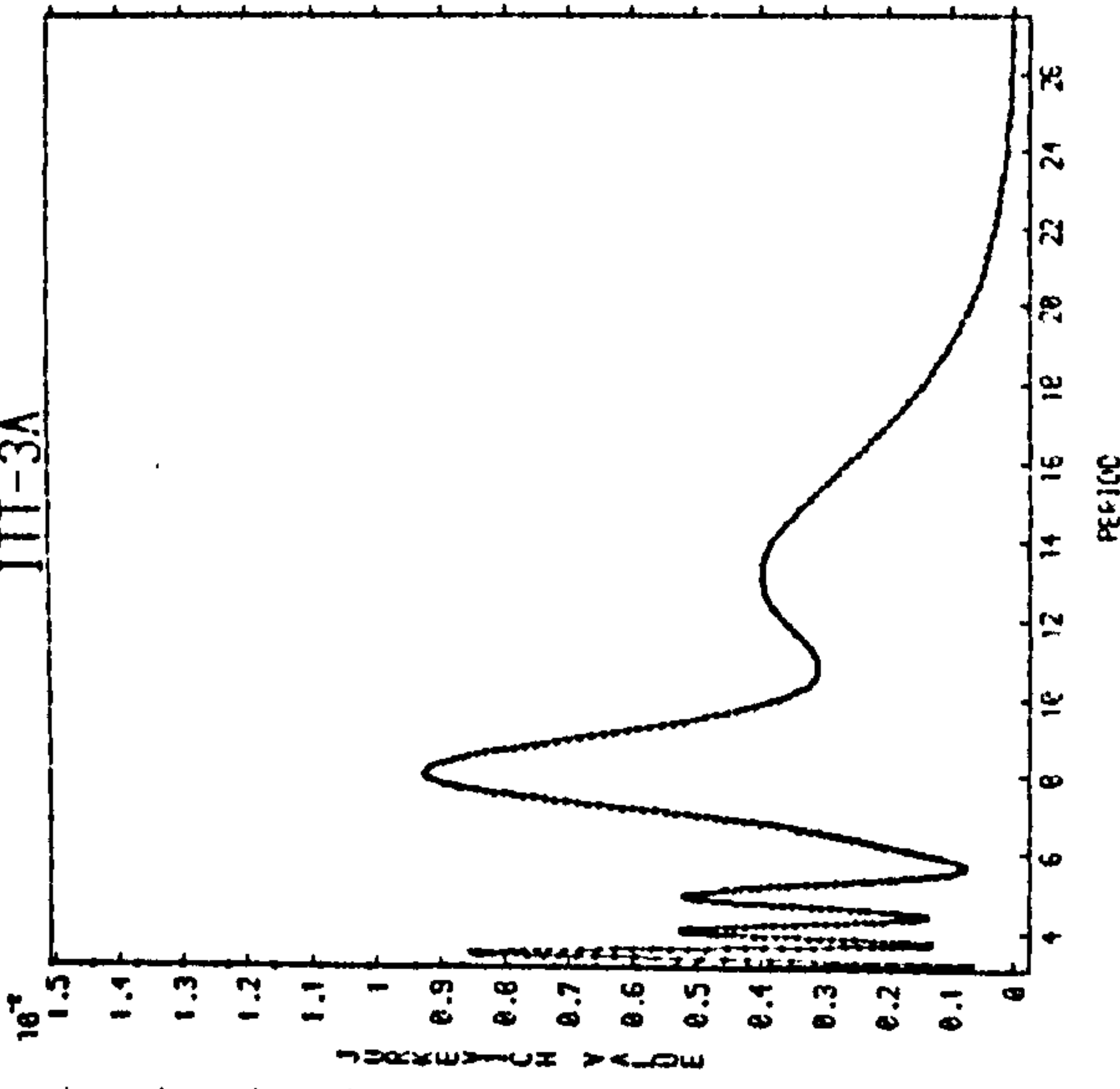
Mu — [ Filar Scale Bench Div. Eng. Adjust. Leveling Focus Eye P. Tube Tool Gauge Binding Misc.

See WMHS-7a for drum and other information

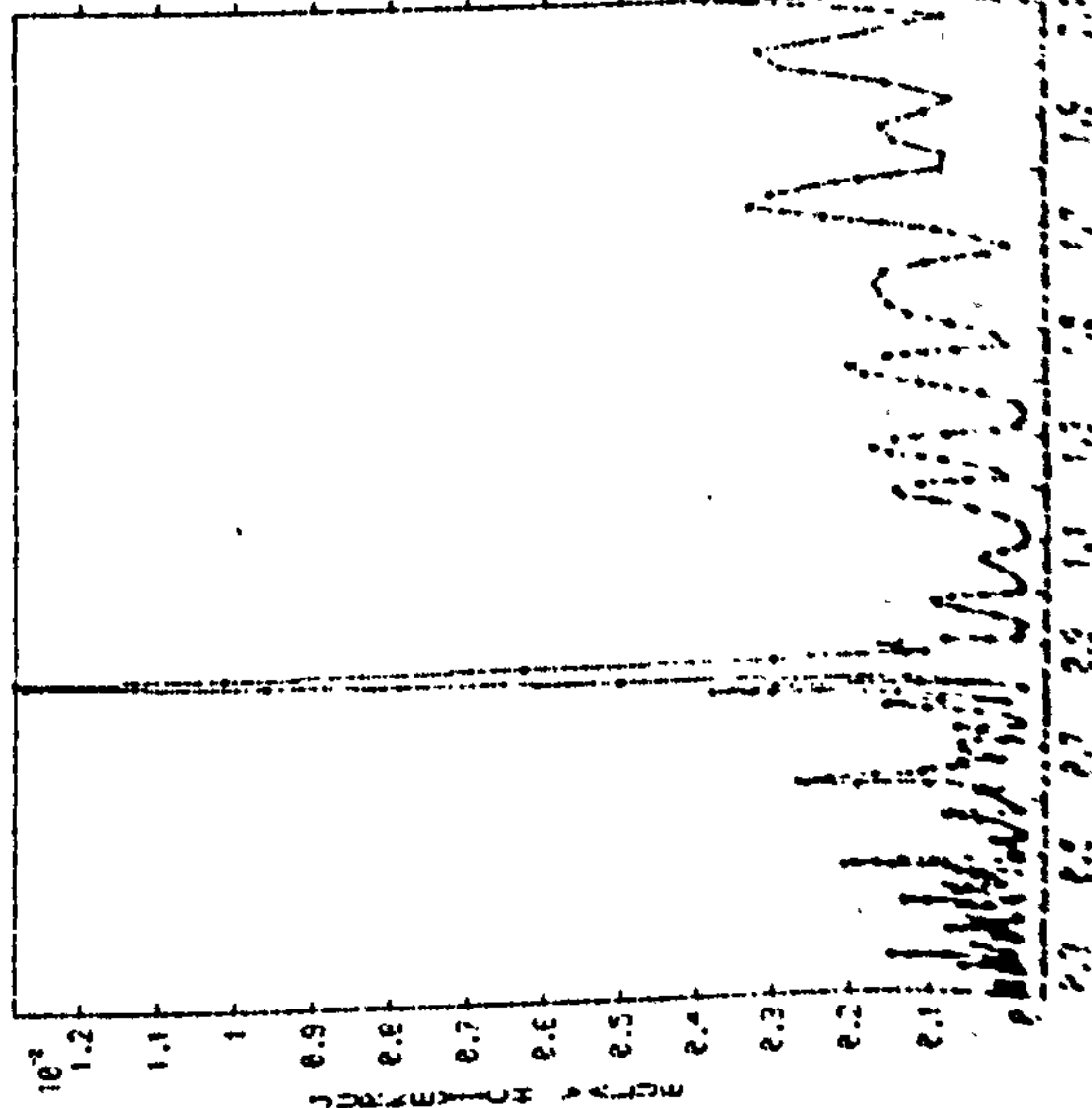
III-3A



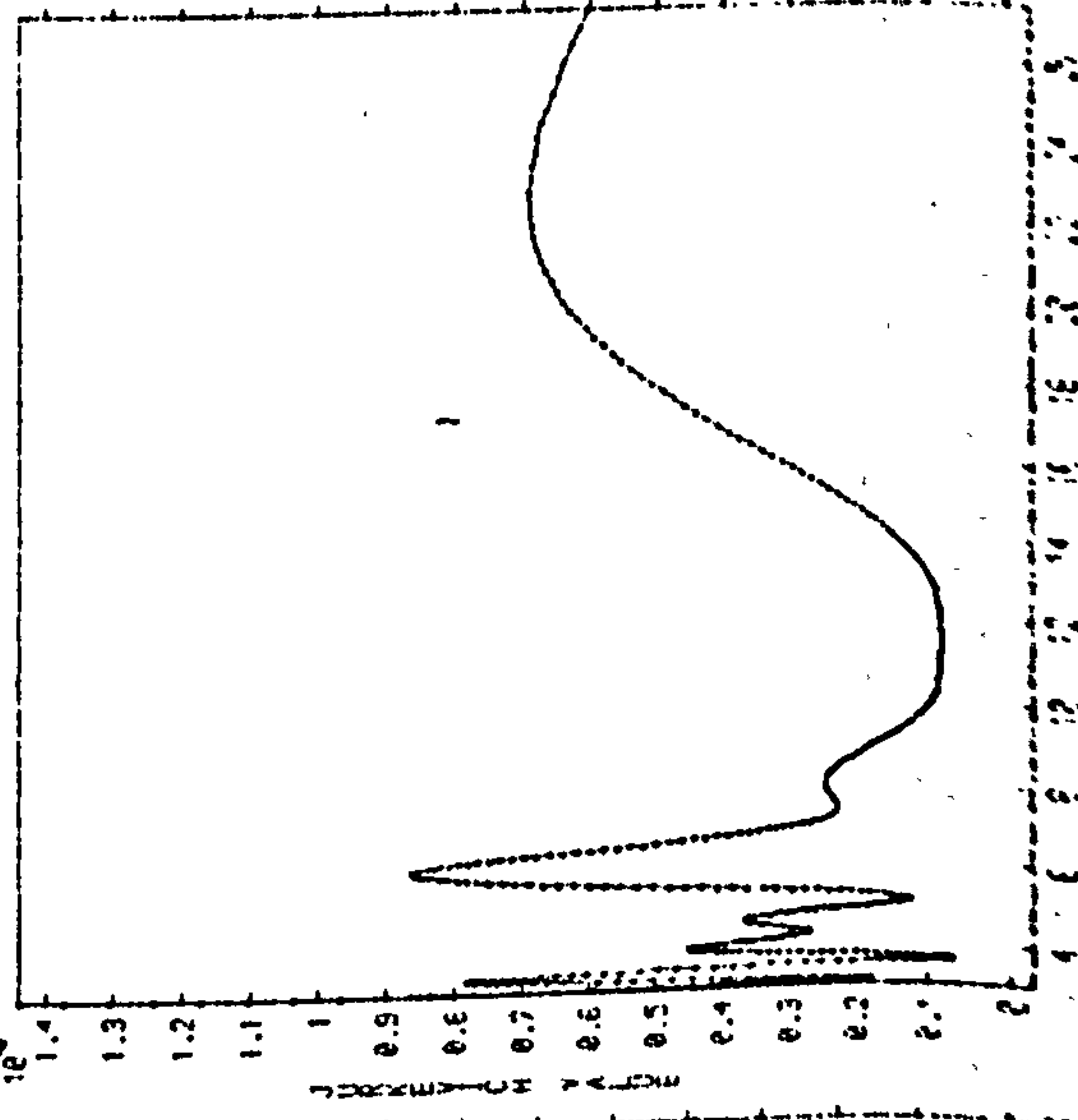
III-3A



PERIOD



PERIOD



PERIOD

PERIOD



Characteristics:

Screw

Nut

Length: 3.55 in / 2.20 cm

Diameter: 0.5265 cm

Steel

Brass

Other:

Instrument Identification:

Study Code:

ITT-3a

Instrument:

Circle-polarization and spectroscopy

Maker:

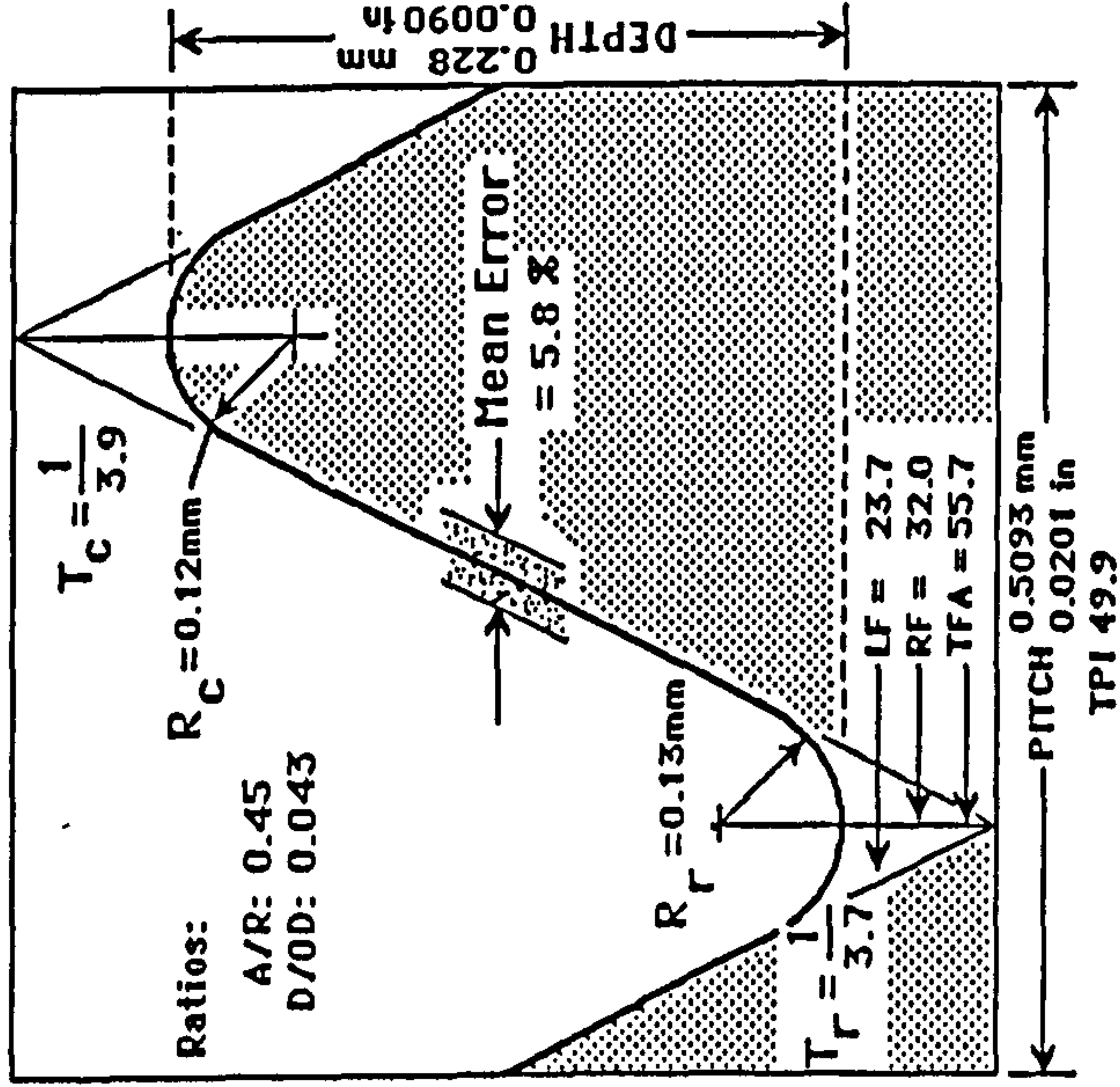
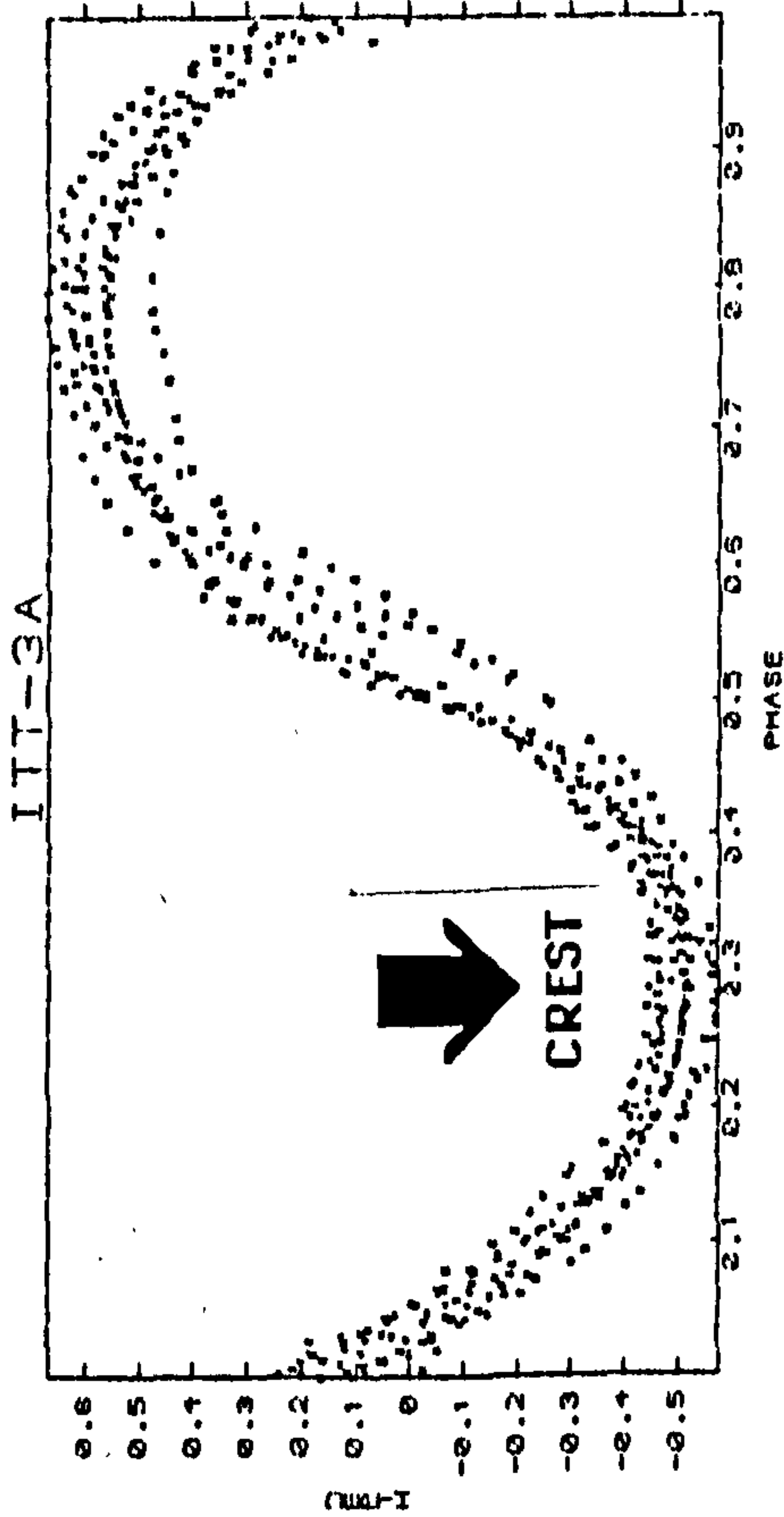
Duboscq

Date:

ca.1855

Ser./Acq. No.

B 48



Mu

Filar

Scale

Bench

Div. Eng.

Adjust.

Leveling

Focus

Eye P.

Tube

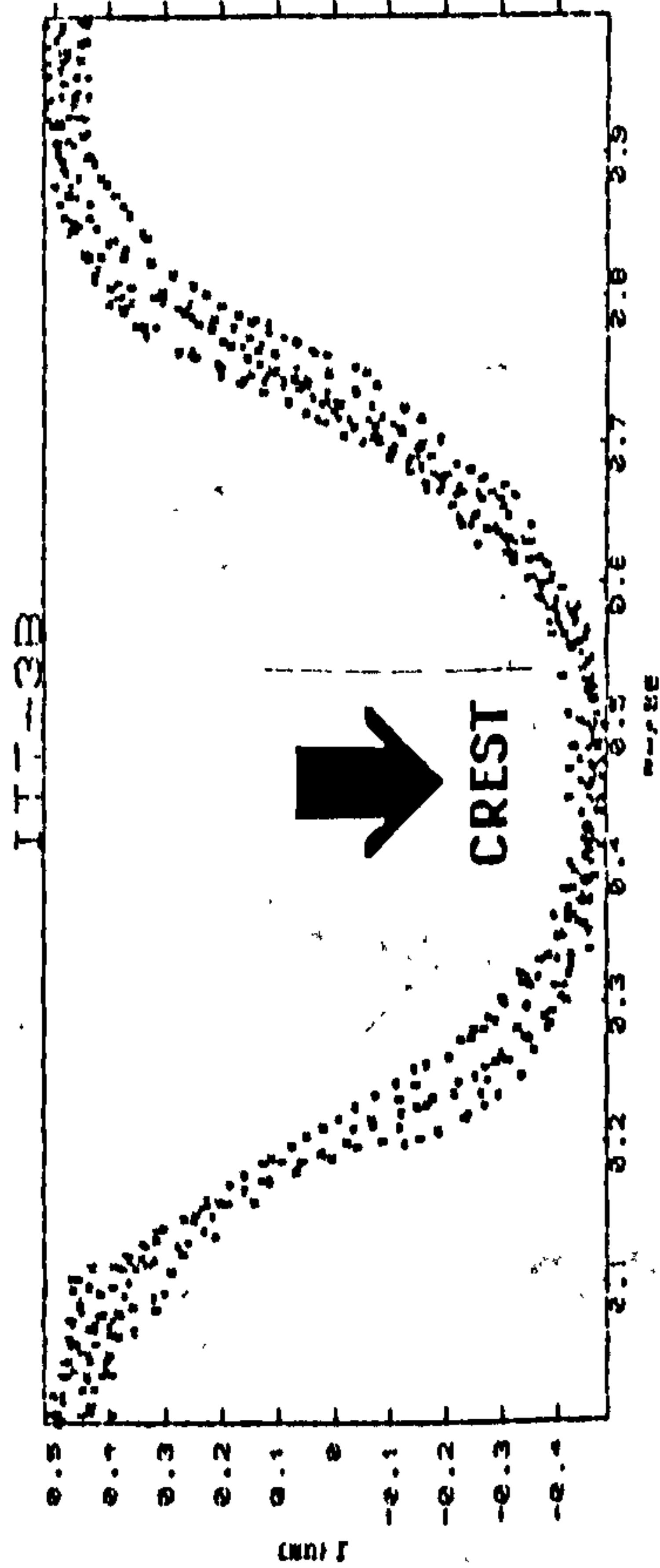
Tool

Gauge

Binding

Misc.

(Is Mu screw used as an adjusting screw but can be accurately set)



**Characteristics:**

Screw ☒ Nut ☐

Leng: 3.55 / 2.2 cm

Diameter: 0.523 cm

Steel ☐ Brass ☒

Other:

**Instrument Identification:**

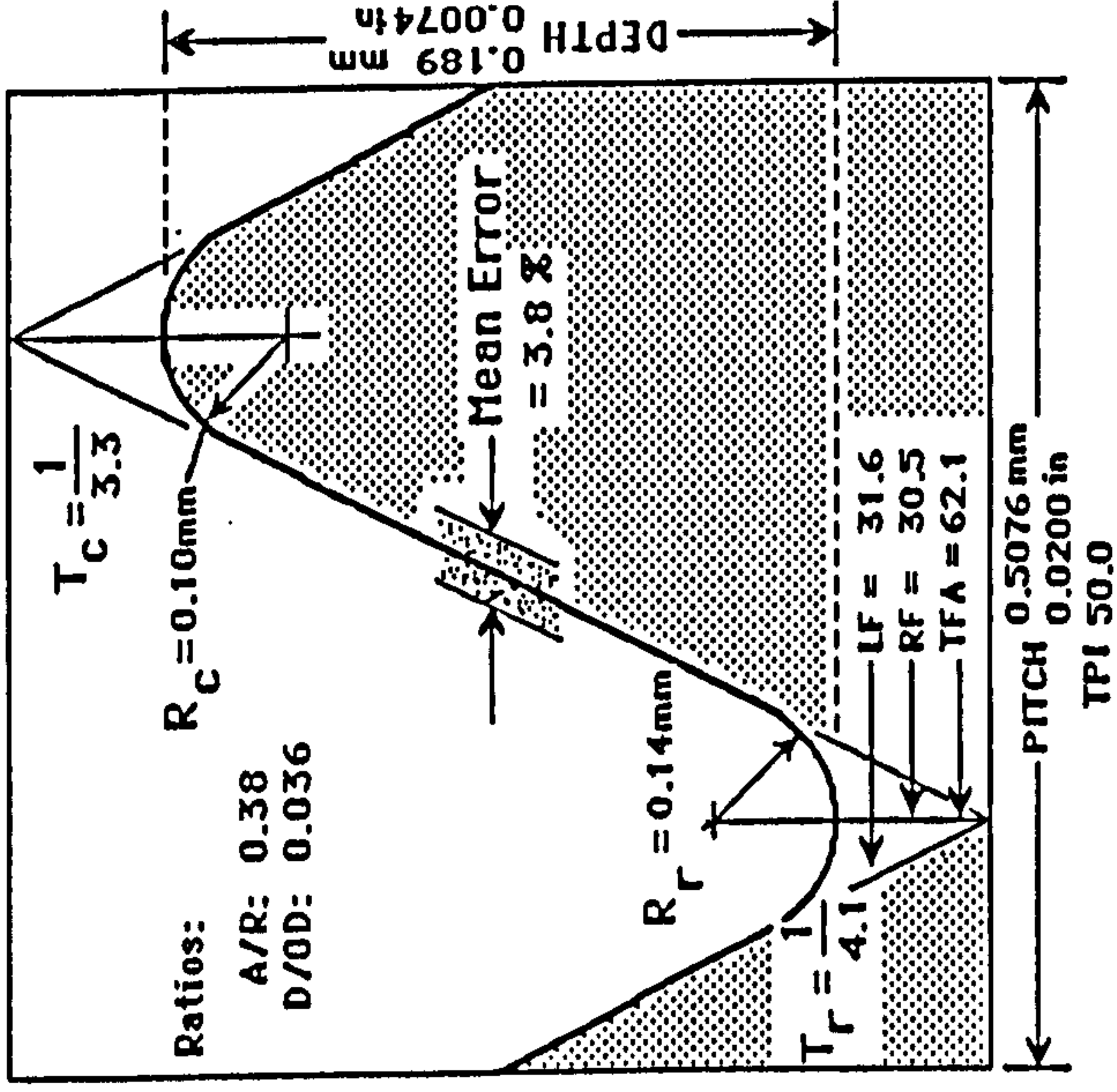
Study Code: ITT-3b

Instrument: Circle-polarization and spectroscopy

Maker: Duboscq.

Date: ca.1855

Ser./Acq. No. B 48



Mu

Filar

Scale

Bench

Div. Eng.

Adjust.

Leveling

Focus

Eye P.

Tube

Tool

Gauge

Binding

Misc.

Characteristics:

Screw

Nut

Leng: 0.98" / 0.24"

Diameter: 0.1553"

Steel

Brass

Other:

Instrument Identification:

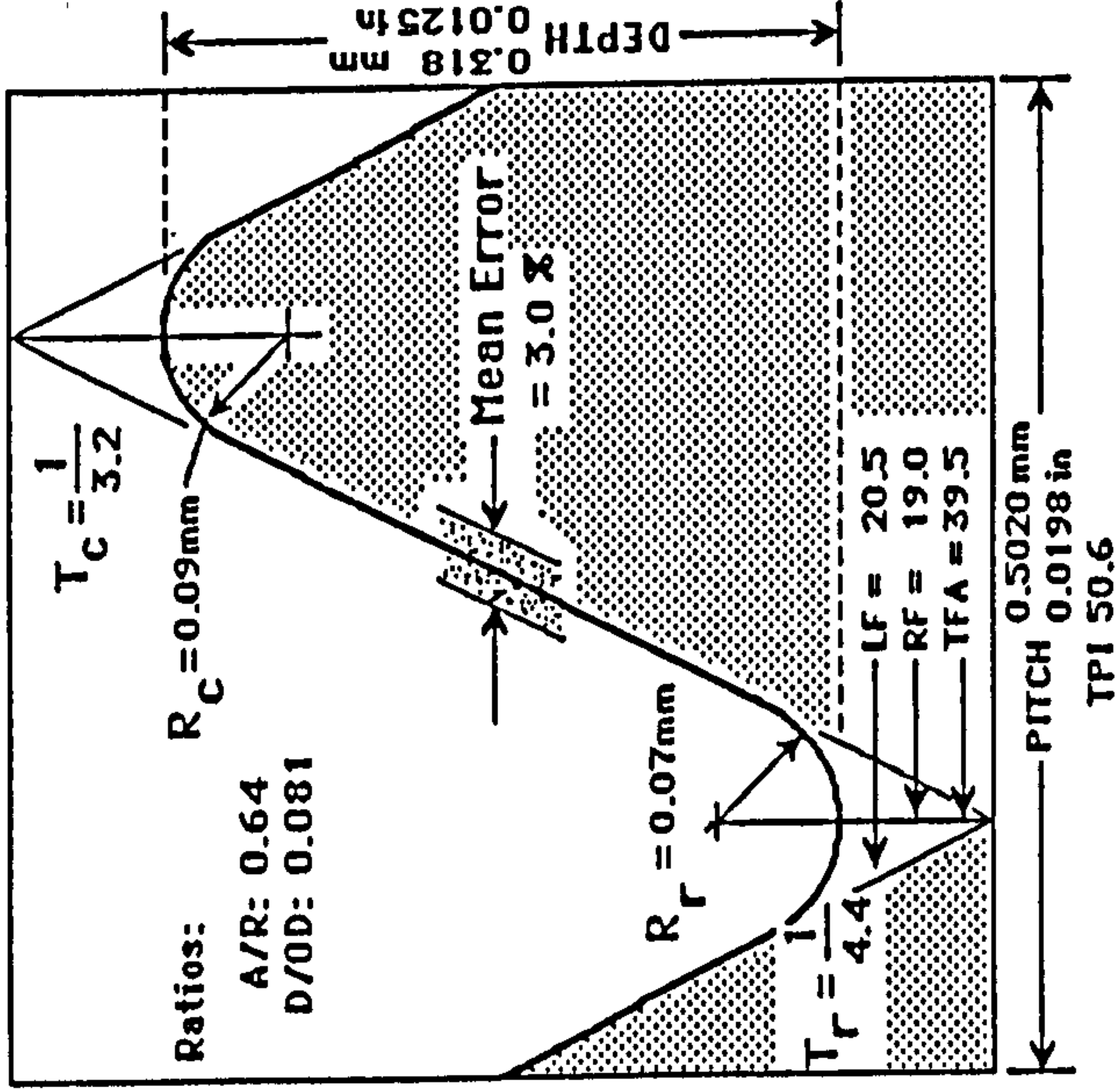
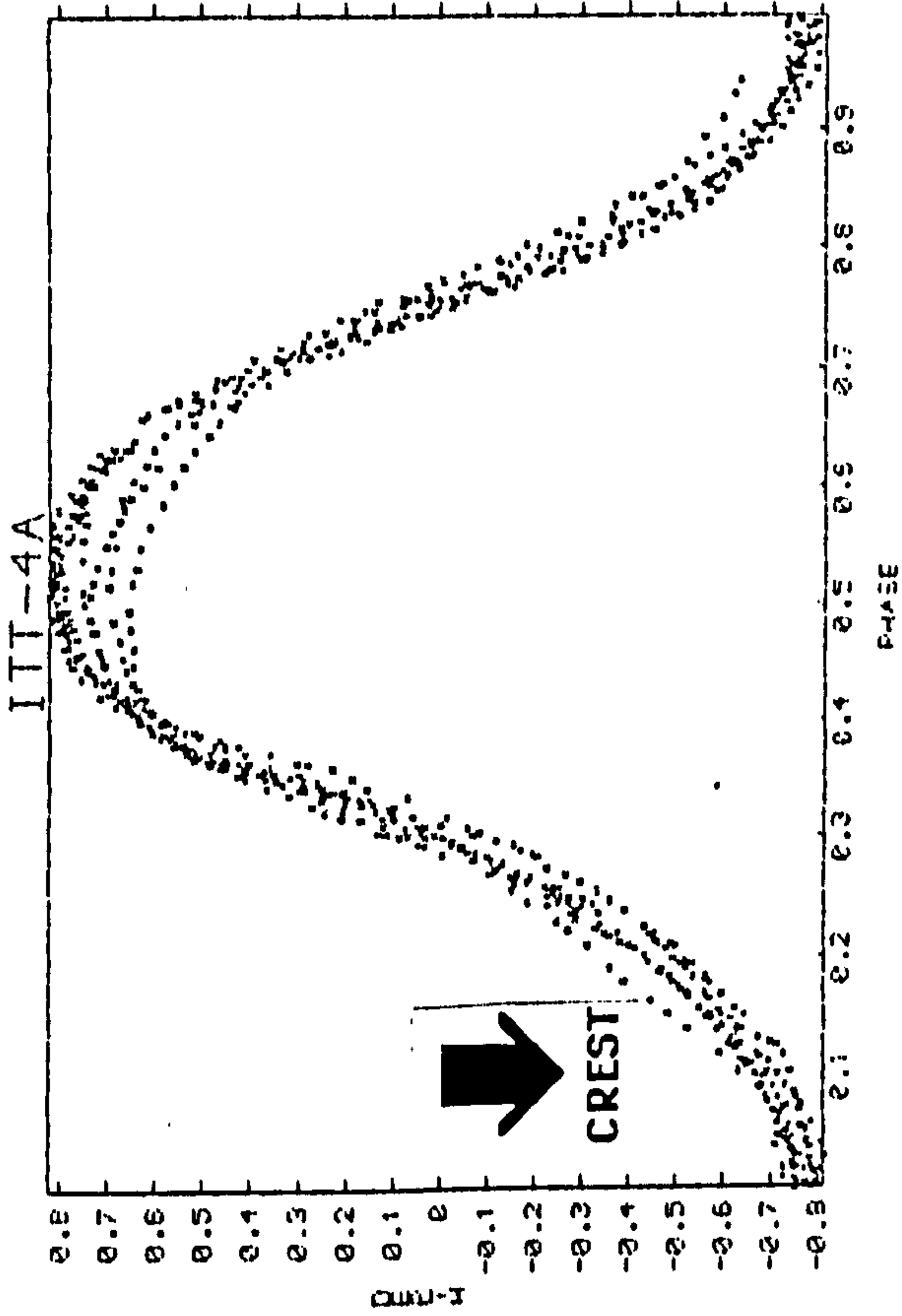
Study Code: ITT-4a

Instrument: Spectrum slit Mu

Maker: Marc Secretan

Date: 1855-78

Ser./Acq. No. B 79



Mu

Filar

Scale

Bench

Div. Eng.

Adjust.

Leveling

Focus

Eye P.

Tube

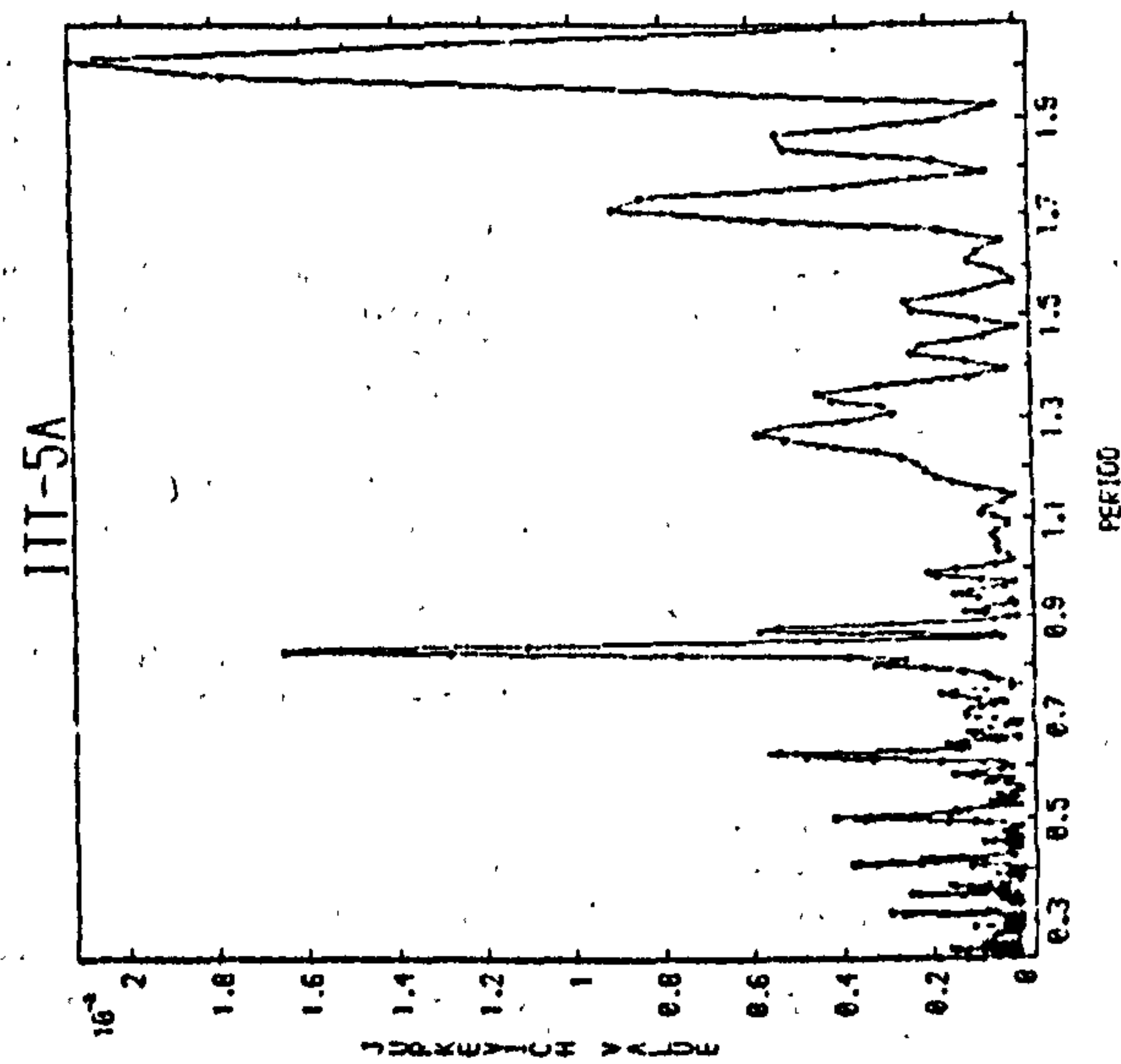
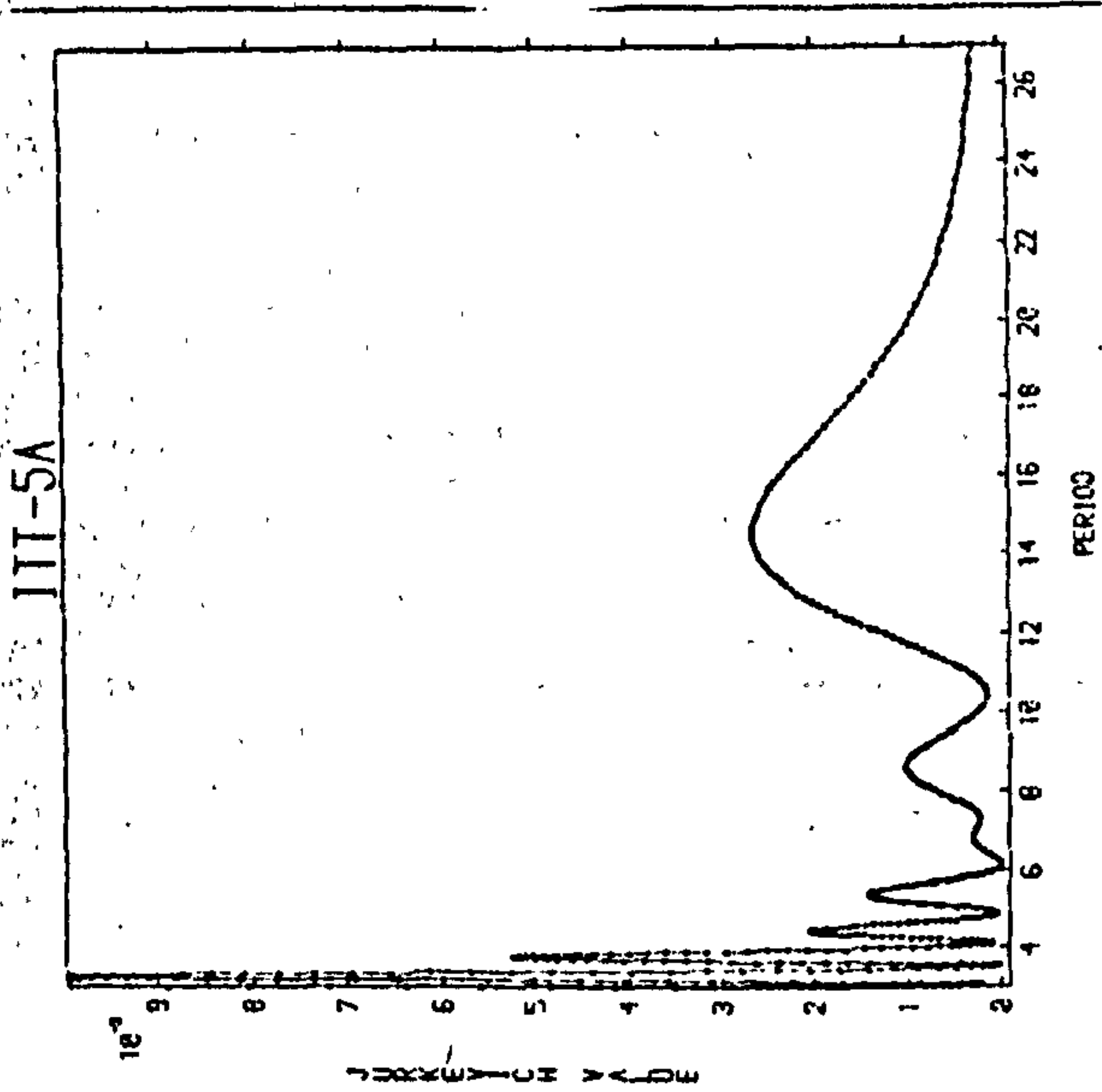
Tool

Gauge

Binding

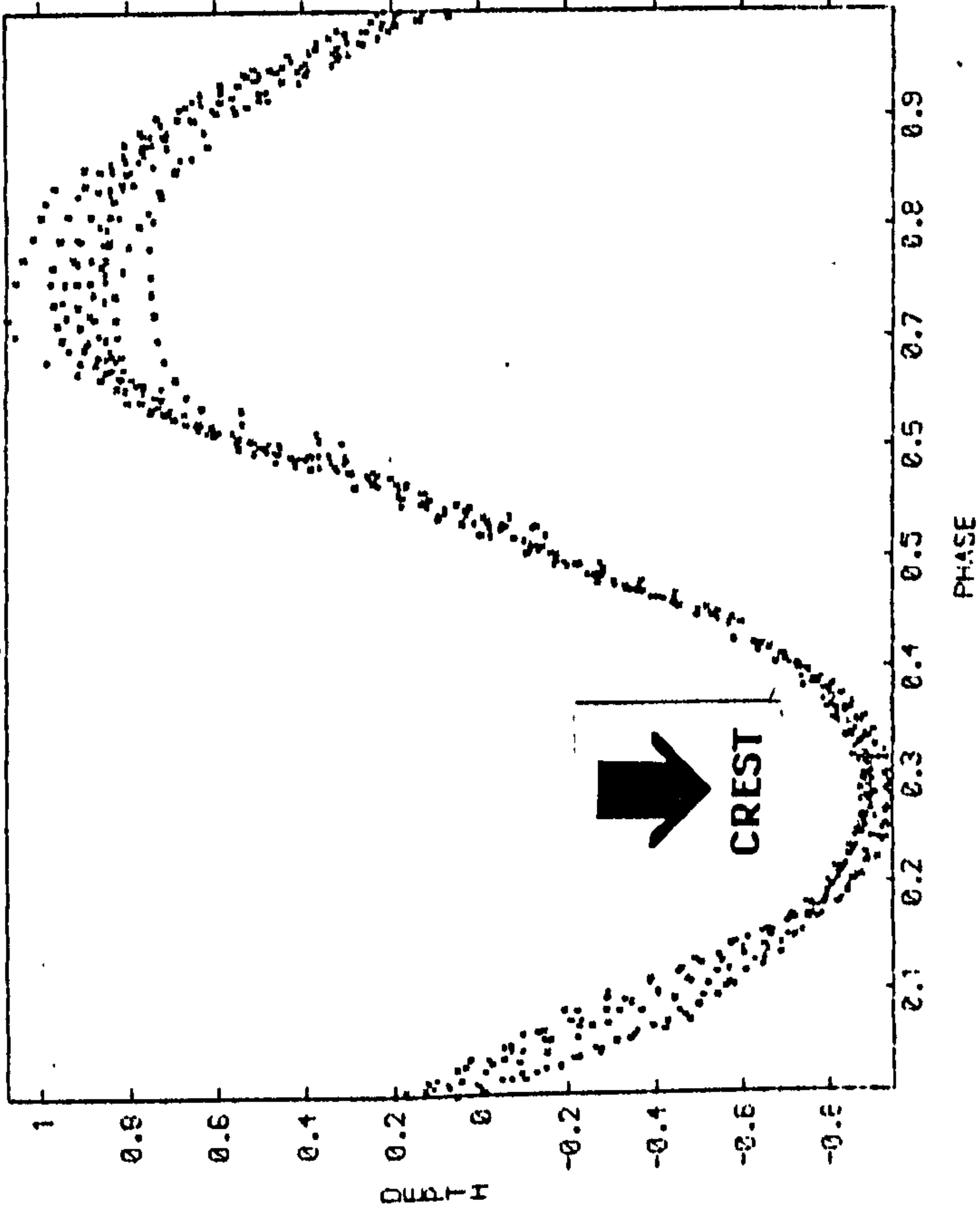
Misc.







ITT-5A



Characteristics:

Screw ☒ Nut ☐

Leng: 6.20 / 2.50 cm

Diameter: 0.416 cm

Steel ☒ Brass ☐

Other:

Instrument Identification:

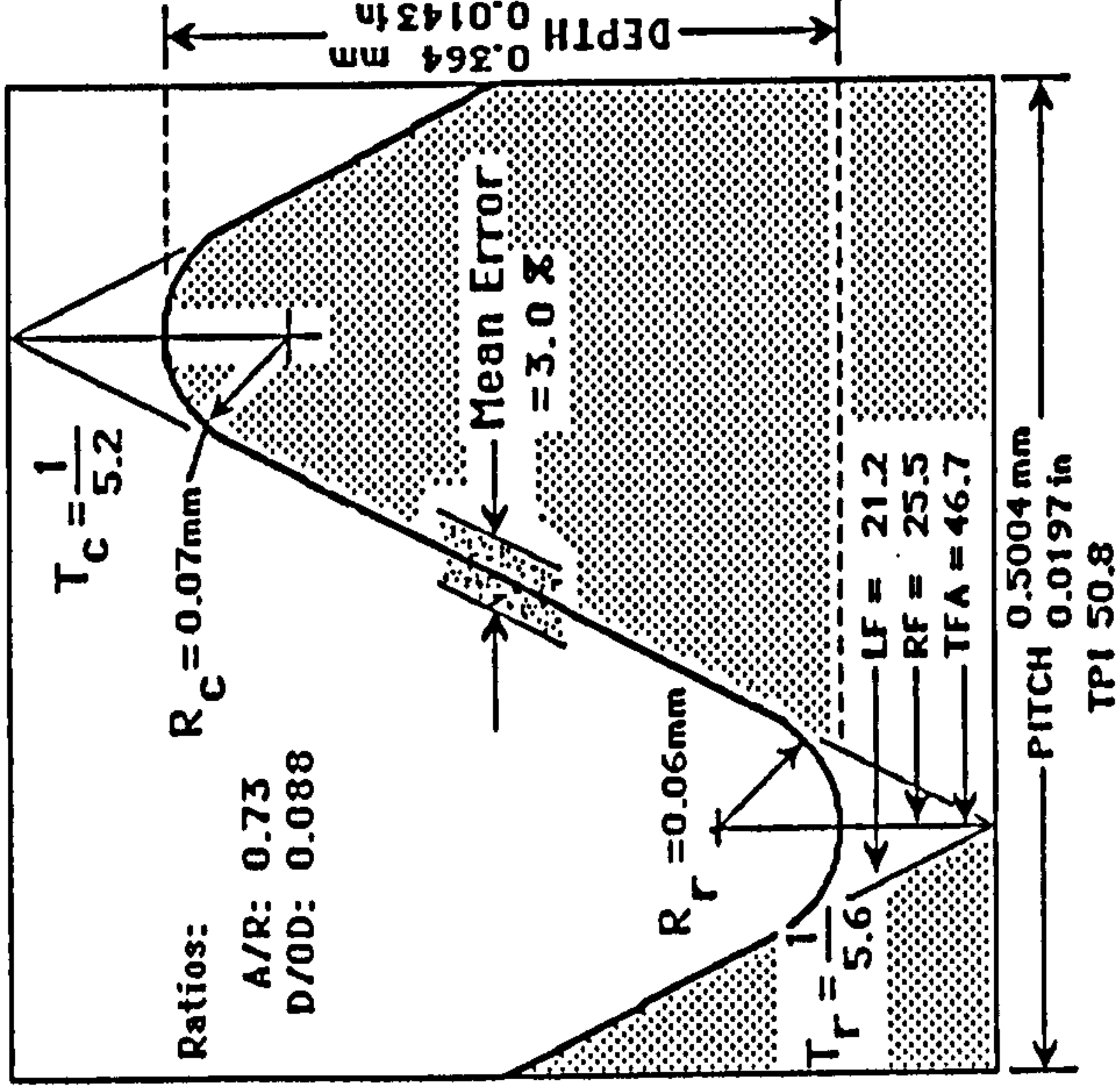
Study Code: ITT-5a

Instrument: Interference slit Mu

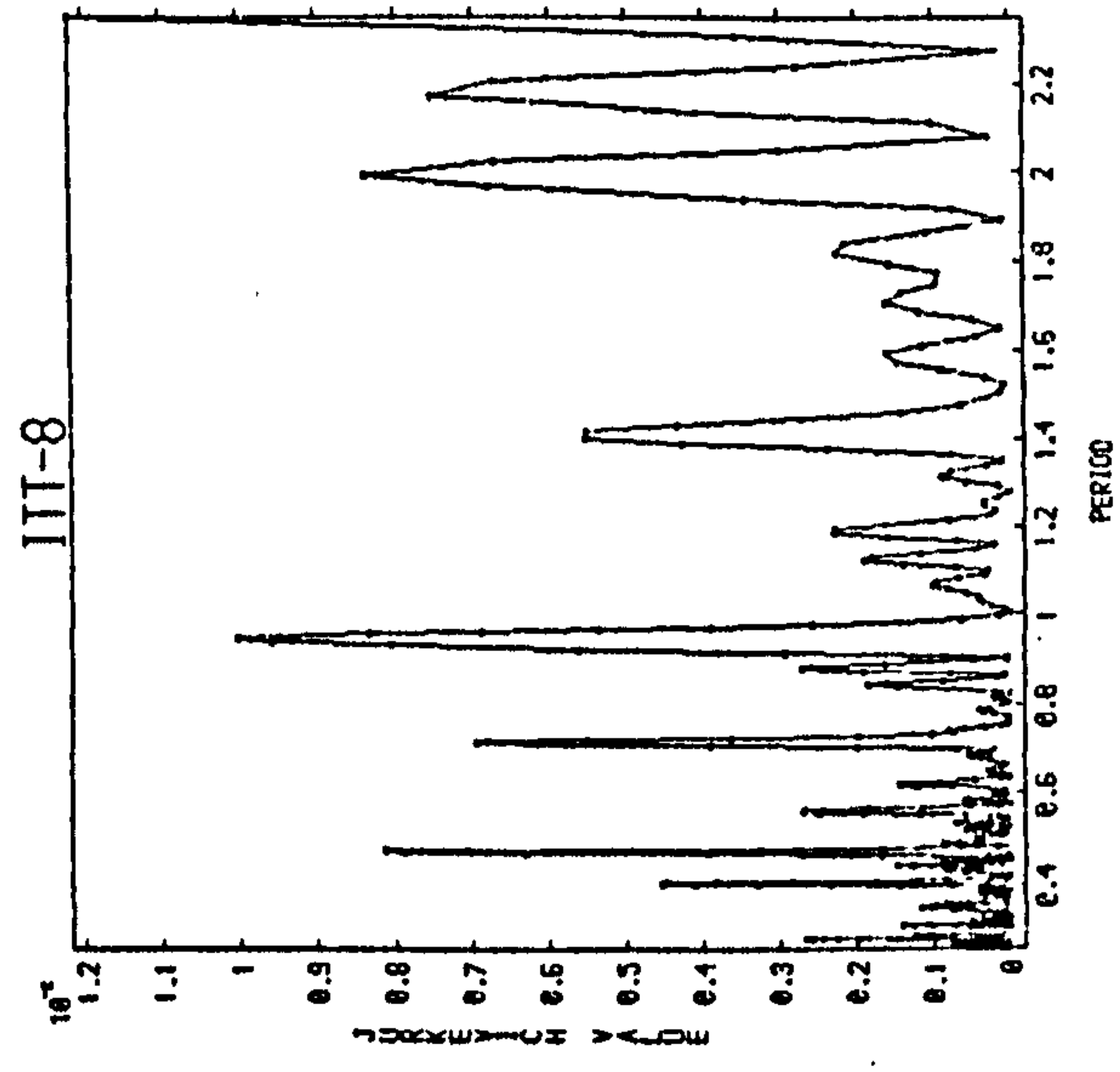
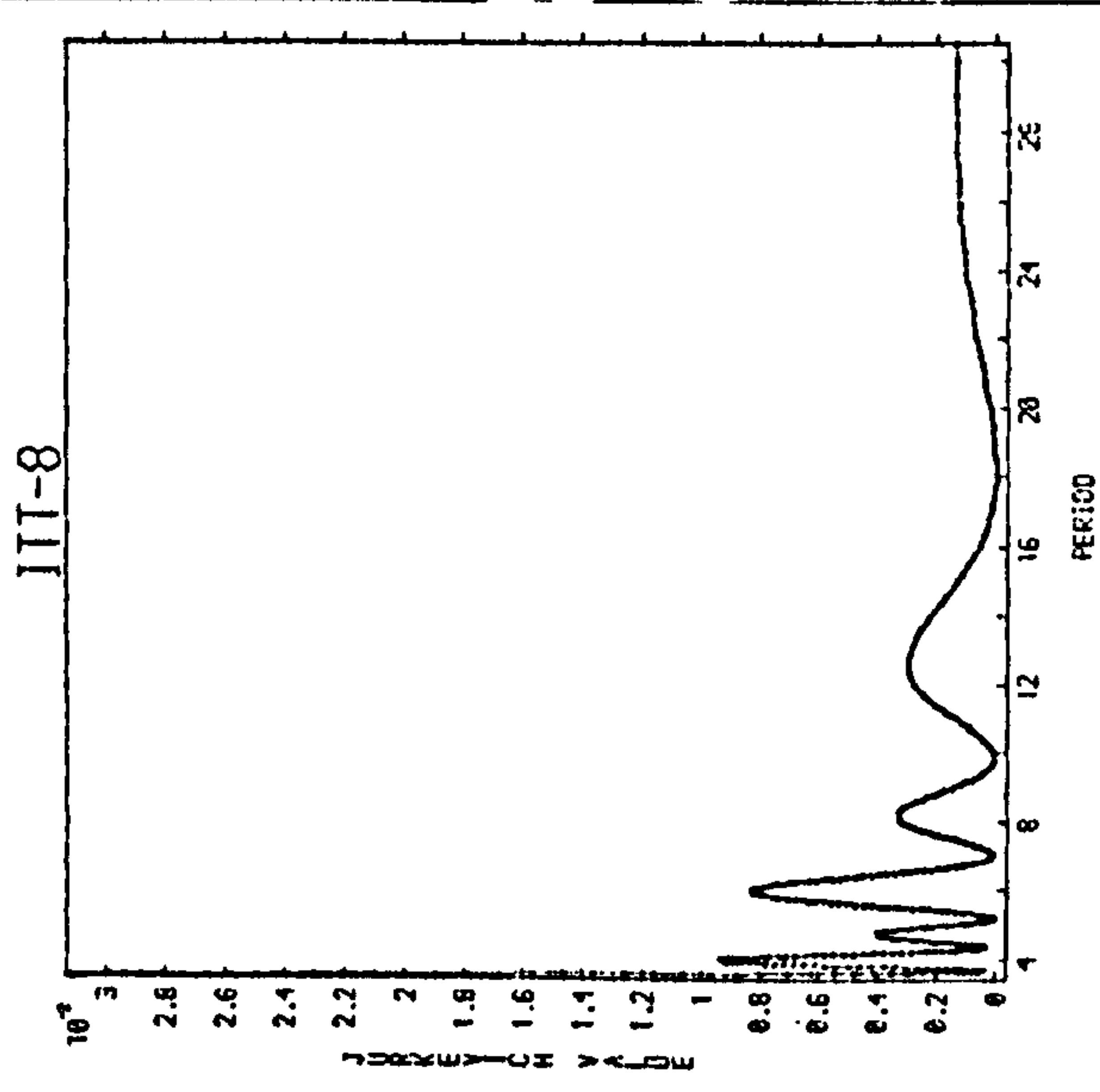
Maker: Kohl (?)

Date: 1855-78

Ser./Acq. No. B166



Mu — [ Filar Scale Bench Div. Eng. Adjust. Leveling Focus Eye P. Tube Tool Gauge Binding Misc.



Characteristics:

Screw ☒ Nut ☐

Leng: 6.50 / 0.75 cm

Diameter: 0.666 cm

Steel ☒ Brass ☐

Other:

Instrument Identification:

Study Code: ITT-8

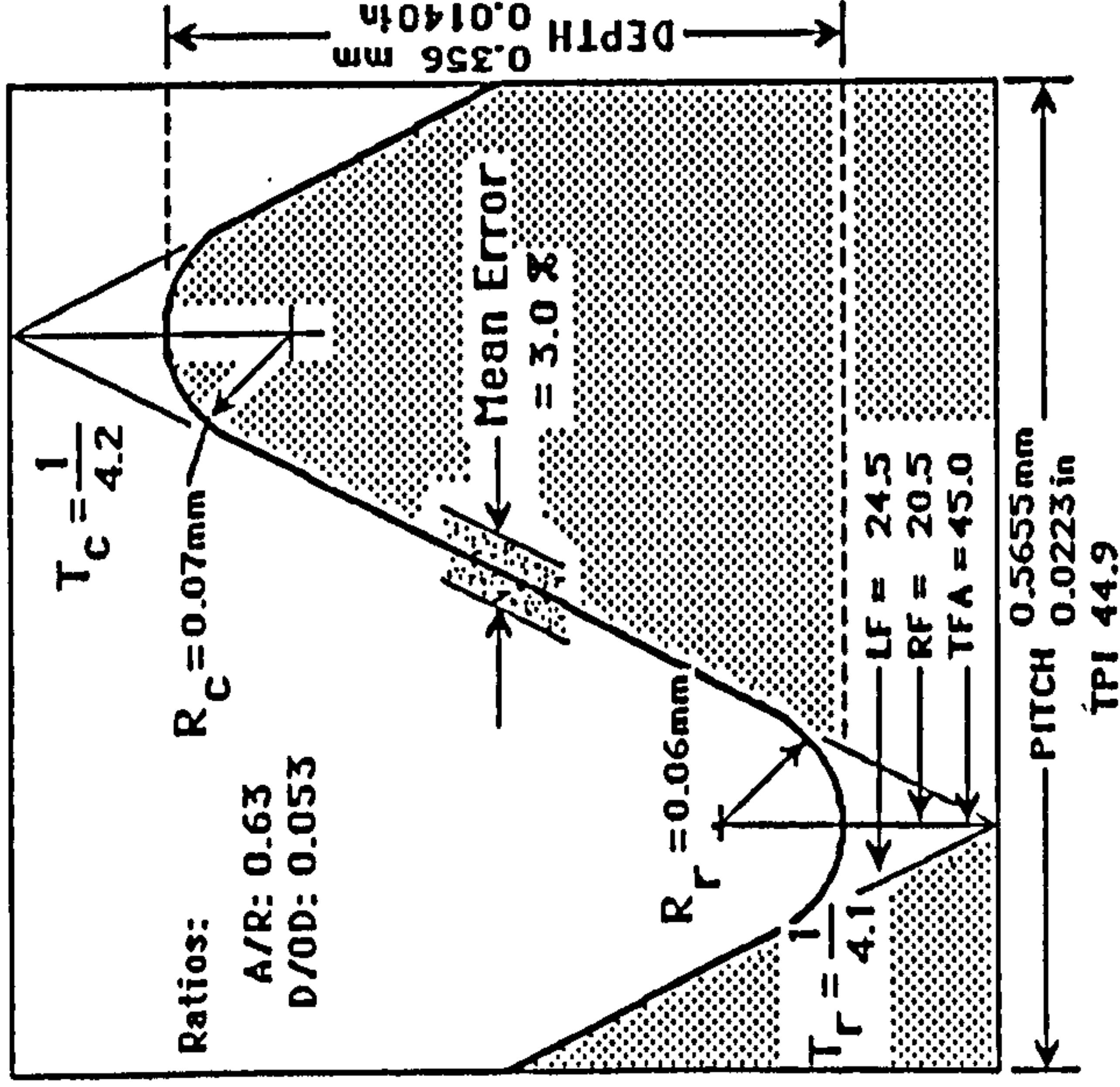
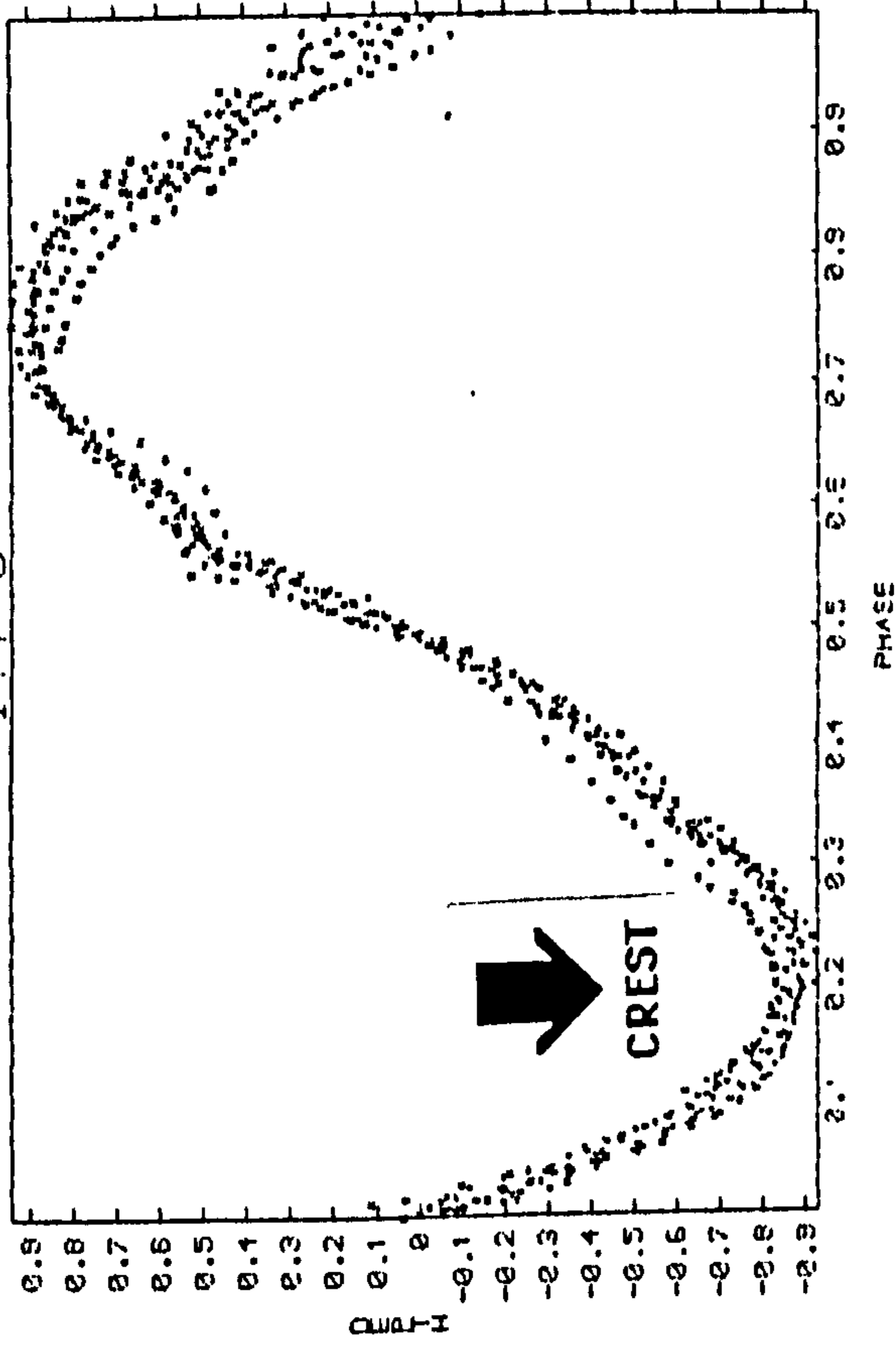
Instrument: Manometer scale reader

Maker: F. Miller, Insbruck

Date: 1855-78

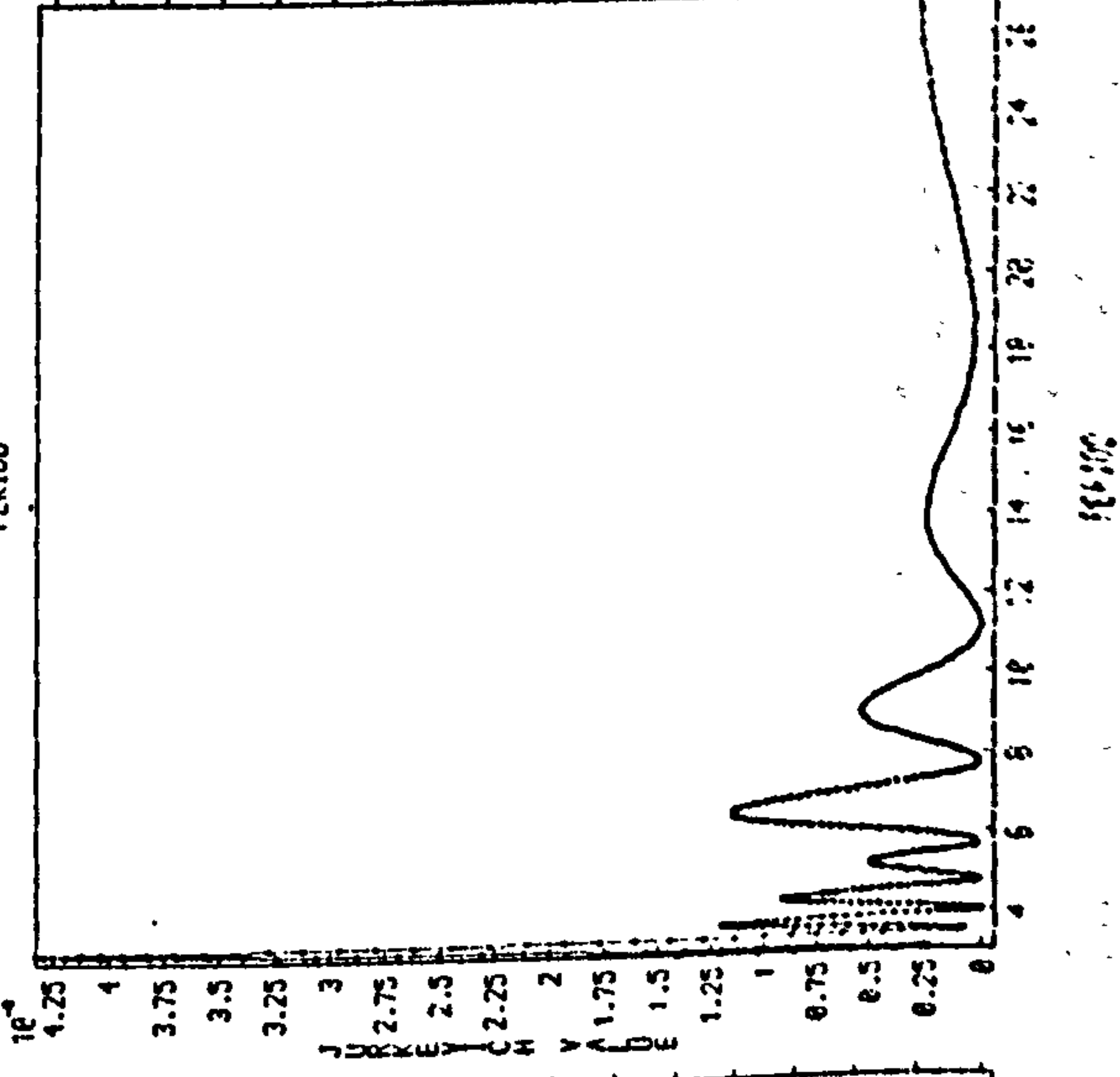
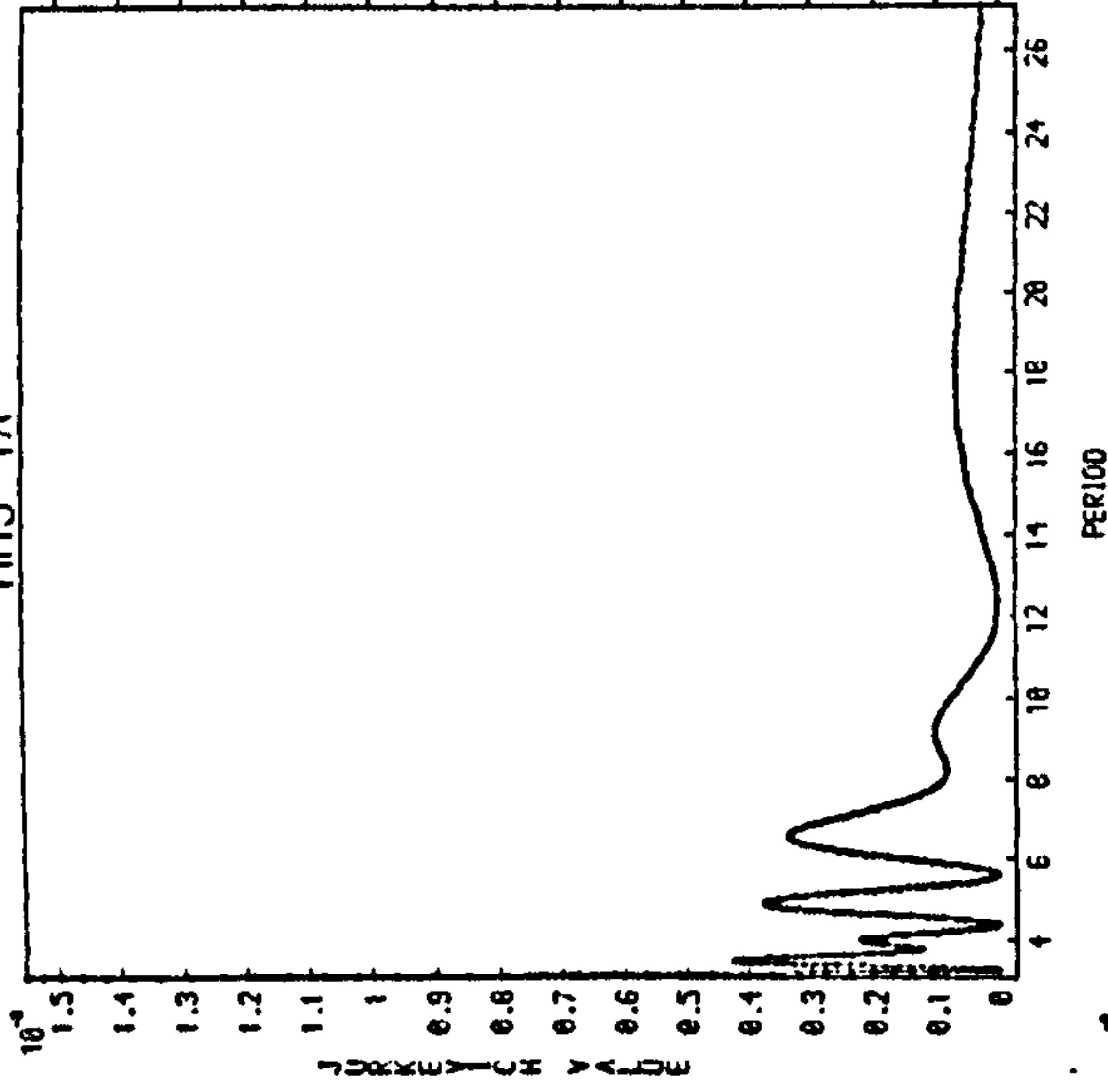
Ser./Acq. No. B-214

ITT-8

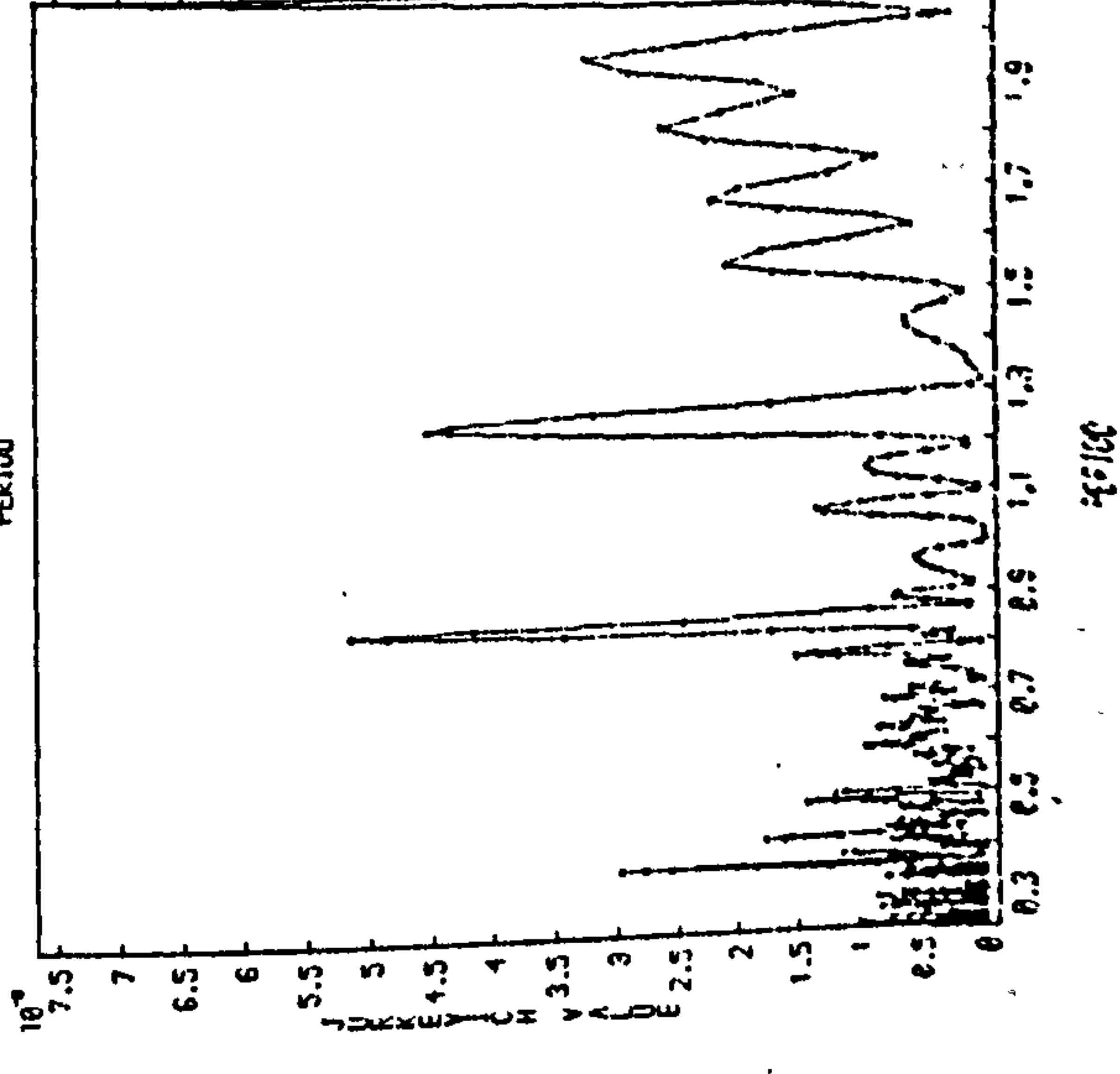
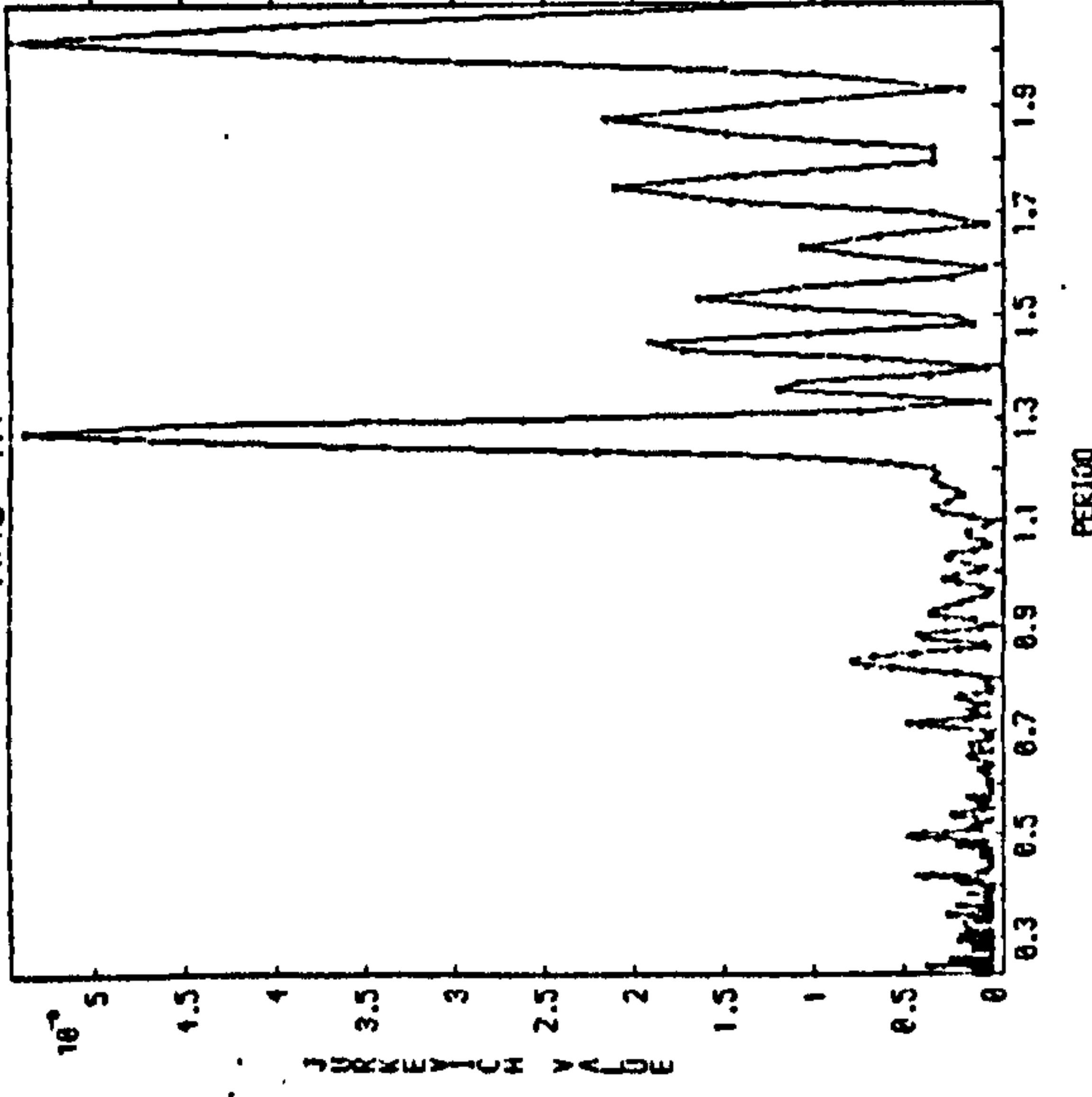


MU — [ Filar Scale Bench Div. Eng. Adjust. Leveling Focus Eye P. Tube Tool Gauge Binding Misc.

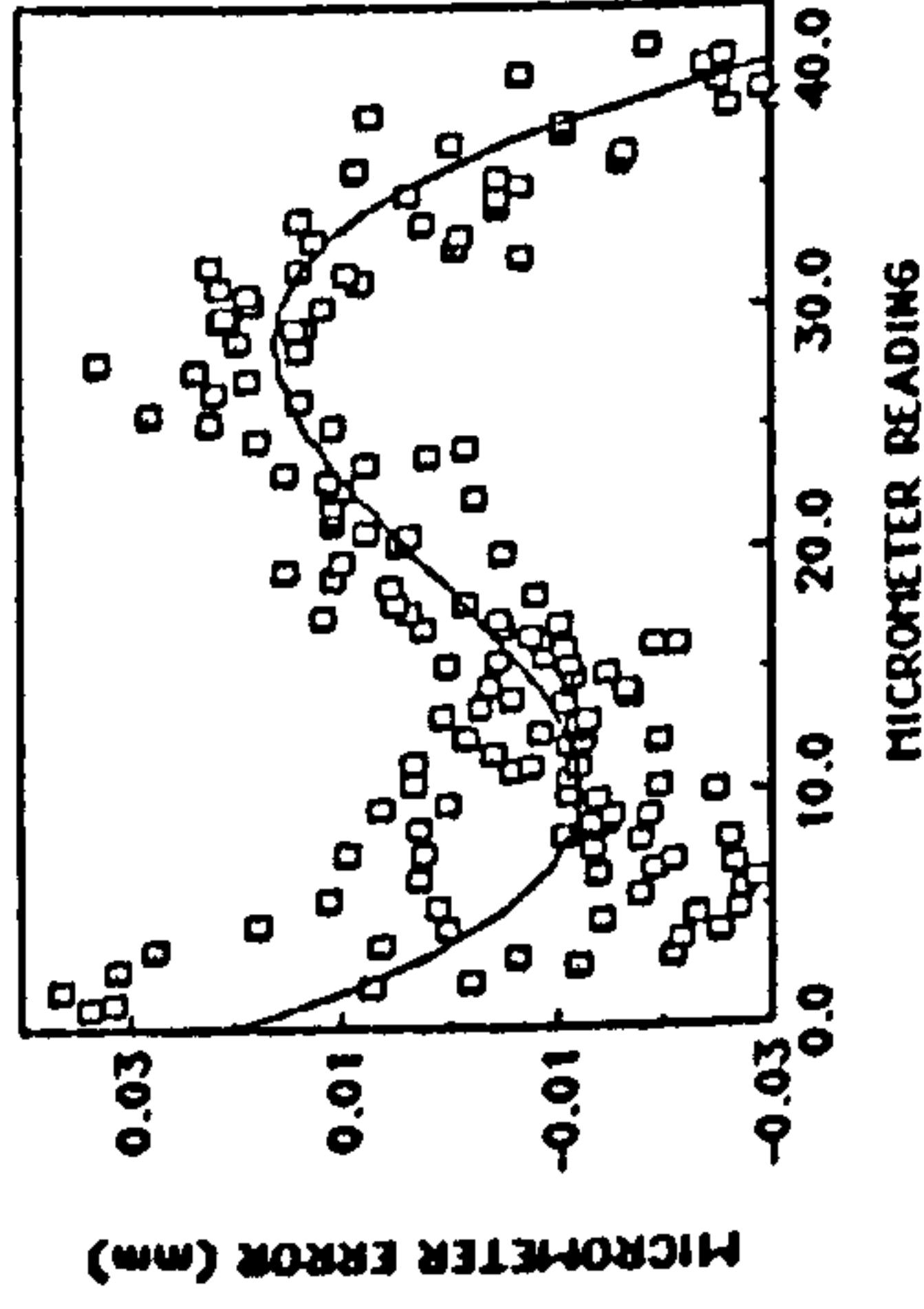
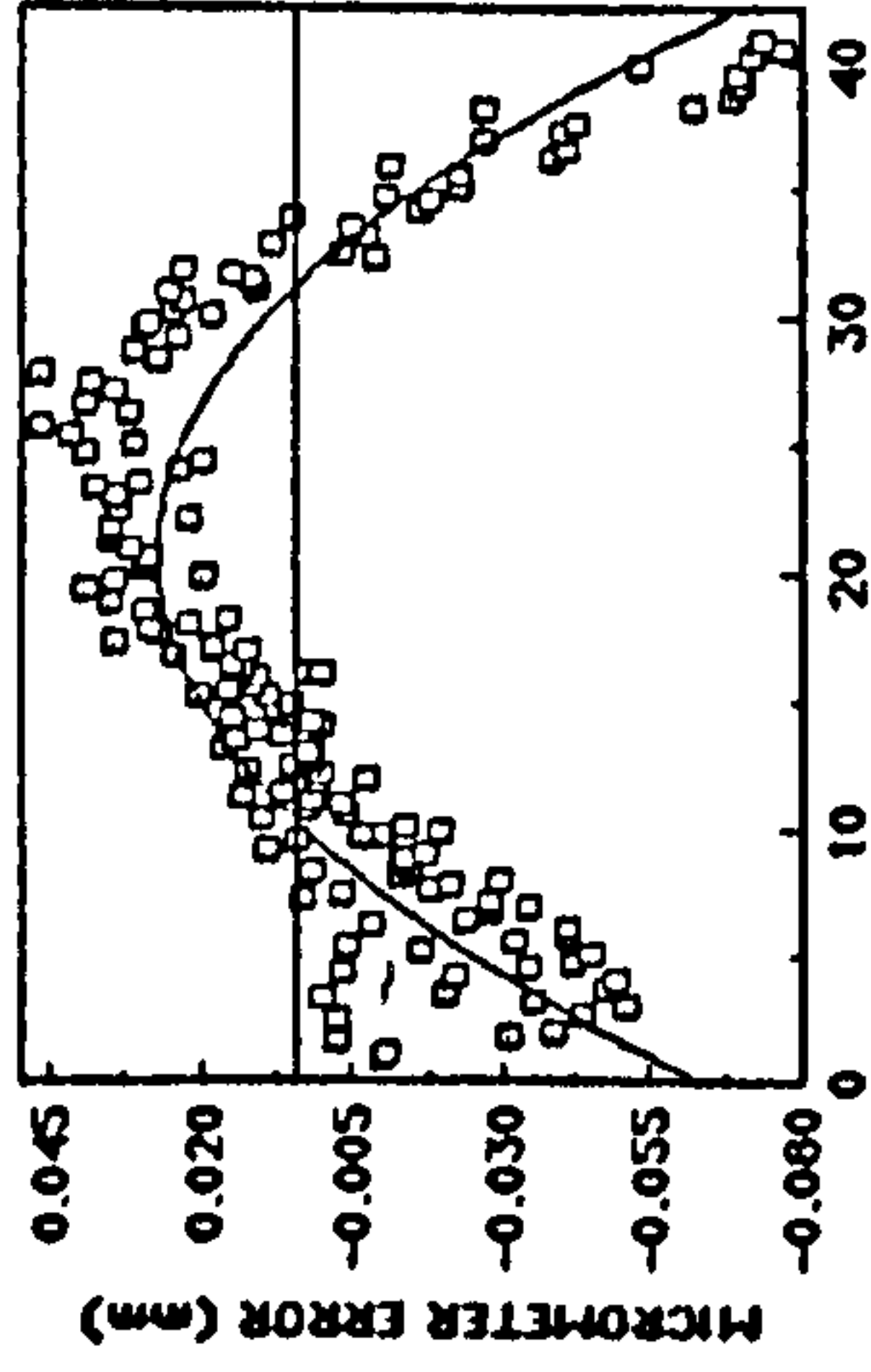
MHS-4A



MHS-4A



MHS-4





Characteristics:

Screw ☒ Nut ☐

Leng: 1.94" / 0.22"

Diameter: 0.1288"

Steel ☒ Brass ☐

Other:

Instrument Identification:

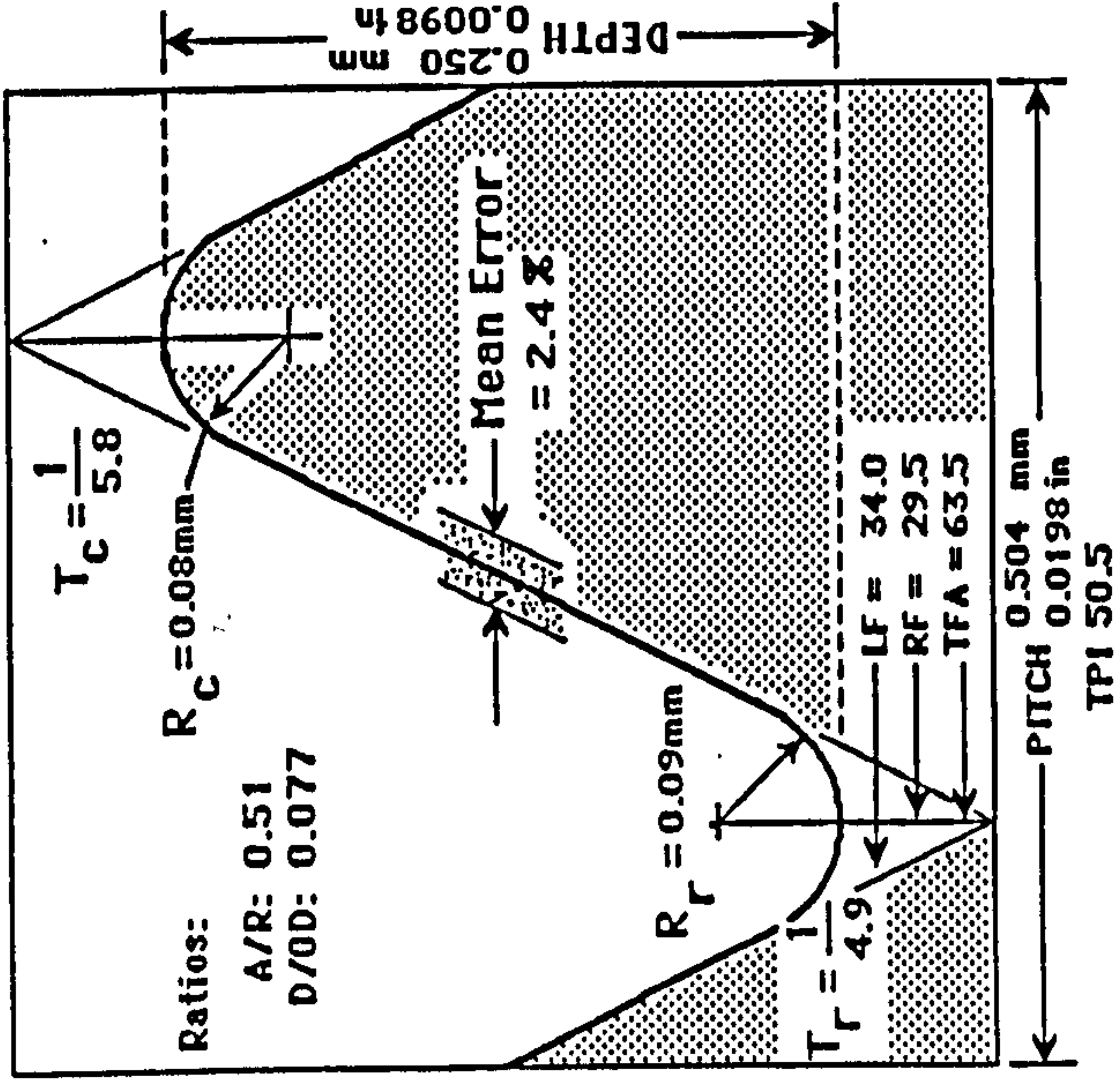
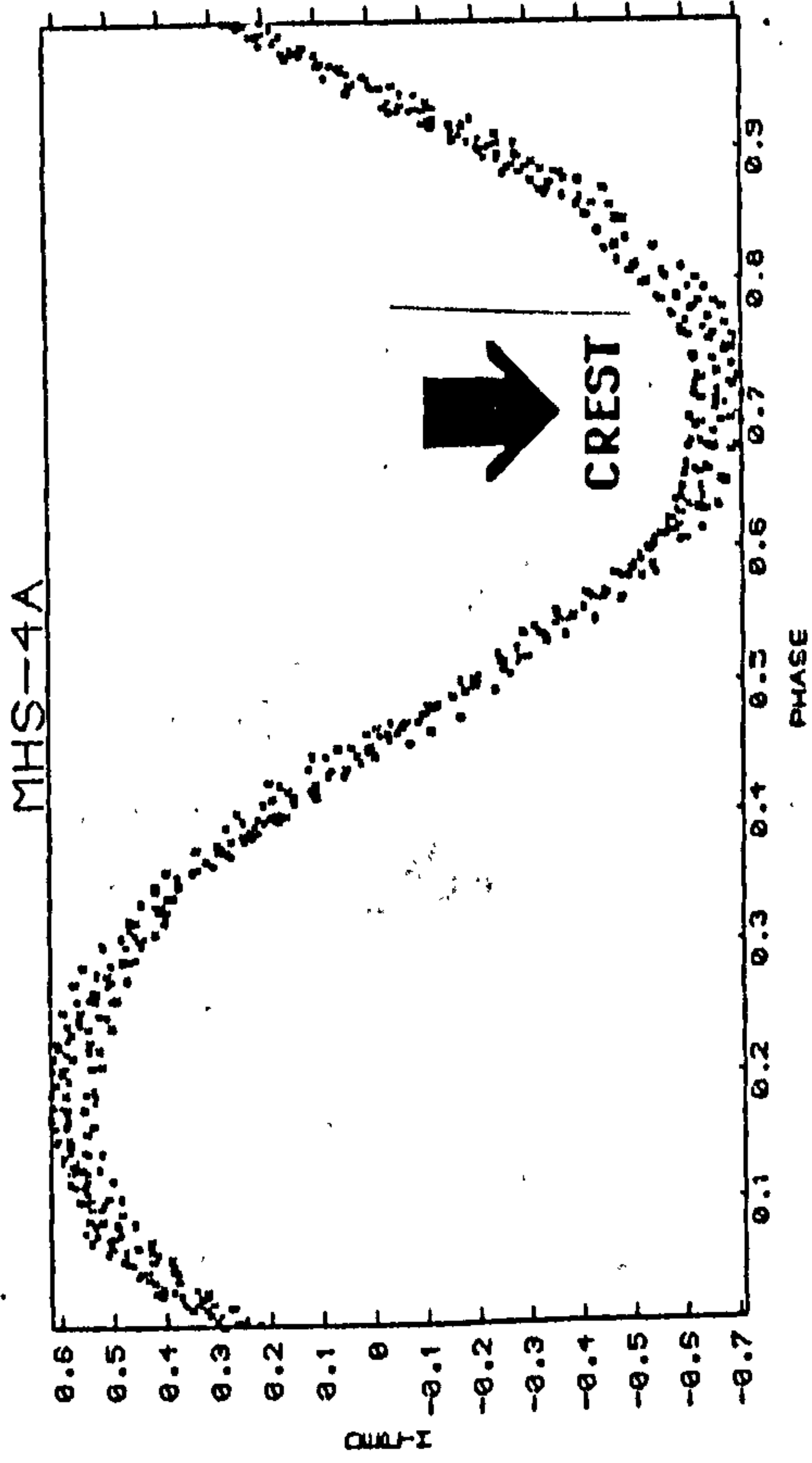
Study Code: MHS-4a

Instrument: Portable quadrant

Maker: John Bird

Date: 1770

Ser./Acq. No.



Mu

Filar

Scale

Bench

Div. Eng.

Adjust.

Leveling

Focus

Eye P.

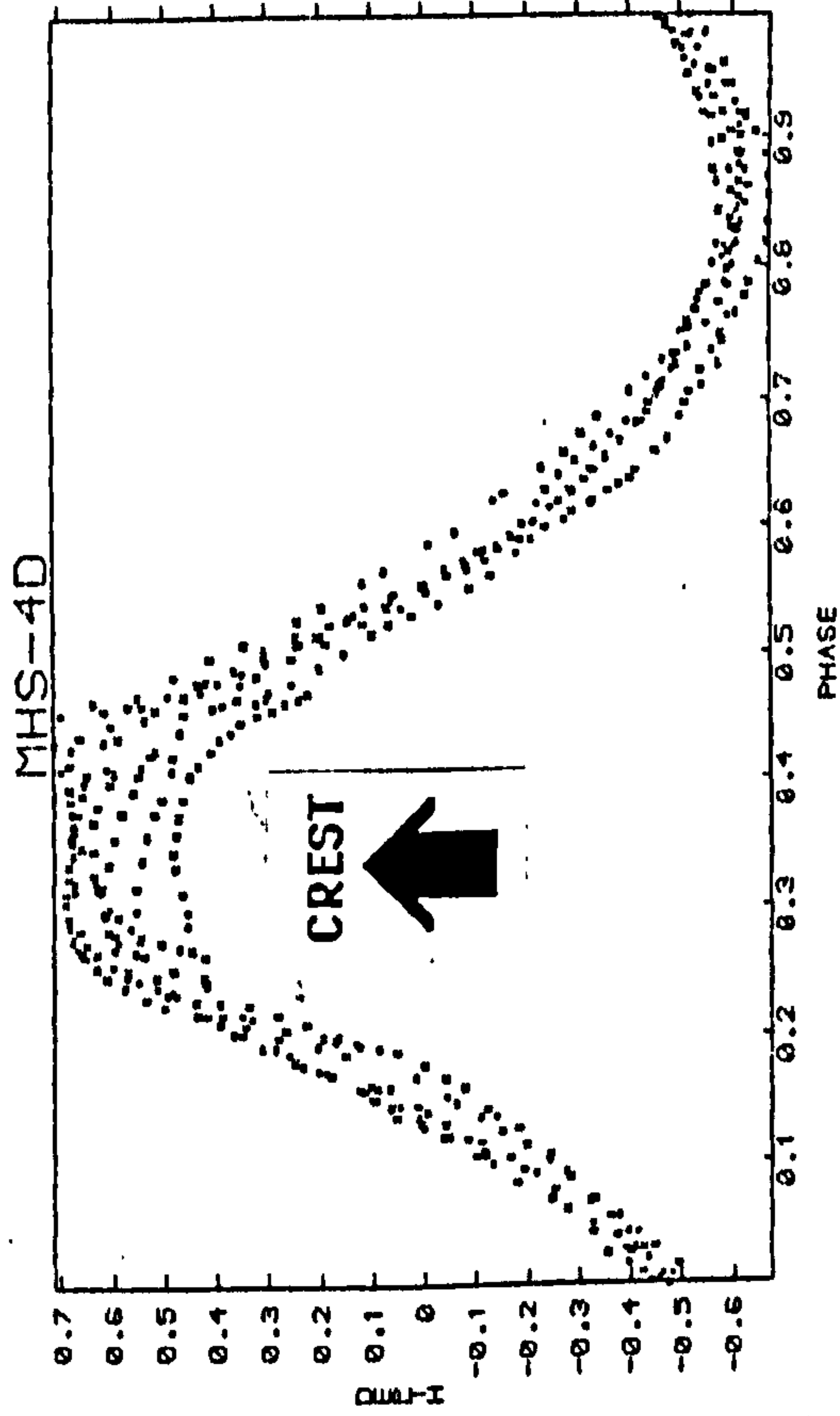
Tube

Tool

Gauge

Binding

Misc.



**Characteristics:**

Screw ☐ Nut ☒

Leng: 1.94" / 0.22"

Diameter: 0.128"

Steel ☐ Brass ☒

Other:

**Instrument Identification:**

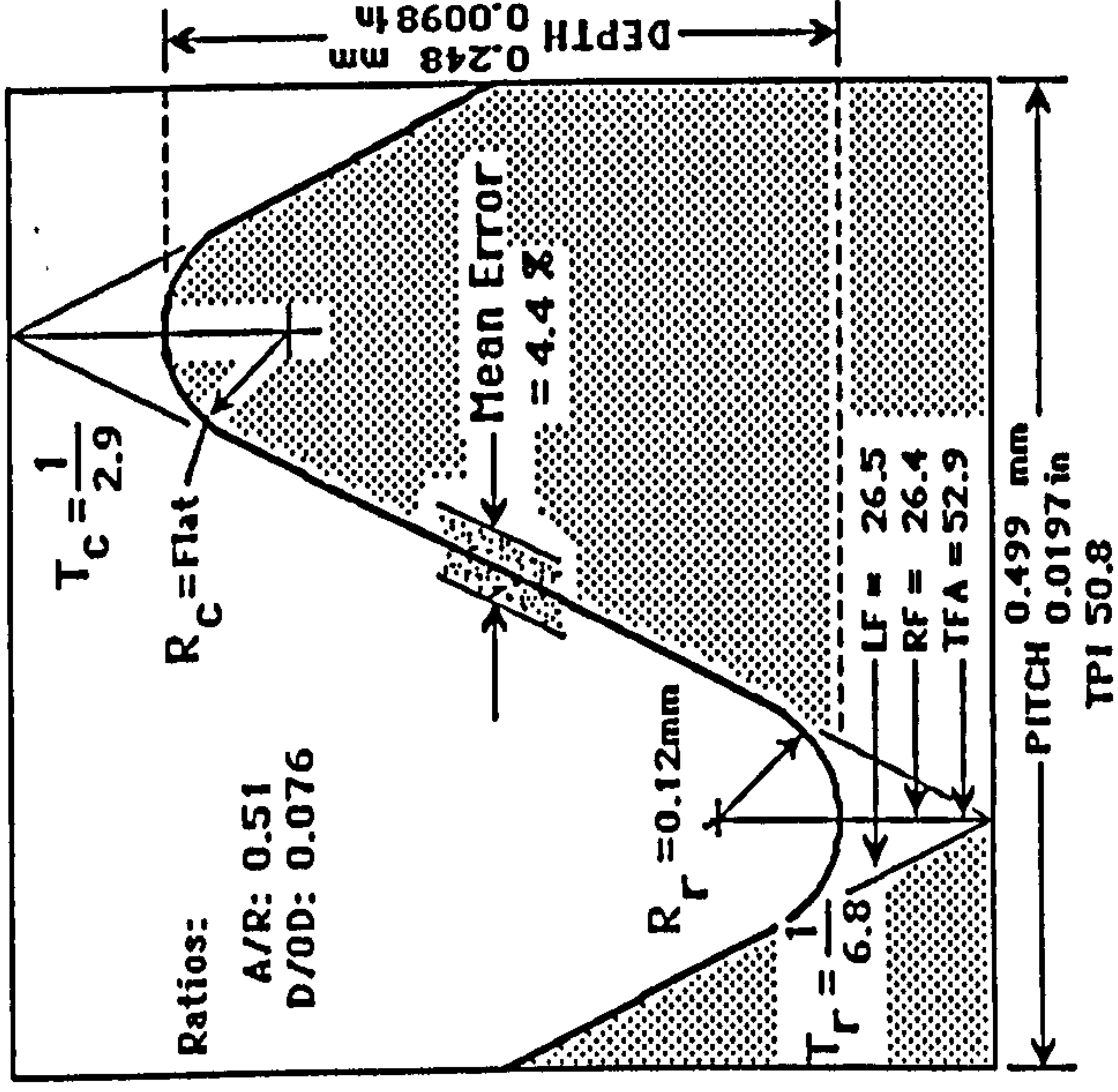
Study Code: MHS-4d

Instrument: Portable quadrant

Maker: John Bird

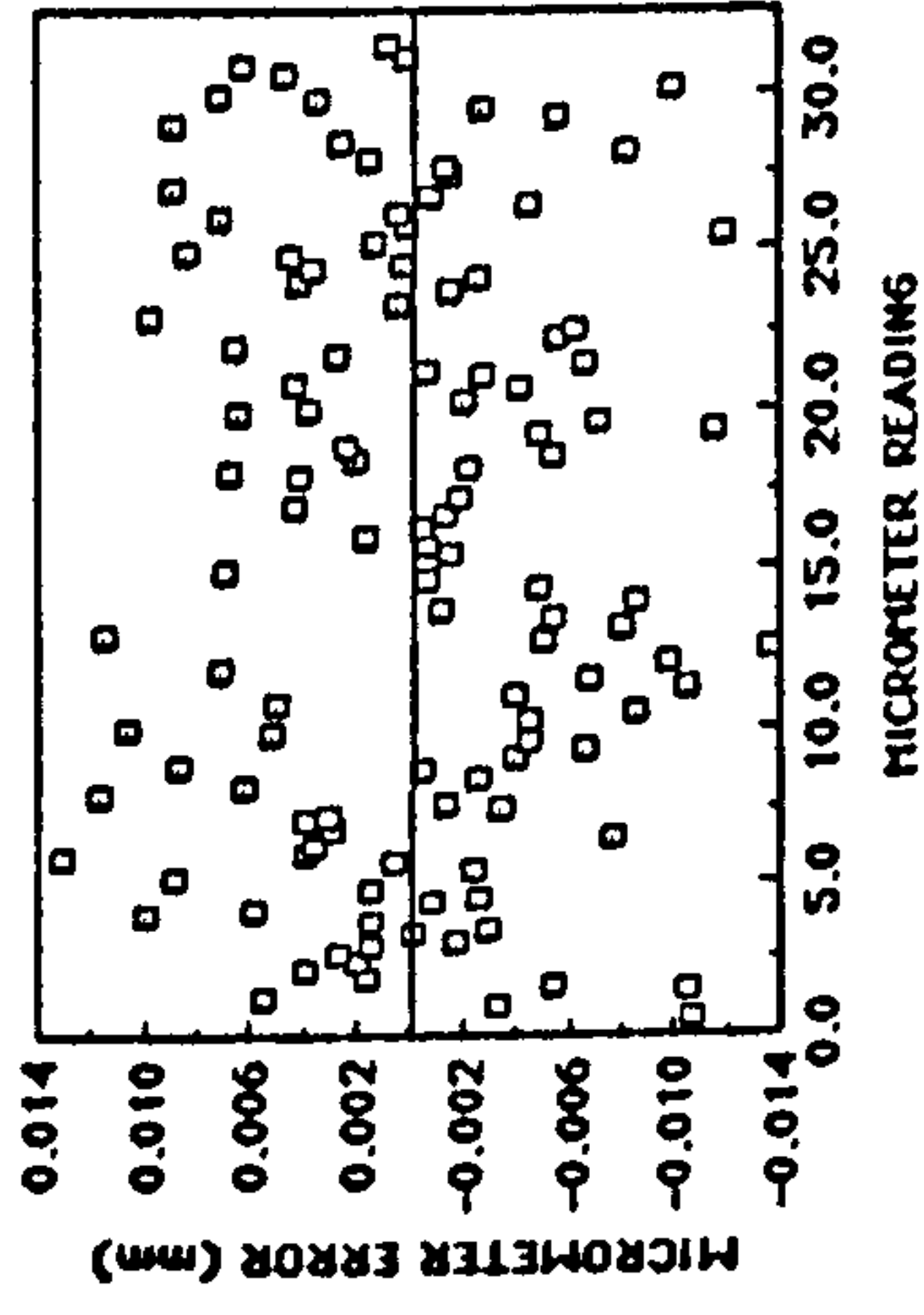
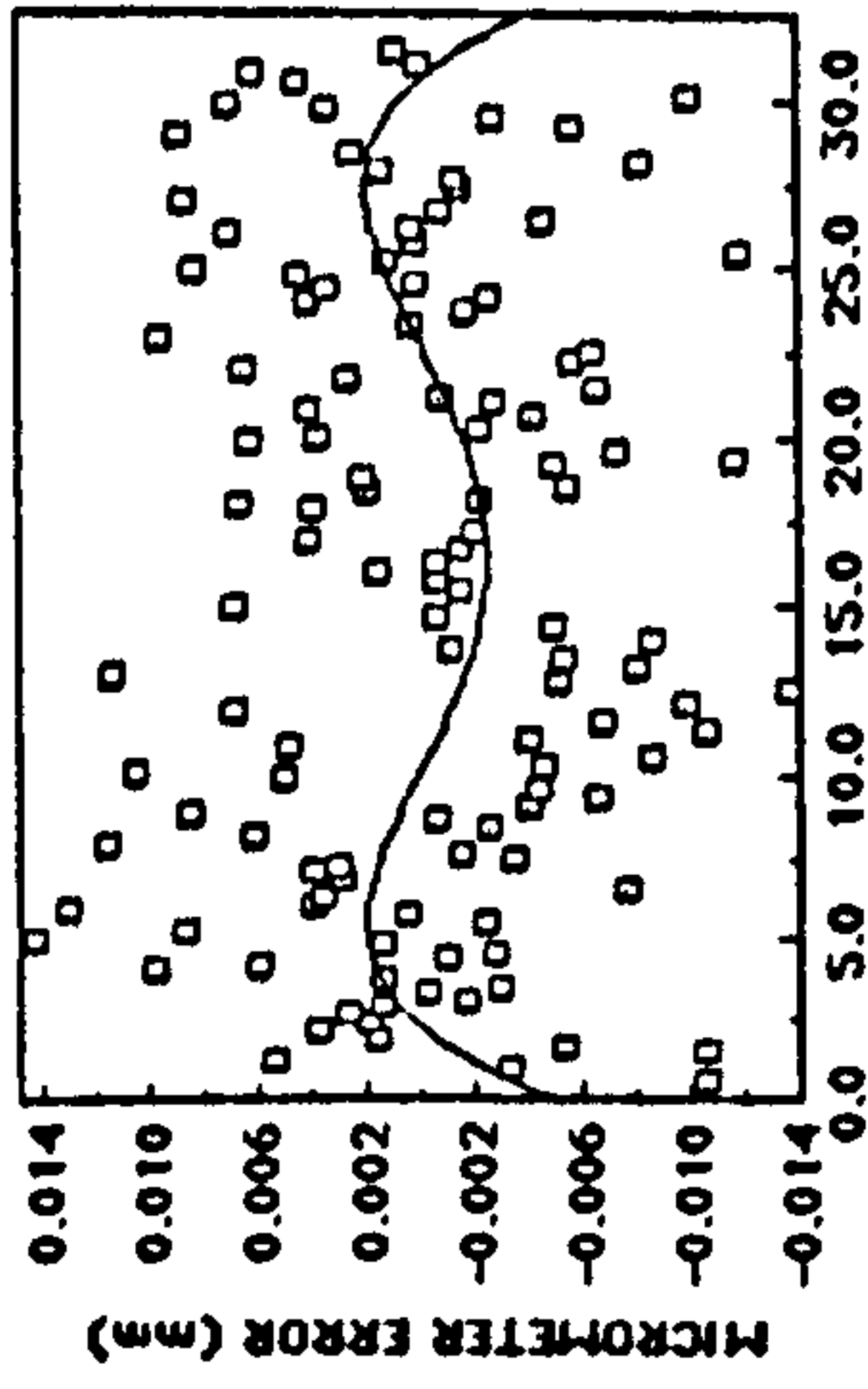
Date: 1770

Ser./Acq. No.

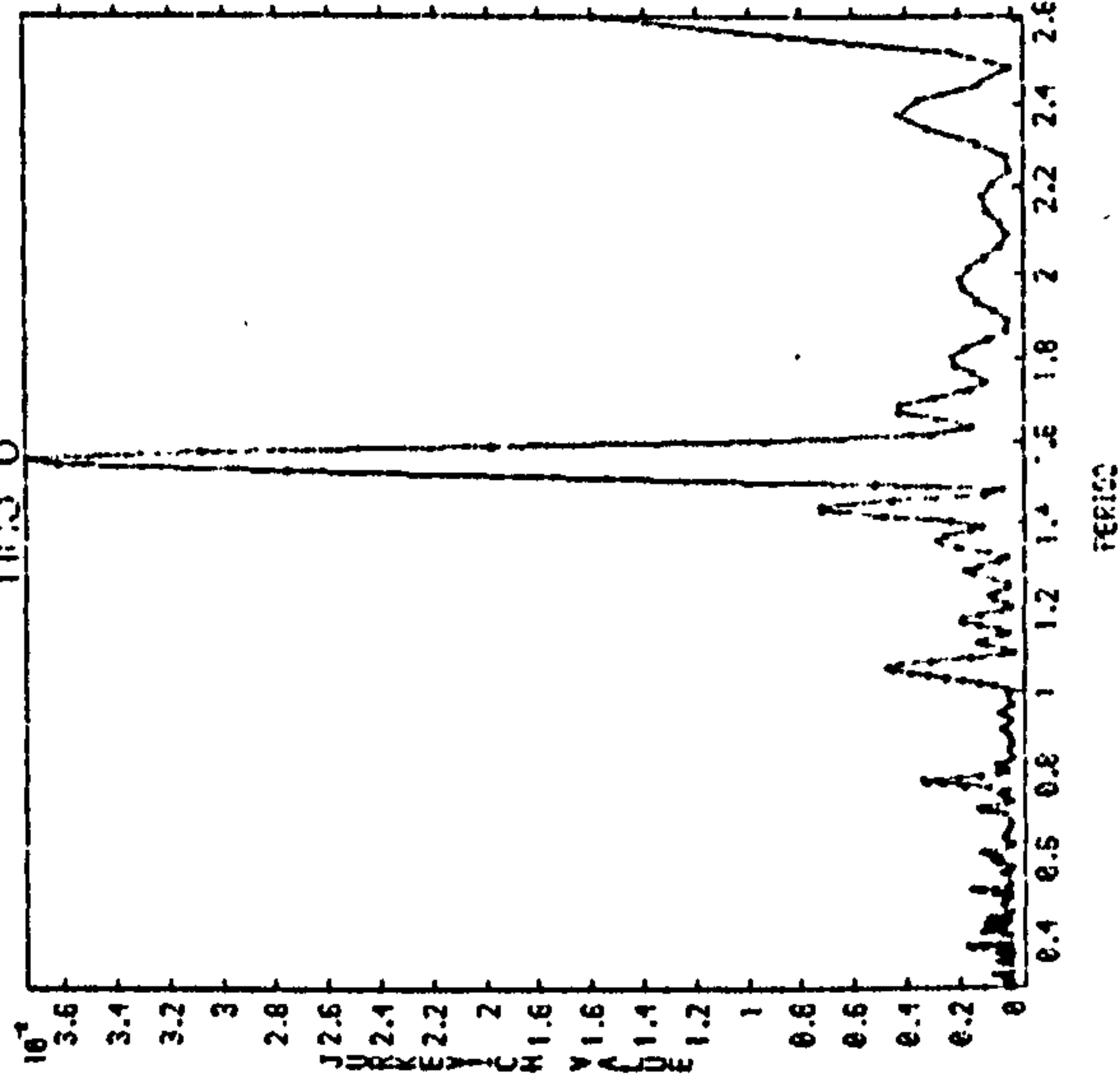


Mu — [ Filar Scale Bench Div. Eng. Adjust. Leveling Focus Eye P. Tube Tool Gauge Binding Misc.

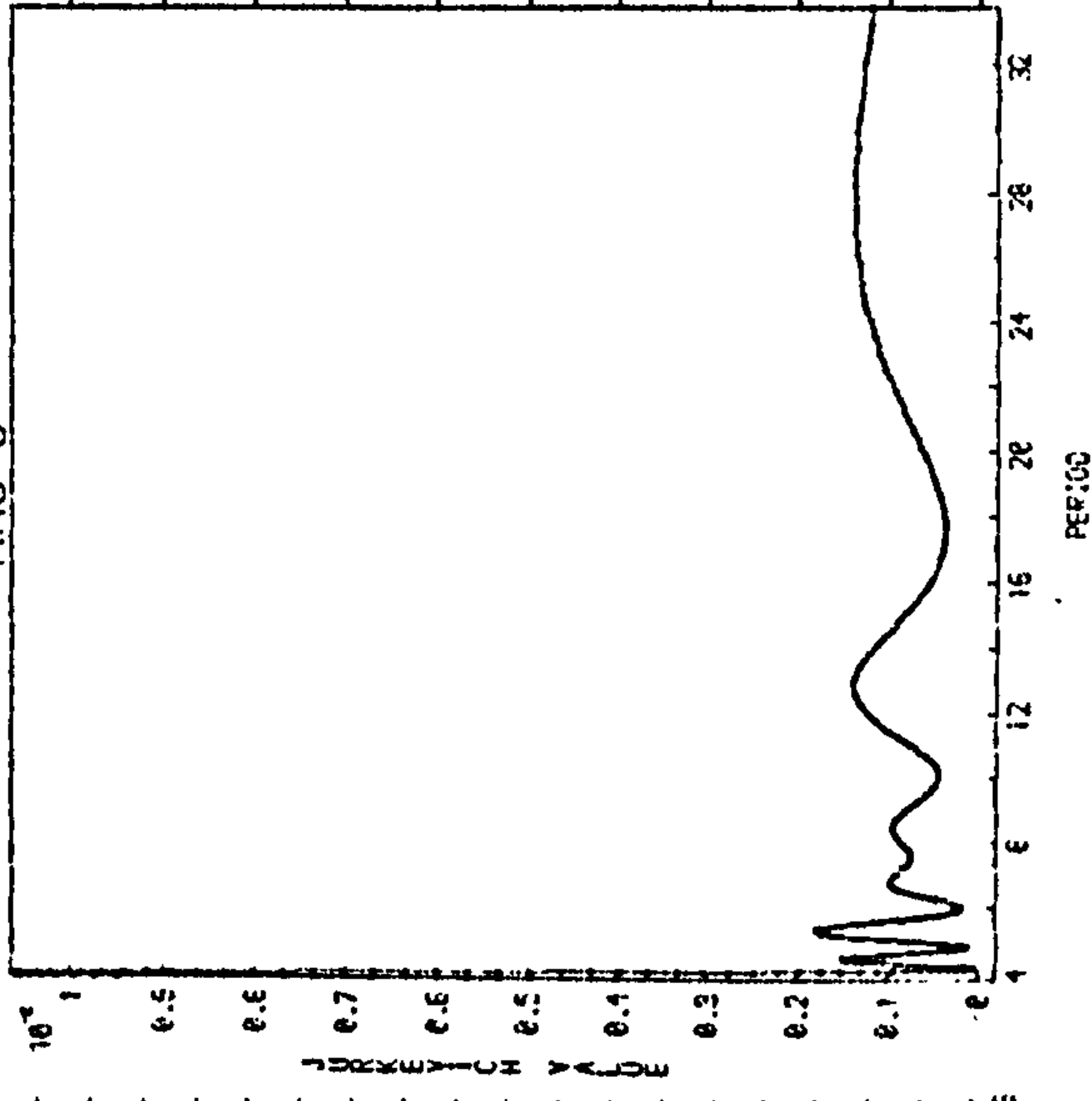
MHS-6



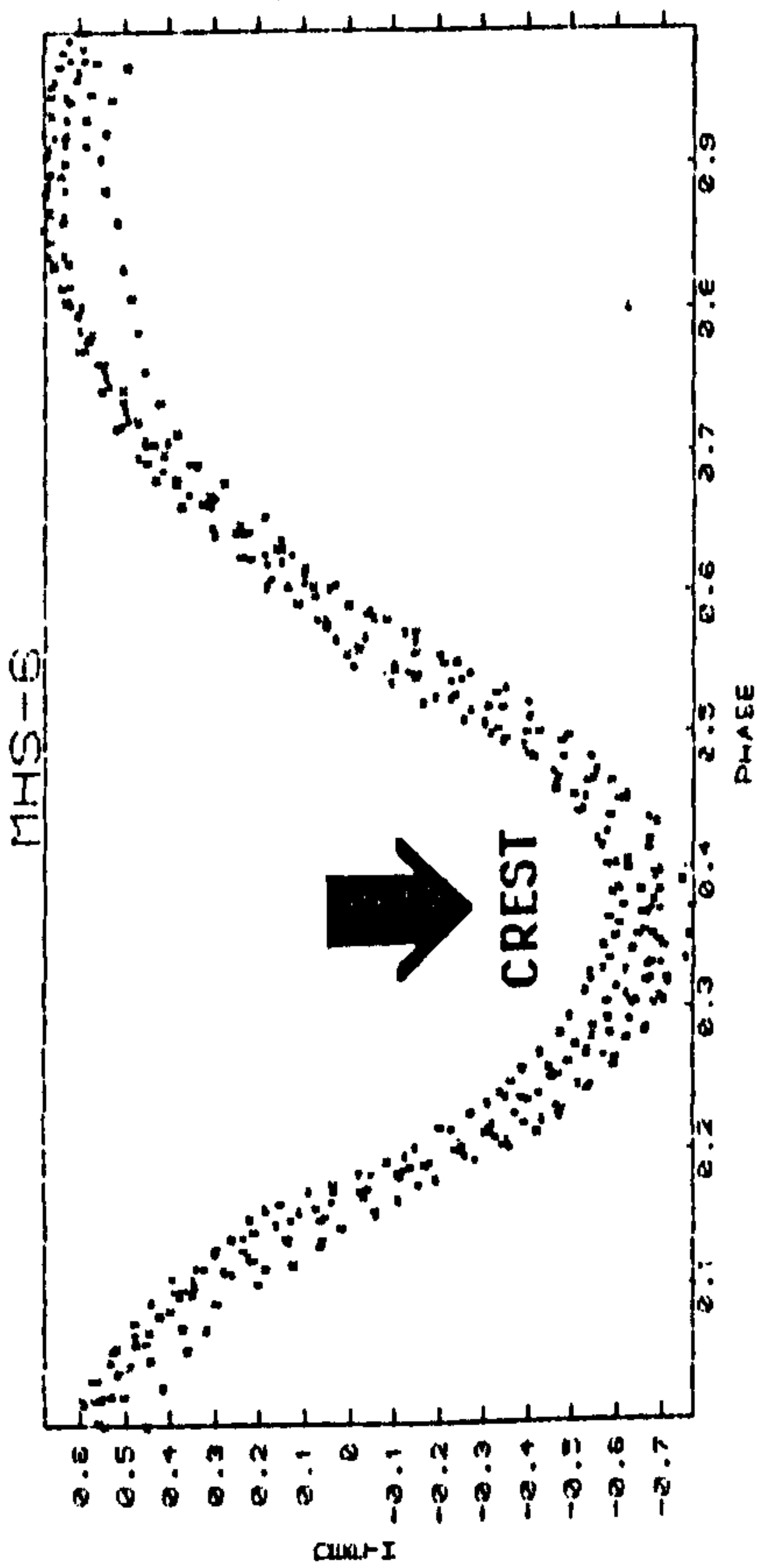
MHS-6



MHS-6







**Characteristics:**

Screw ☒ Nut ☐

Leng: 2.875"

Diameter: 0.281"

Steel ☒ Brass ☐

Other:

**Instrument Identification:**

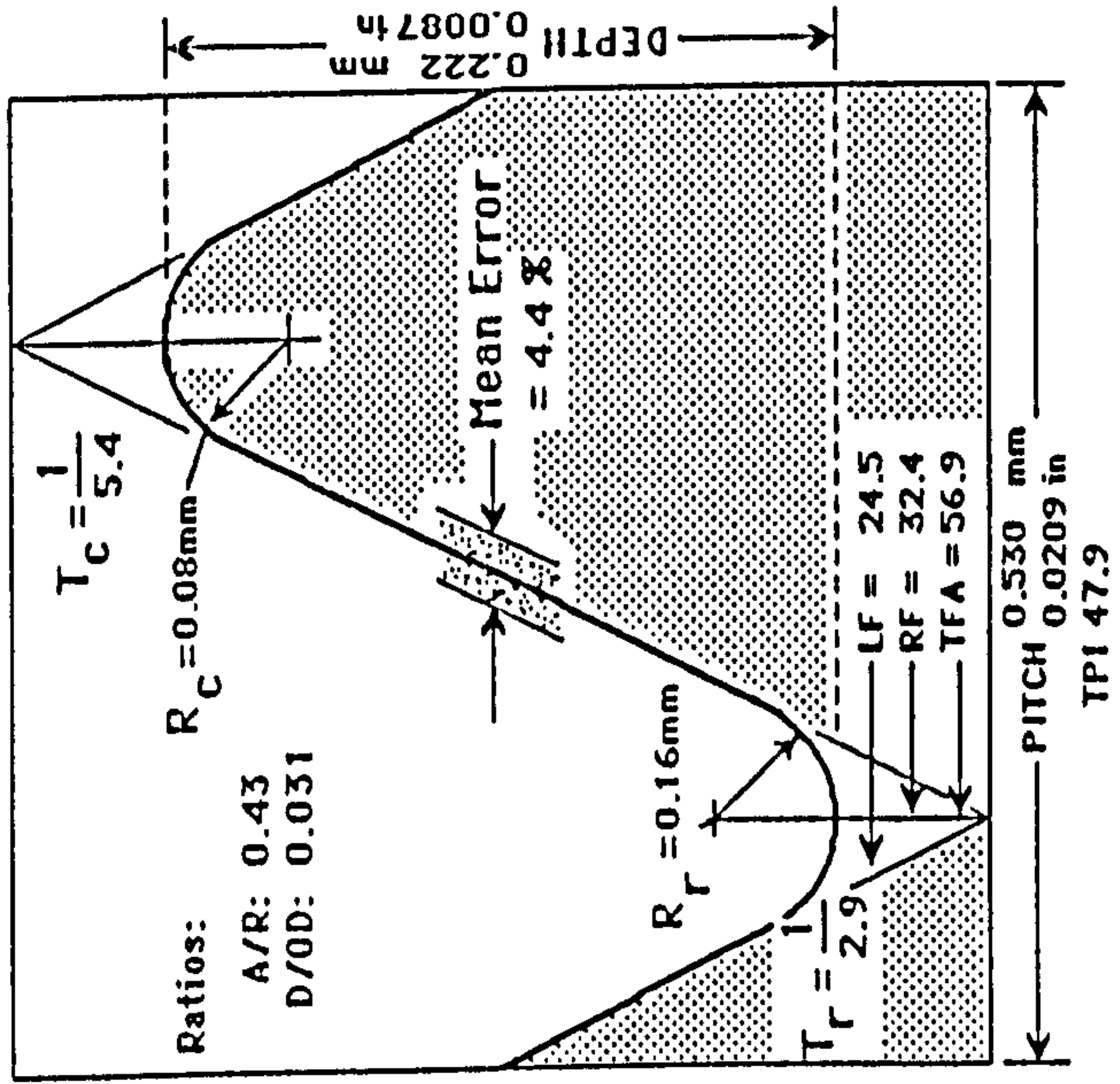
Study Code: MHS-6

Instrument: 8' Mural quadrant

Maker: John Bird

Date: 1773

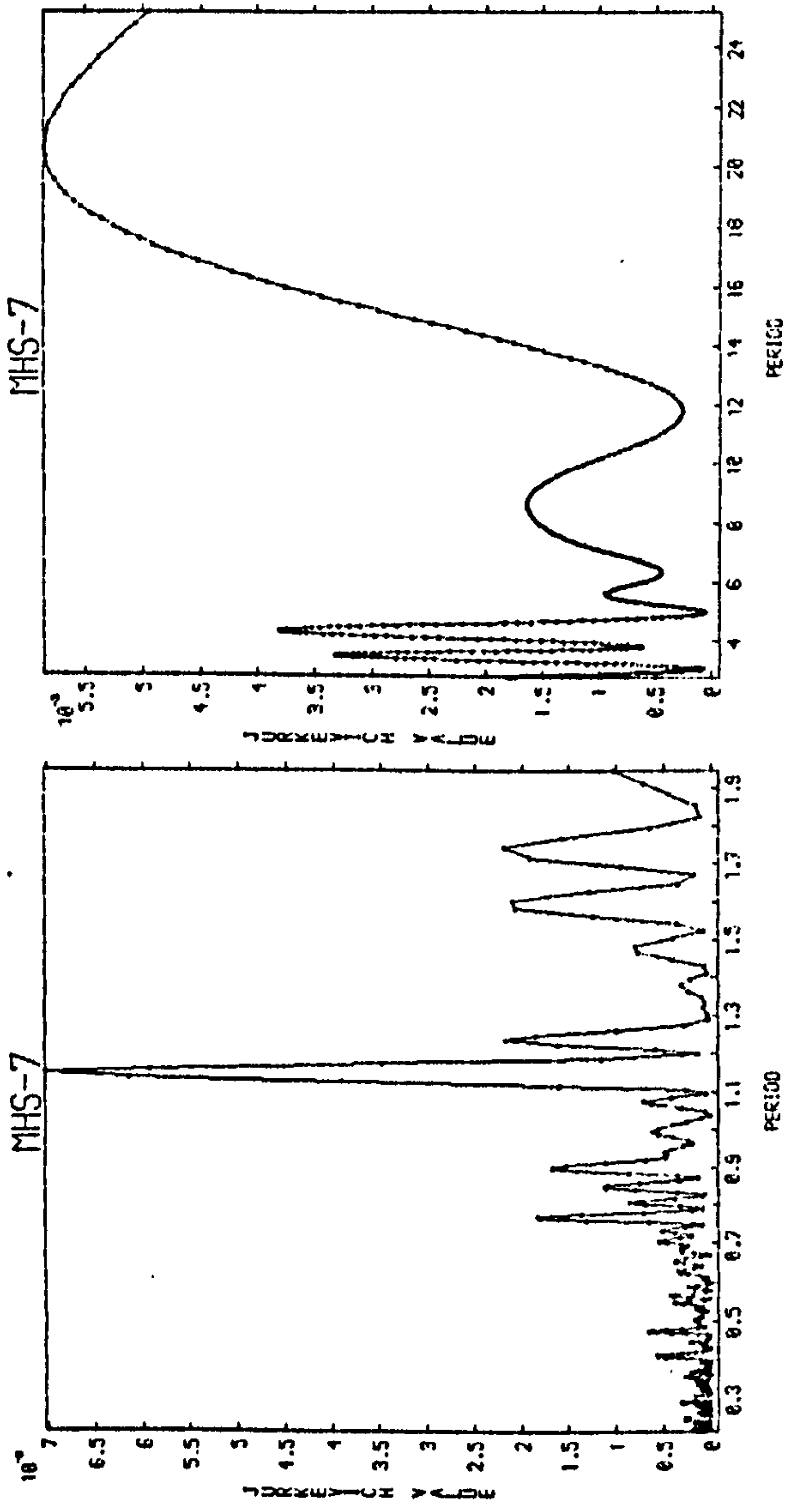
Ser./Acq. No.

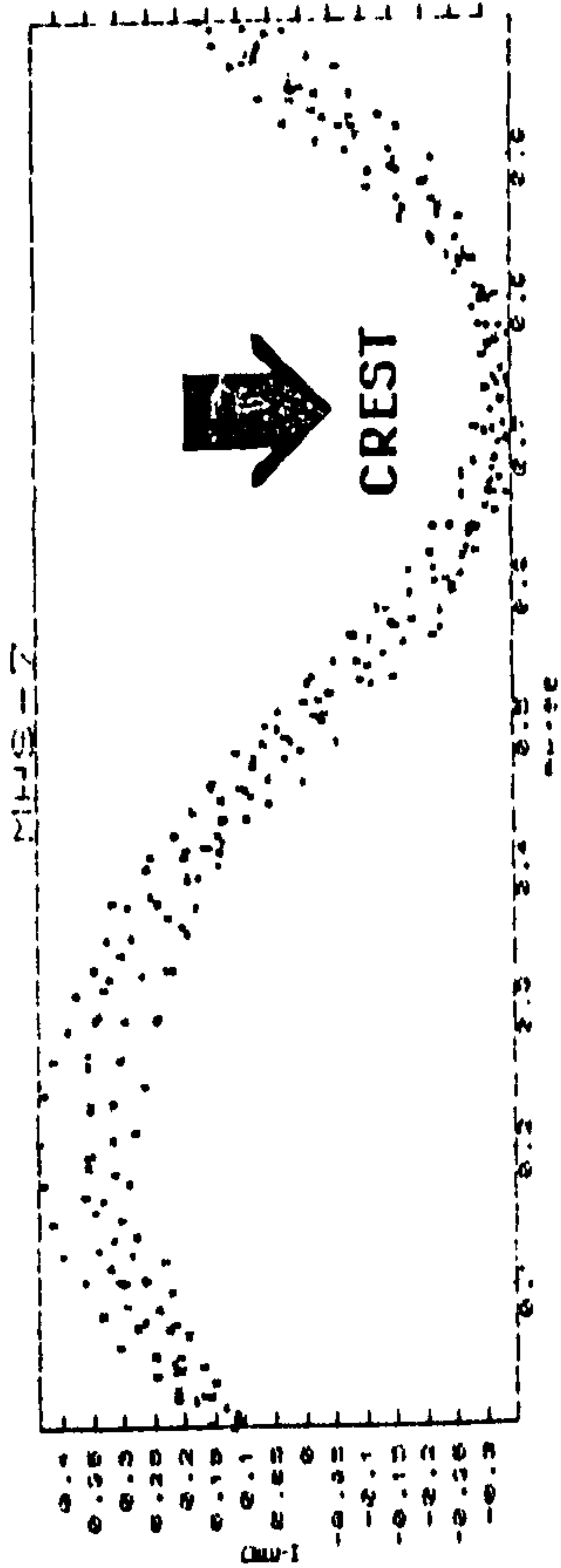


Mu	Filar
	Scale
	Bench
	Div. Eng.
	Adjust.
	Leveling
	Focus
	Eye P.
	Tube
	Tool
	Gauge
	Binding
	Misc.

See Bennett: 1987, p.116







Characteristics:

Screw

☒

Nut

☐

Leng: 2.00"

Diameter: 0.188"

☒ Steel

☐ Brass

Other:

Instrument Identification:

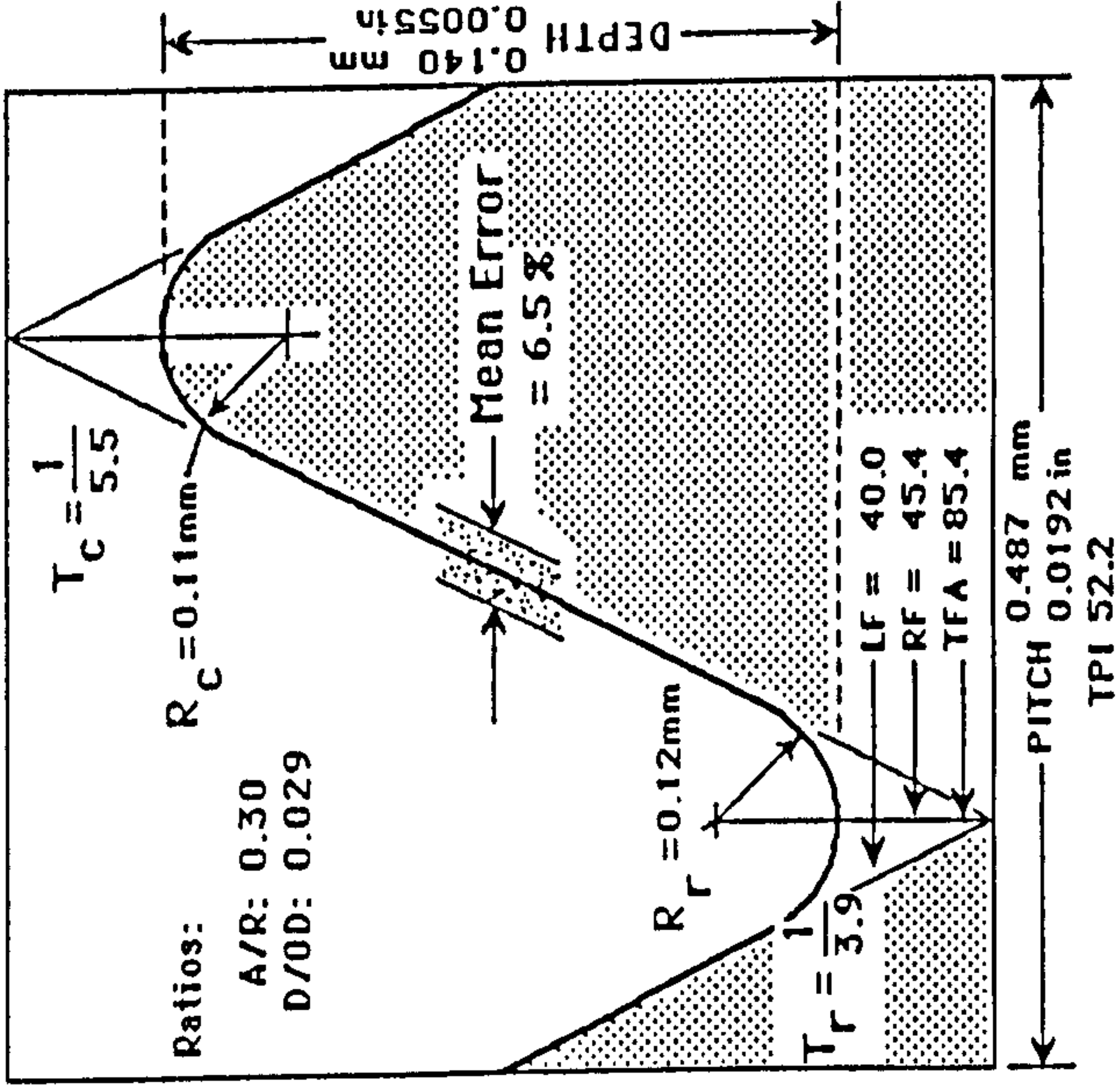
Study Code: MHS-7

Instrument: Zenith sector

Maker: John Bird

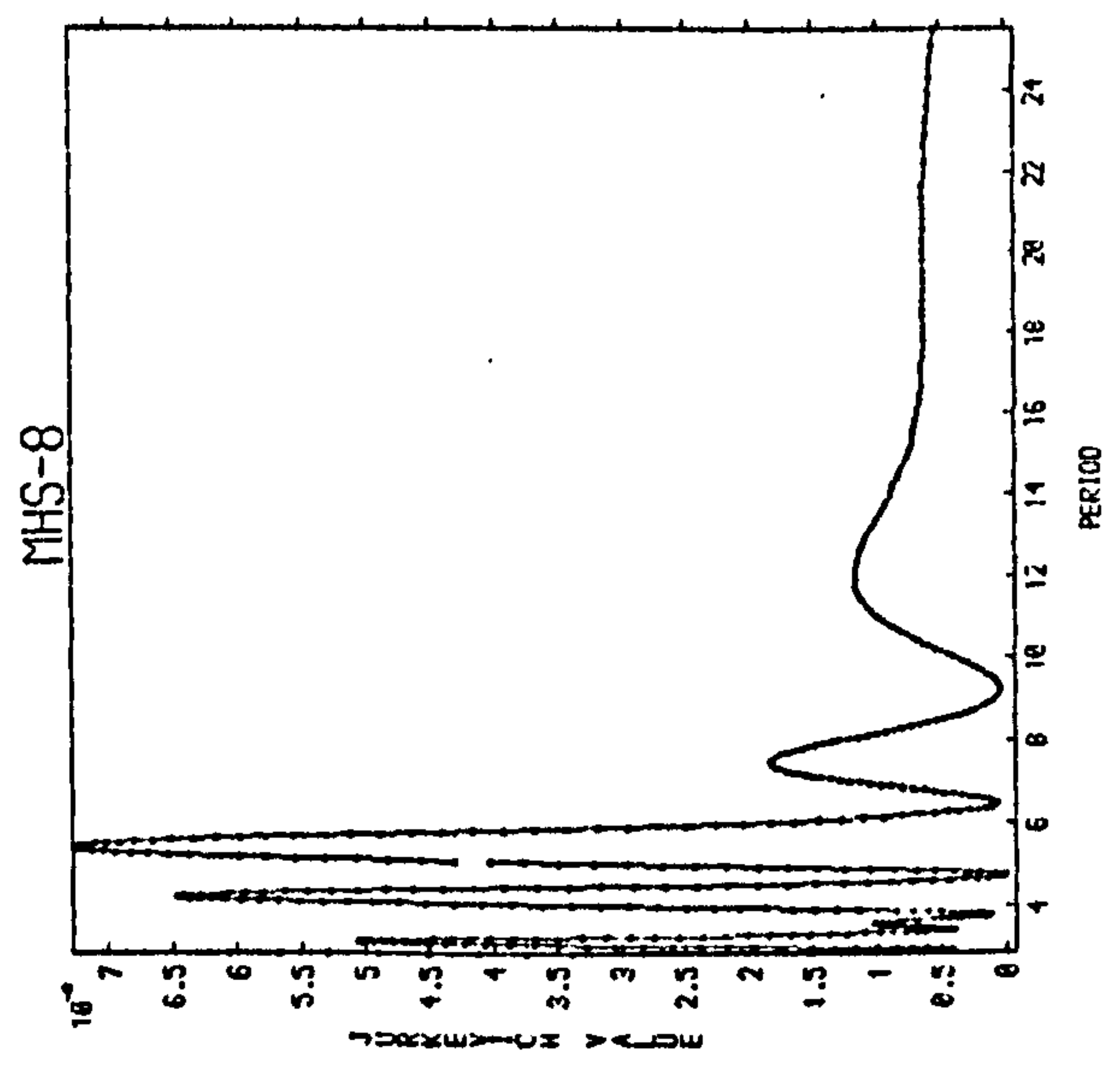
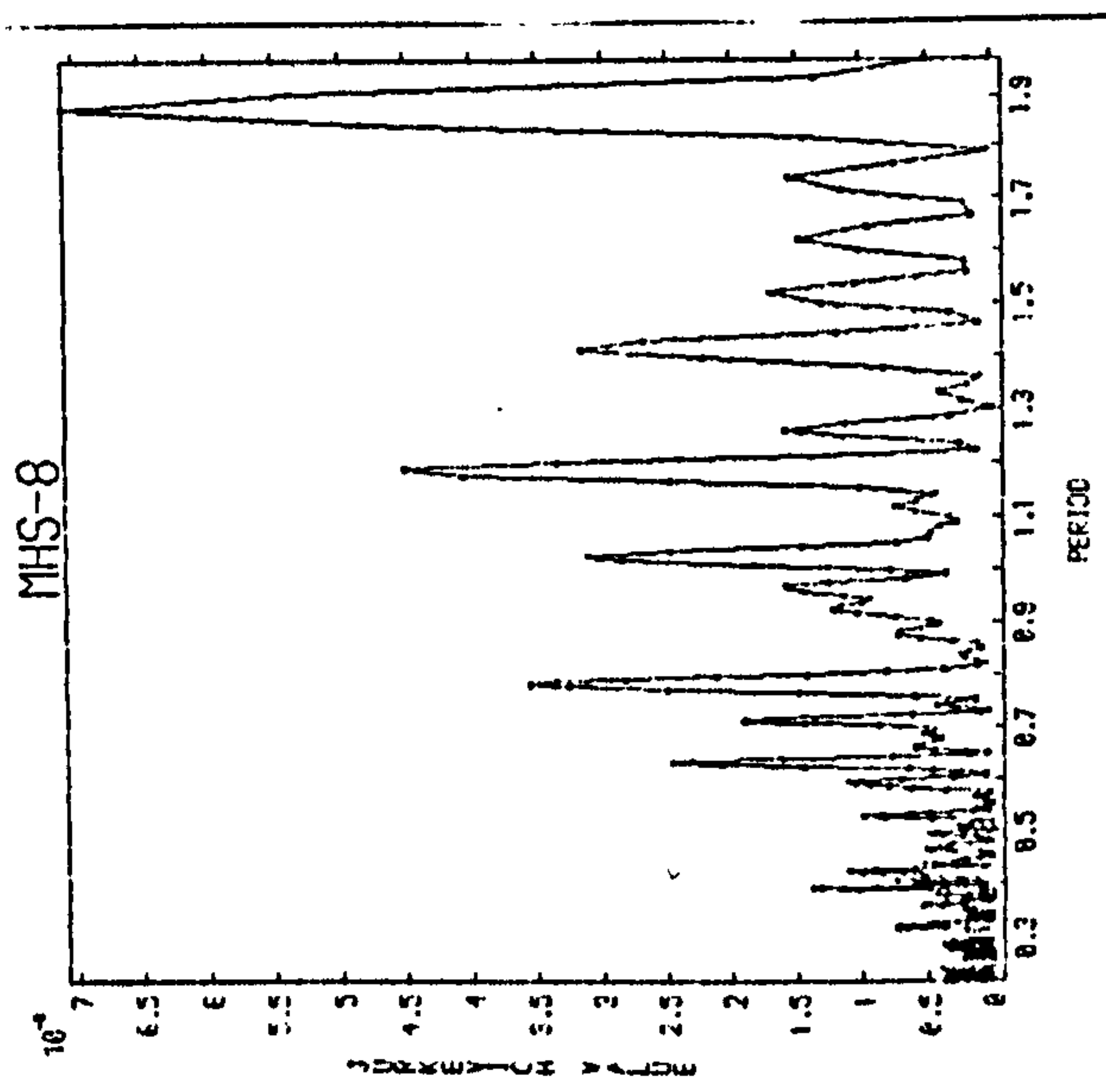
Date: 1773

Ser./Acq. No.



MU	Filar
	Scale
	Bench
	Div. Eng.
	Adjust.
	Leveling
	Focus
	Eye P.
	Tube
	Tool
	Gauge
	Binding
	Misc.

See Bennett: 1987, p.118



Characteristics:

Screw ☒ Nut ☐

Leng: 2.50"

Diameter: 0.188"

Steel ☒ Brass ☐

Other:

Instrument Identification:

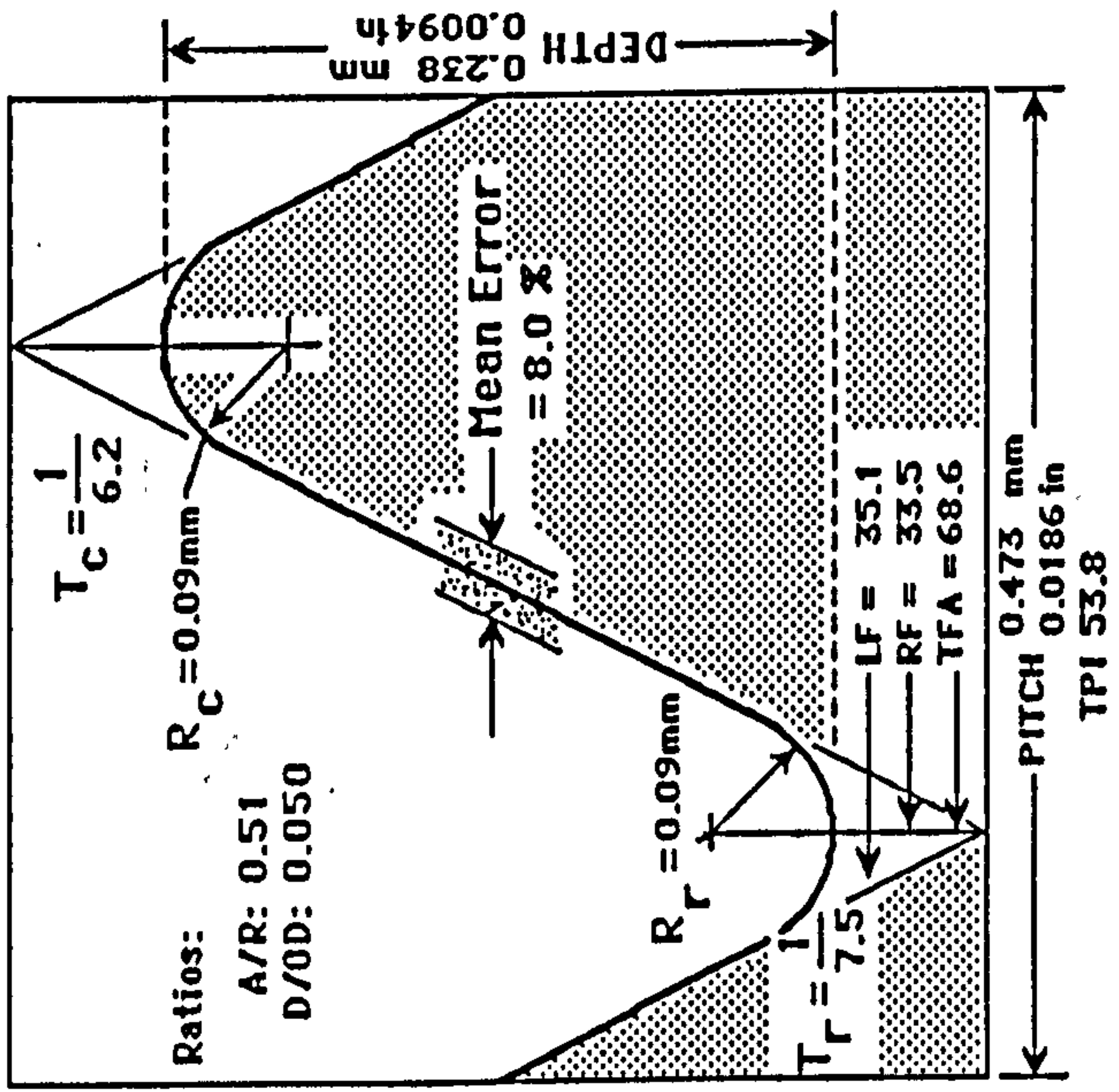
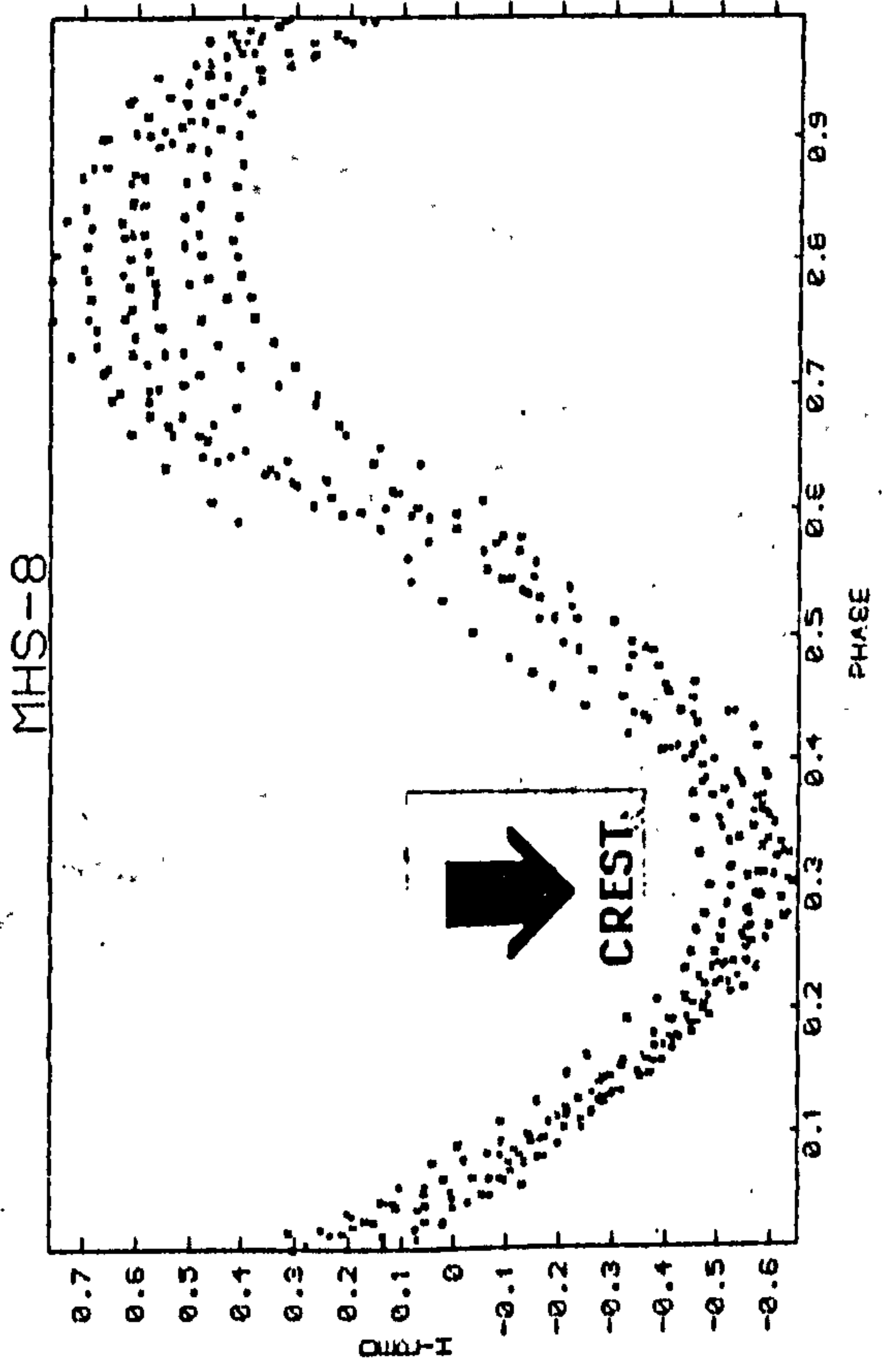
Study Code: MHS-8

Instrument: 32" Portable quadrant

Maker: John Bird

Date: ca.1767

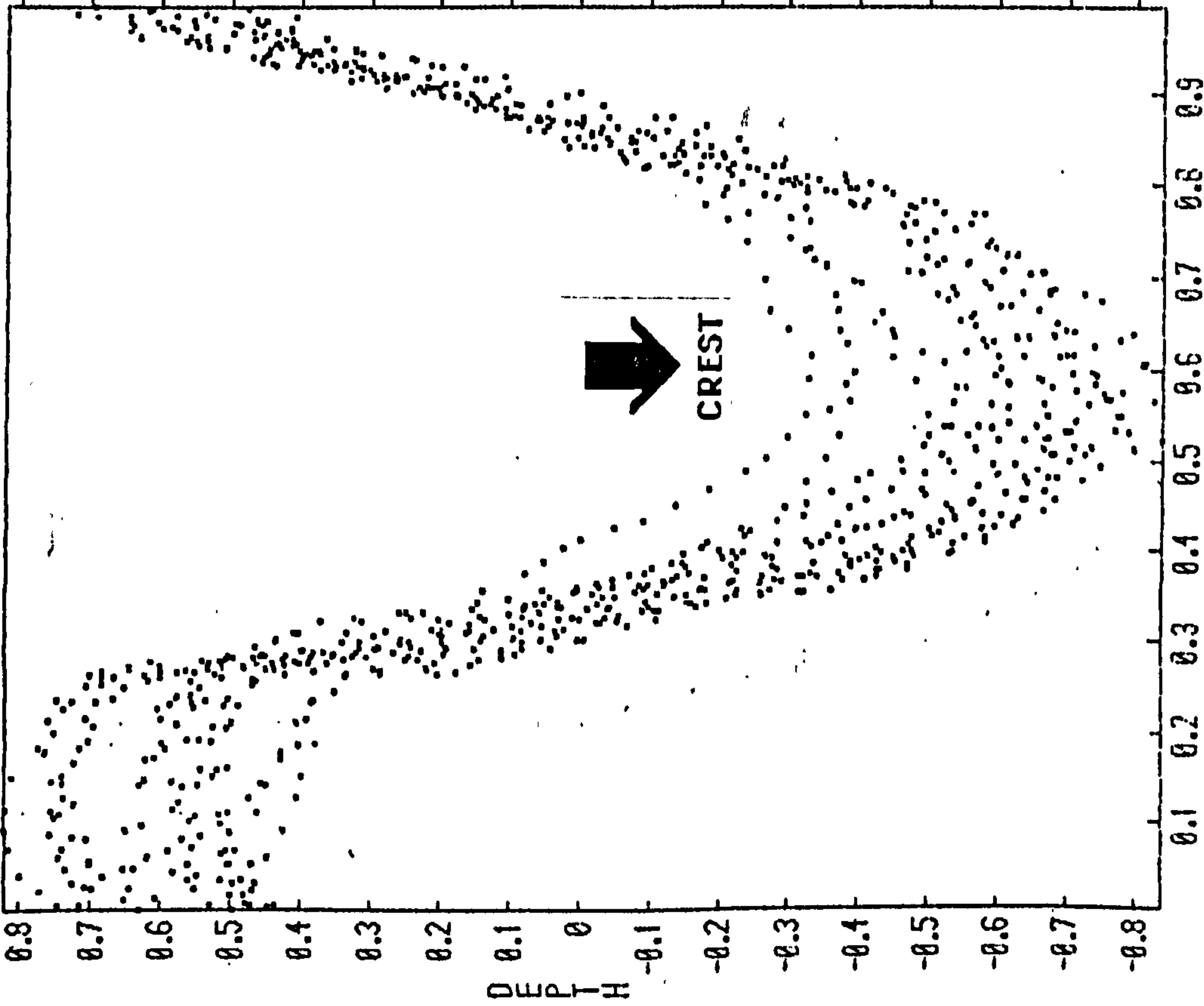
Ser./Acq. No.



MU	Filar
	Scale
	Bench
	Div. Eng.
	Adjust.
	Leveling
	Focus
	Eye P.
	Tube
	Tool
	Gauge
	Binding
	Misc.



P0-8B



### Characteristics:

Screw ☒ Nut ☐

Leng: 1.375" / ~1.125"

Diameter: 0.1701"

Steel ☒ Brass ☐

Other:

### Instrument Identification:

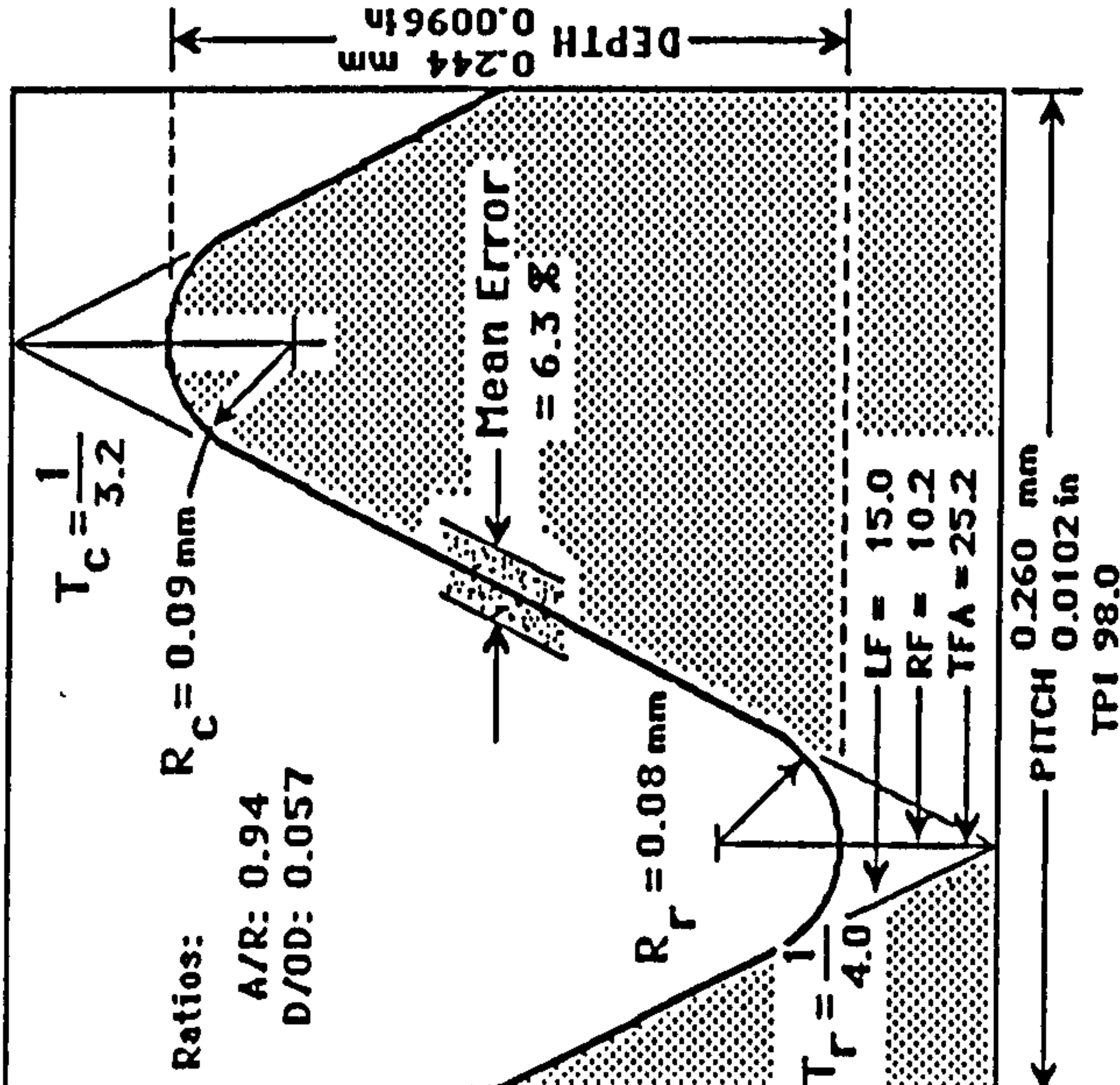
Study Code: P0-8b

Instrument: Altazimuth instrument

Maker: Rigaud à Paris

Date: ca.1880

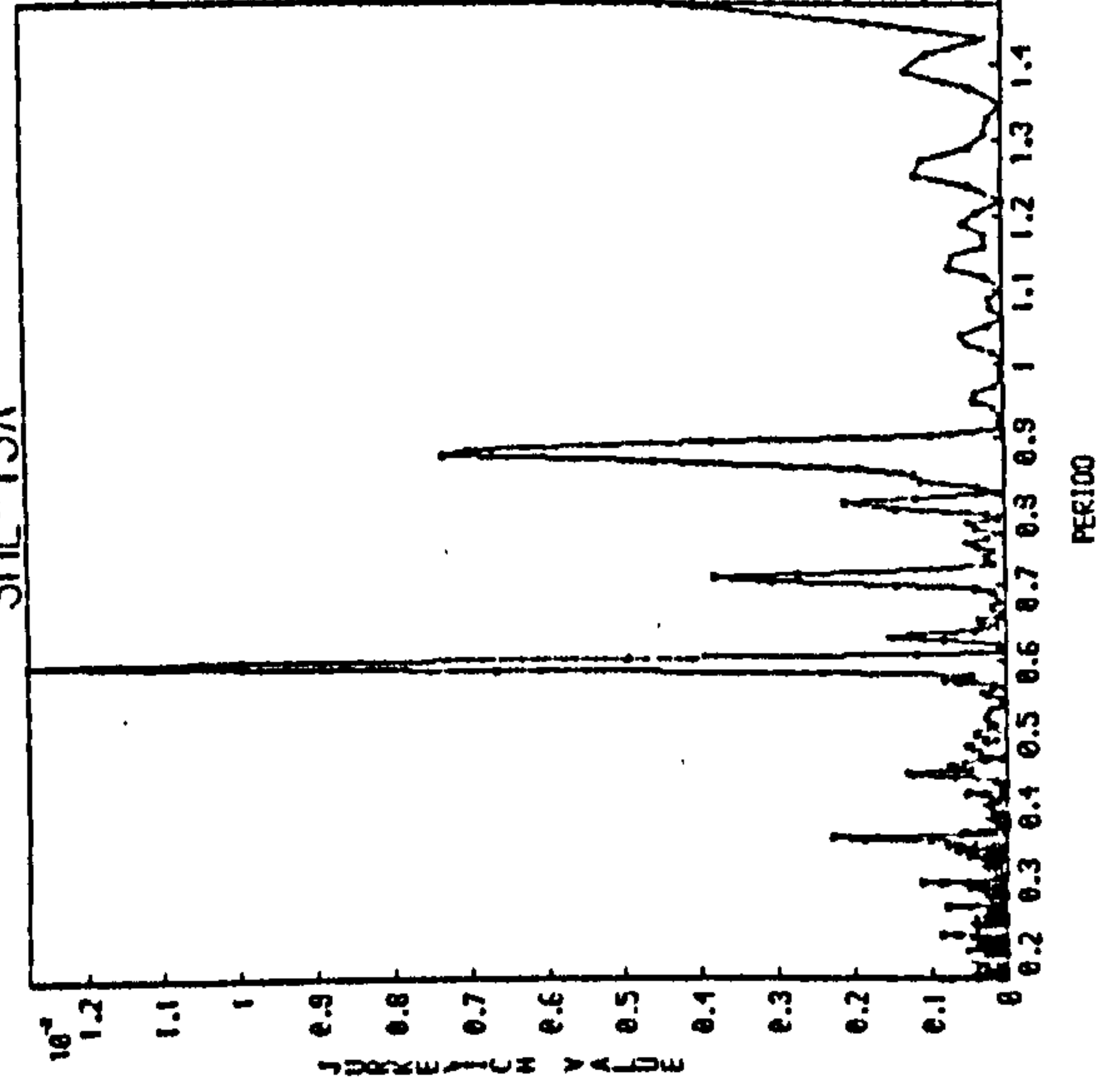
Ser./Acq. No.



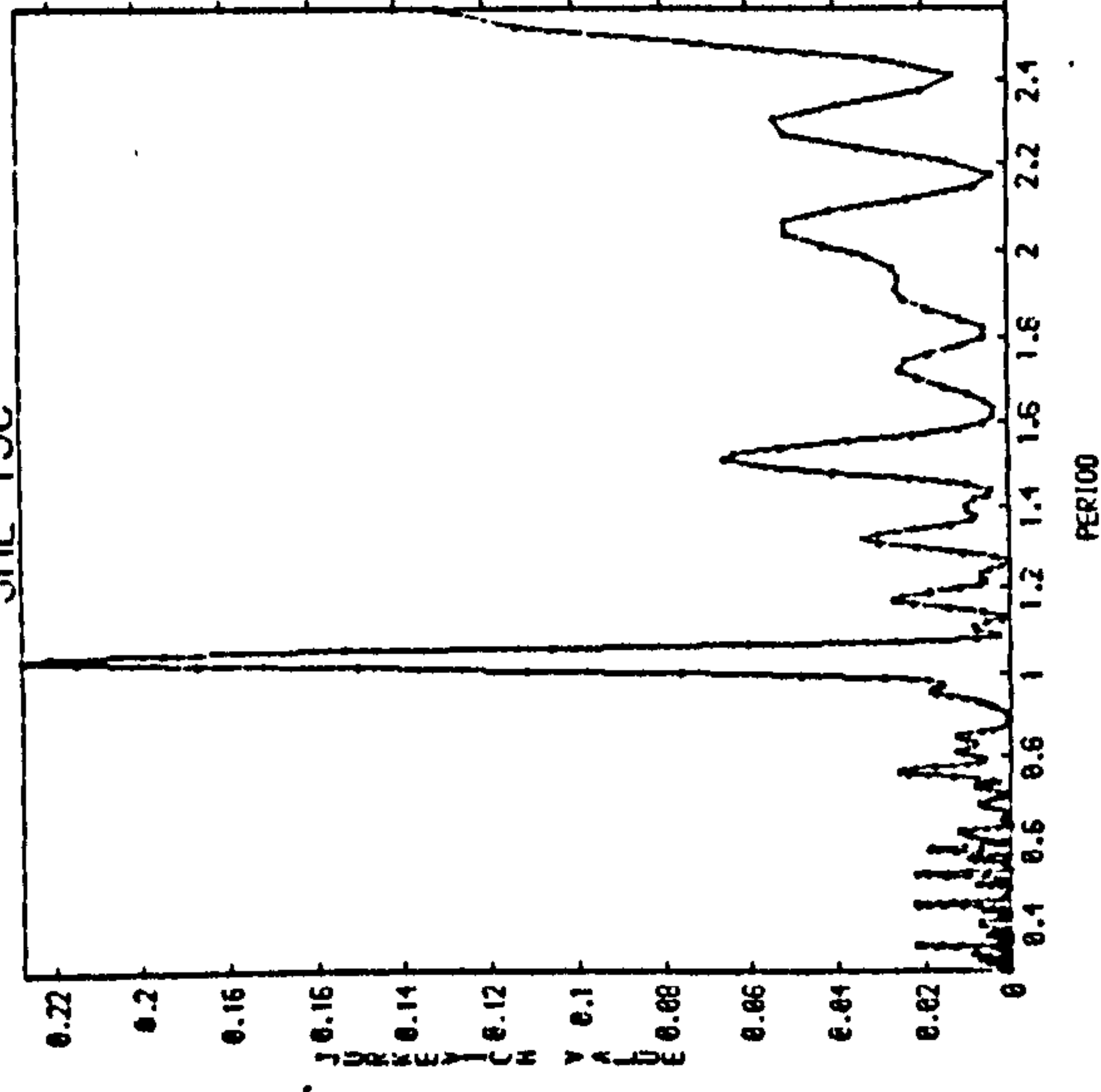
Mu	Filar
	Scale
	Bench
	Div. Eng.
	Adjust.
	Leveling
	Focus
	Eye P.
	Tube
	Tool
	Gauge
	Binding
	Misc.

Mu Drum: dia.: 1.438"  
divisions: 100  
resolution: 1/10

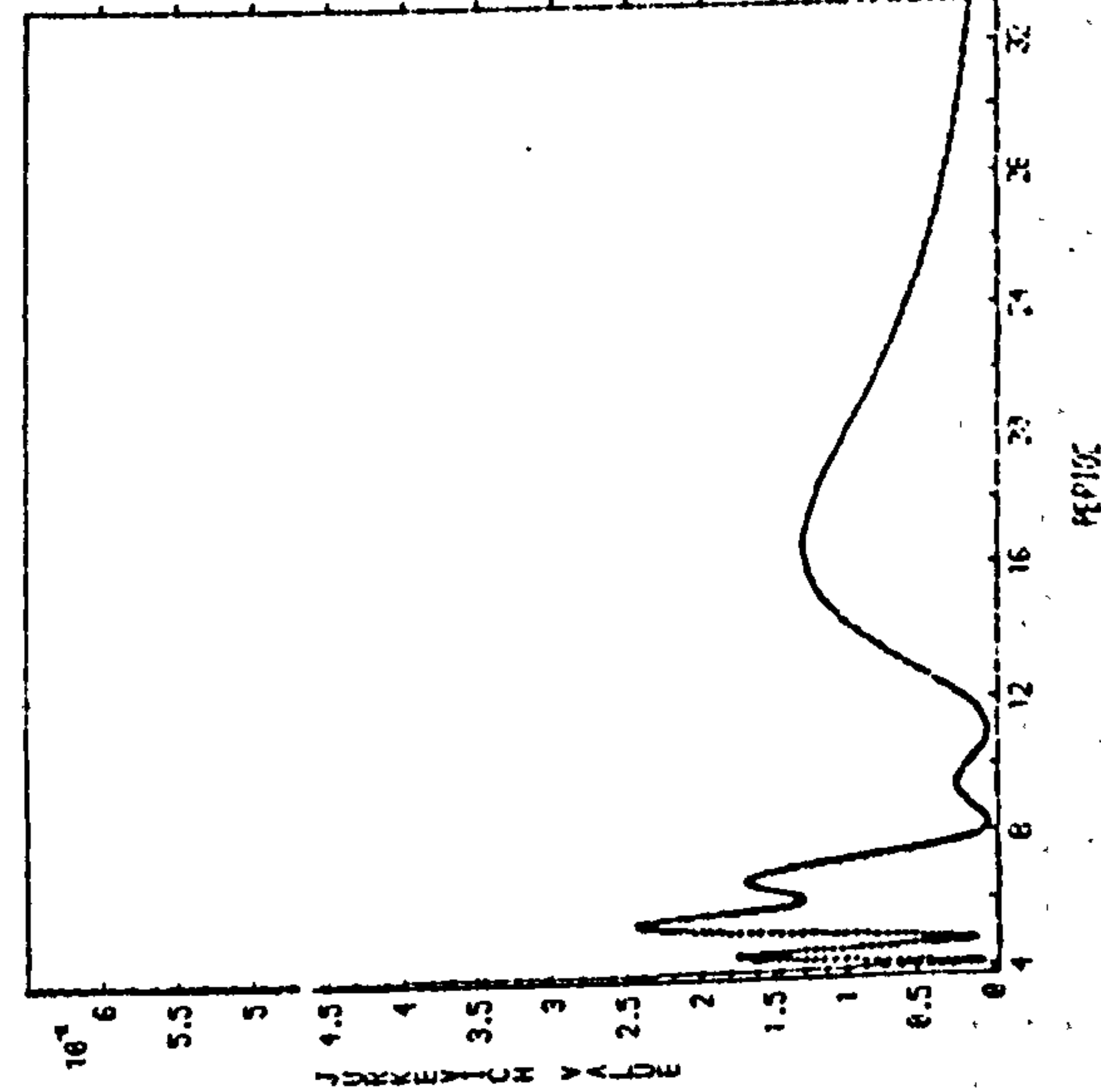
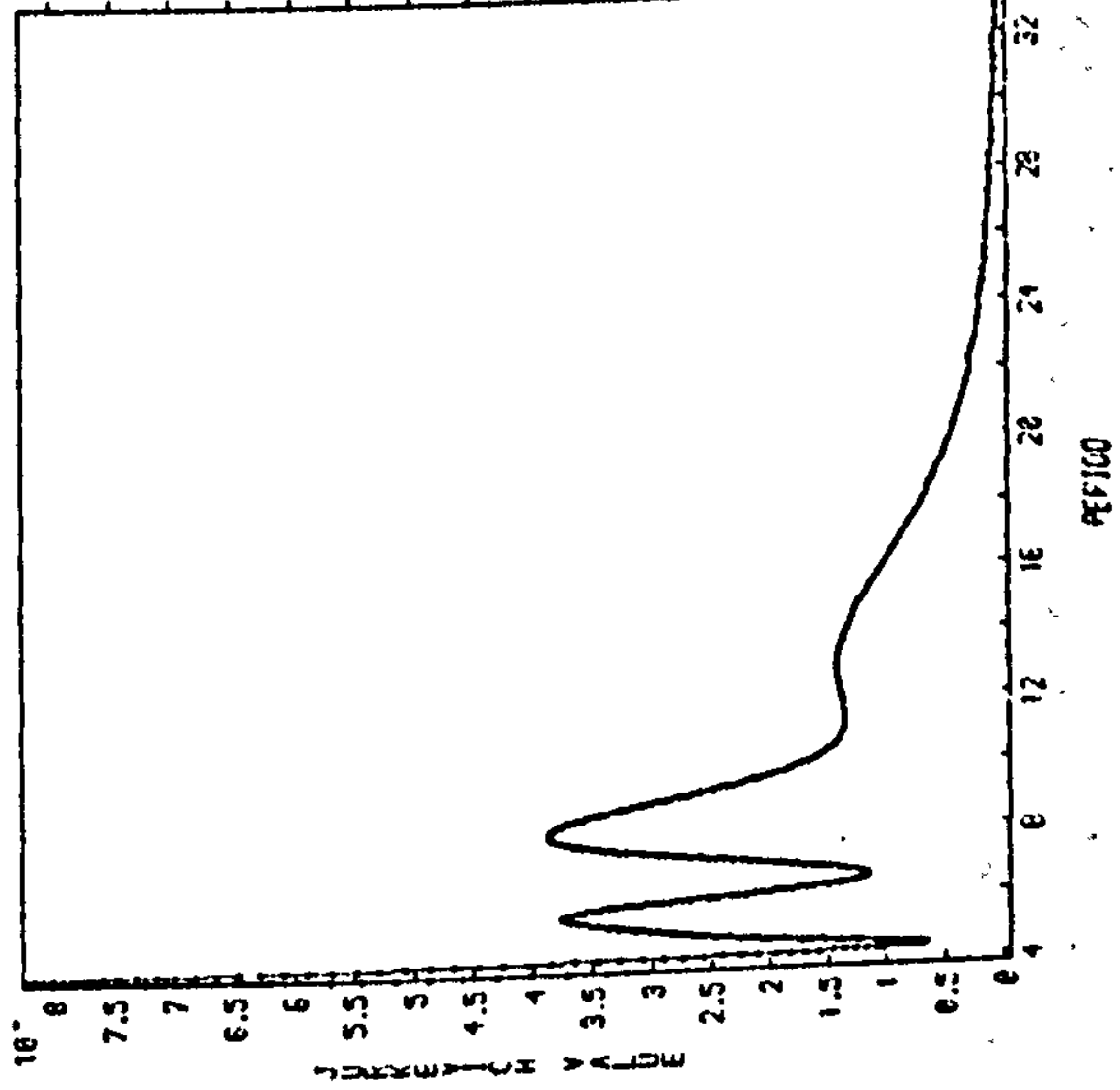
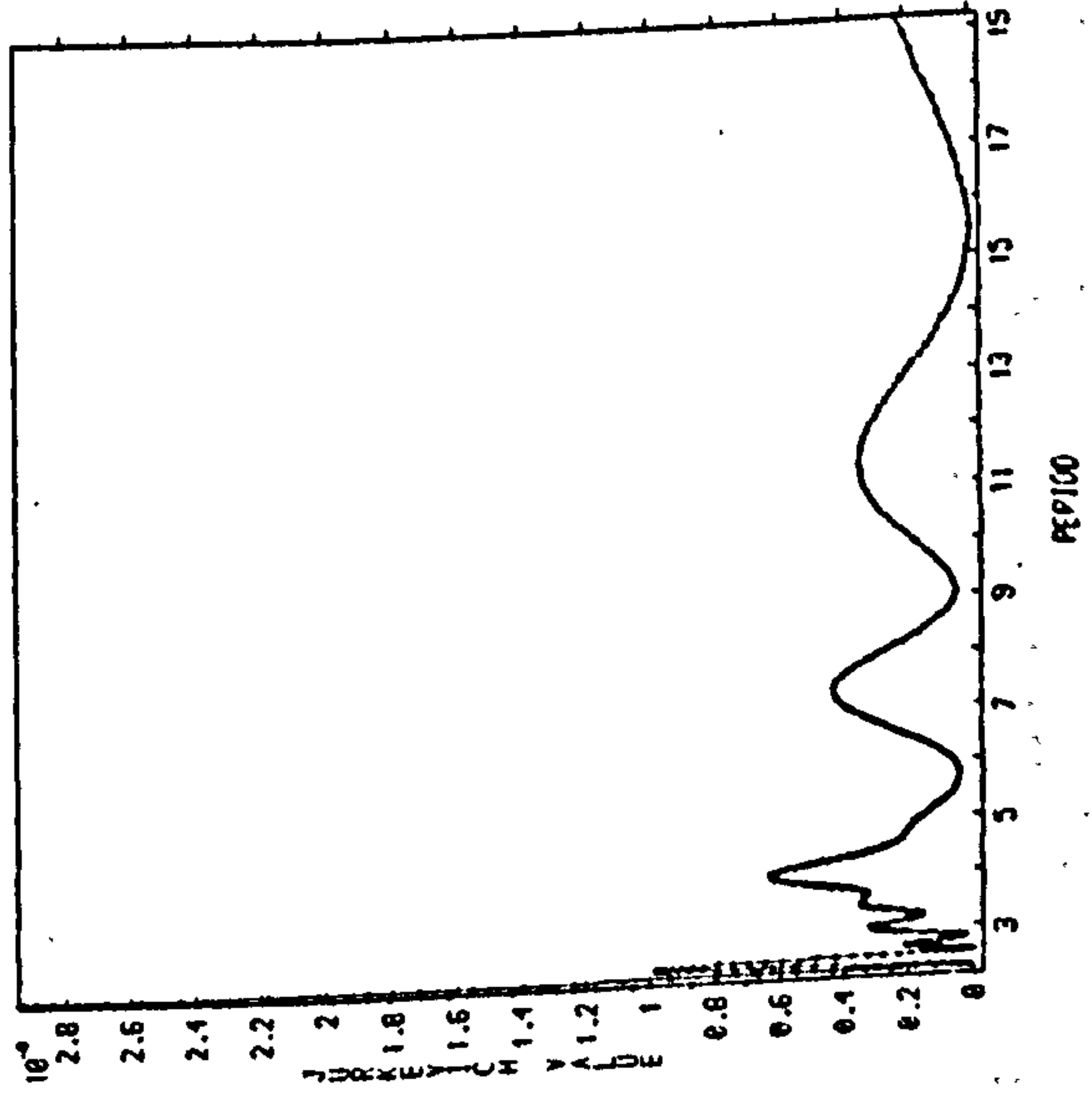
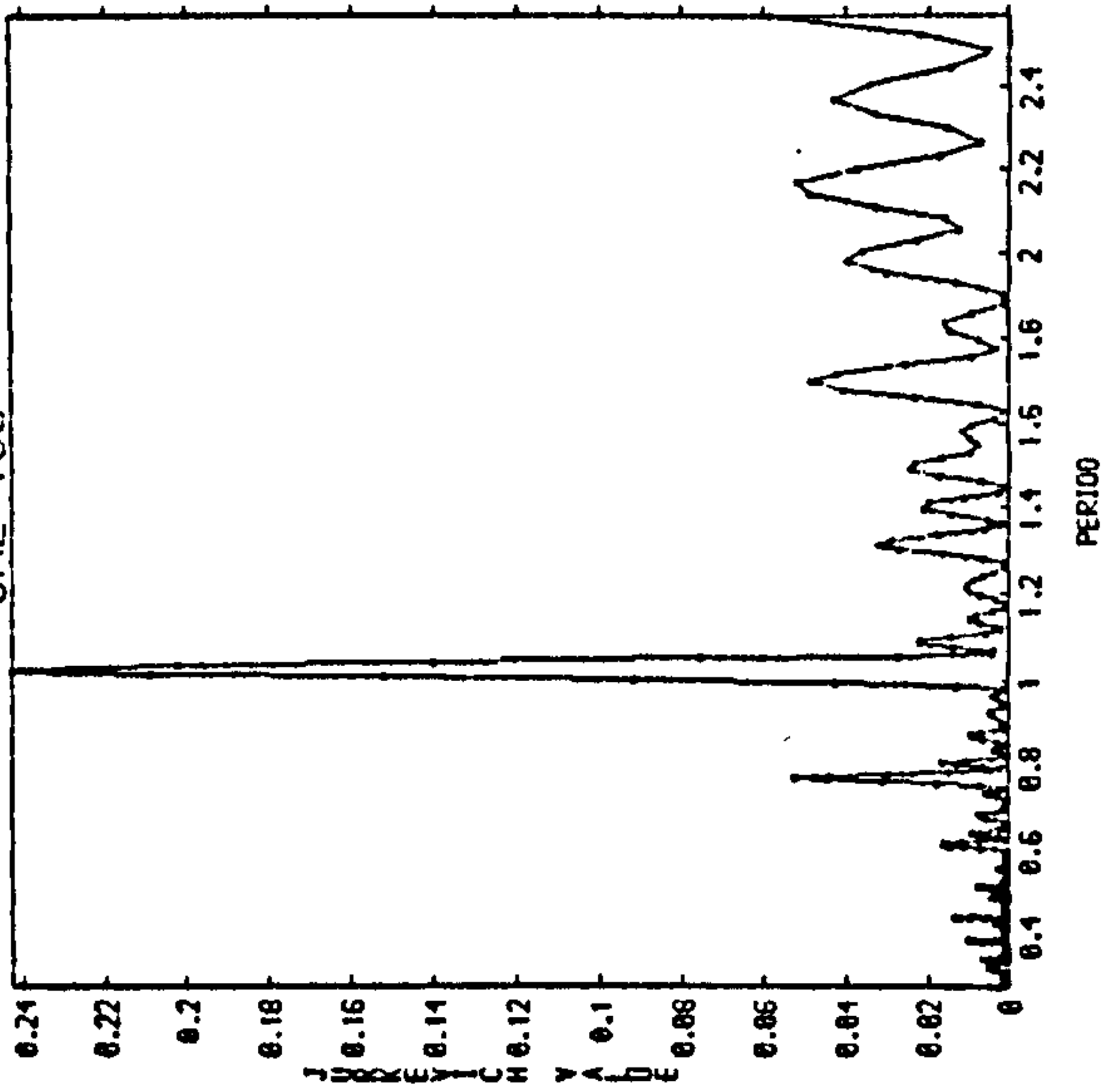
SML-13A



SML-13C



SML-13D



Characteristics:

Screw

Nut

☐

Leng: 0.75"

Diameter: 0.1416"

Steel

Brass

☐

Other:

Instrument Identification:

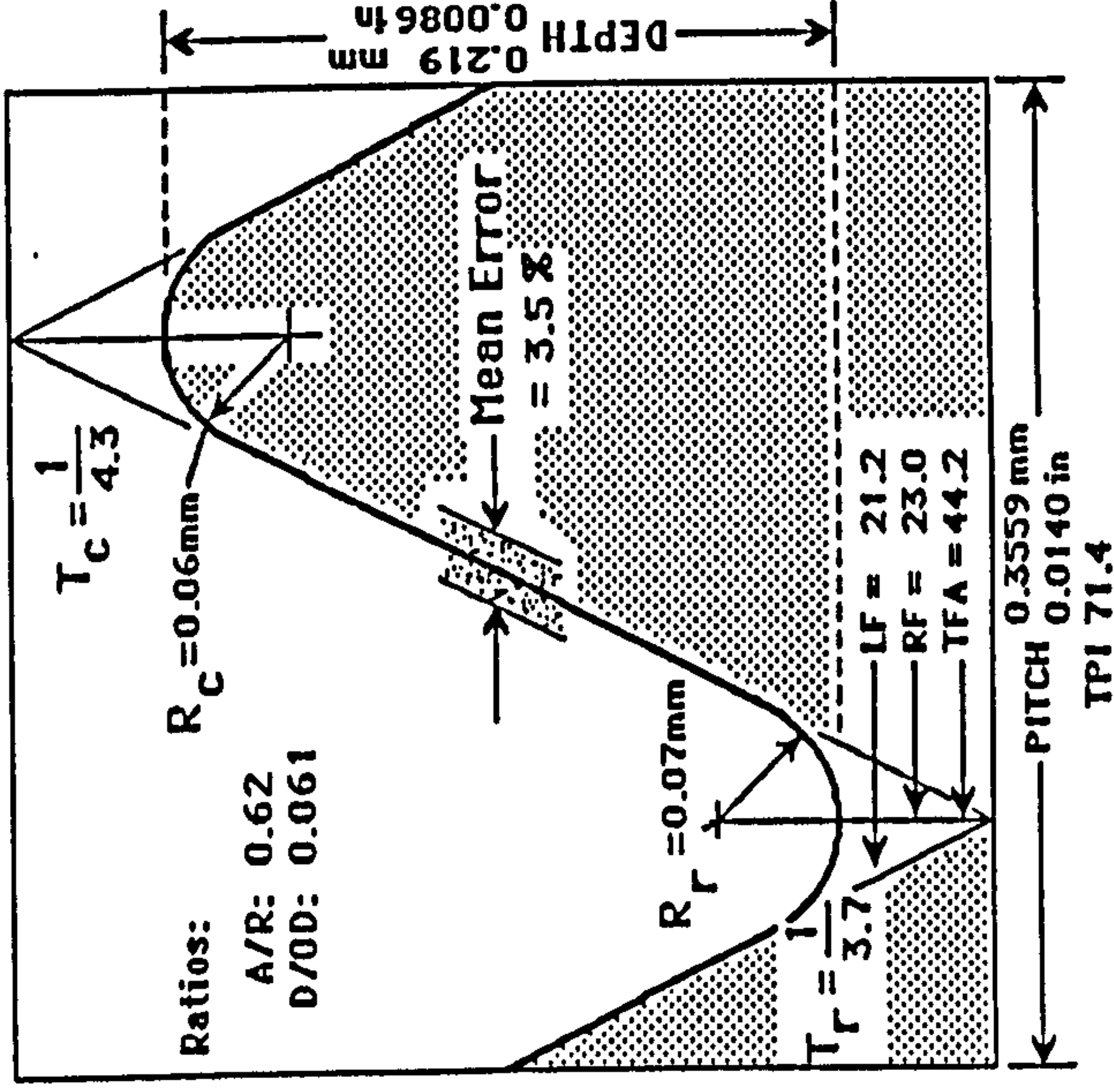
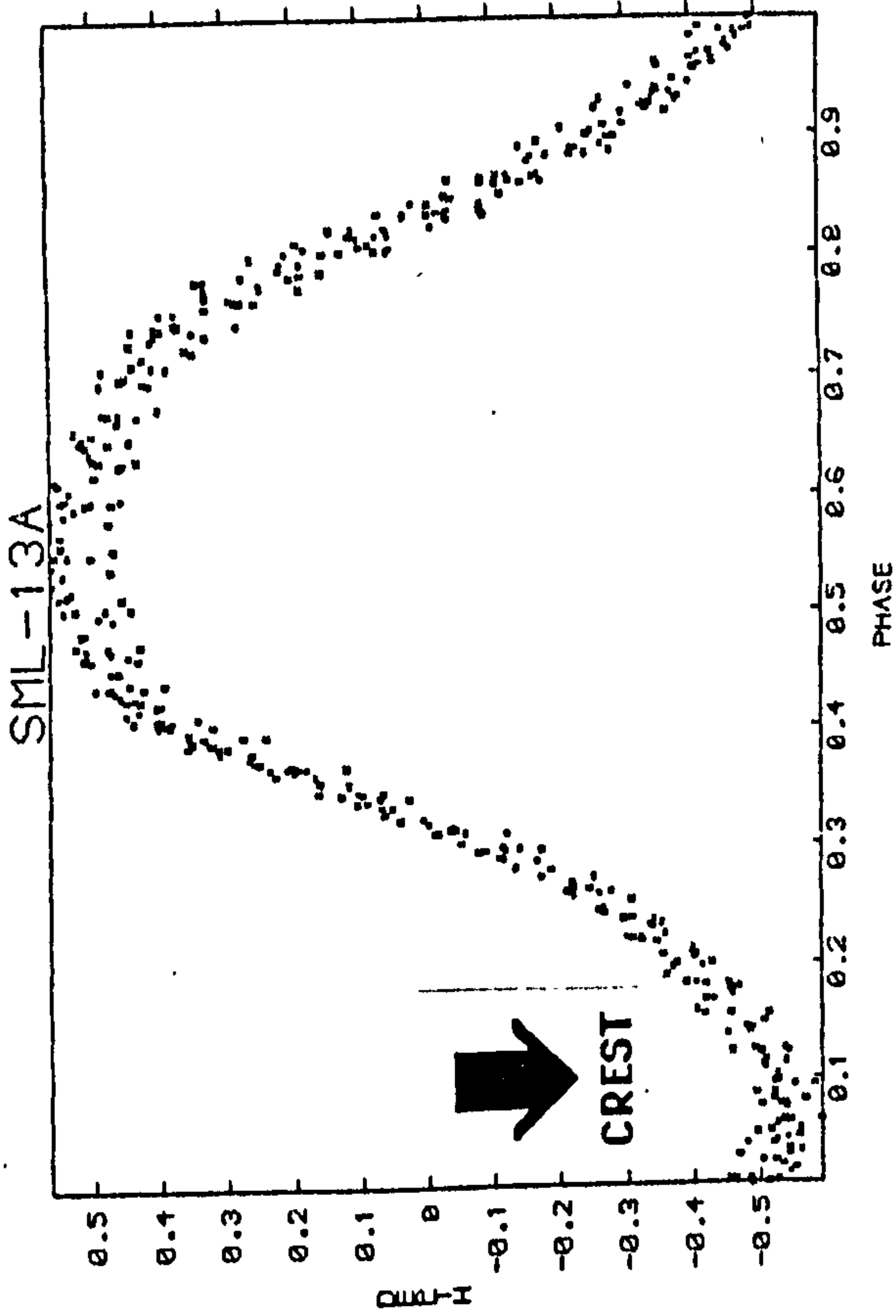
Study Code: SML-13a

Instrument: Geodetic theodolite

Maker: Ramdsen

Date: 118th c

Ser./Acq. No. 1981-111



Mu

Filar

Scale

Bench

Div. Eng.

Adjust.

Leveling

Focus

Eye P.

Tube

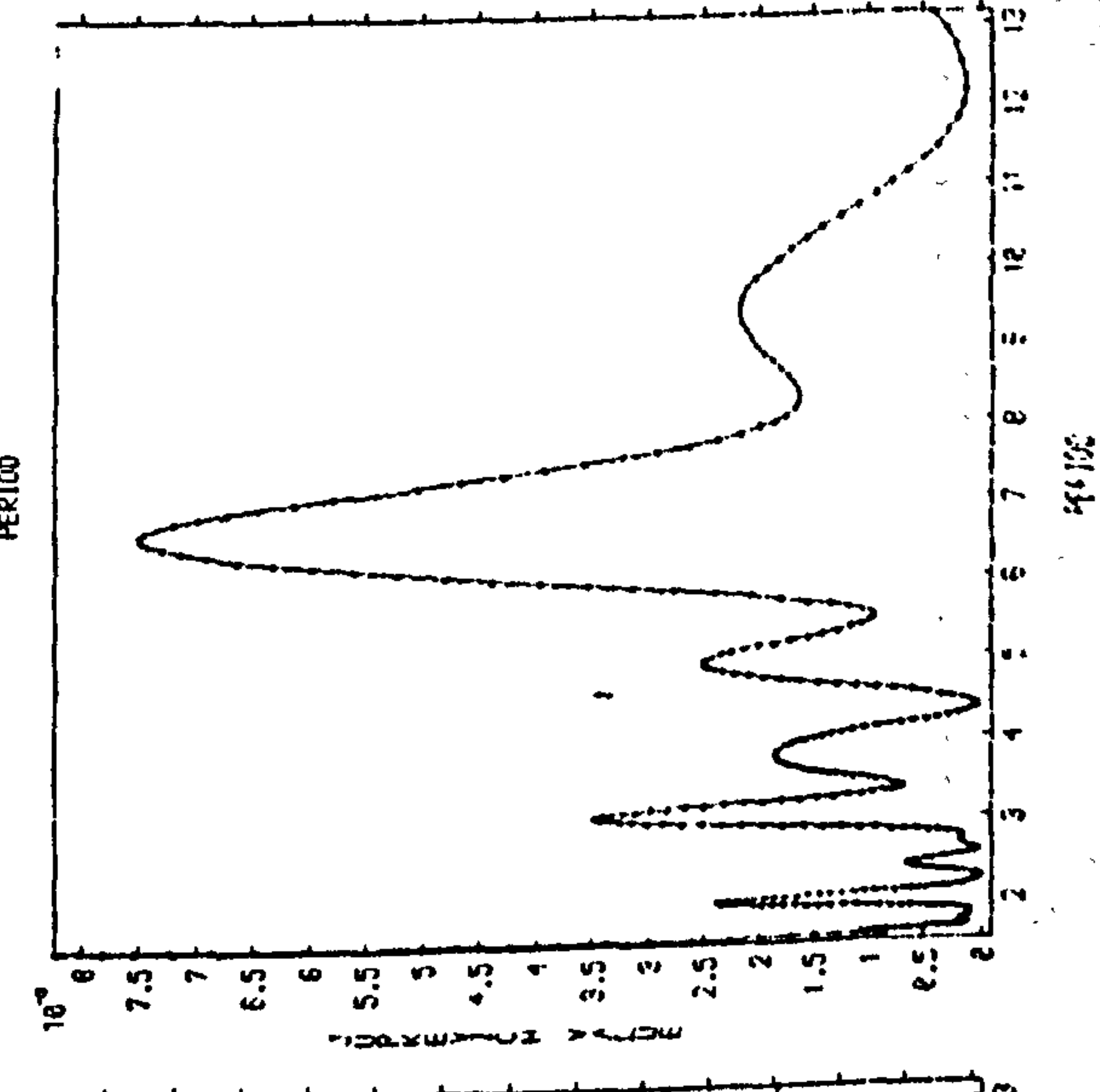
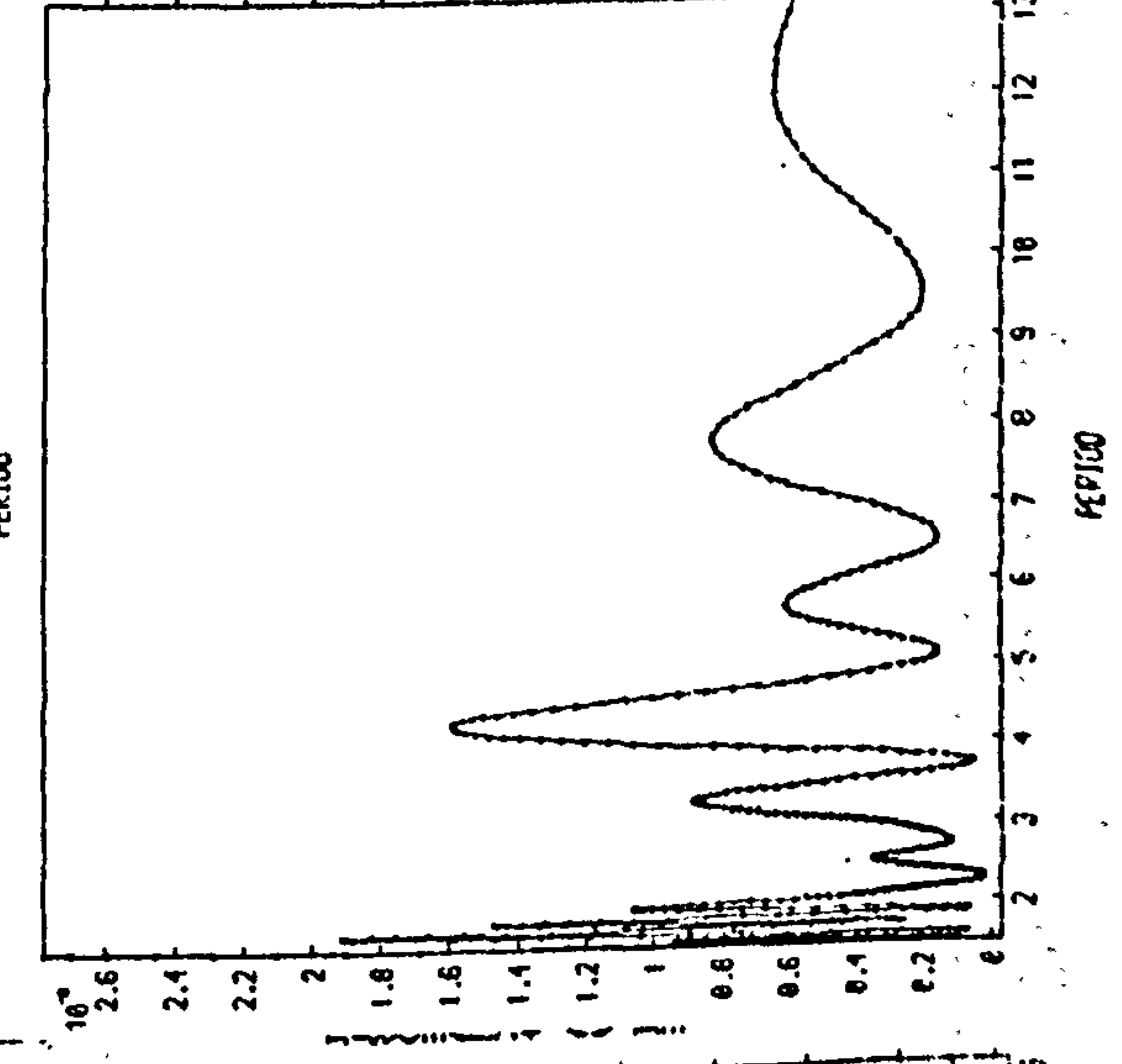
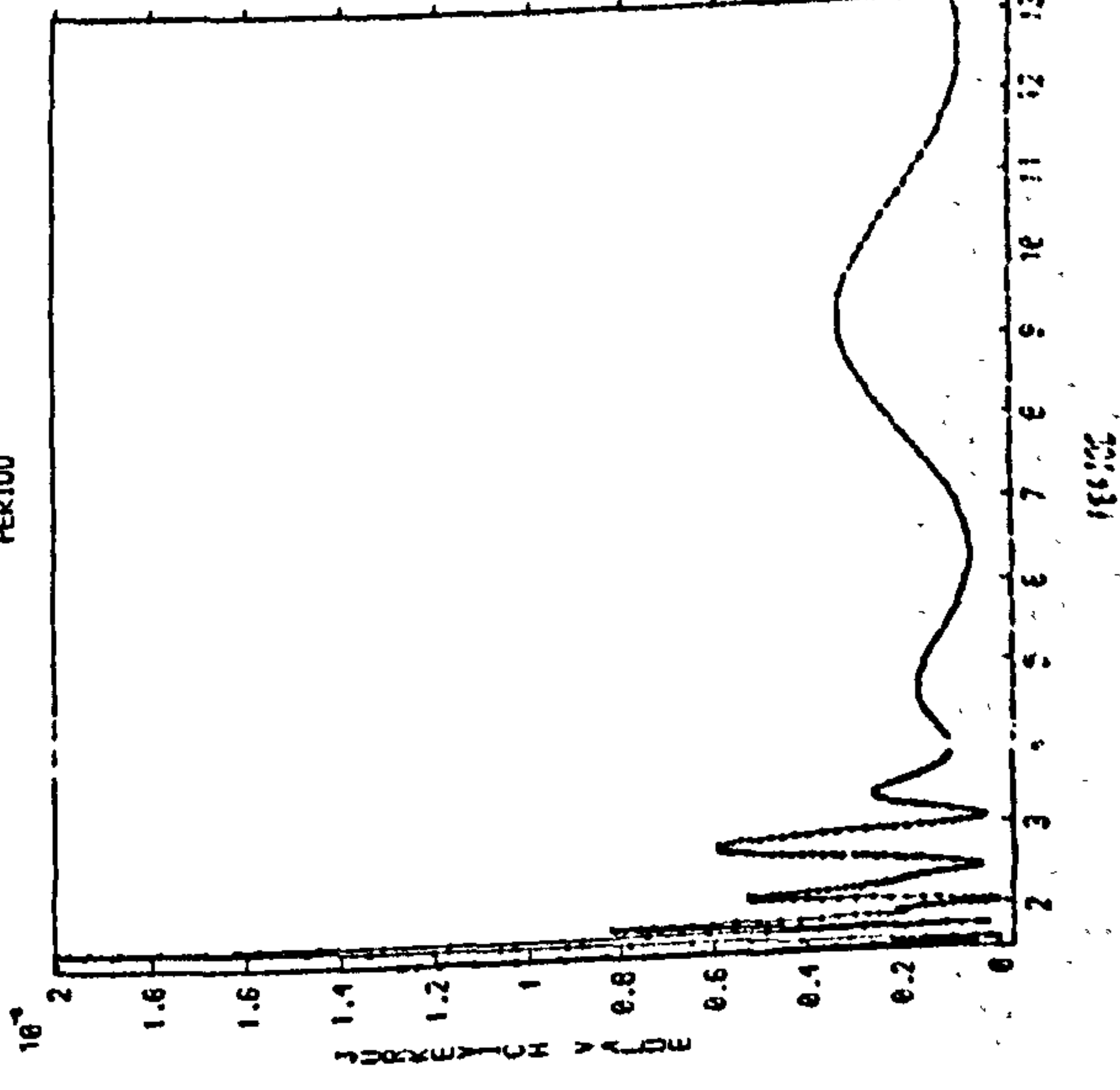
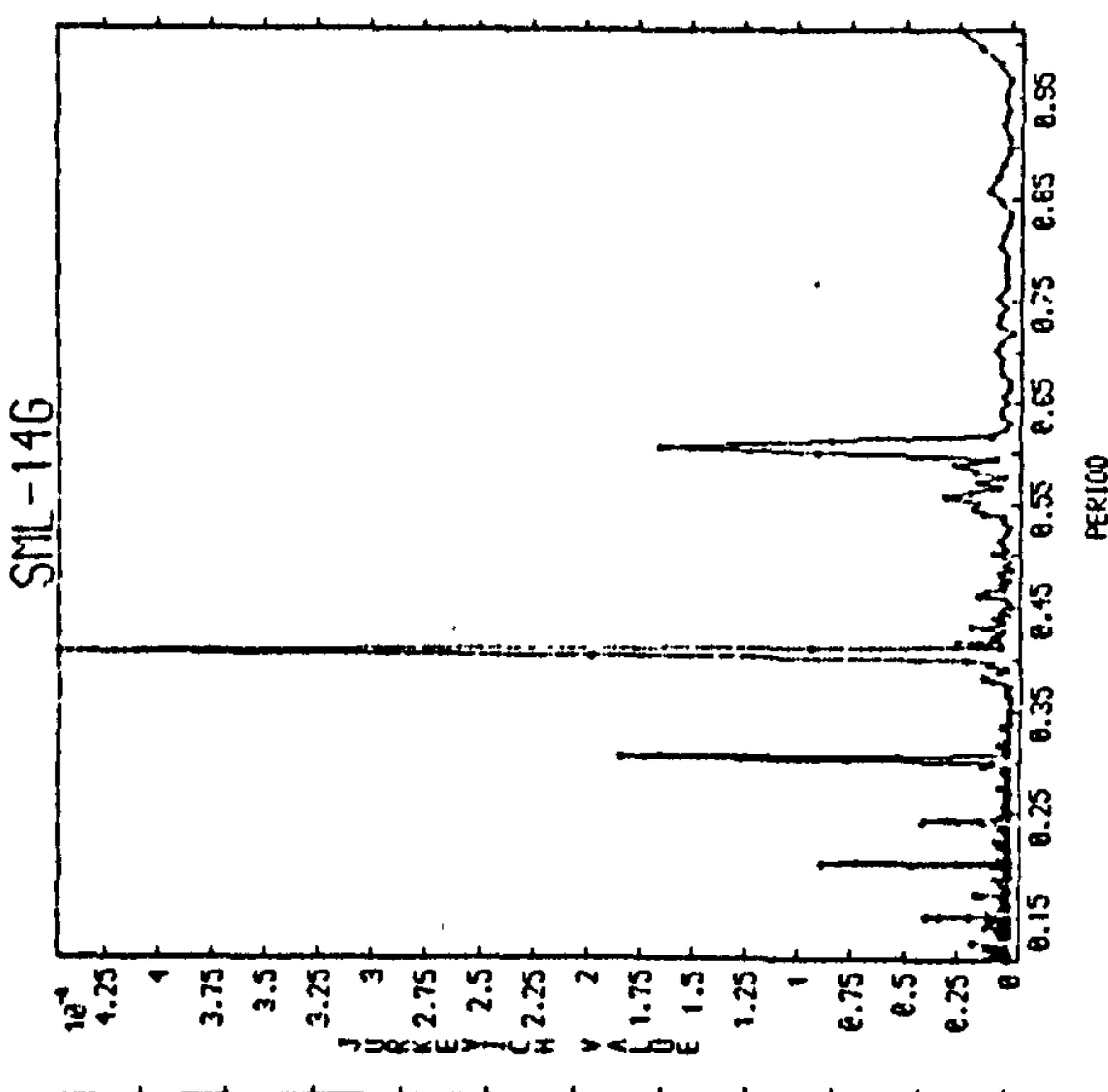
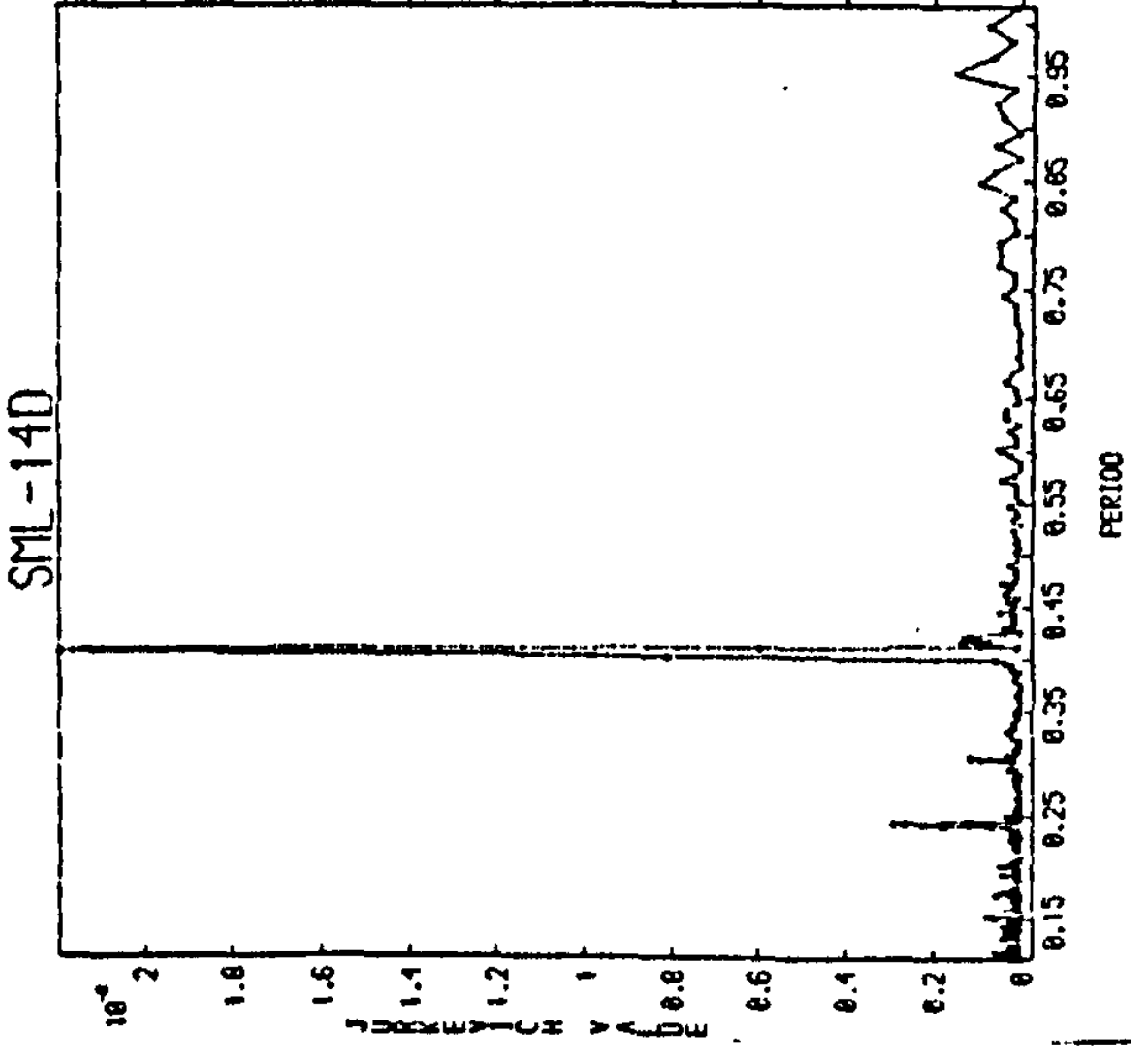
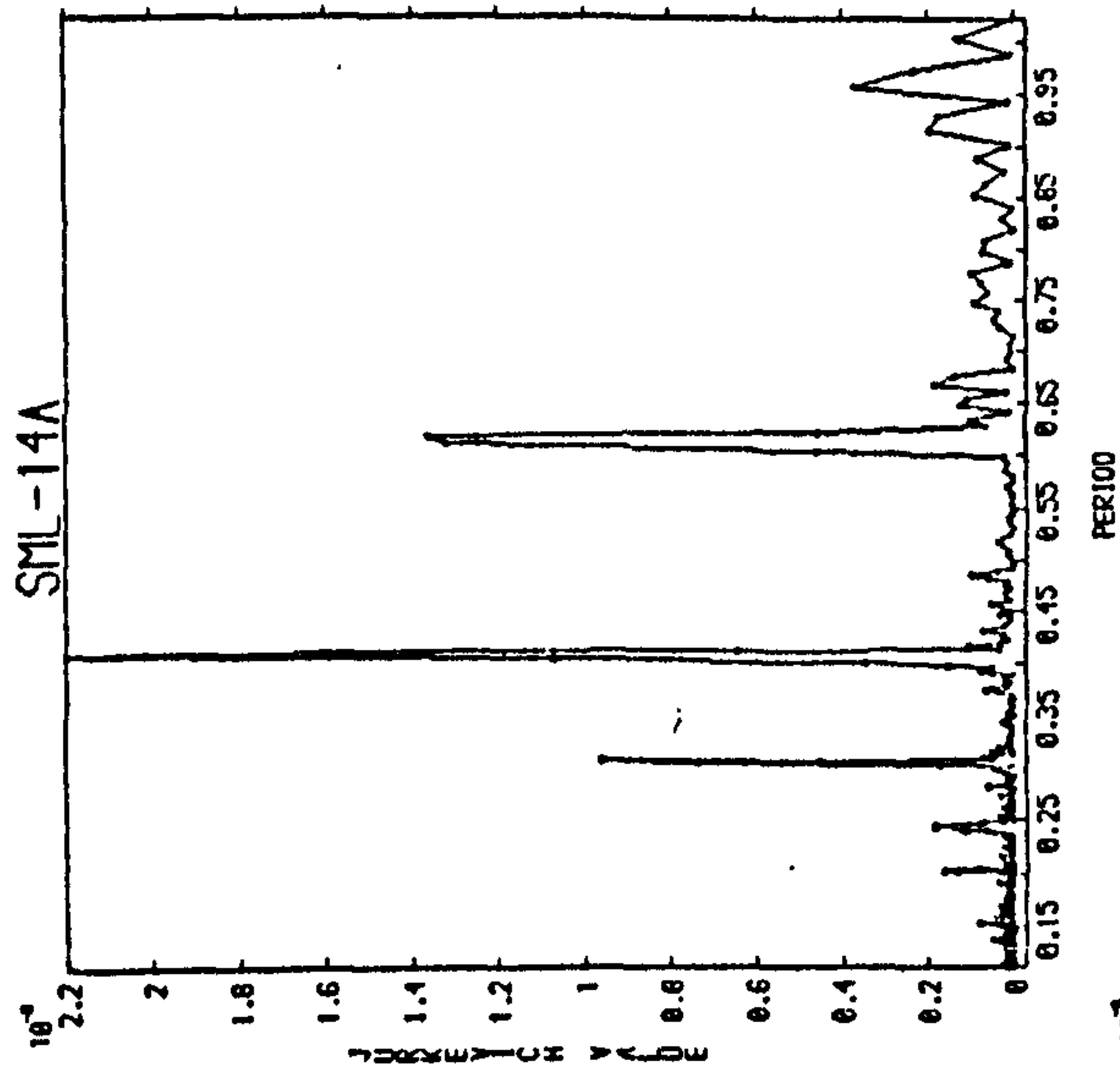
Tool

Gauge

Binding

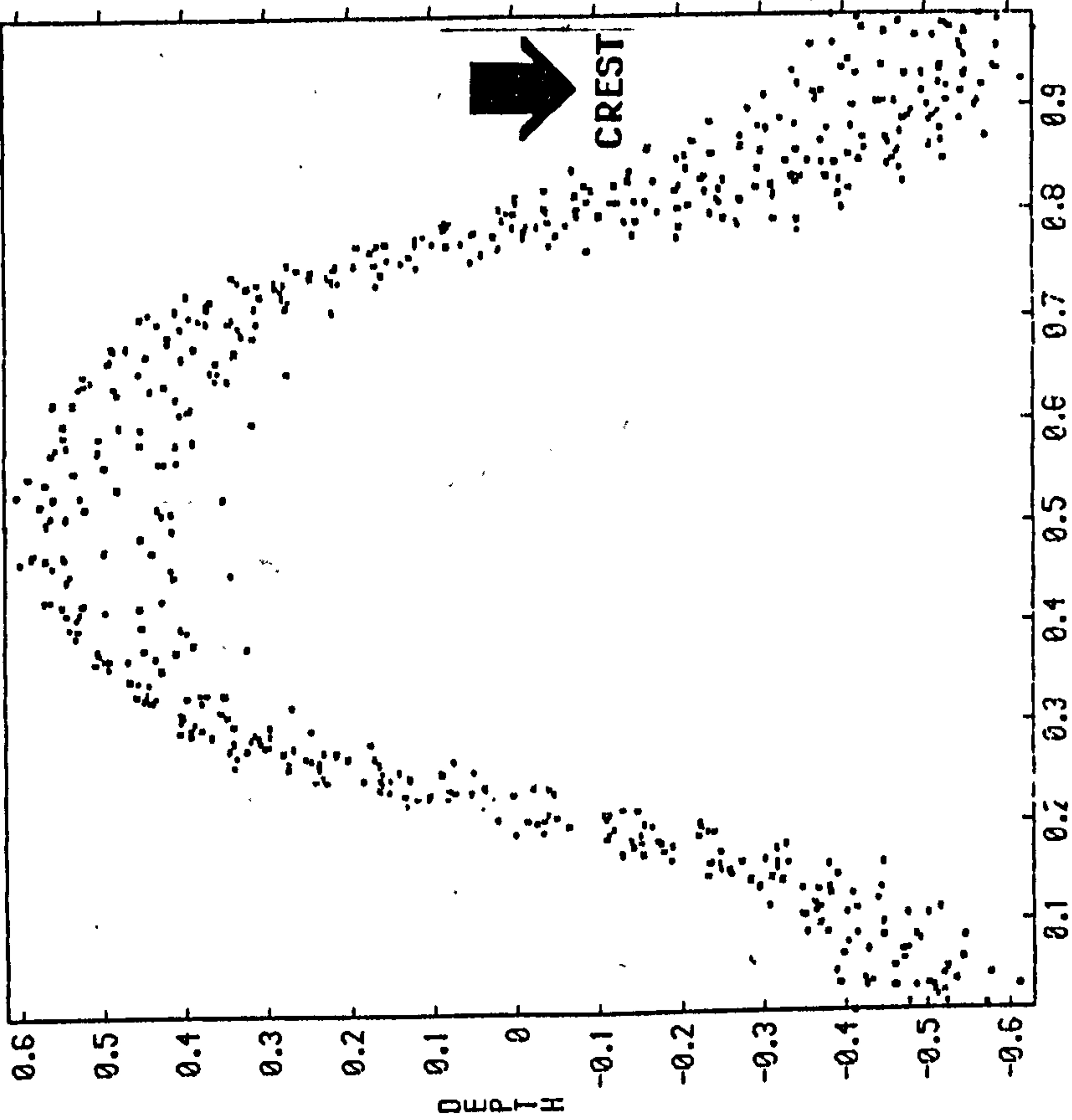
Misc.







SML-14A

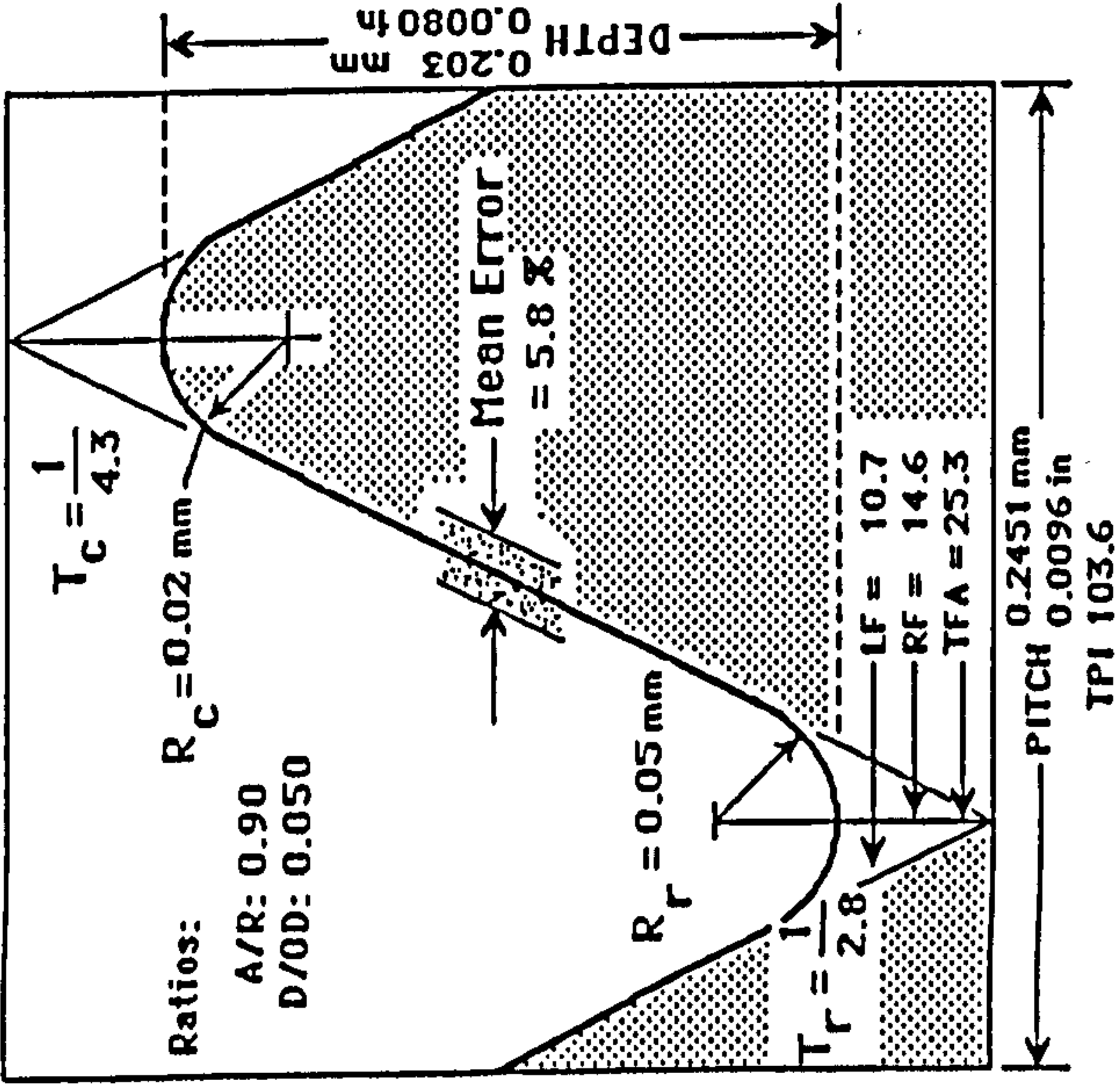


Characteristics:

Screw ☒ Nut ☐  
Leng: 0.875" /  $\approx 0.125$ "  
Diameter: 0.1616"  
Steel ☒ Brass ☐  
Other:

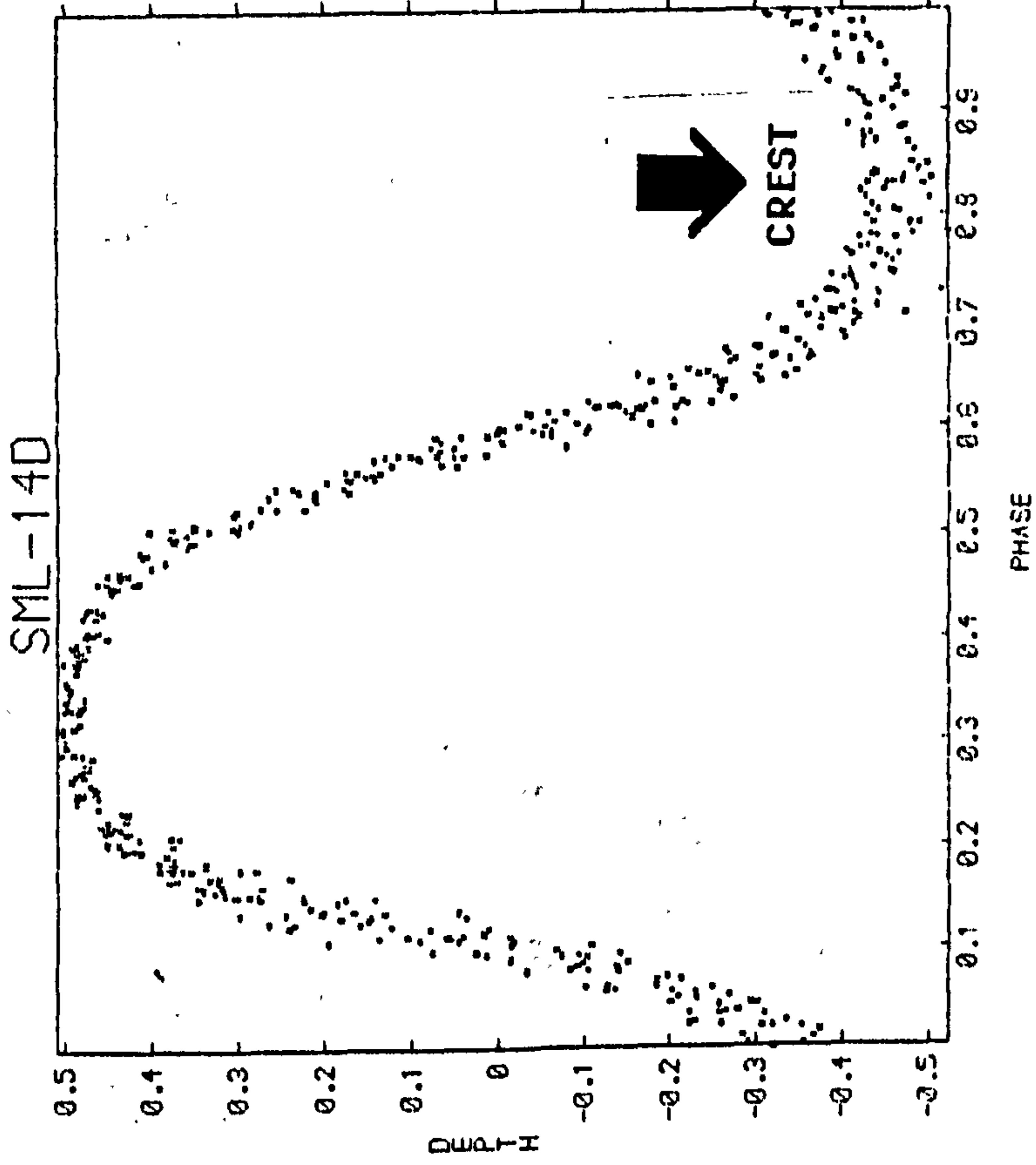
Instrument Identification:

Study Code: SML-14a  
Instrument: 2' Geodetic theodolite  
Maker: Troughton & Simms  
Date: 1828  
Ser./Acq. No. 1876-1204



Mu	Filar
	Scale
	Bench
	Div. Eng.
	Adjust.
	Leveling
	Focus
	Eye P.
	Tube
	Tool
	Gauge
	Binding
	Misc.

Mu Drum: dia.: 1.0"  
divisions: 60  
resolution: 1/4-1/2div.



Characteristics:

Screw ☒ Nut ☐

Leng: 1.00"

Diameter: 0.1628"

Steel ☒ Brass ☐

Other:

Instrument Identification:

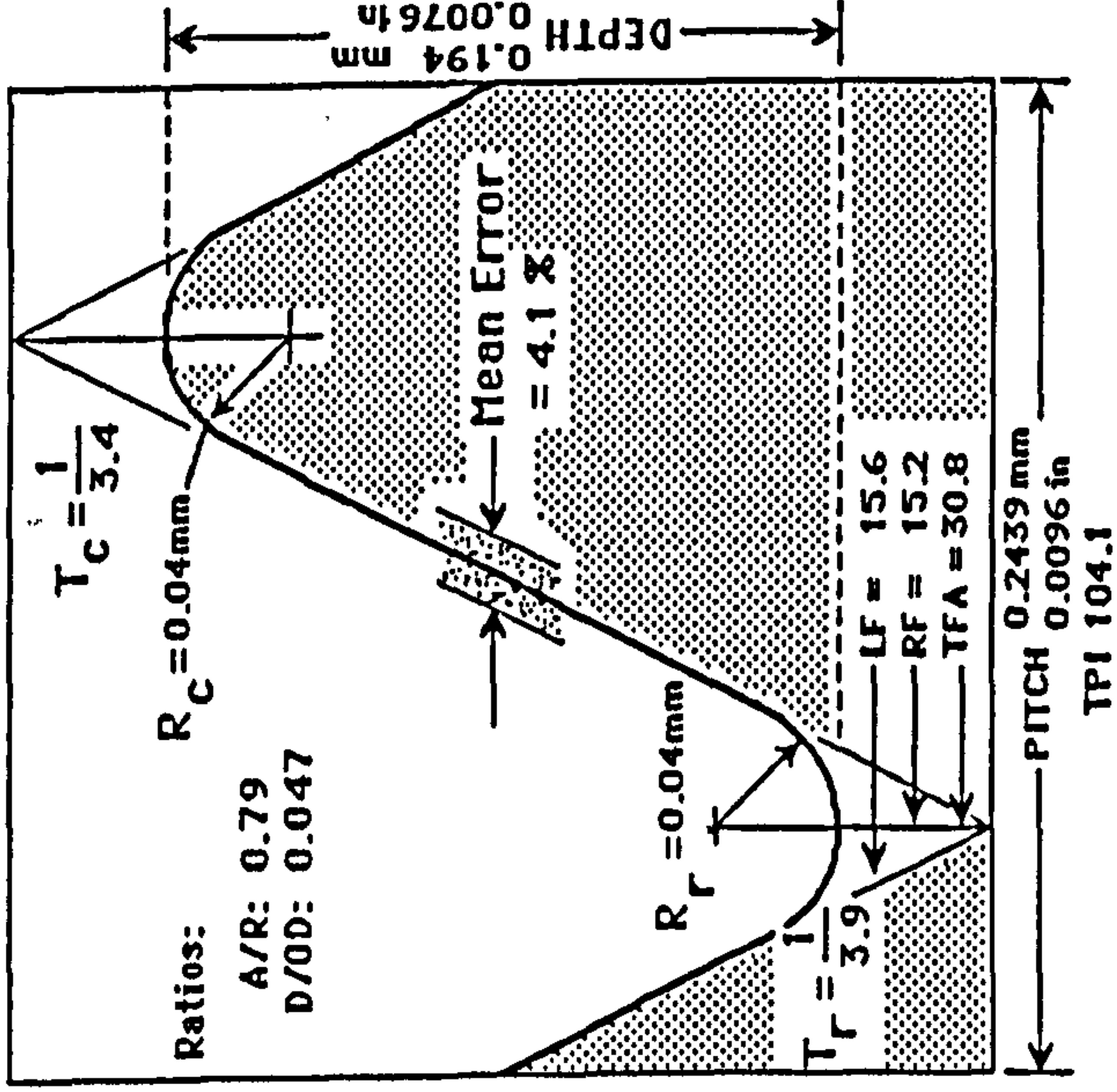
Study Code: SML-14d

Instrument: Geodetic theodolite

Maker: Troughton & Simms

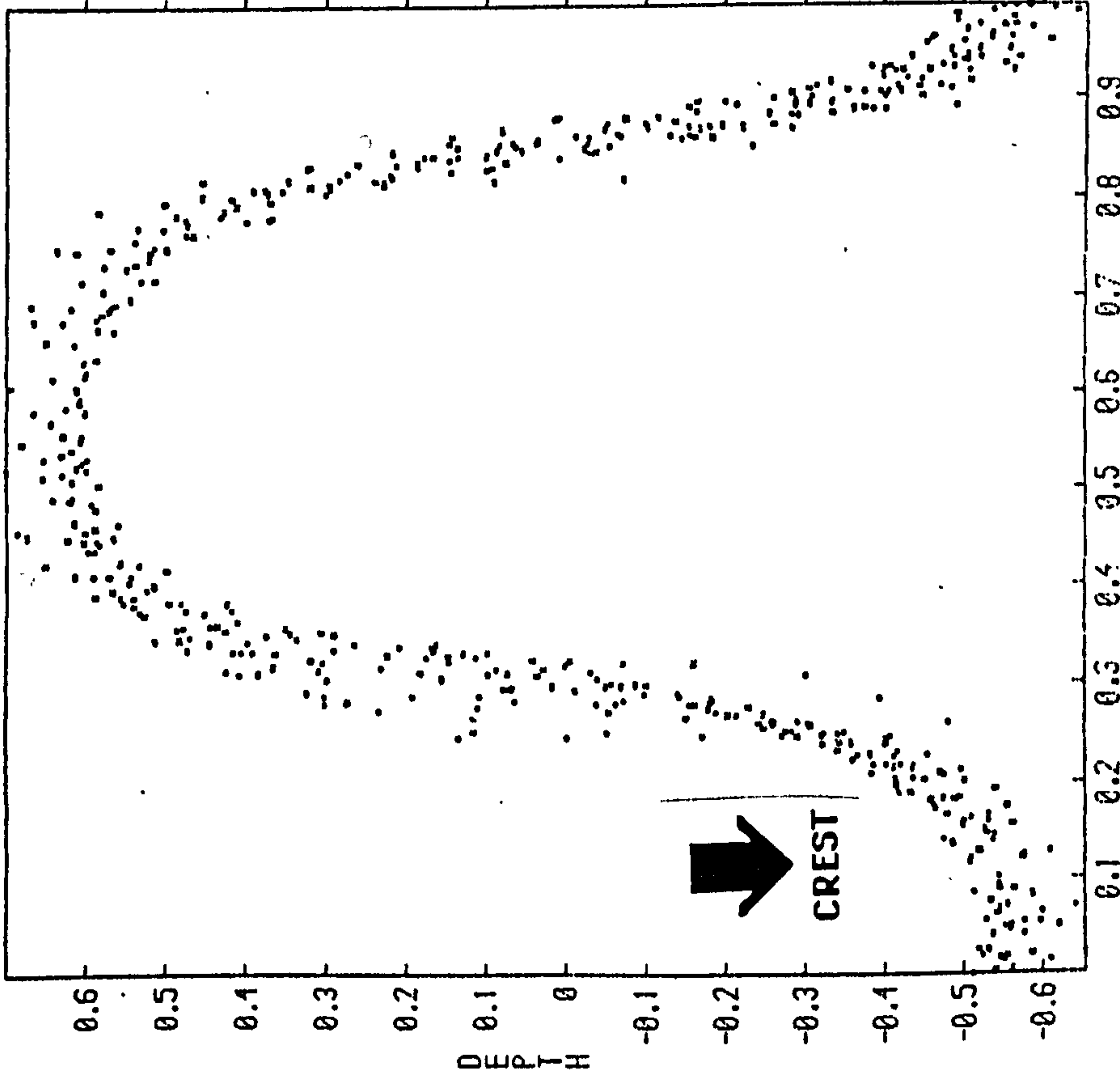
Date: 1828

Ser./Acq. No. 1876-1204



MU — [ Filar Scale Bench Div. Eng. Adjust. Leveling Focus Eye P. Tube Tool Gauge Binding Misc. ]

SML-14G

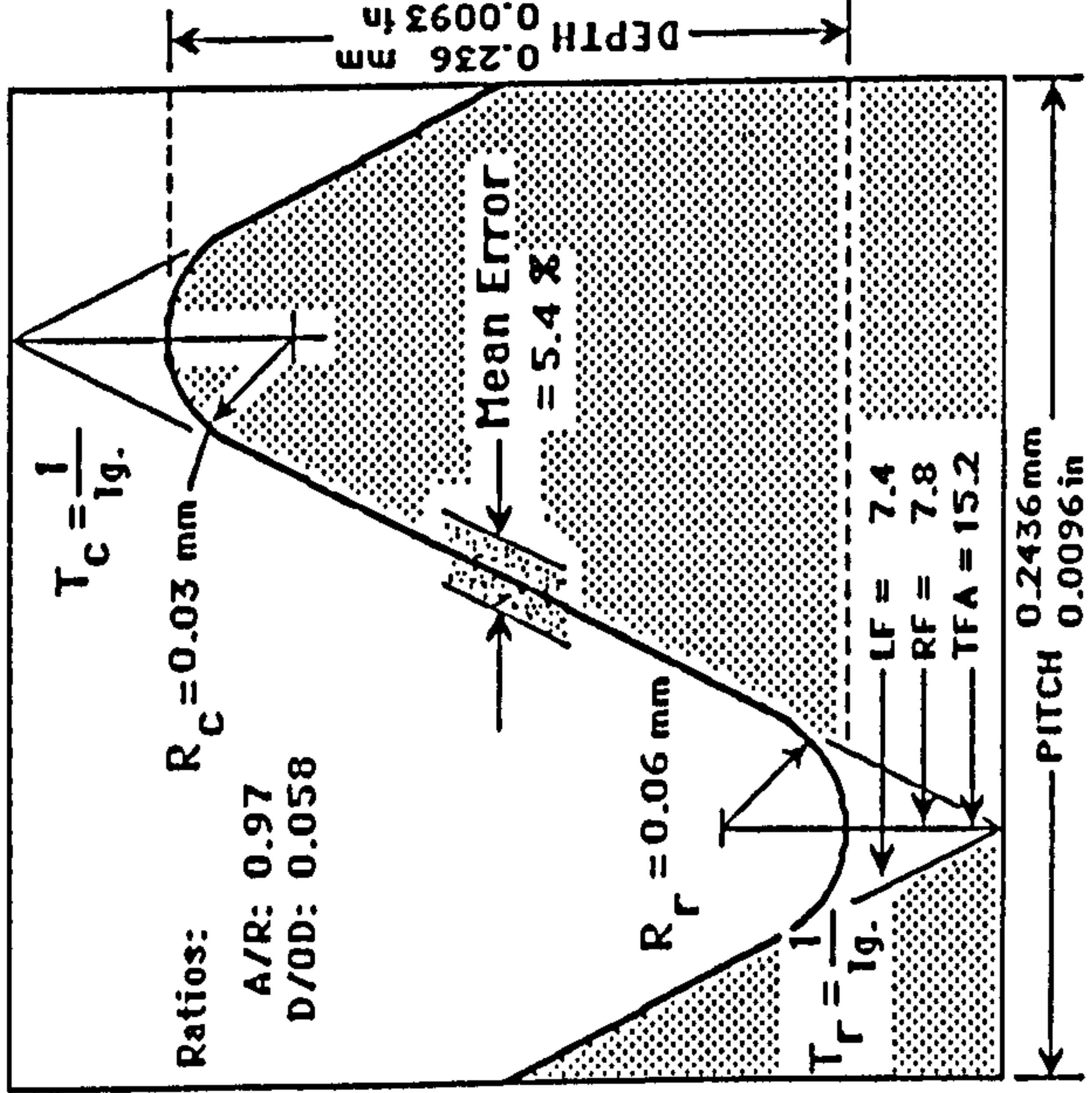


Characteristics:

Screw ☒ Nut ☐  
 Leng: 0.875" / ~0.125"  
 Diameter: 0.1628"  
 Steel ☐ Brass ☒  
 Other:

Instrument Identification:

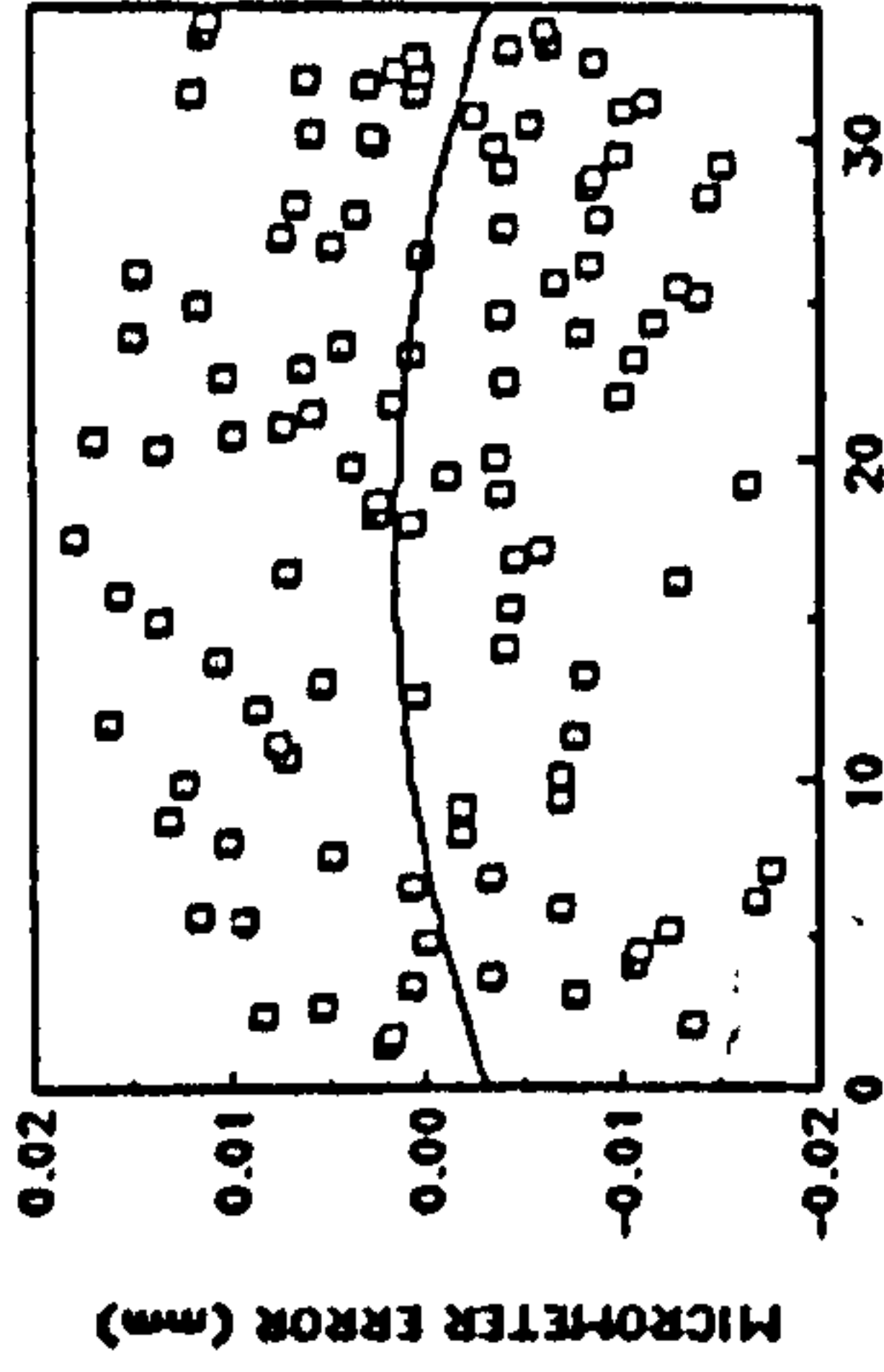
Study Code: SML-14g  
 Instrument: Geodetic theodolite  
 Maker: Troughton & Simms  
 Date: 1828  
 Ser./Acq. No. 1876-1204



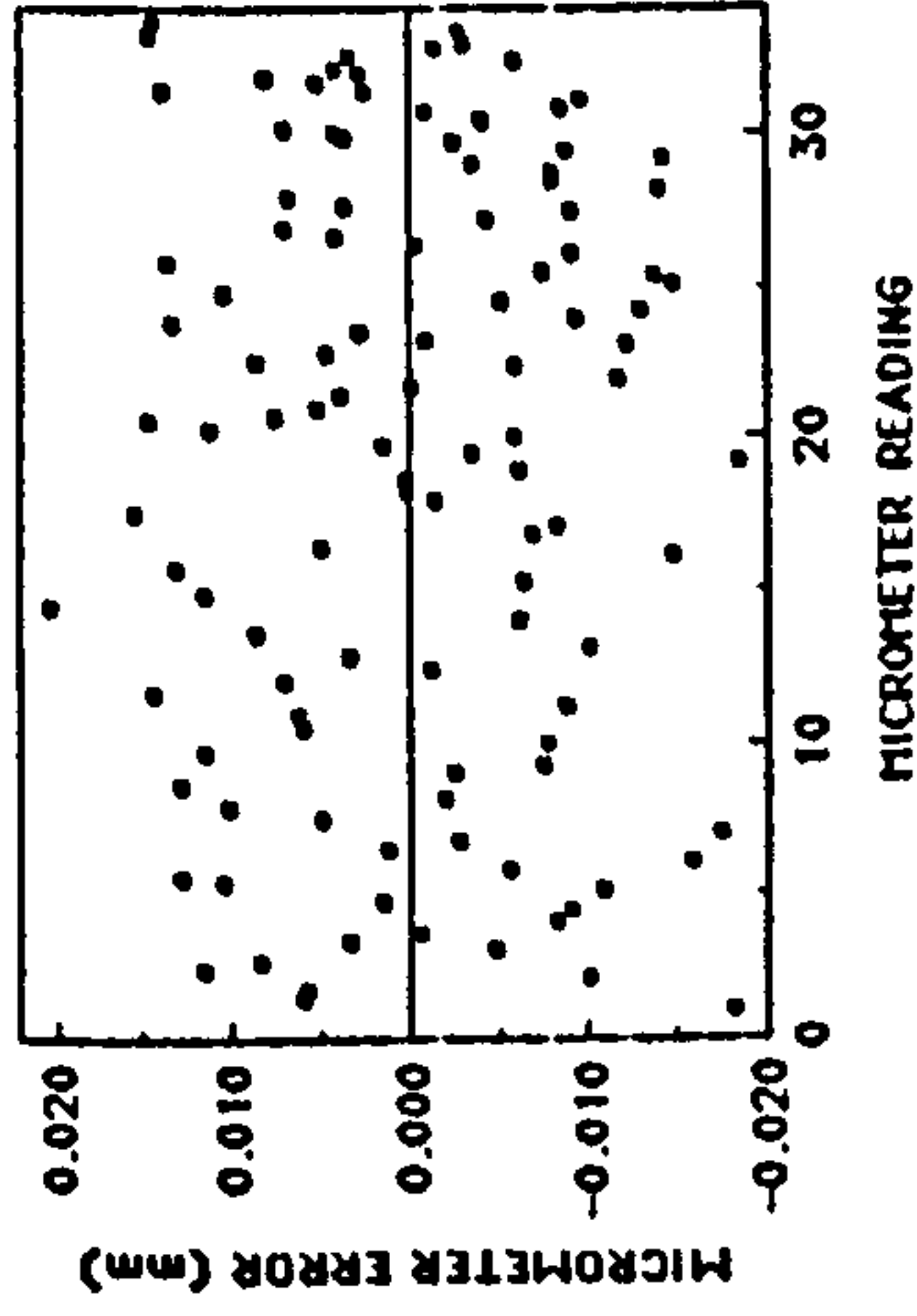
Mu	Filar
	Scale
	Bench
	Div. Eng.
	Adjust.
	Leveling
	Focus
	Eye P.
	Tube
	Tool
	Gauge
	Binding
	Misc.

Mu Drum: dia.: 0.625"  
 divisions: 100  
 resolution: 1/4-1/2 div.

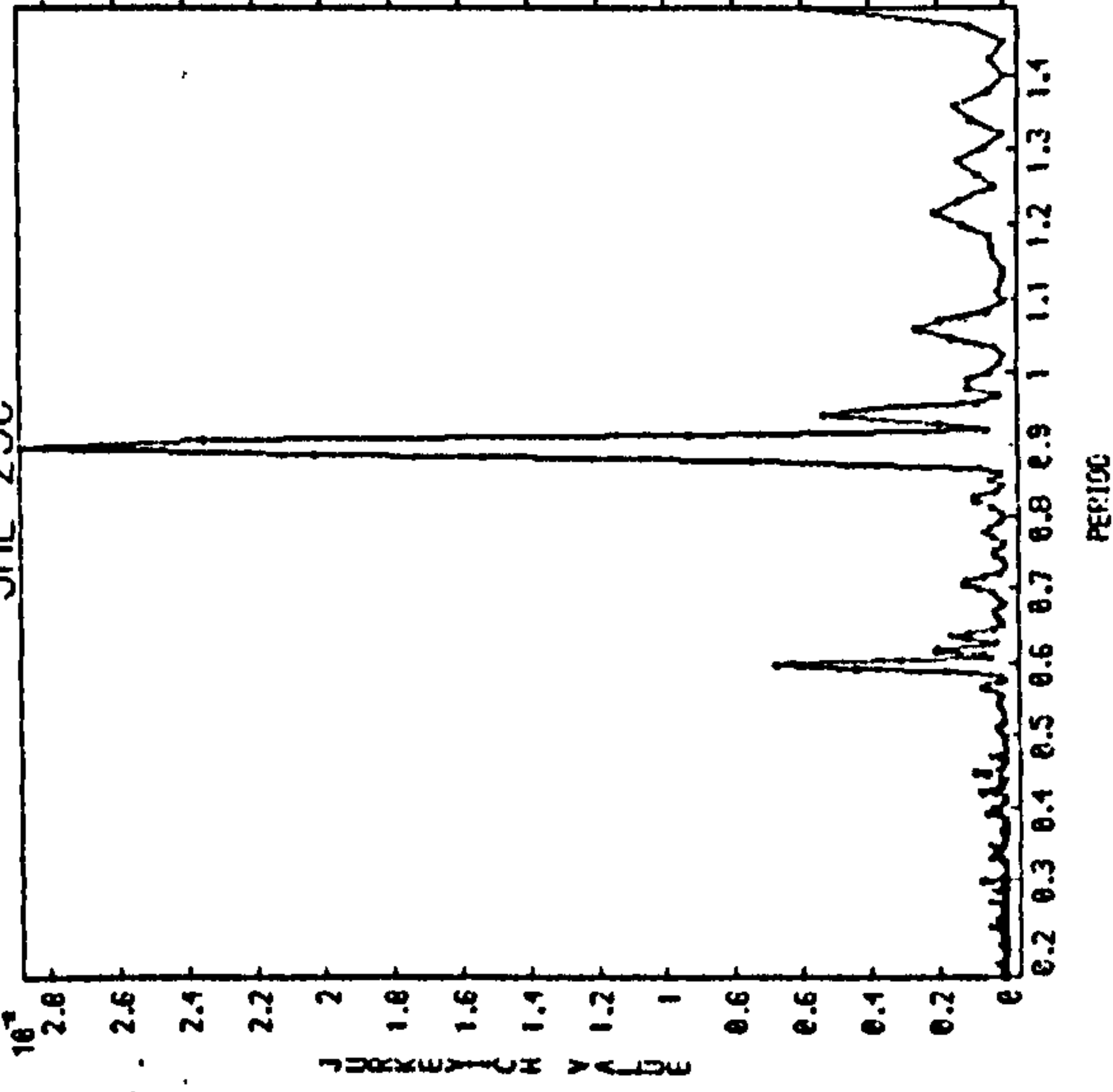
SML-23



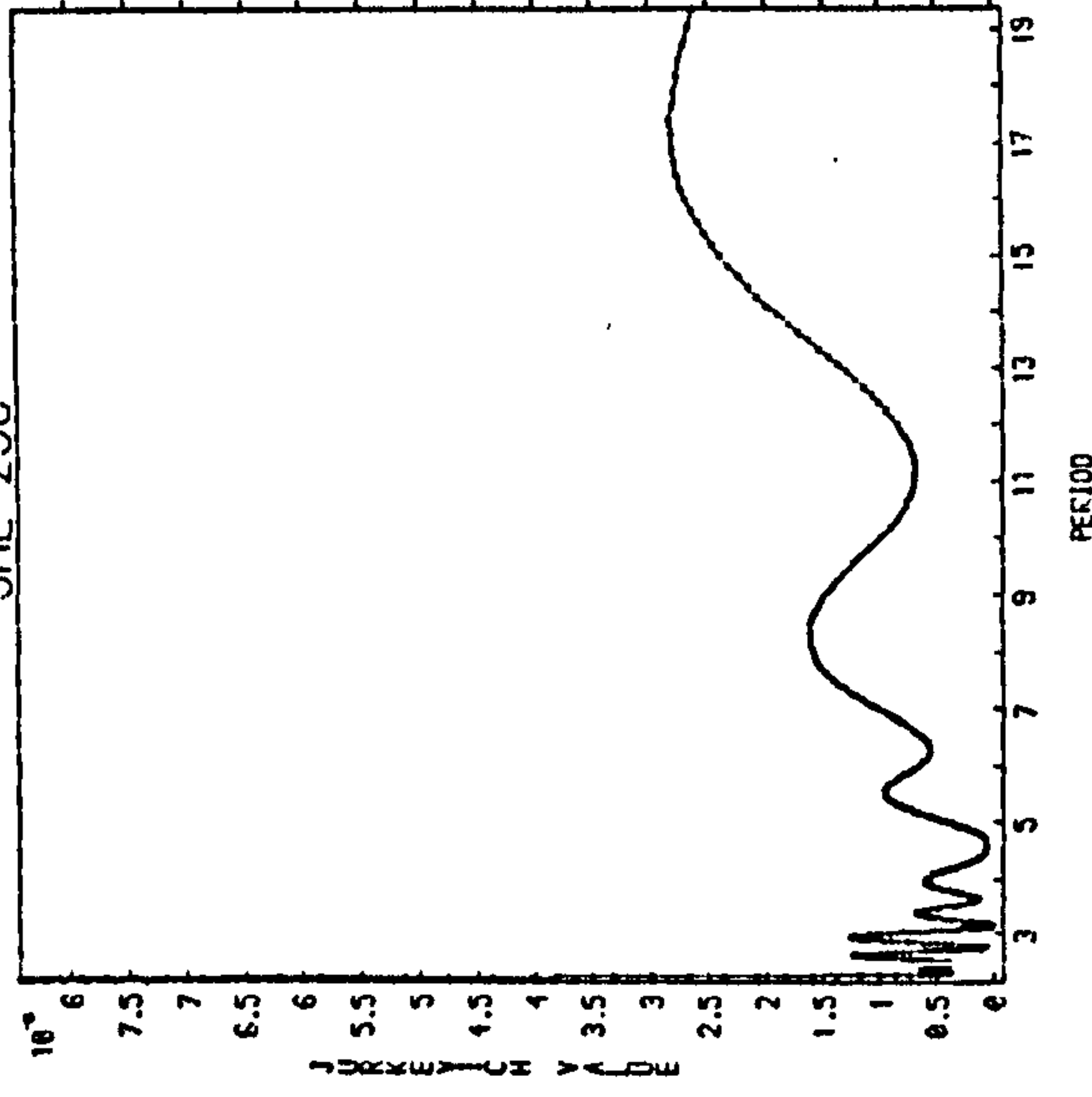
SML-23 (2dp)



SML-23C



SML-23C





Characteristics:

Screw

Nut

Leng: 2.625"

Diameter: 0.1841"

Steel

Brass

Other:

Instrument Identification:

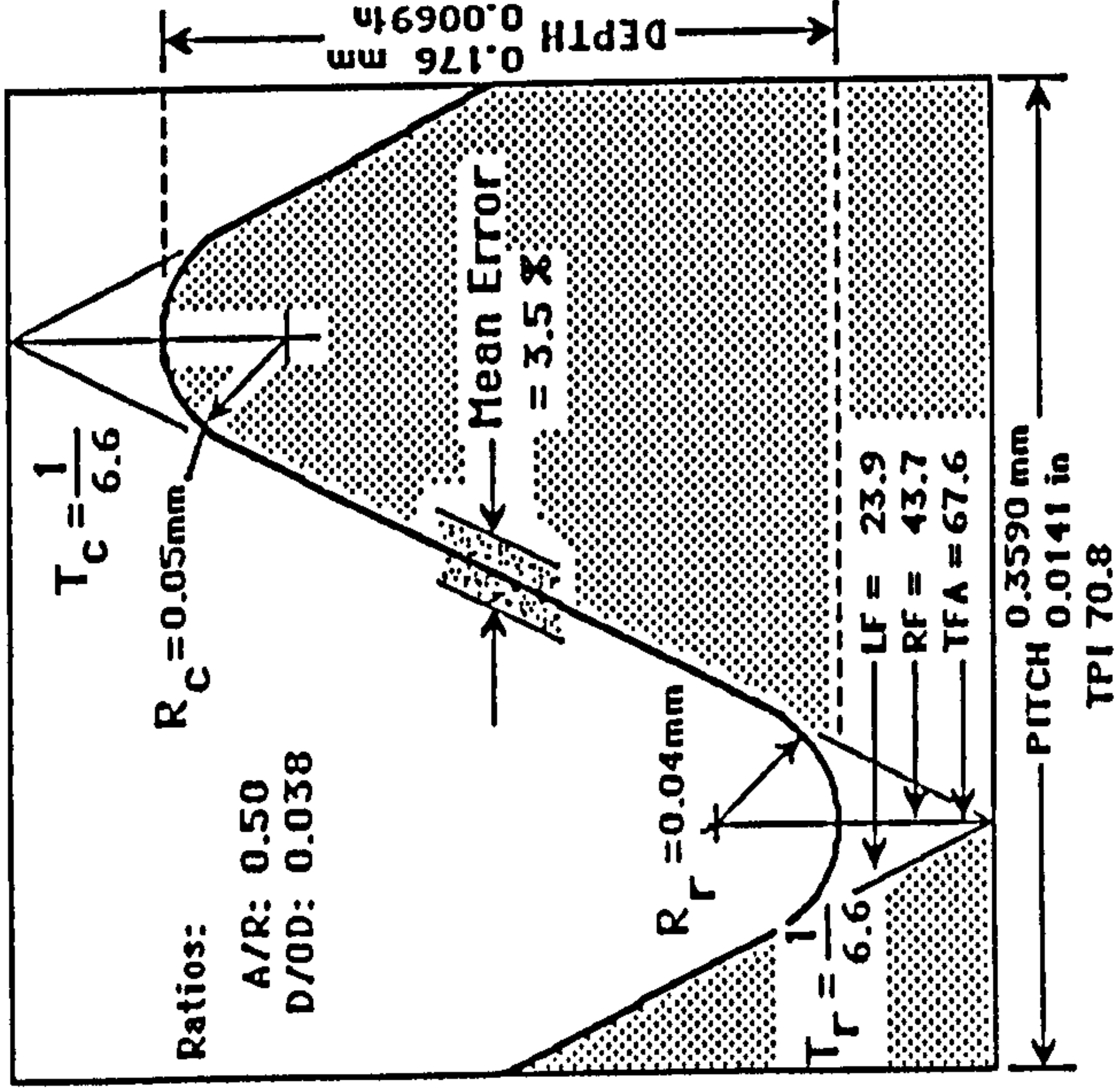
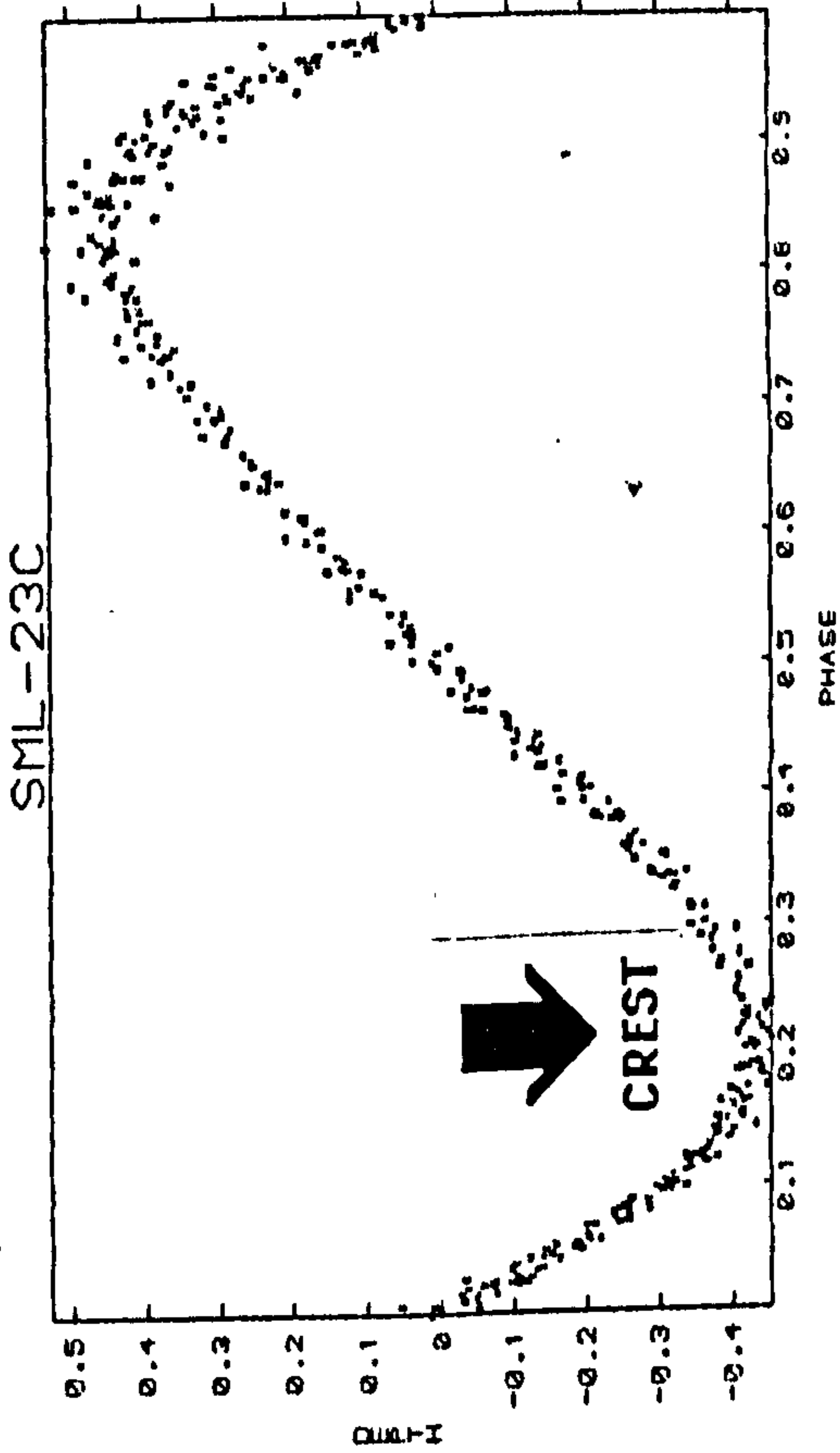
Study Code: SML-23c

Instrument: Portable Quadrant

Maker: Dollond

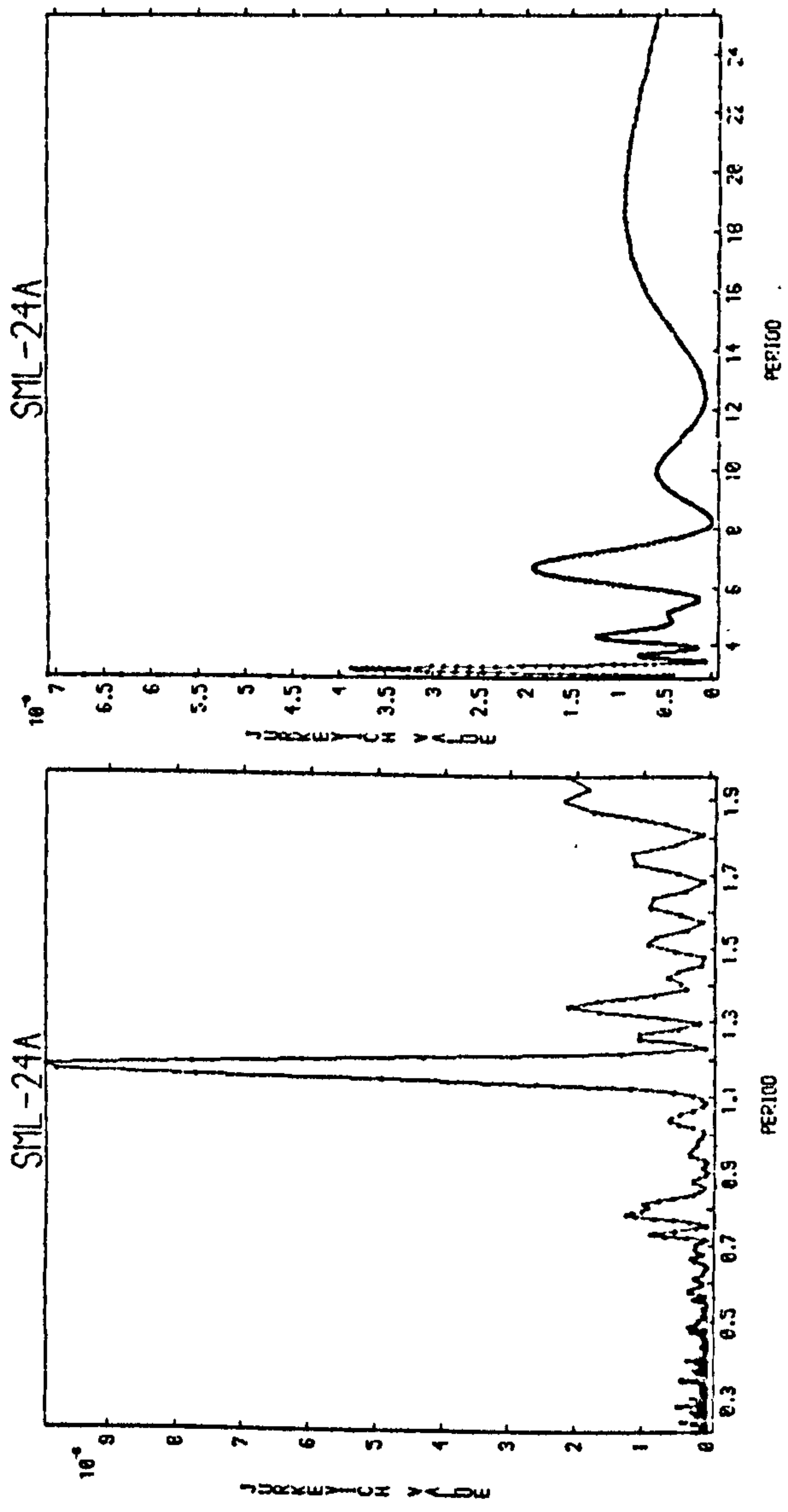
Date: ca.1767

Ser./Acq. No. 1911-214



Mu	Filar
	Scale
	Bench
	Div. Eng.
	Adjust.
	Leveling
	Focus
	Eye P.
	Tube
	Tool
	Gauge
	Binding
	Misc.

(Used by Samuel Holland  
in the survey of Gulf of  
St. Lawrence)



Characteristics:

Screw

Nut

Leng: 2.00"

Diameter: 0.1734"

Steel

Brass

Other:

Instrument Identification:

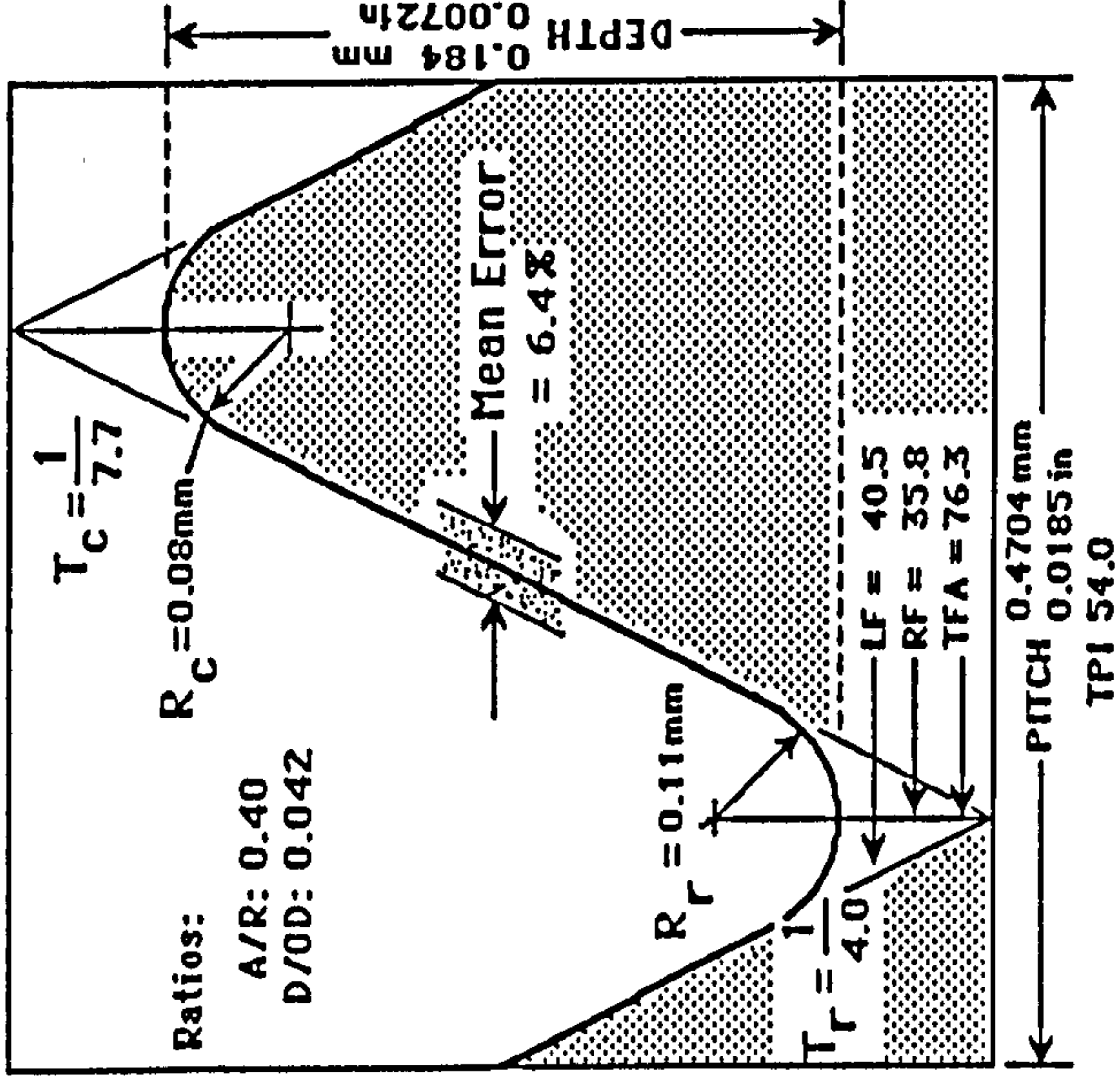
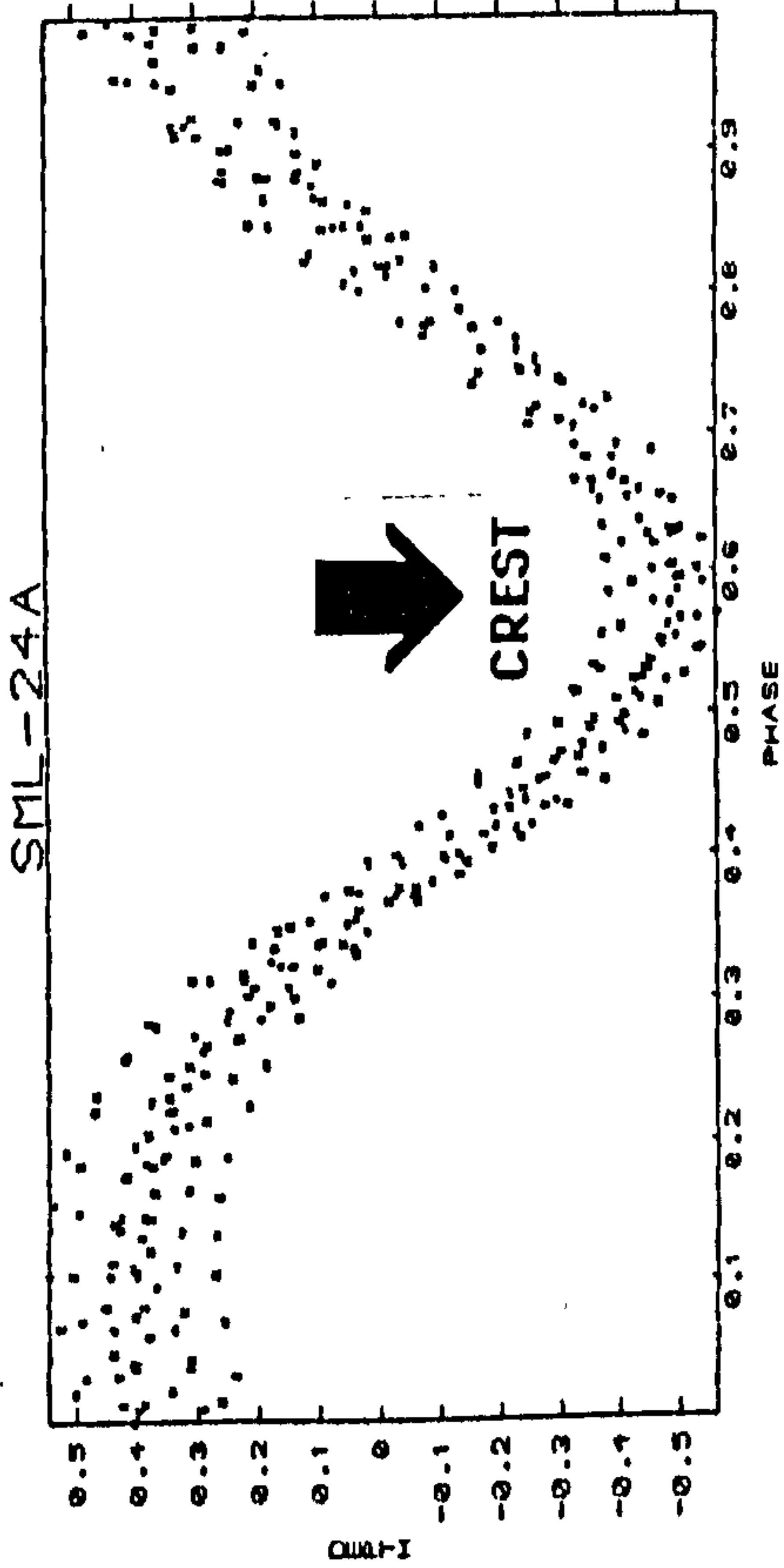
Study Code: SML-24a

Instrument: Portable quadrant

Maker: John Bird

Date: ca.1770

Ser./Acq. No. 1937-600



Mu

Filar

Scale

Bench

Div. Eng.

Adjust.

Leveling

Focus

Eye P.

Tube

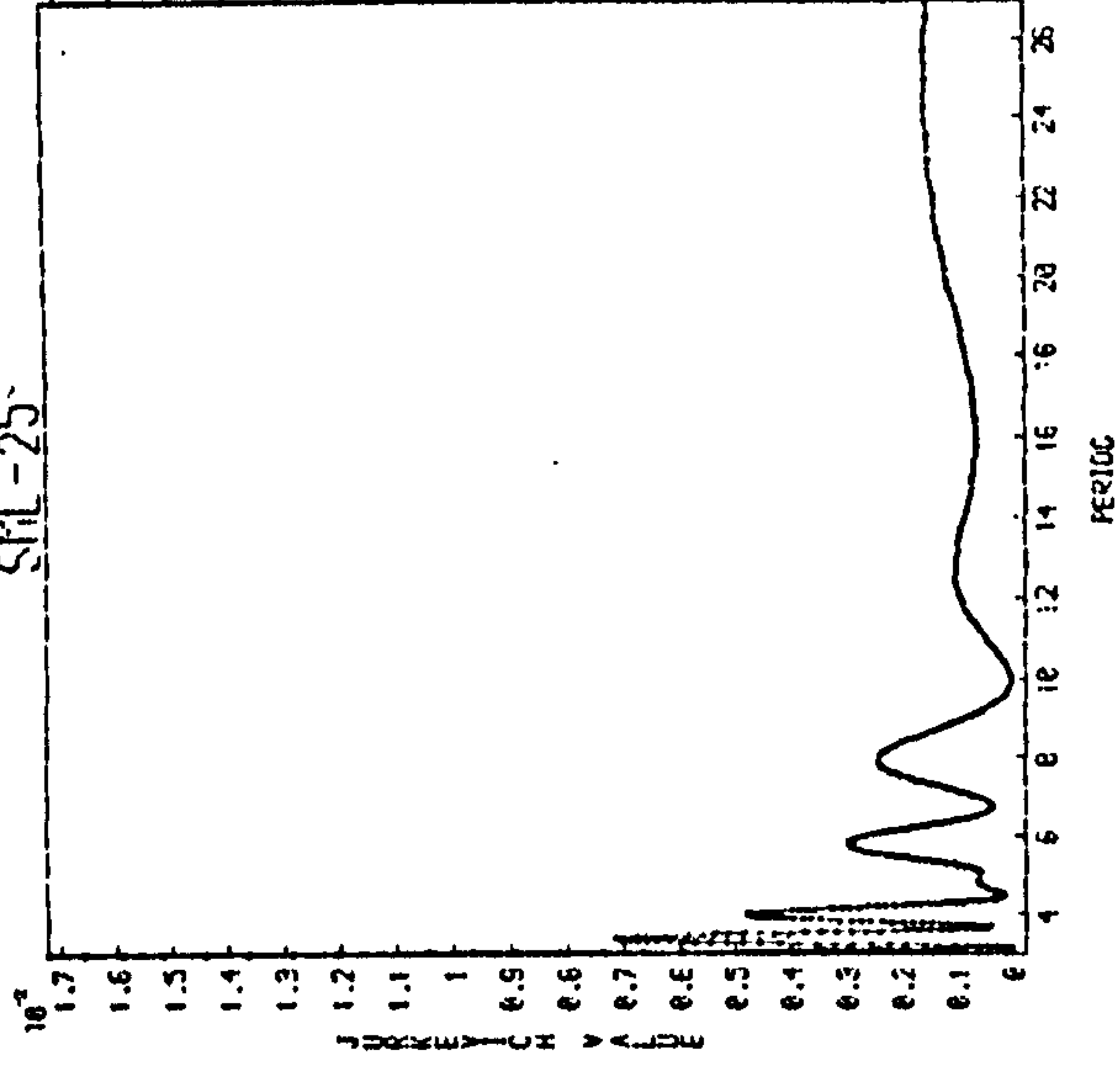
Tool

Gauge

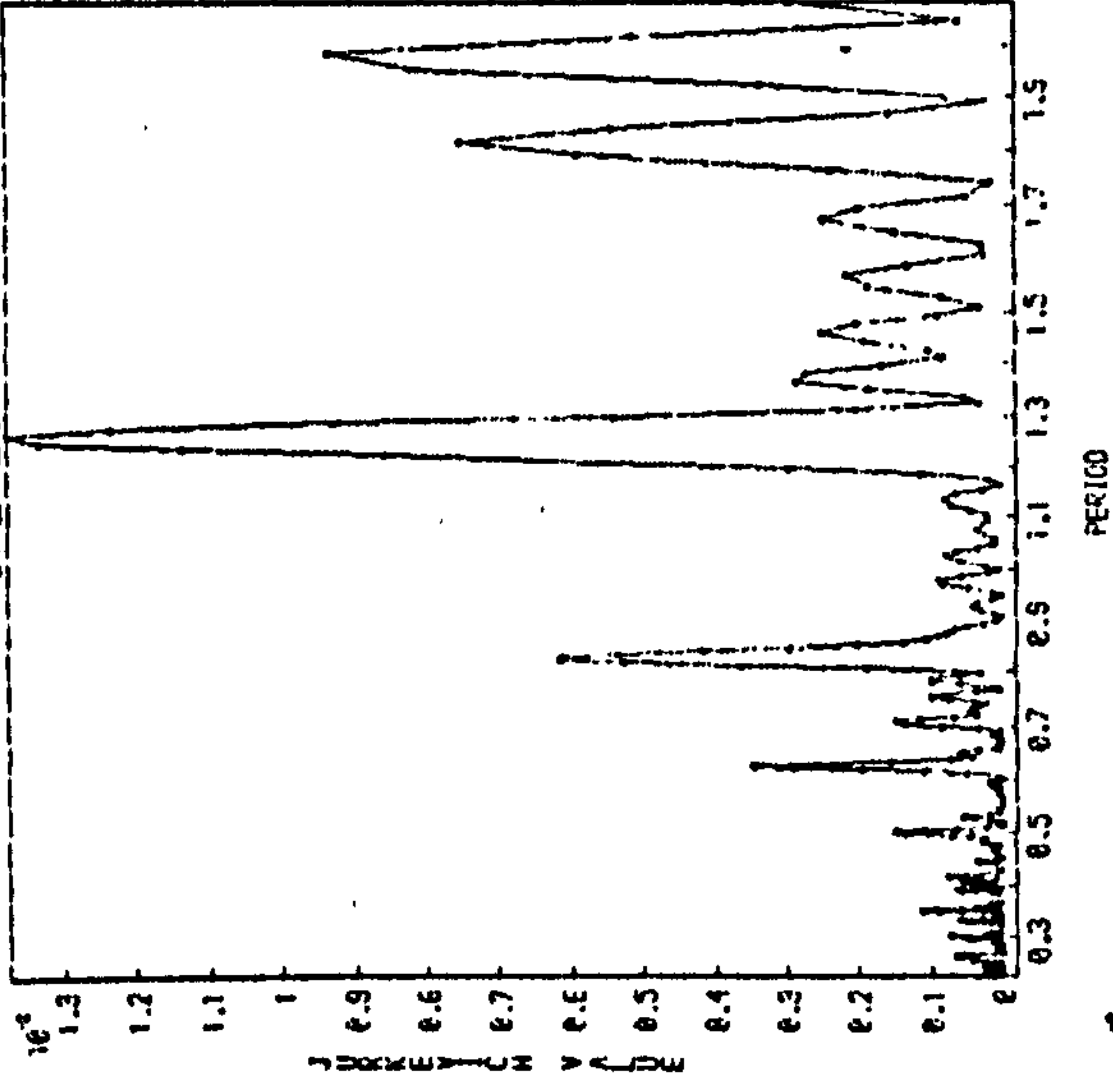
Binding

Misc.

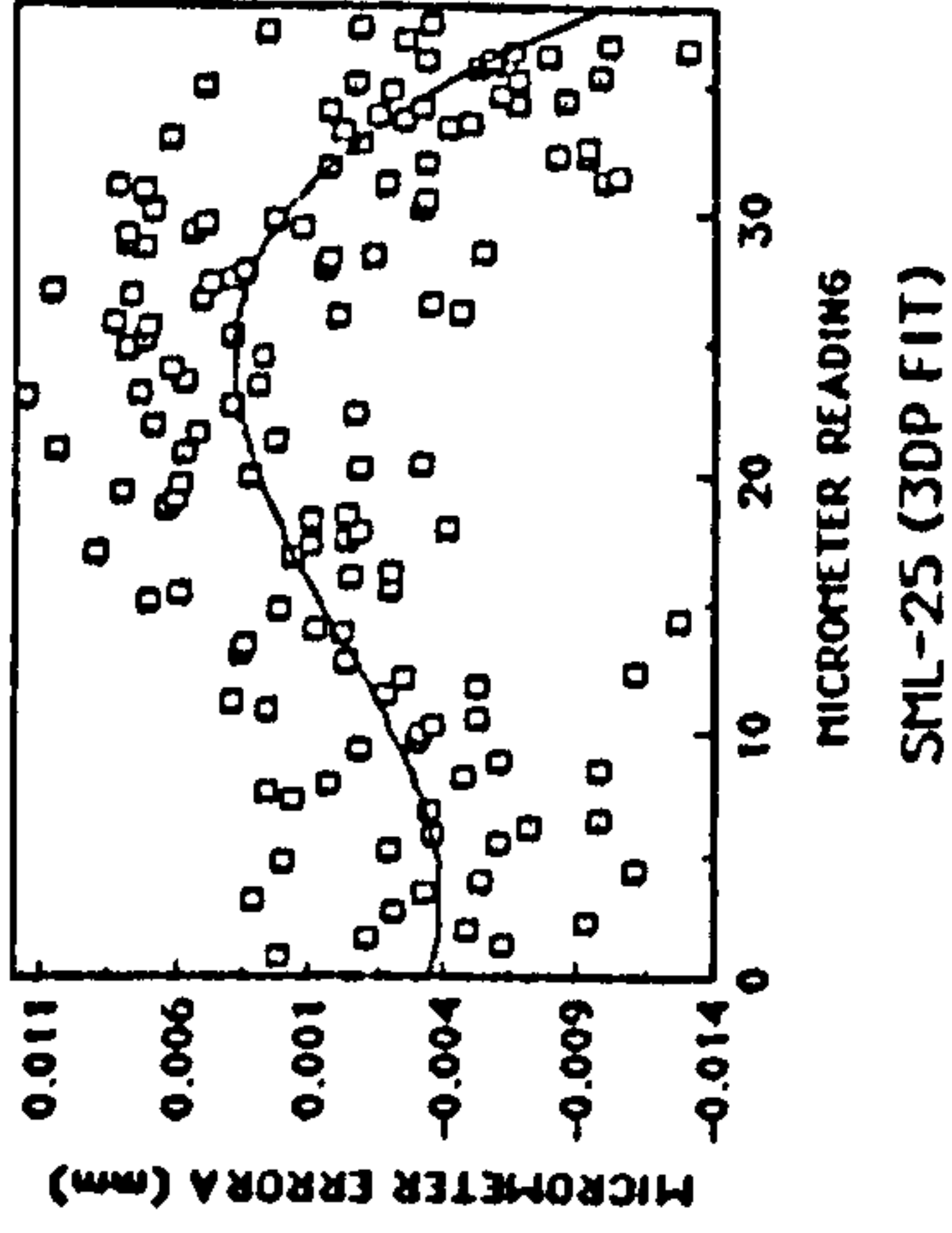
SRL-25



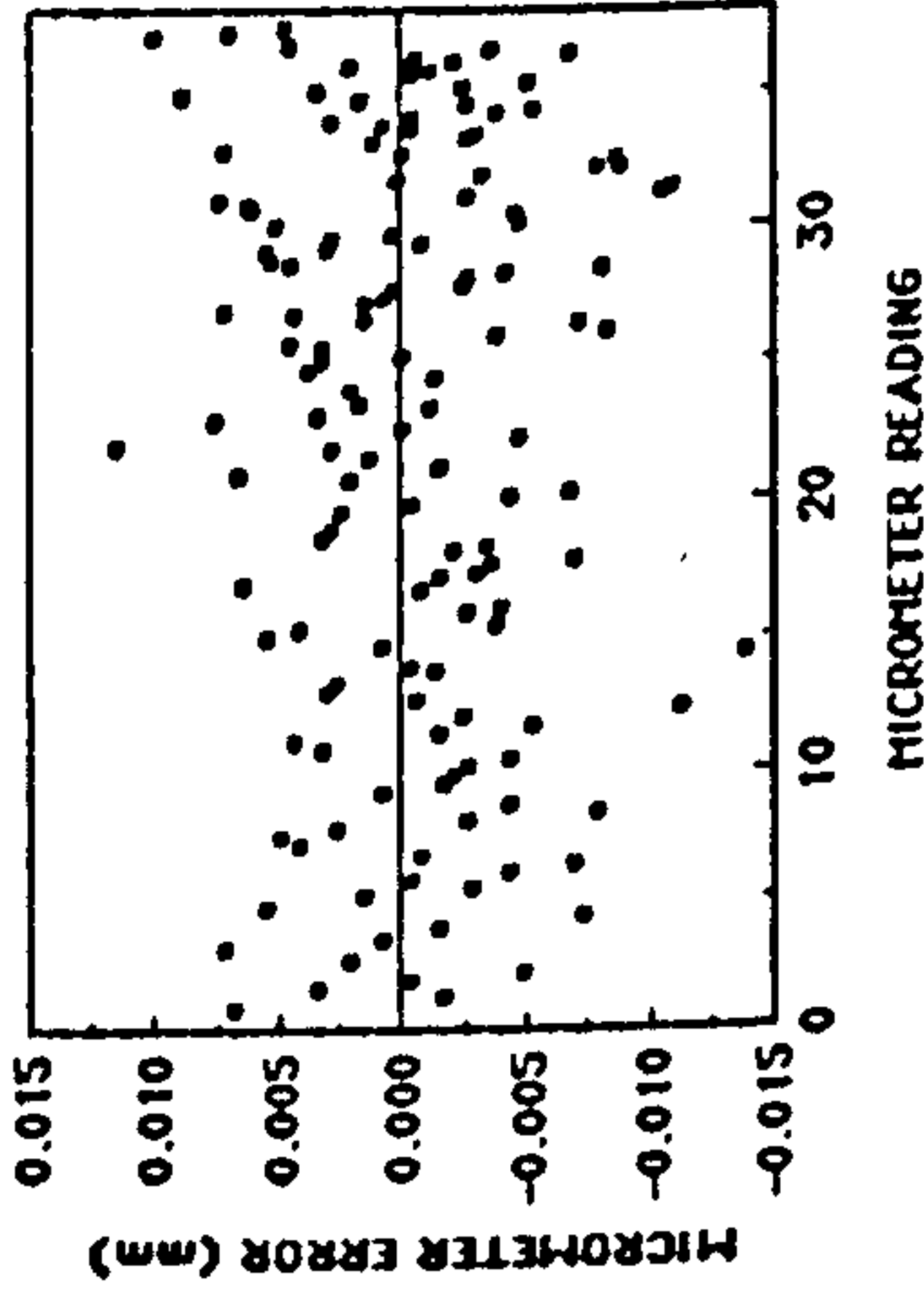
SRL-25



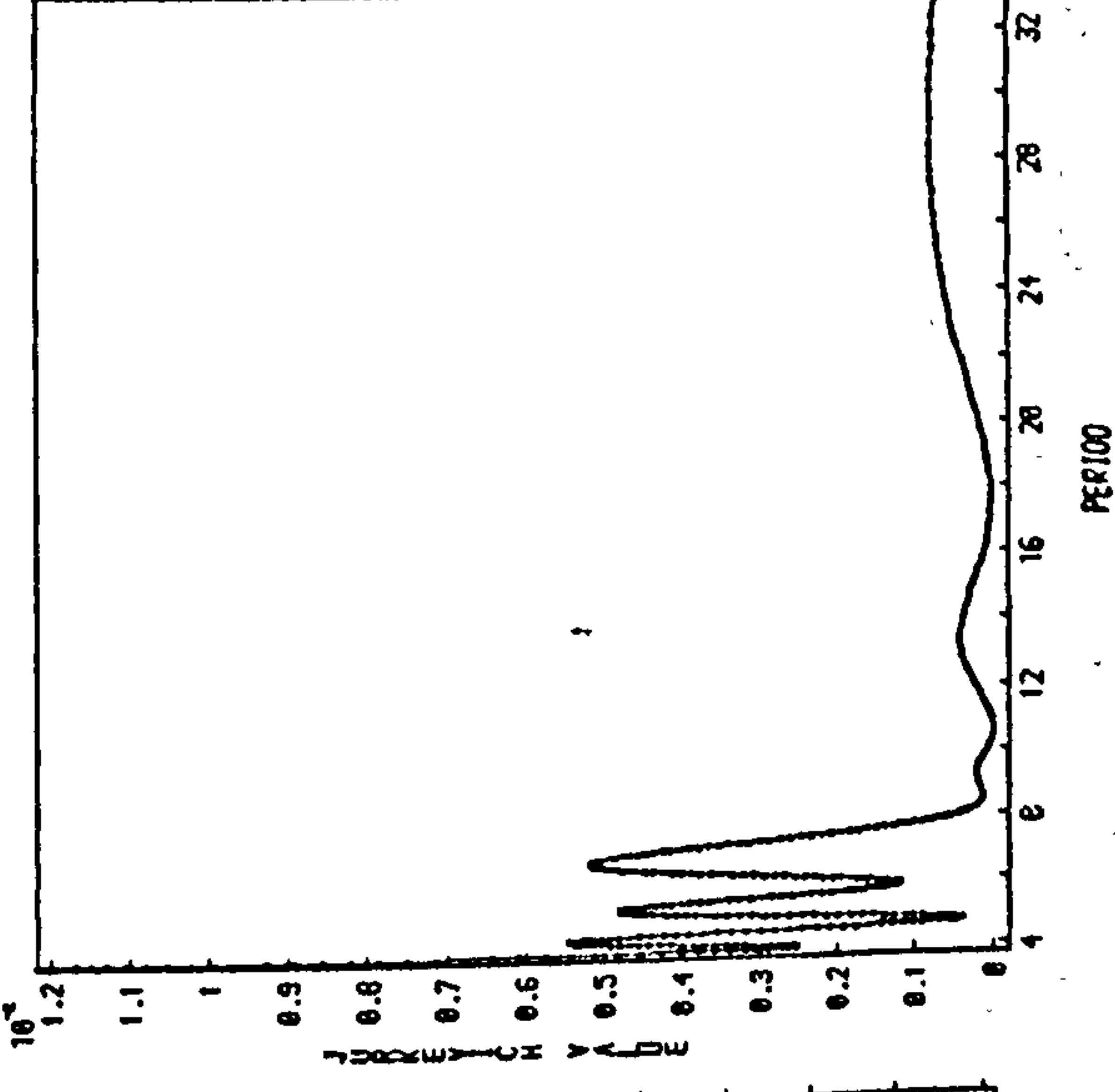
SRL-25



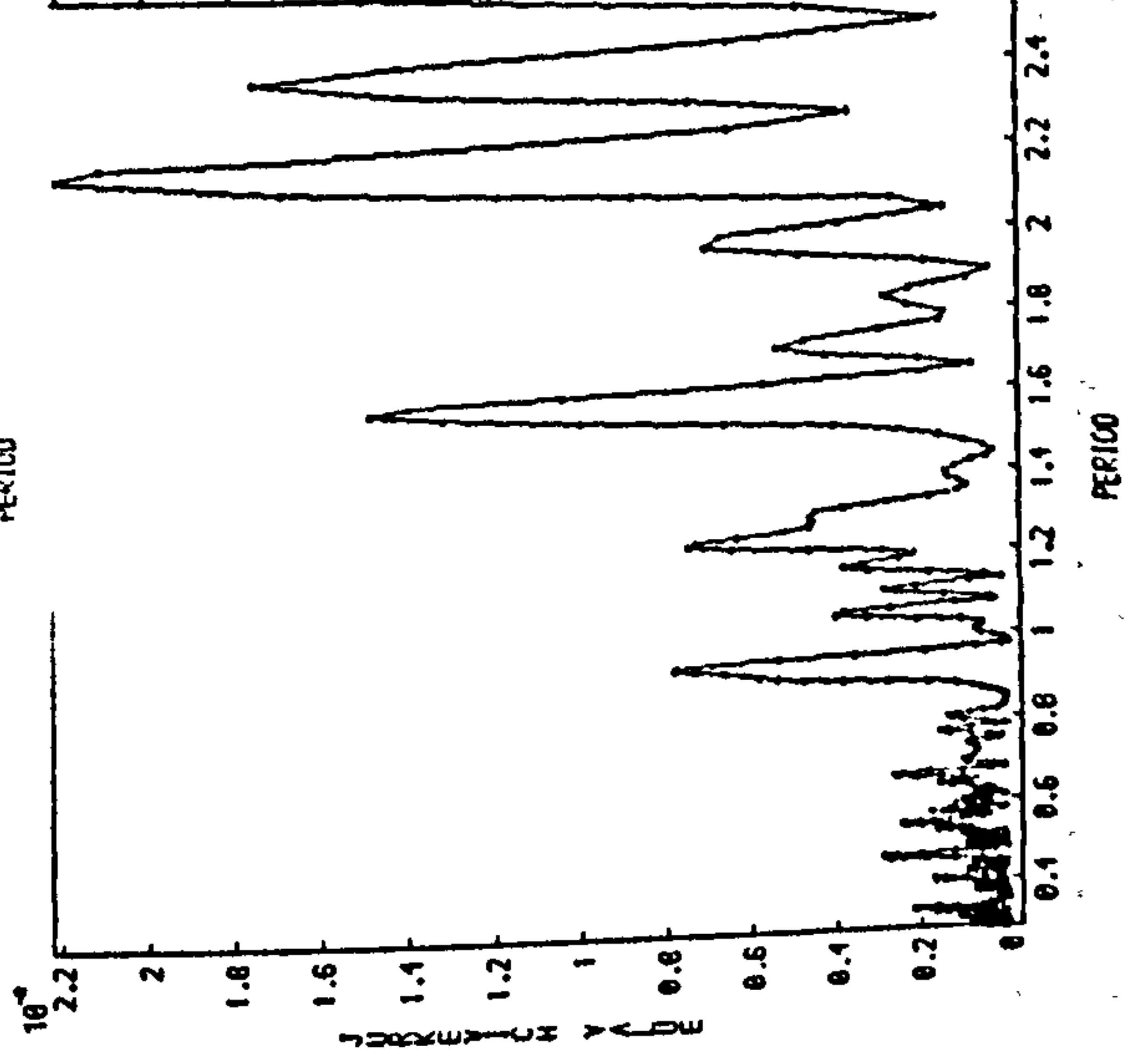
SRL-25 (30P FIT)



PERIOD



PERIOD





Characteristics:

Screw

Nut

Leng: 1.813" / 0.438"

Diameter: 0.1676-92"

Steel

Brass

Other:

Instrument Identification:

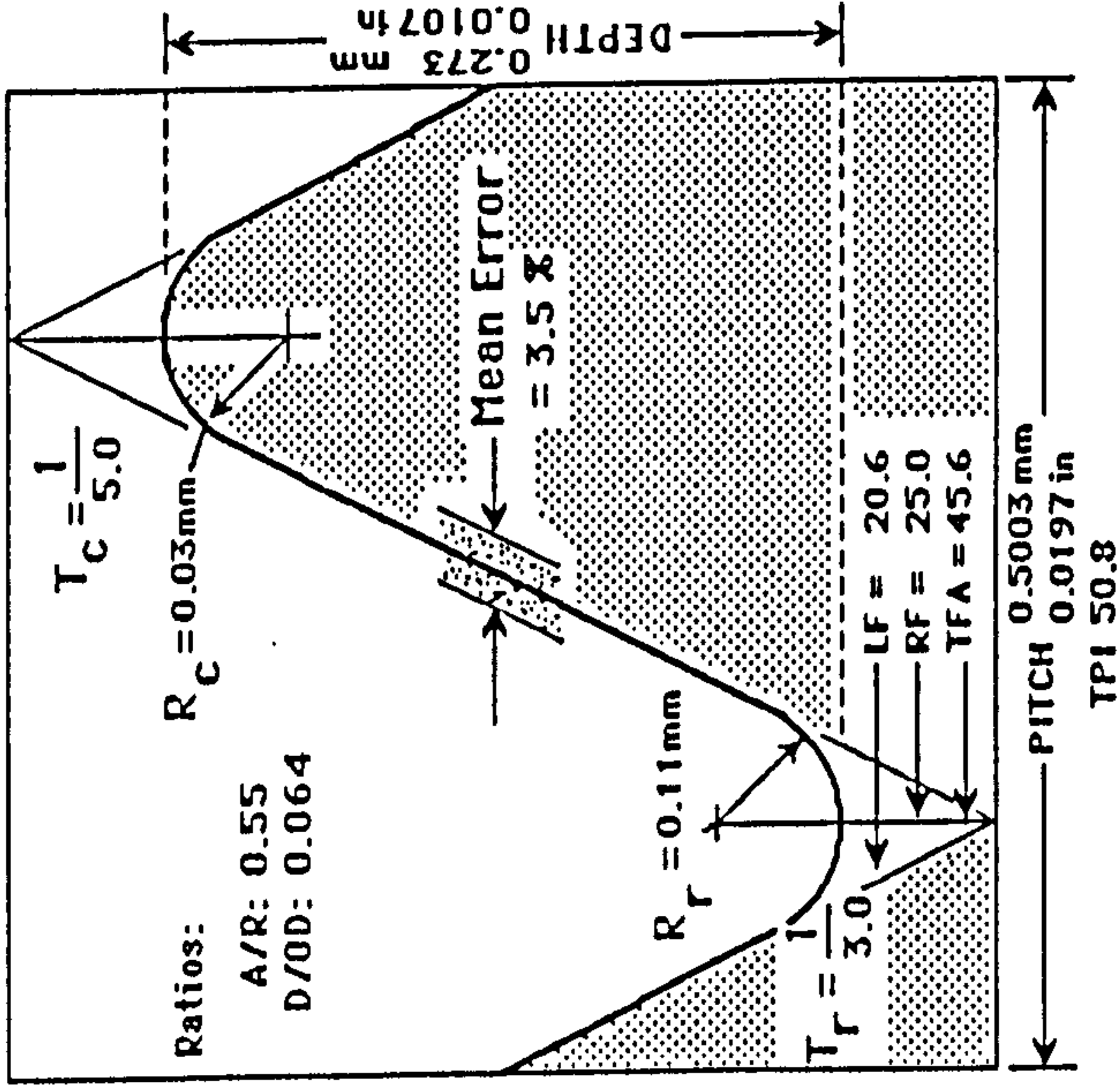
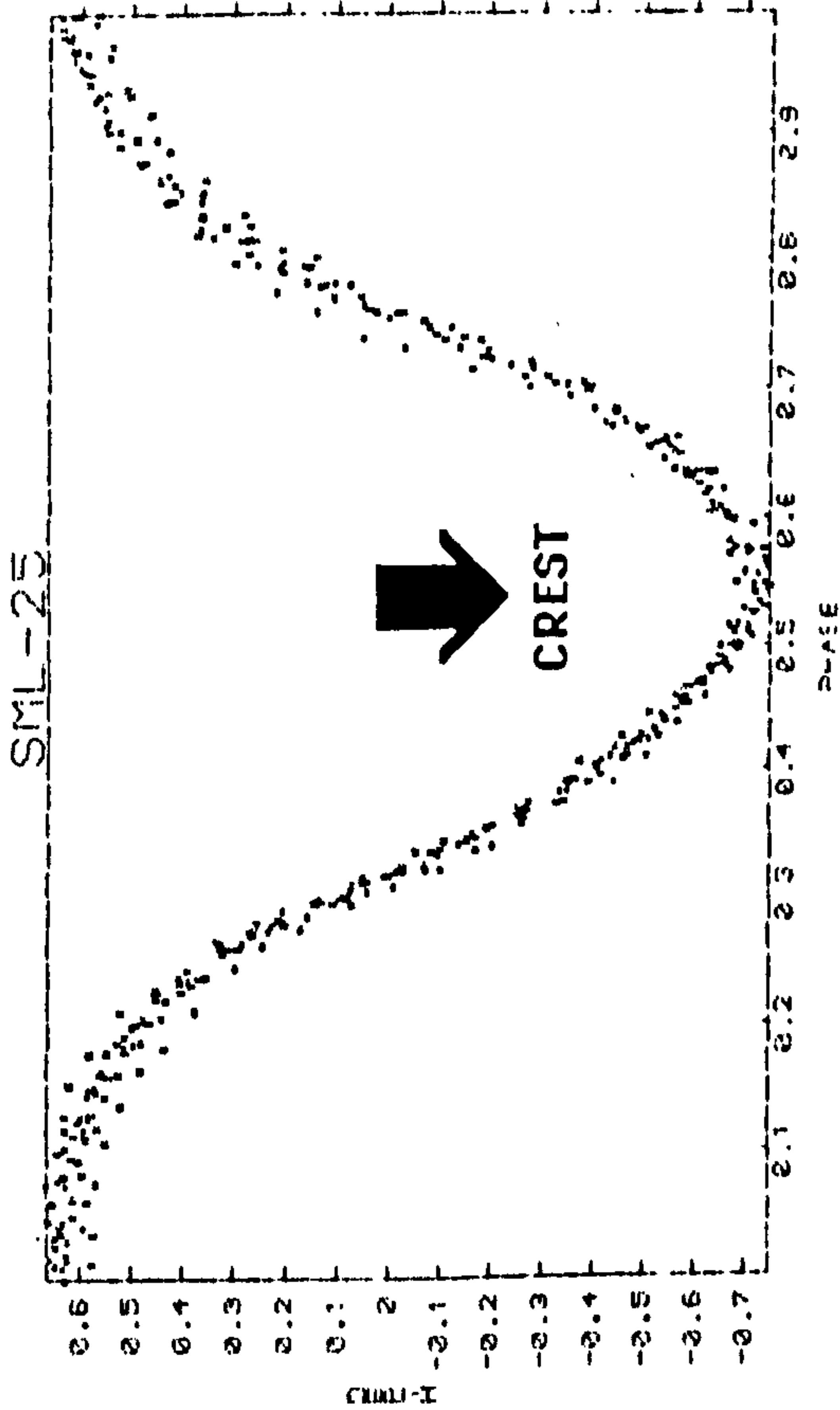
Study Code: SML-25a

Instrument: Portable quadrant

Maker: John Bird

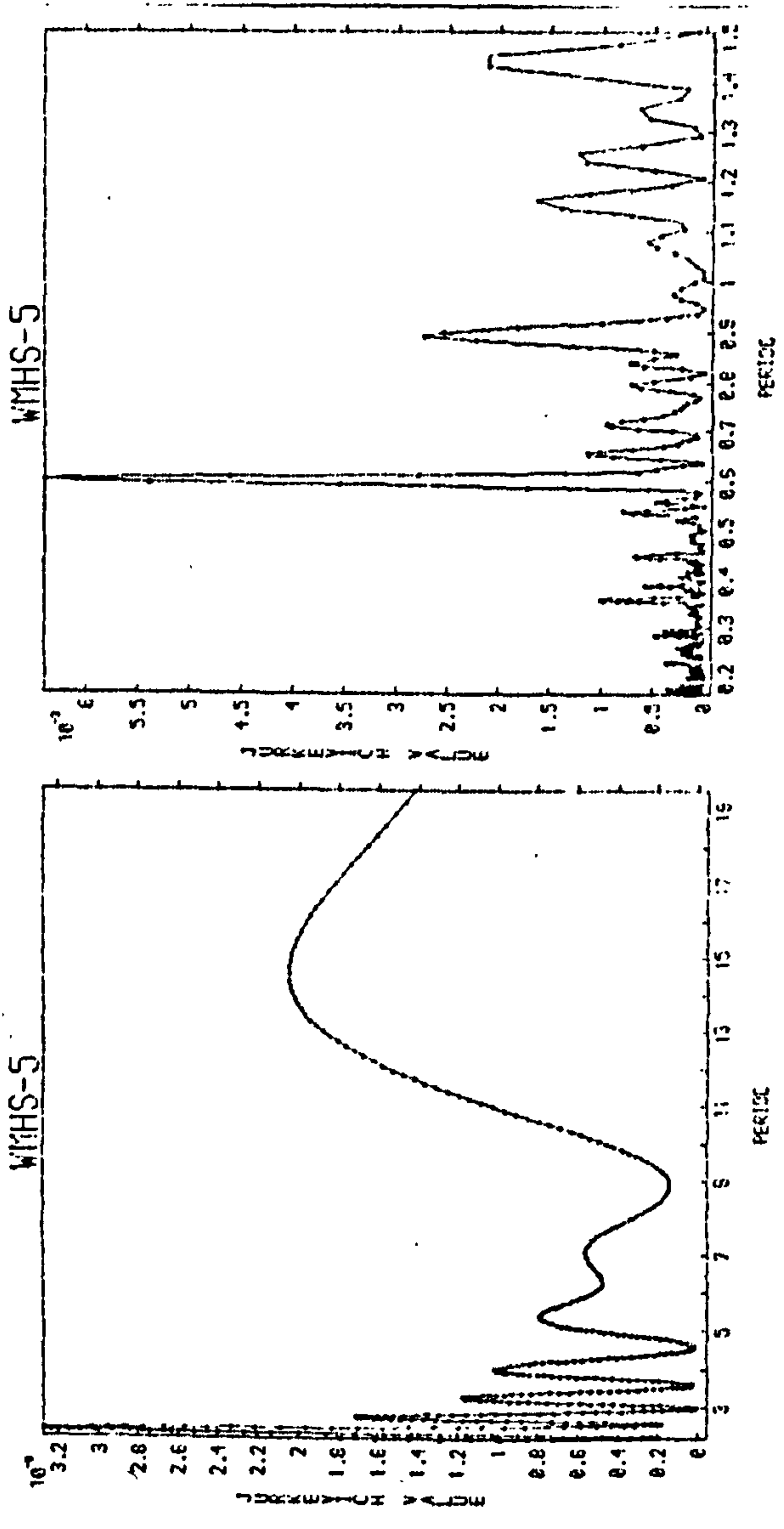
Date: ca.1767

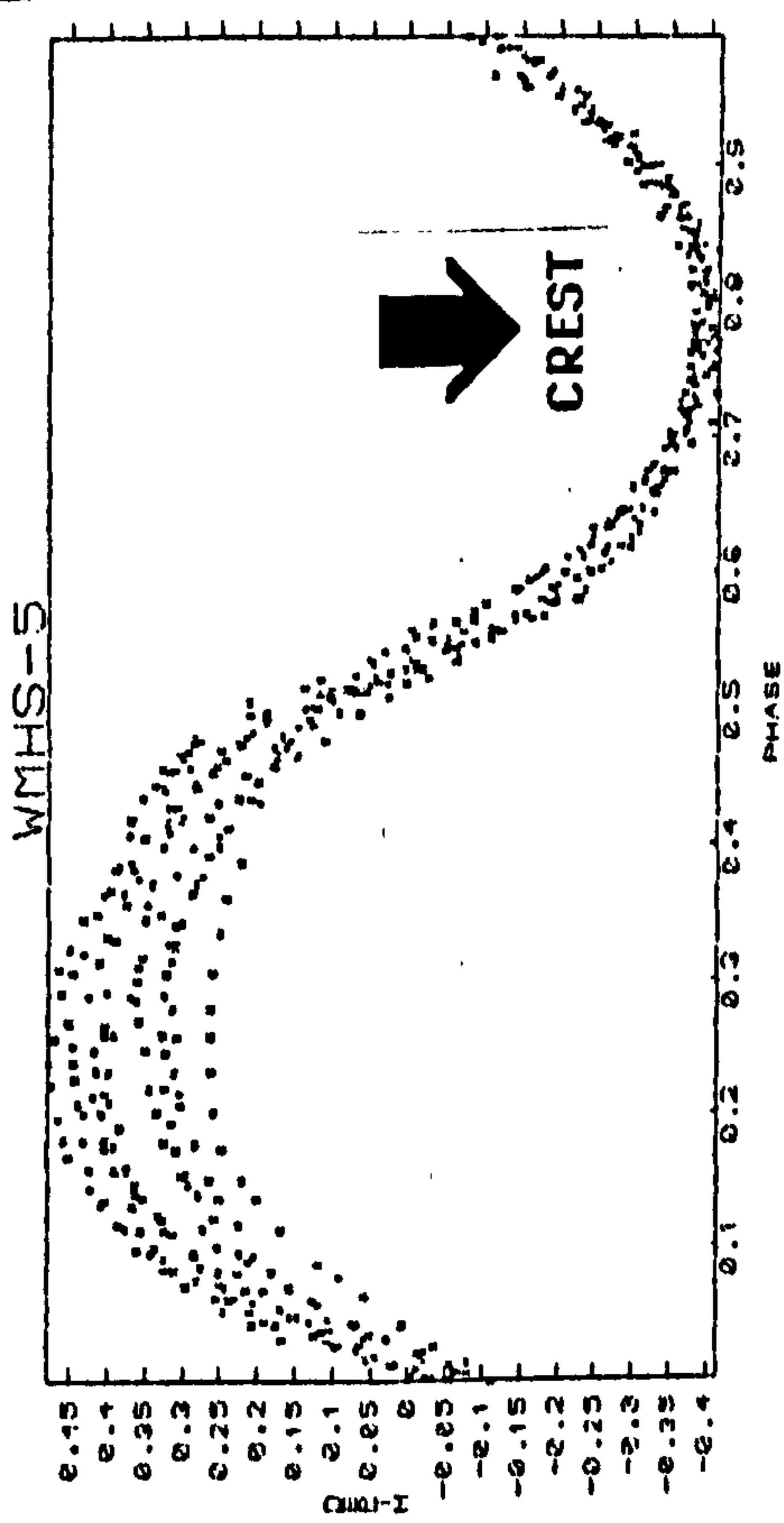
Ser./Acq. No. 1900-138 (RS#63)



Mu	Filar	
		Scale
Bench	Div. Eng.	
		Adjust.
Leveling	Focus	
		Eye P.
Tube	Tôol	
		Gauge
Binding	Misc.	

See Bennett: 1987, p.122





Characteristics:

Screw ☒ Nut ☐

Leng: 1.938"

Diameter: 0.1820"

Steel ☒ Brass ☐

Other:

Instrument Identification:

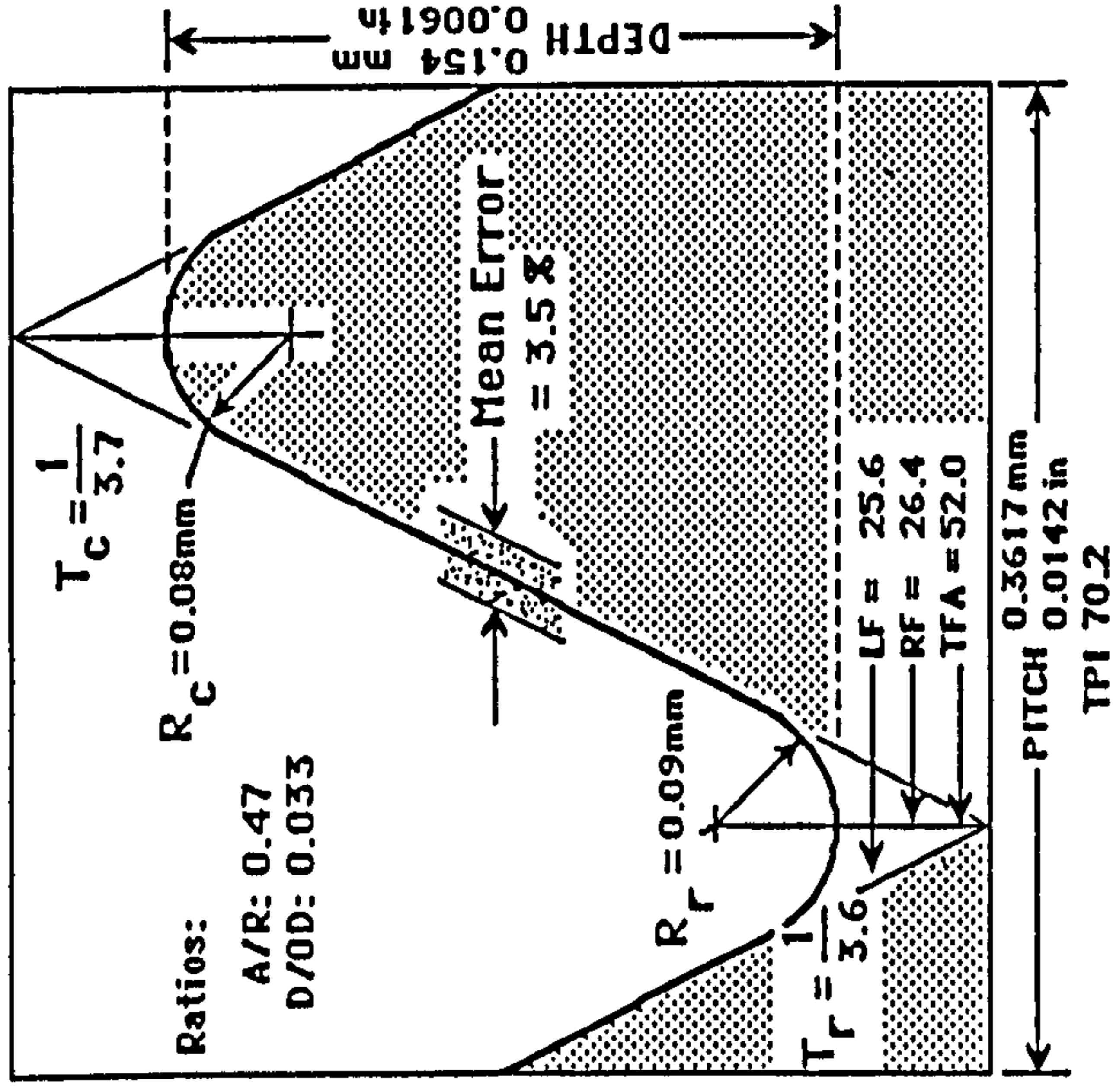
Study Code: WMHS-5

Instrument: Astronomical circle

Maker: Wm. Cary

Date: 1800

Ser./Acq. No.



MU

Filar

Scale

Bench

Div. Eng.

Adjust.

Leveling

Focus

Eye P.

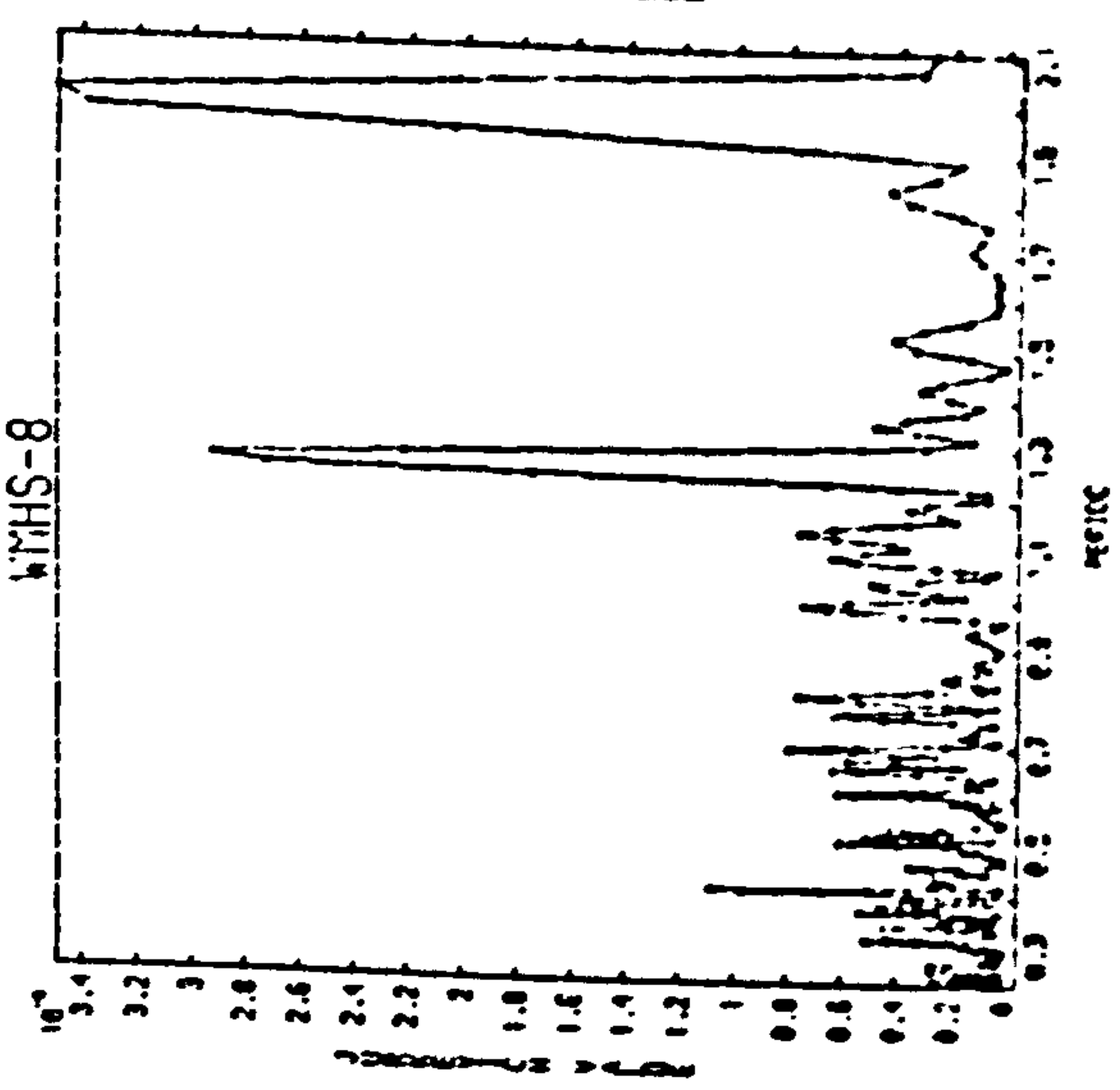
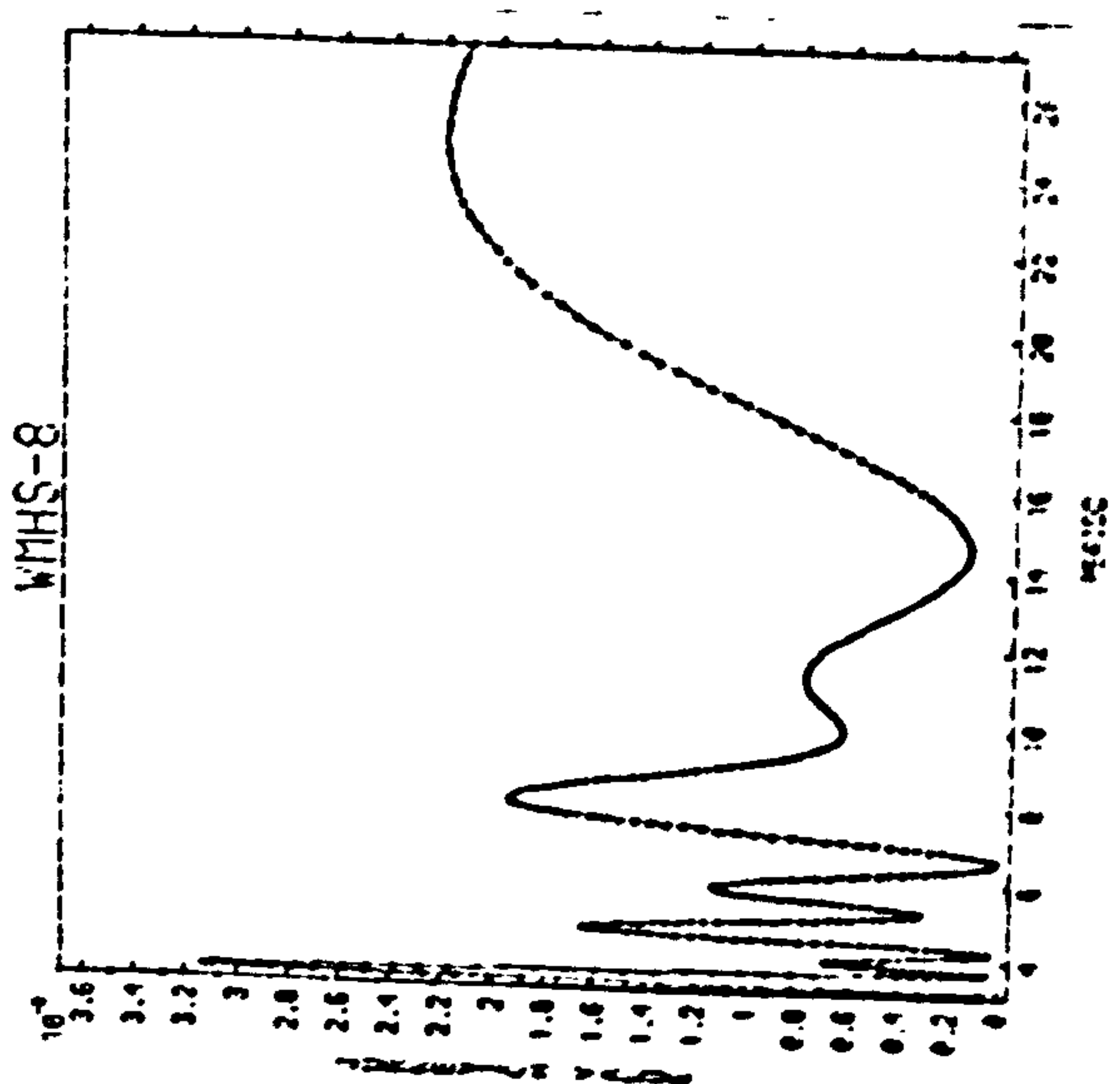
Tube

Tool

Gauge

Binding

Misc.





Characteristics:

Screw

Nut

Leng: 1.875" / 0.375"

Diameter: 0.1602"

Steel

Brass

Other:

Instrument Identification:

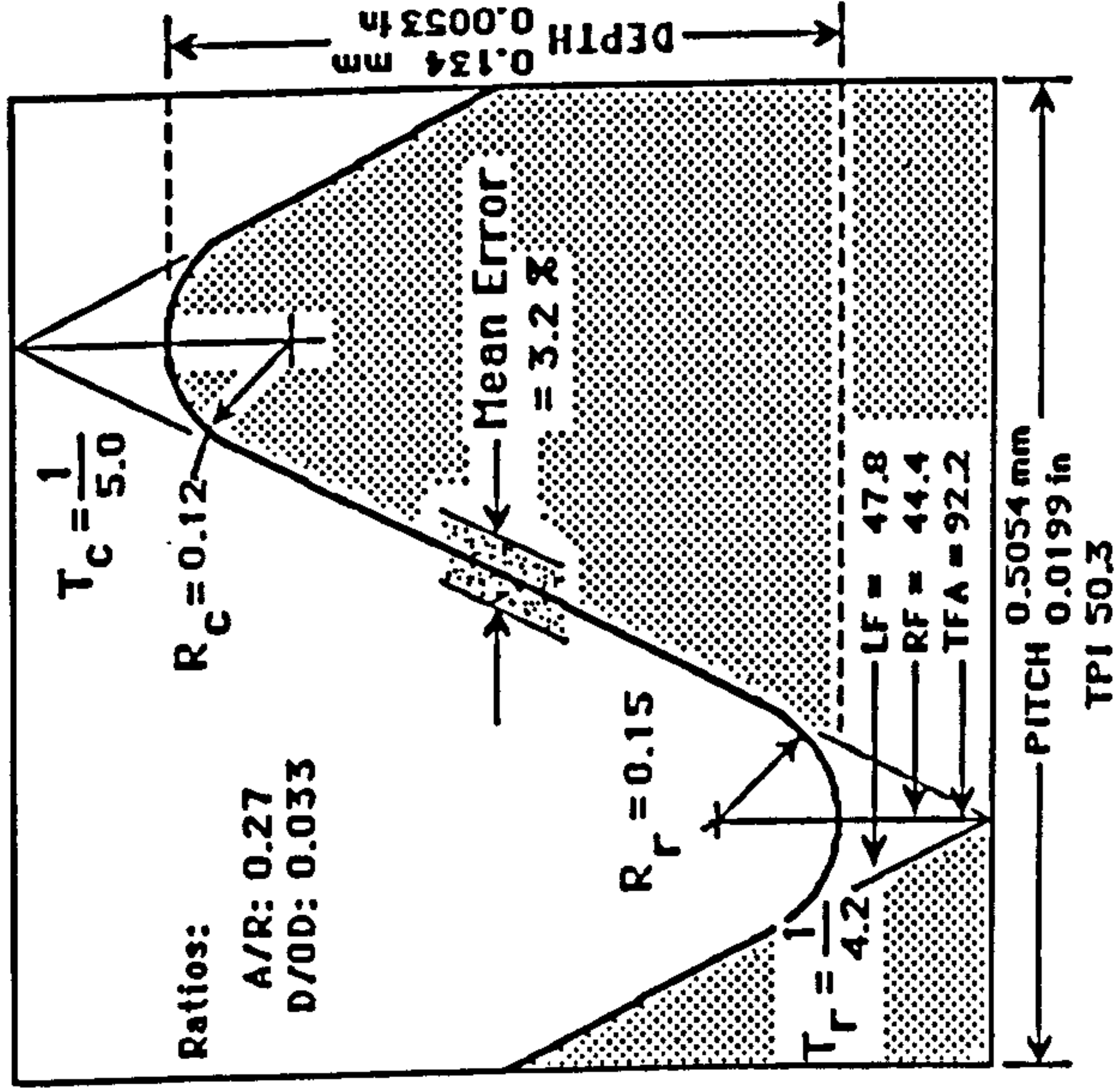
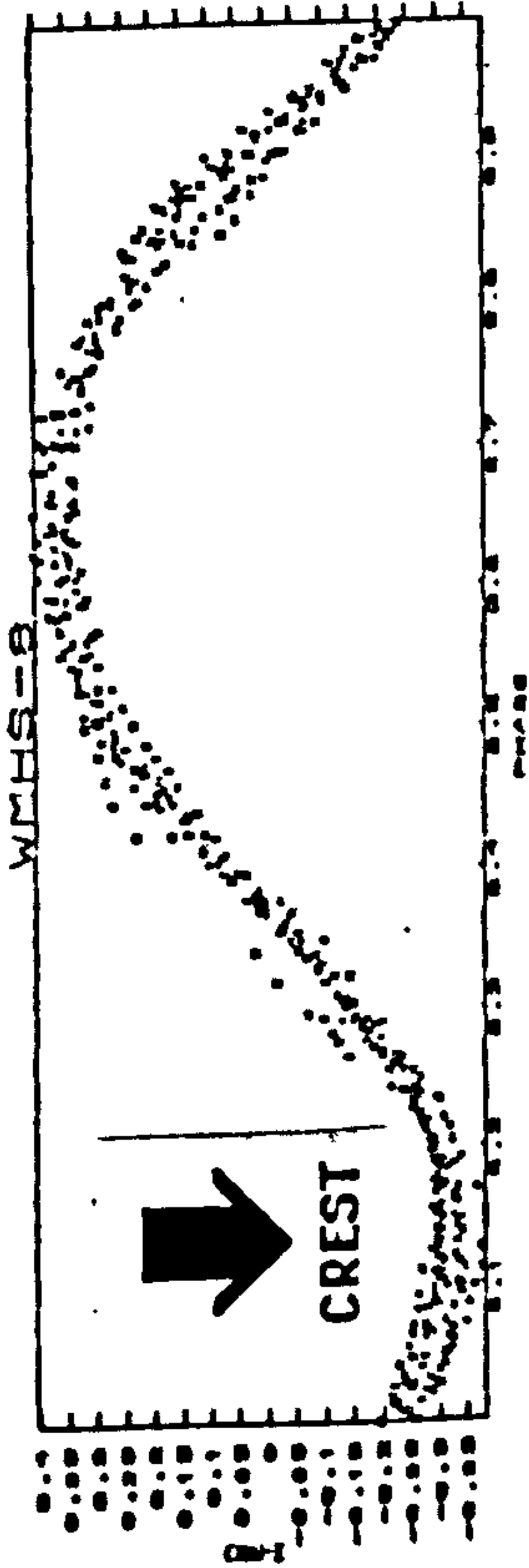
Study Code: WMHS-8

Instrument: Portable quadrant

Maker: John Bird

Date: ca.1770

Ser./Acq. No.



Mu

Filar

Scale

Bench

Div. Eng.

Adjust.

Leveling

Focus

Eye P.

Tube

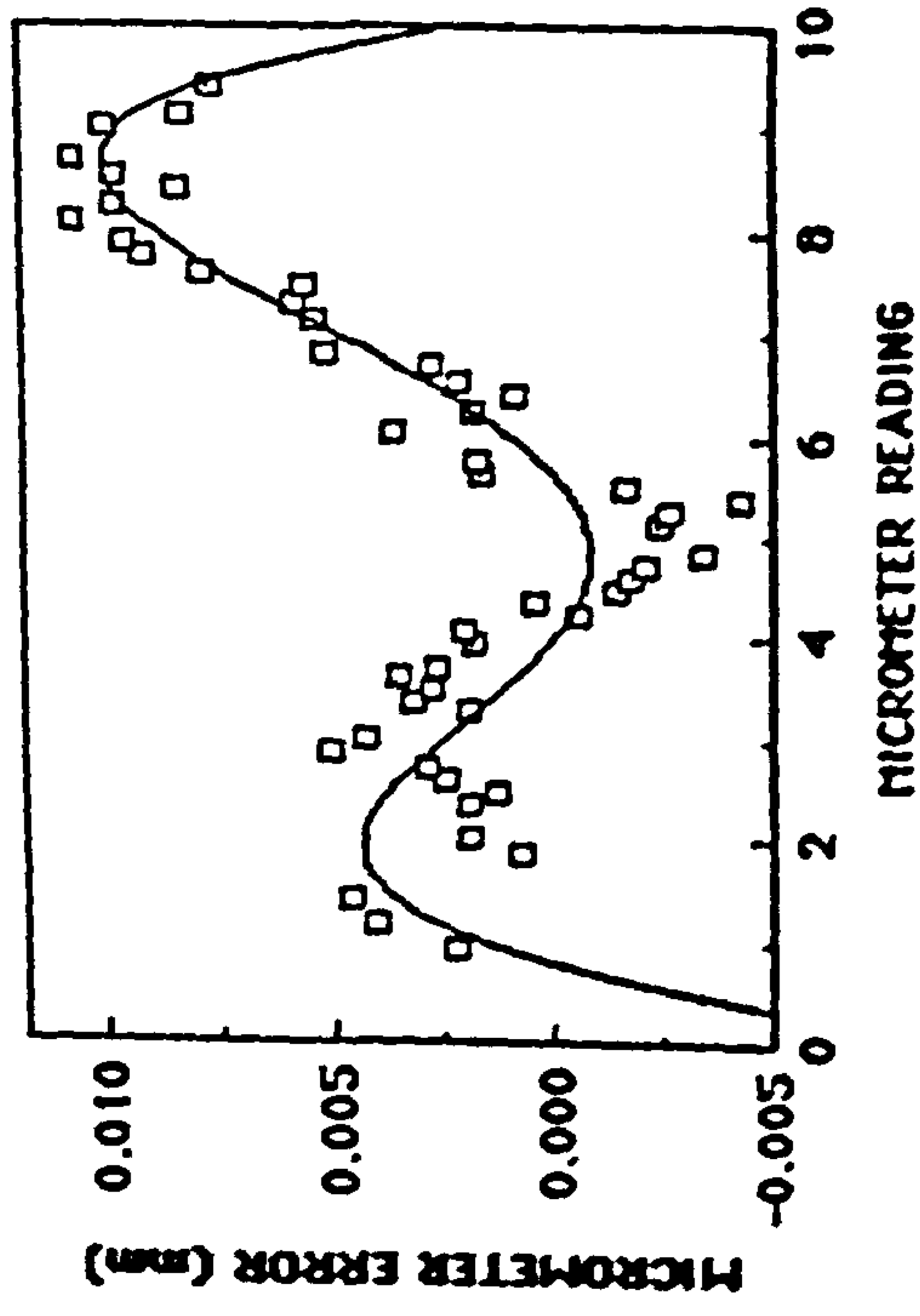
Tool

Gauge

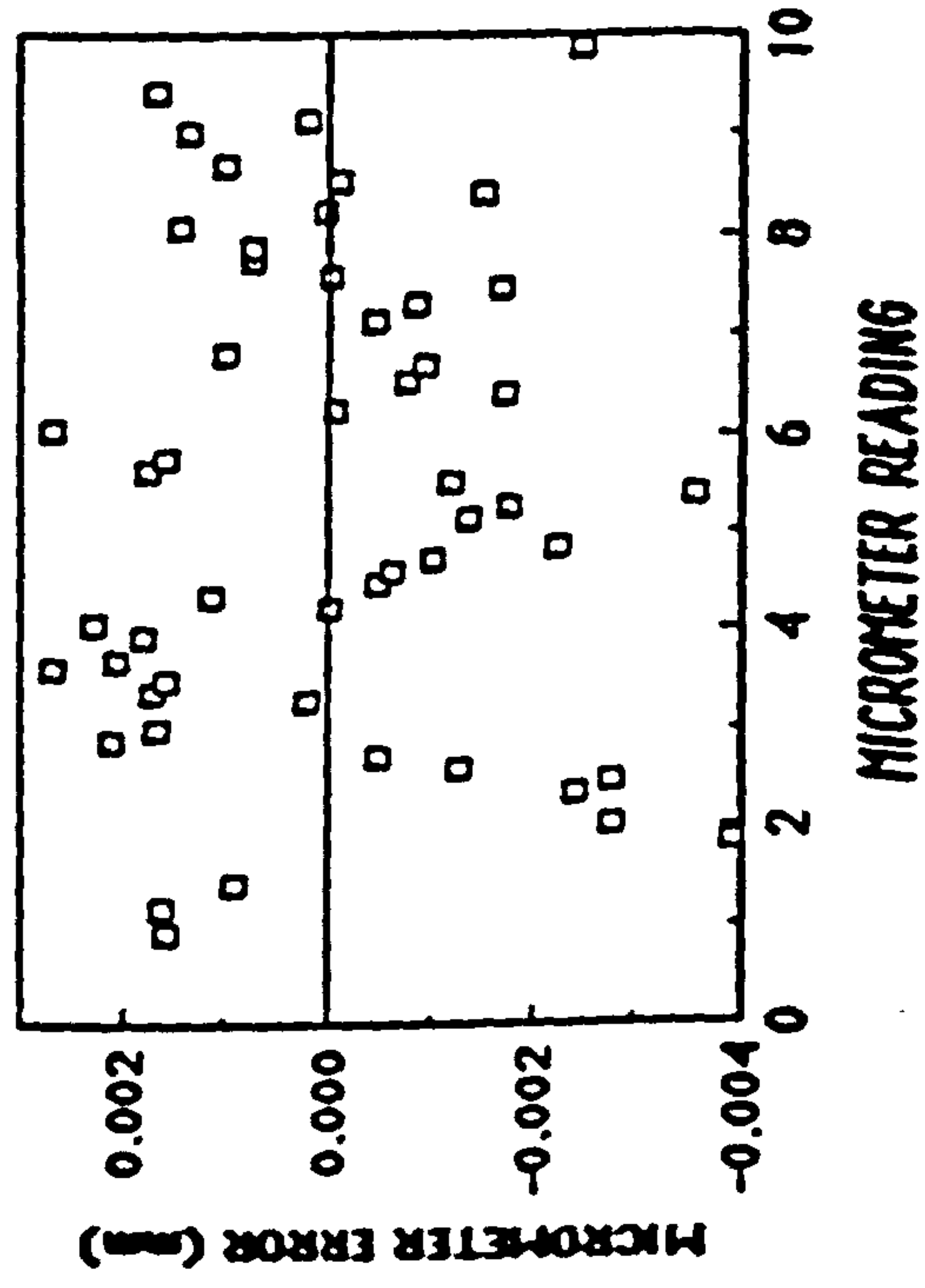
Binding

Misc.

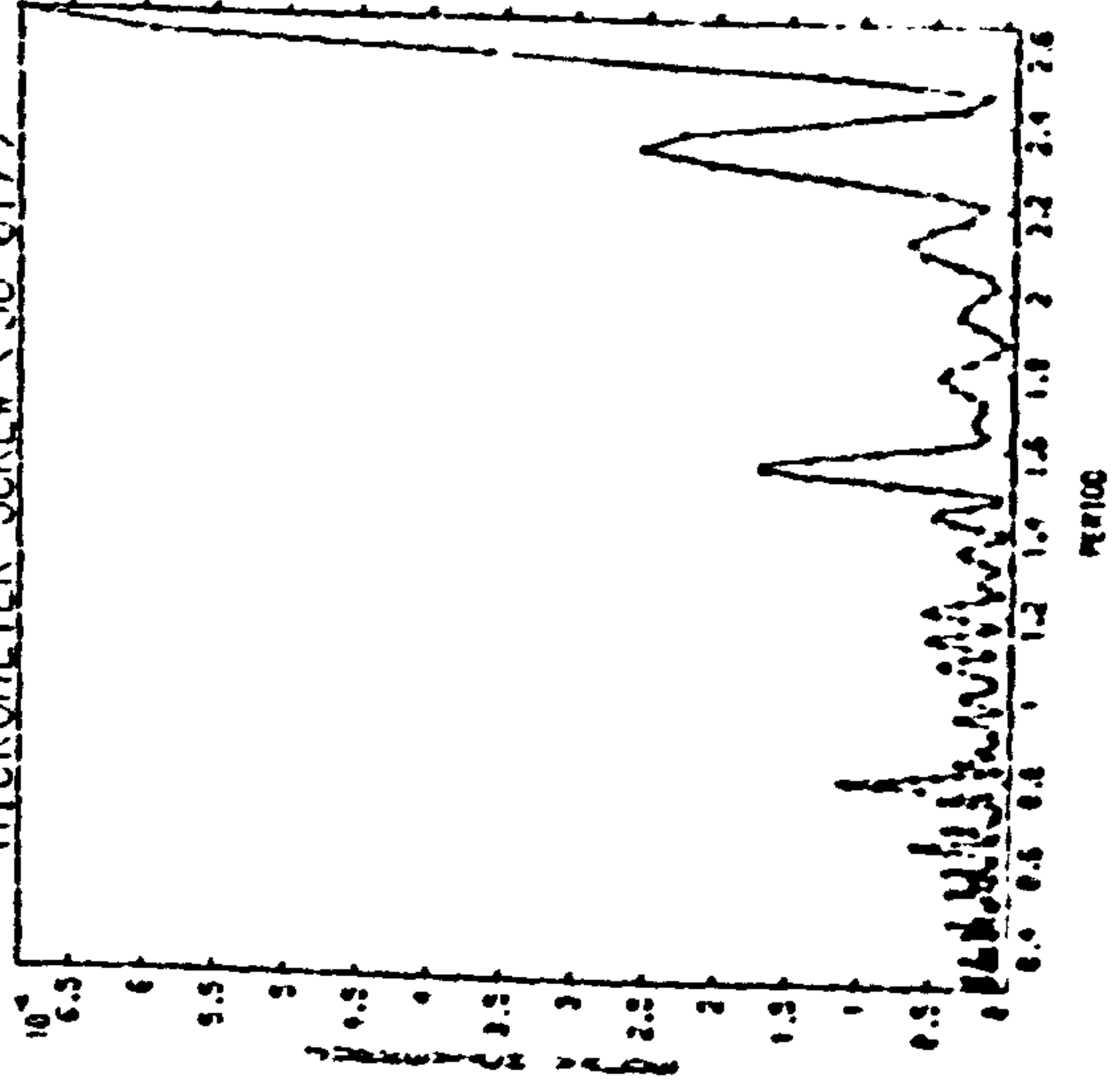
SML40-2 (4dp)



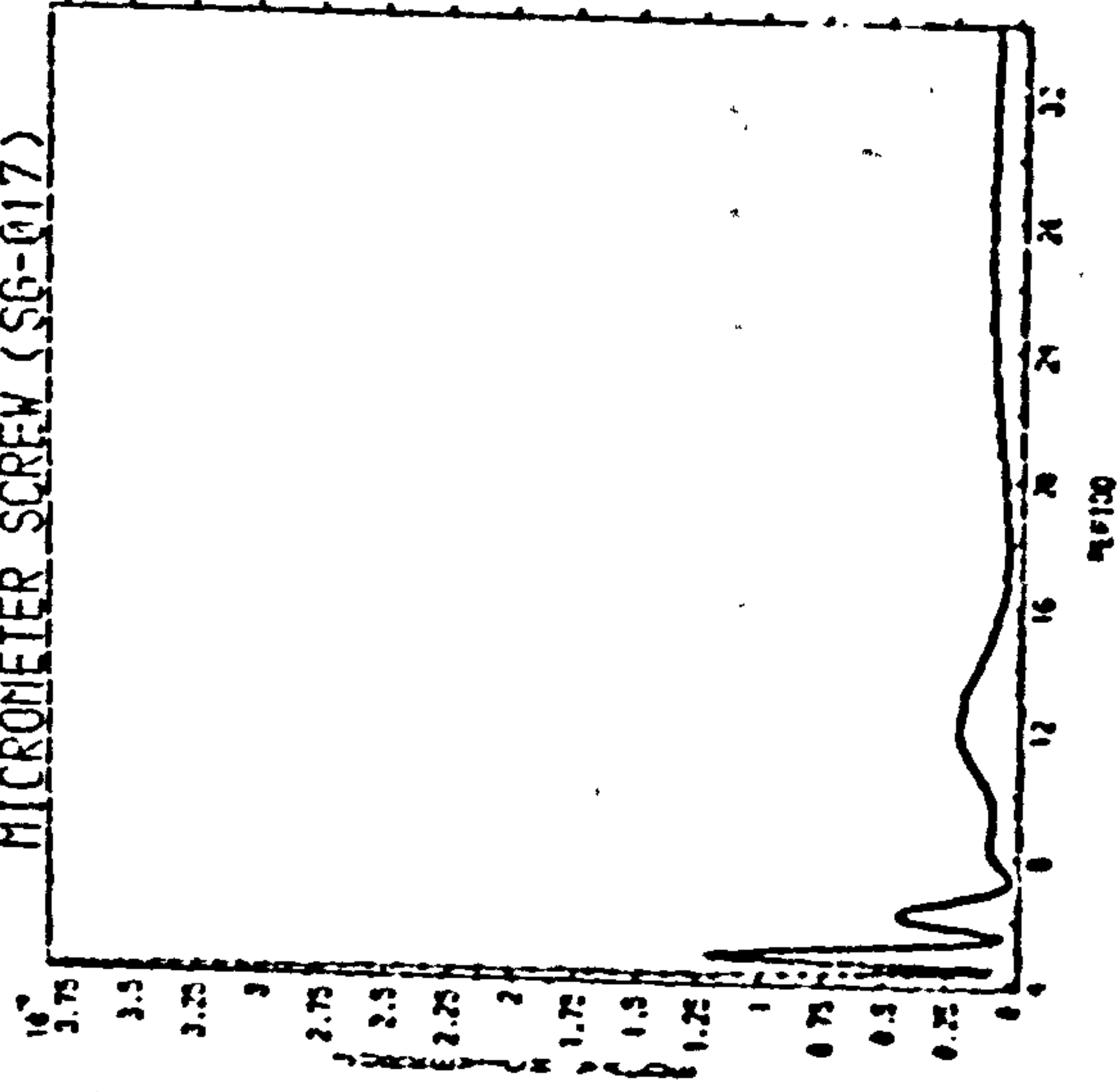
SML-40 (4dp)

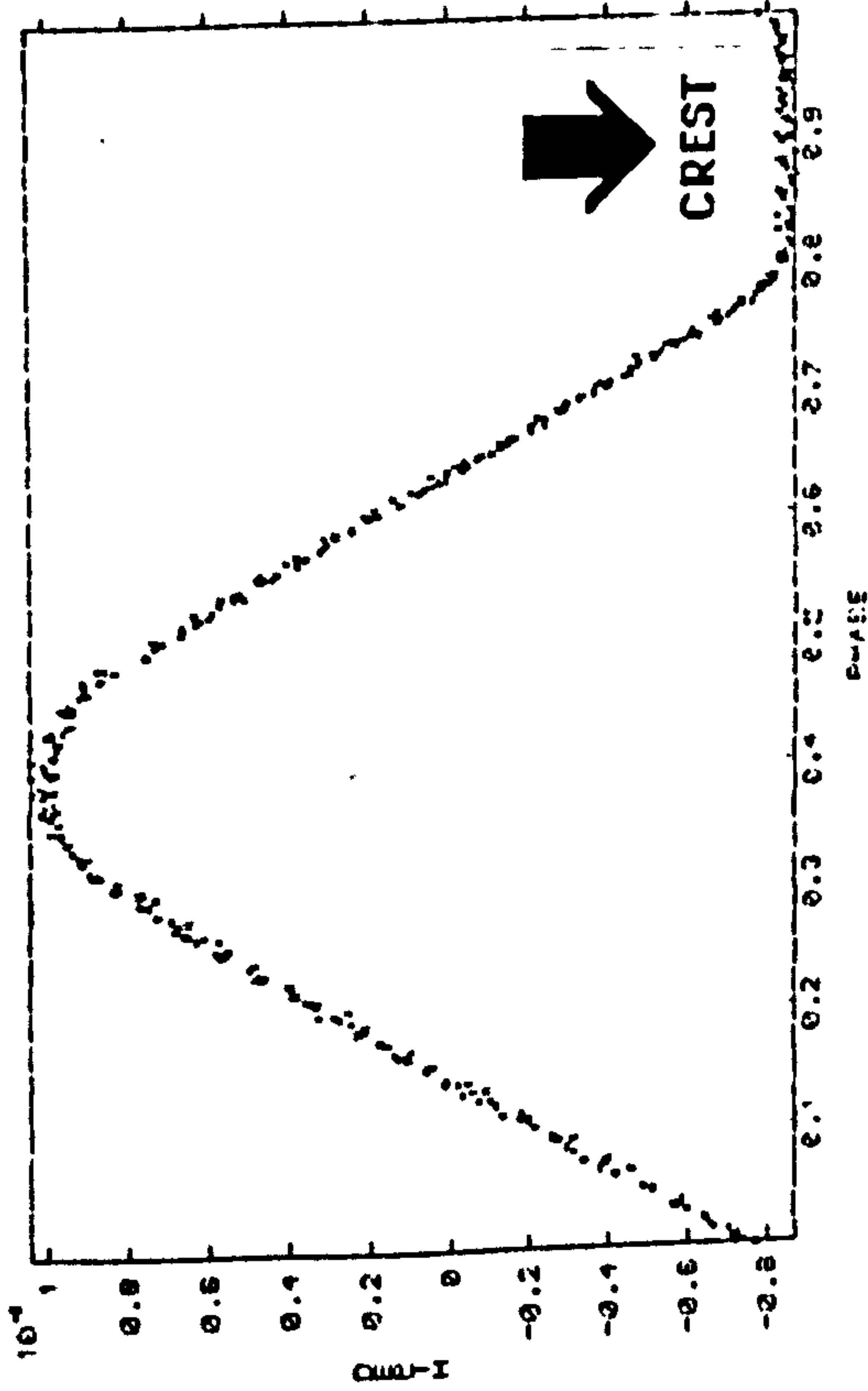


MICROMETER SCREW (SG-017)



MICROMETER SCREW (SG-017)





**Characteristics:**

Screw ☒ Nut ☐

Leng: 1.719" / 0.438"

Diameter: 0.2986"

Steel ☒ Brass ☐

Other: ☐

**Instrument Identification:**

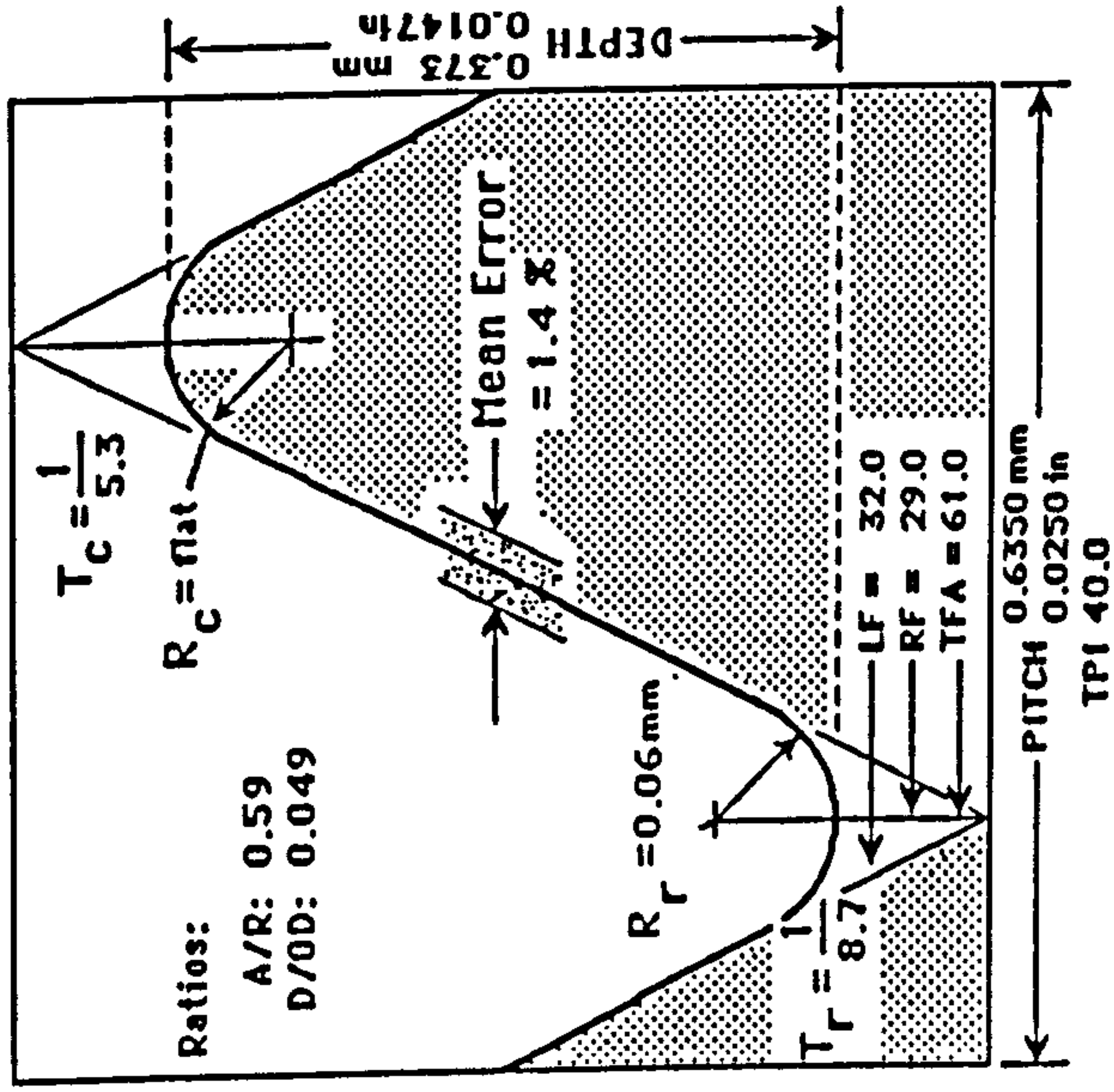
Study Code: Comparison

Instrument: Micrometer

Maker: Moore & Wright(?)

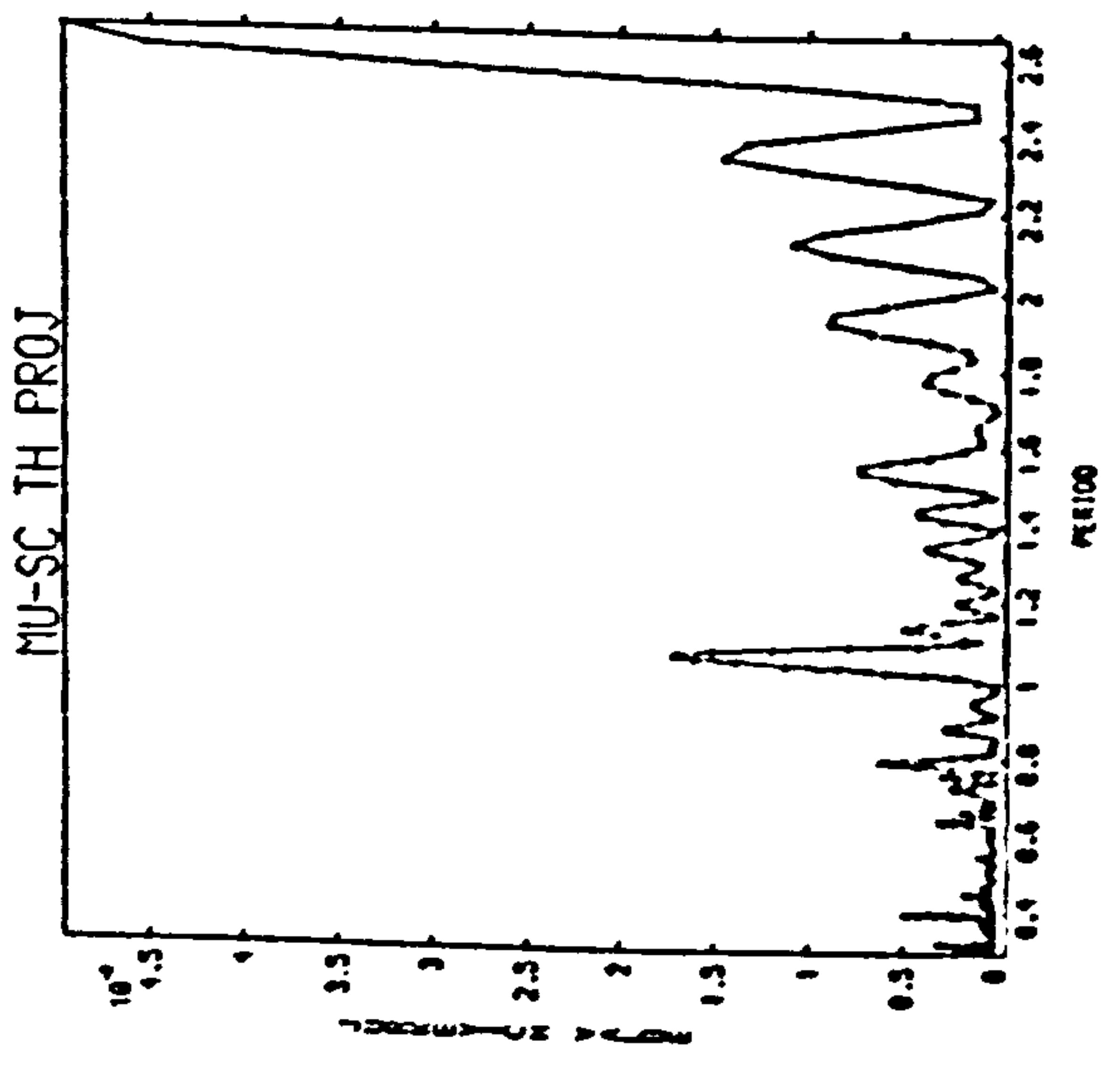
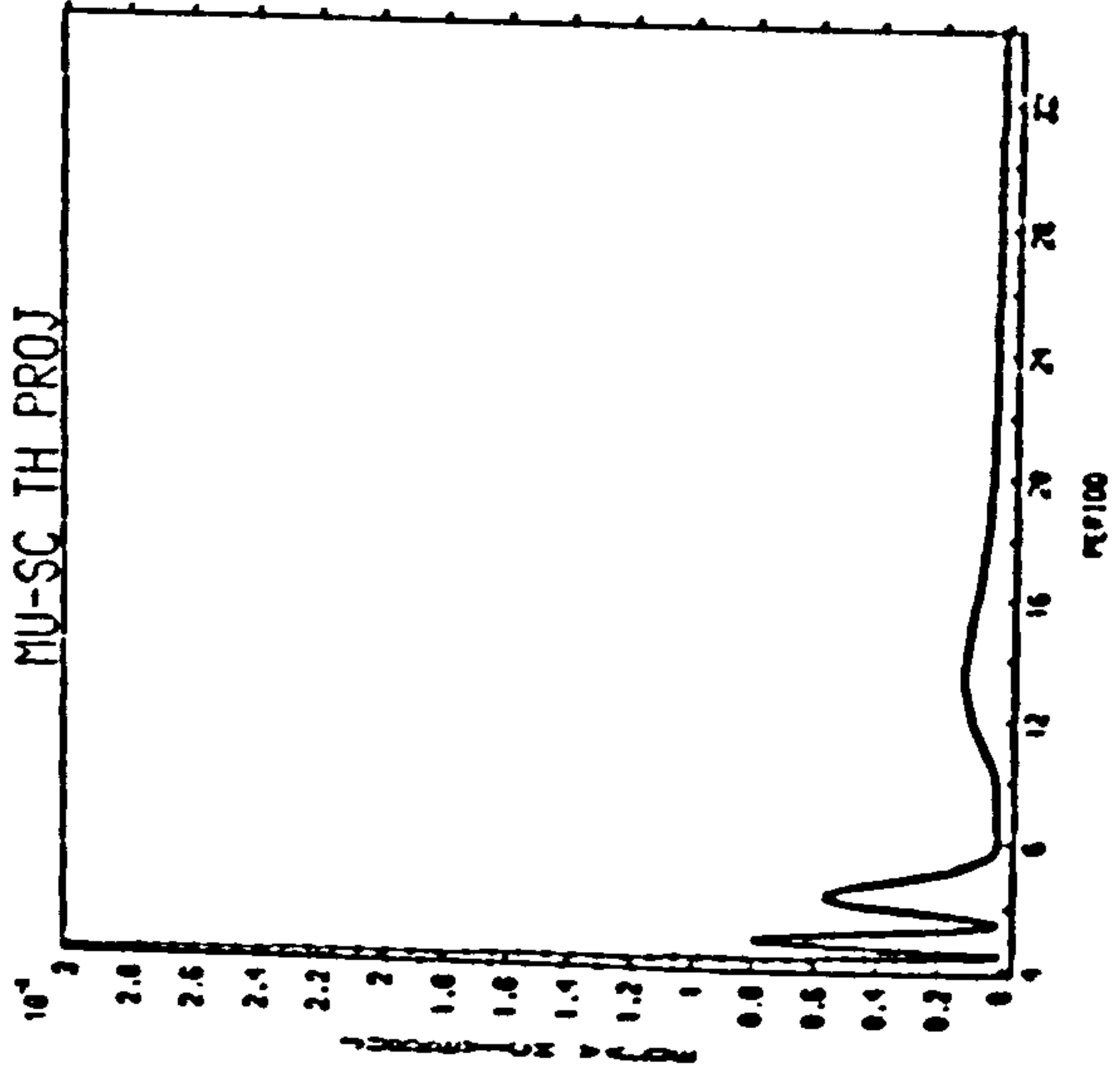
Date: m 20th c

Ser./Acq. No.

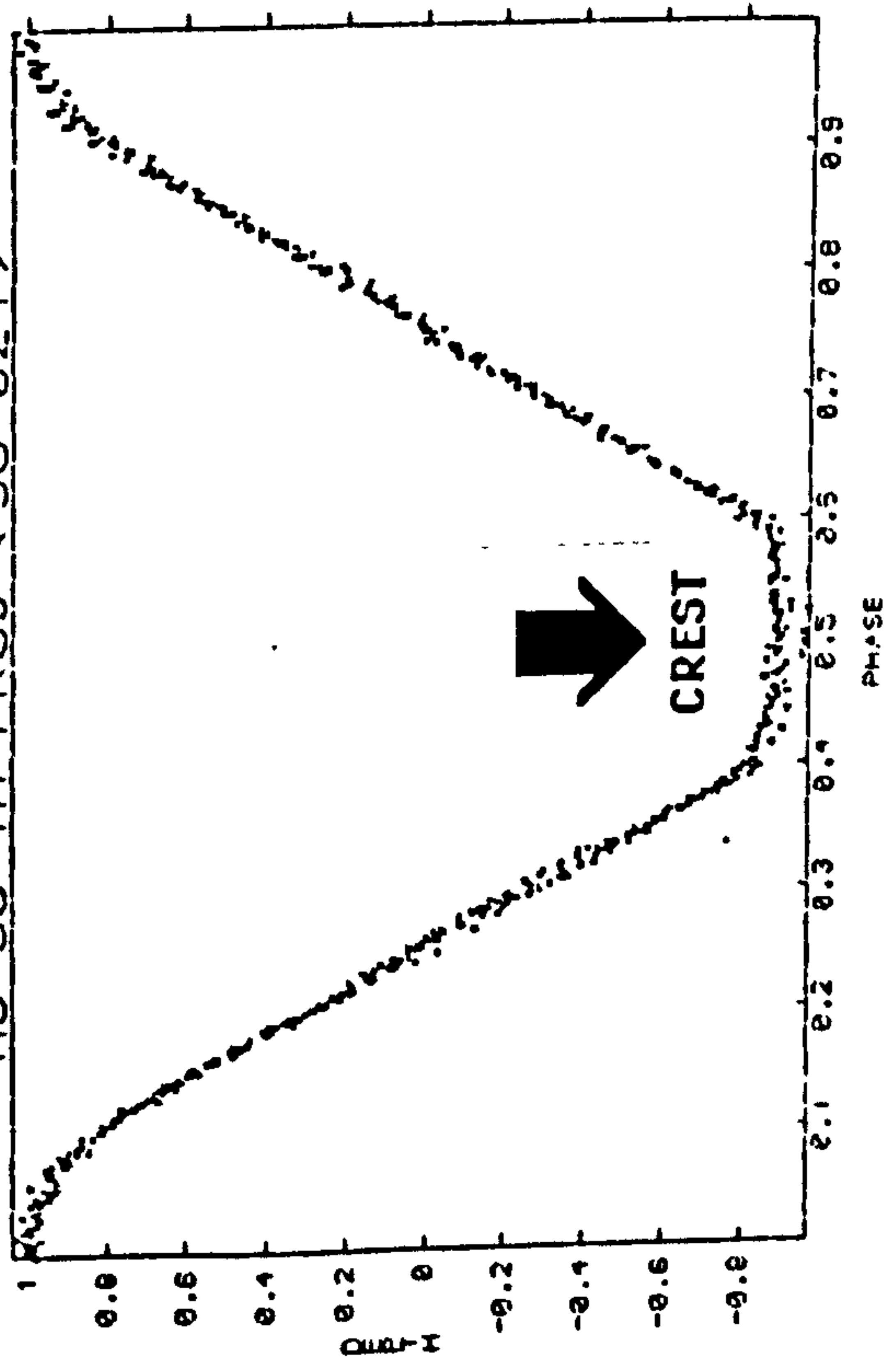


MU ☐ Filar ☐ Scale ☐ Bench ☐ Div. Eng. ☐ Adjust. ☐ Leveling ☐ Focus ☐ Eye P. ☐ Tube ☐ Tool ☐ Gauge ☐ Binding ☐ Misc. ☐





MU-SC TH PROJ (SG-024)



Characteristics:

Screw ☒ Nut ☐

Leng: 1.625" / 0.375"

Diameter: 0.2993"

Steel ☒ Brass ☐

Other: ☐

Instrument Identification:

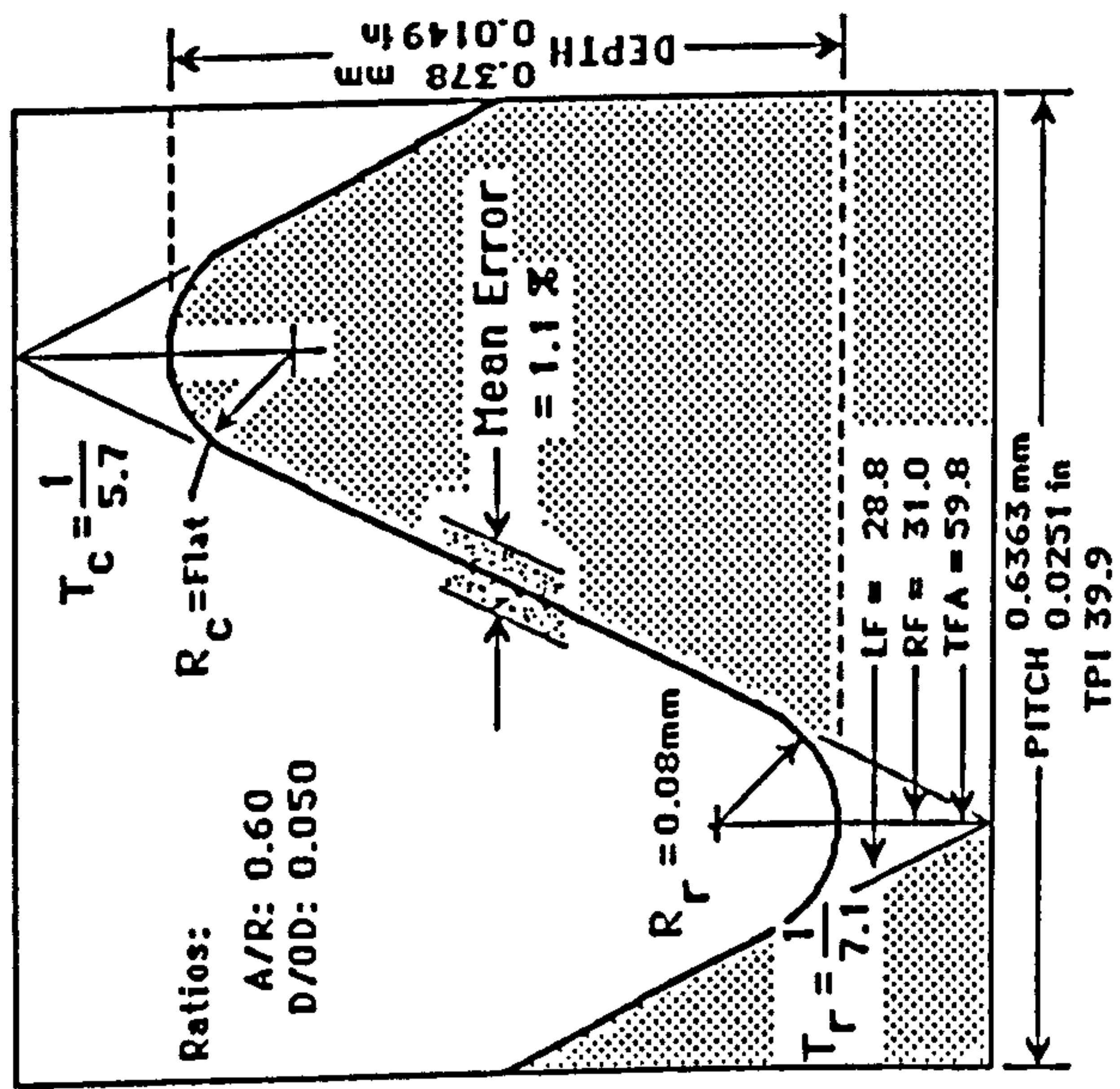
Study Code: Comparison

Instrument: Screw Thread Projector

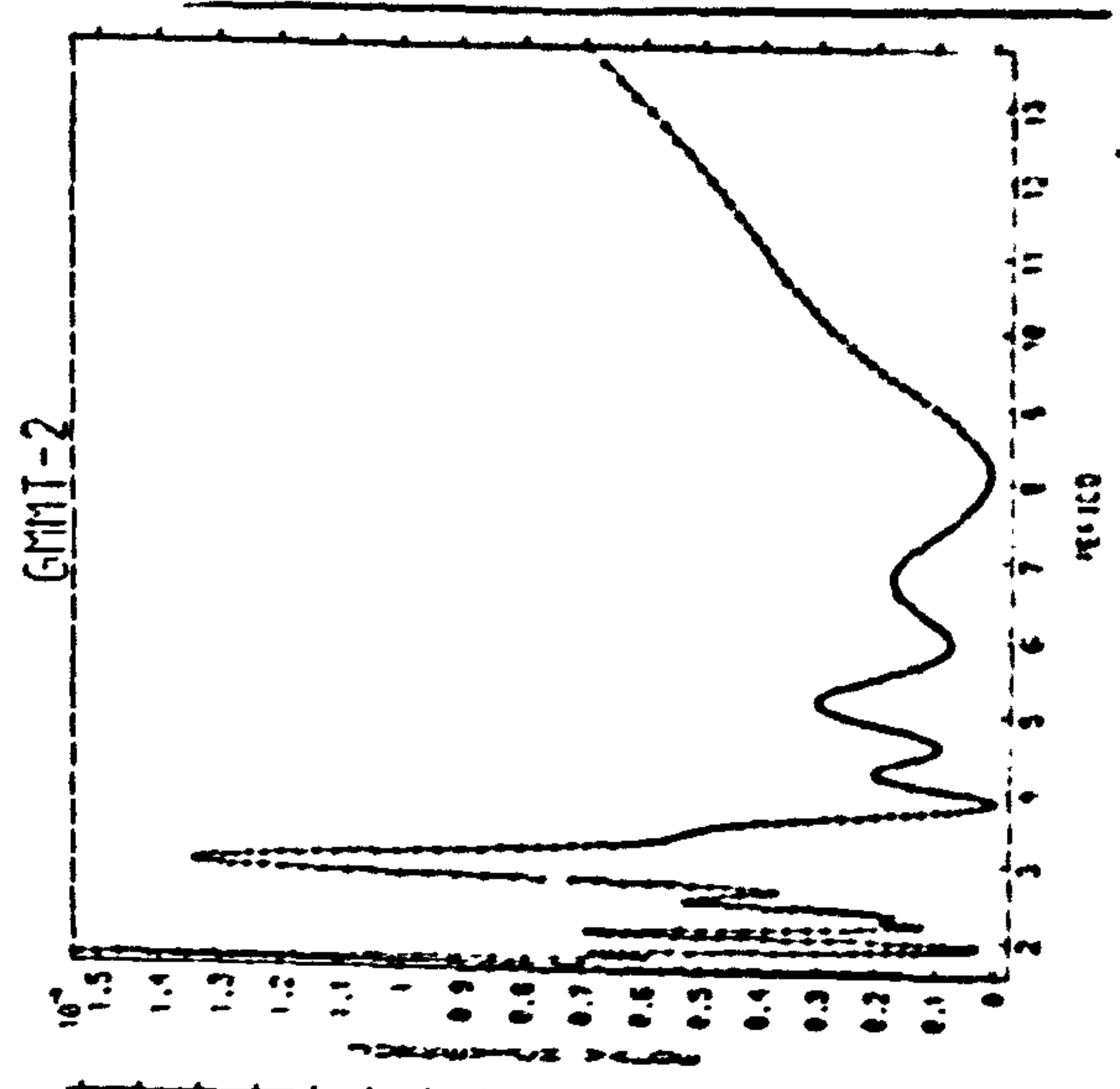
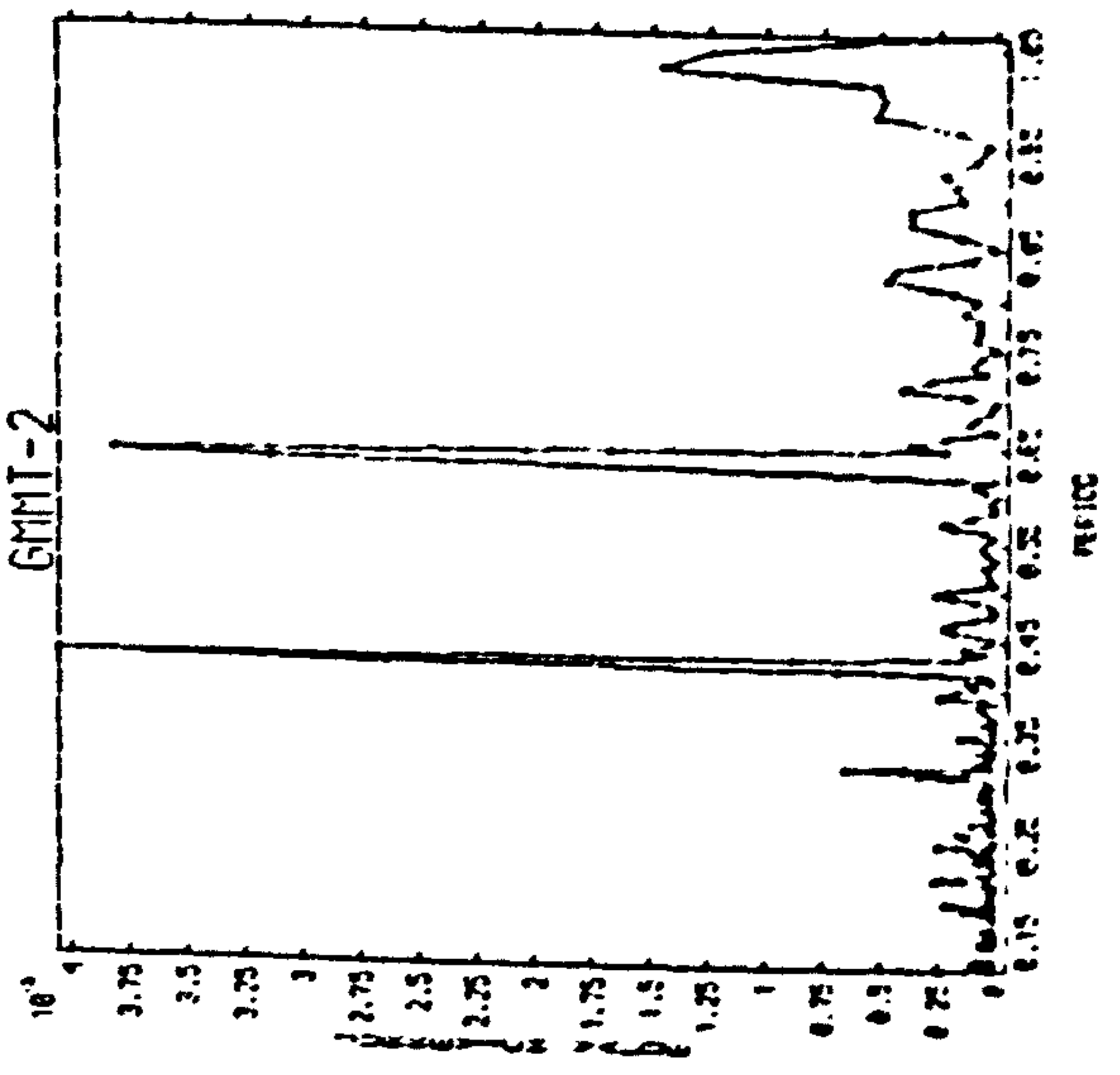
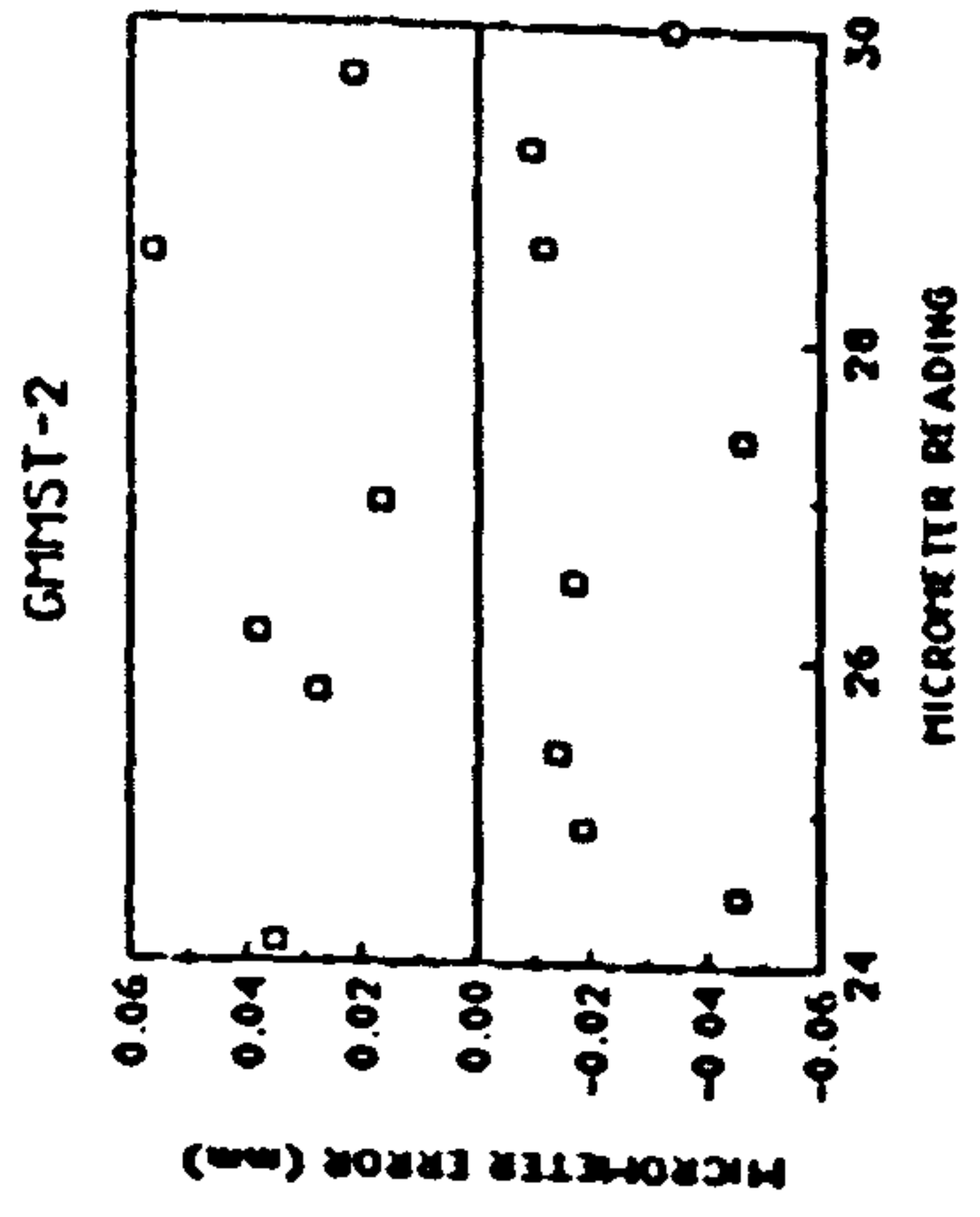
Maker: Baty (My not signed)

Date: ca.1975

Ser./Acq. No.:



MU — [ Filar Scale Bench Div. Eng. Adjust. Leveling Focus Eye P. Tube Tool Gauge Binding Misc. ]



Characteristics:

Screw

Nut

Length: 1.25"

Diameter: 0.1895"

Steel

Brass

Other:

Instrument Identification:

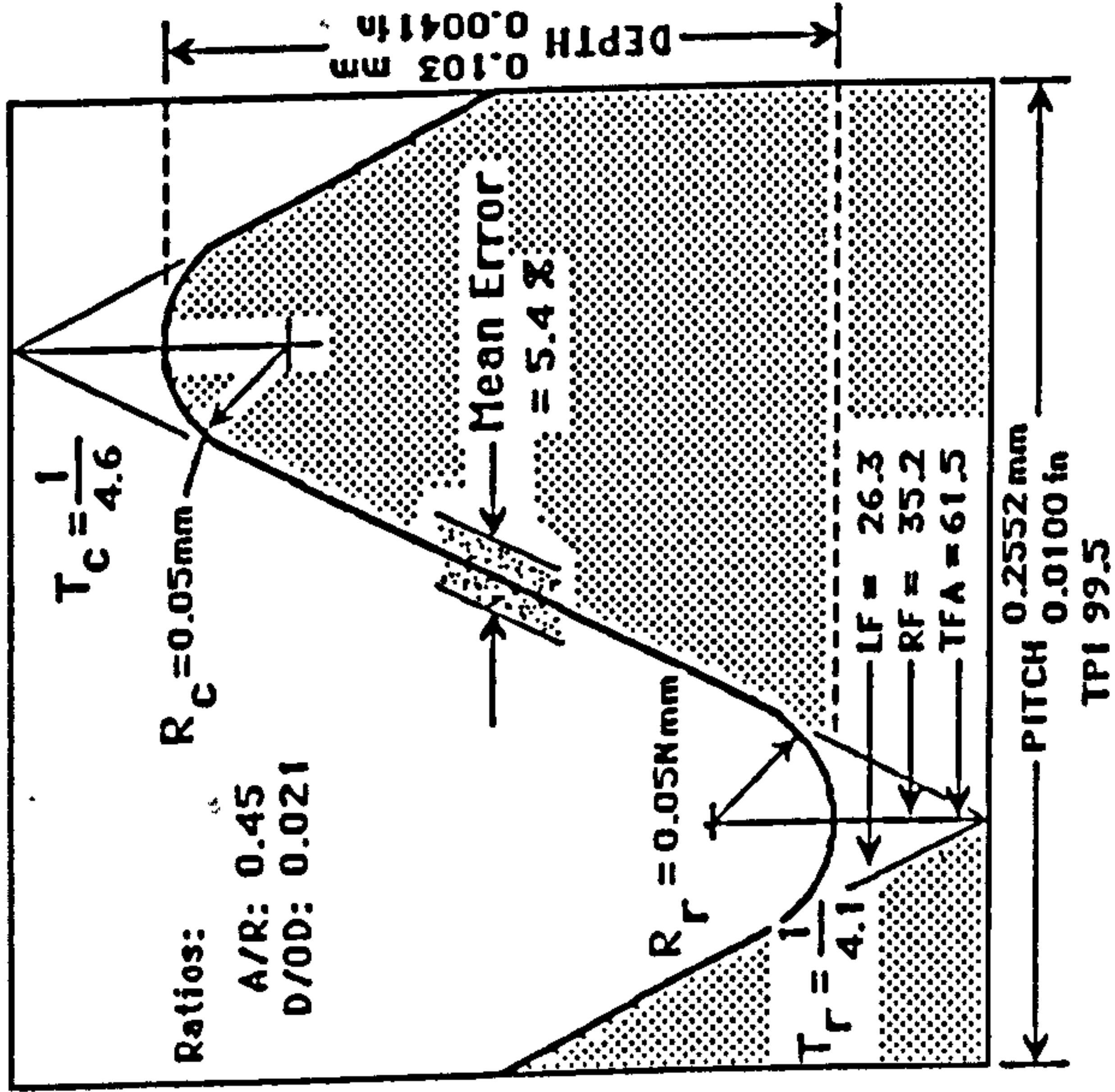
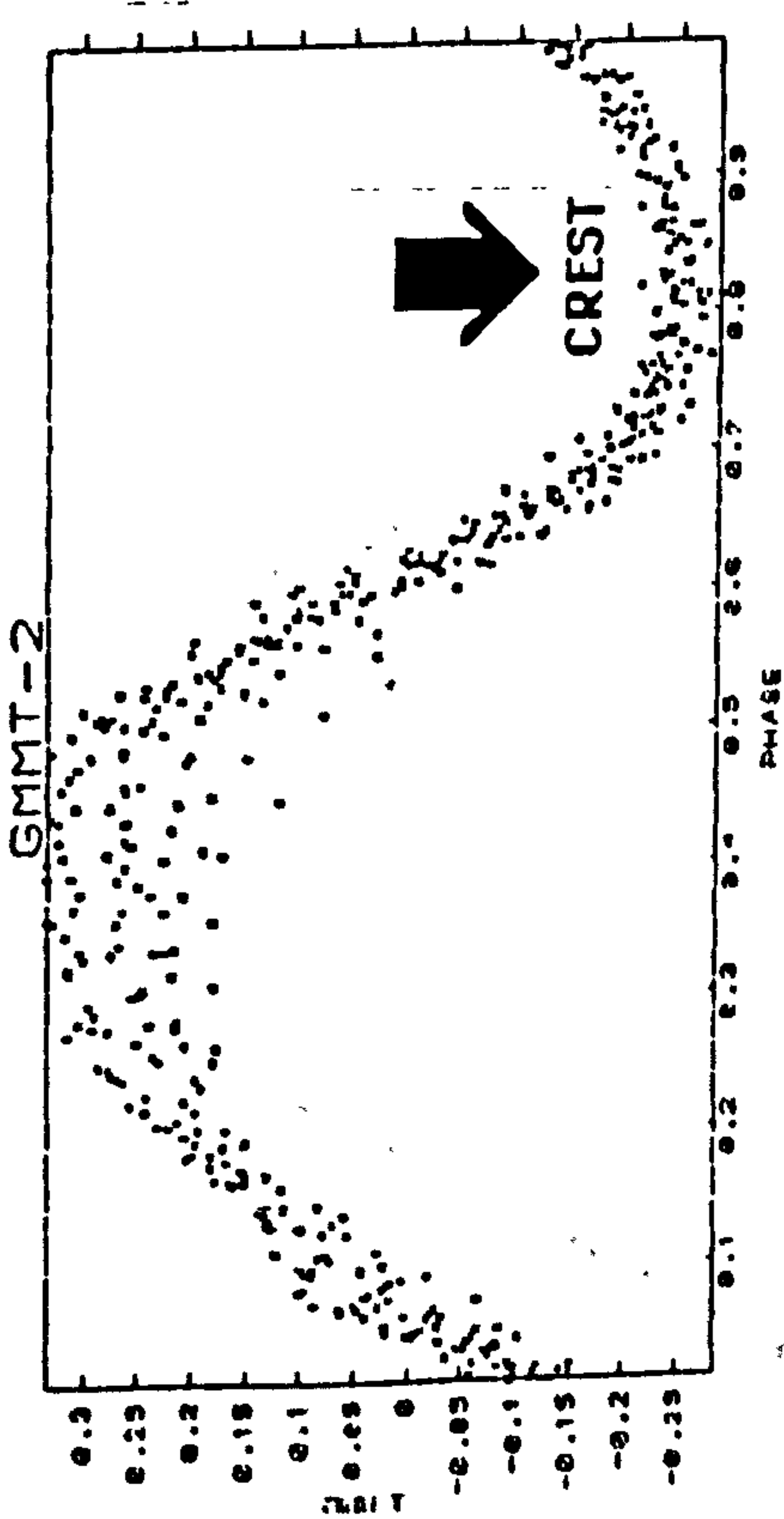
Study Code: GMT-2

Instrument: Spherometer

Maker: Harvey & Peak

Date: 1 19th c

Ser./Acq. No.



Mu

Filar

Scale

Bench

Div. Eng.

Adjust.

Leveling

Focus

Eye P.

Tube

Tool

Gauge

Binding

Misc.



Characteristics:

Screw

Nut

Leng: 1.688" / 0.563"

Diameter: 0.2962"

Steel

Brass

Other:

Instrument Identification:

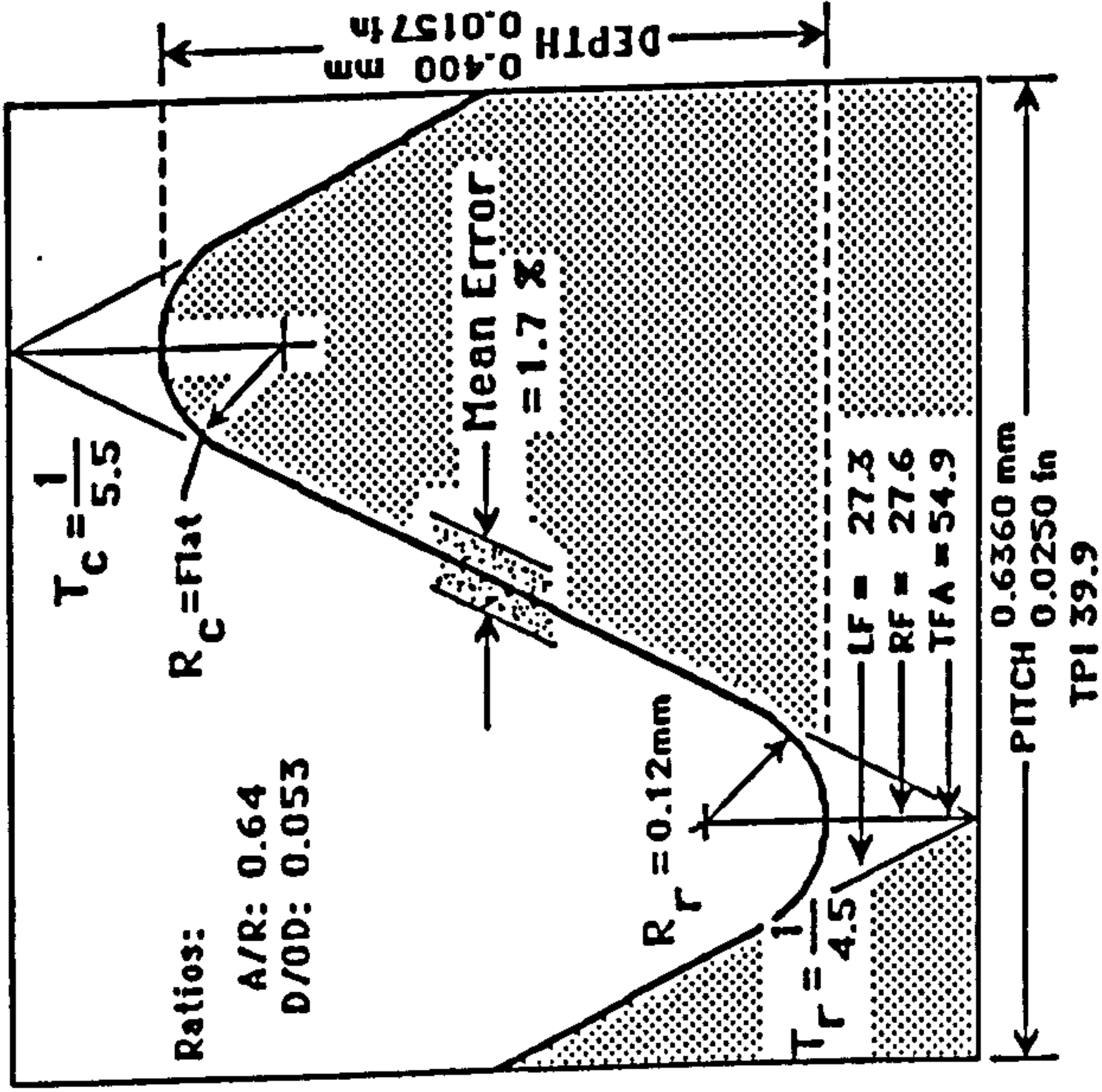
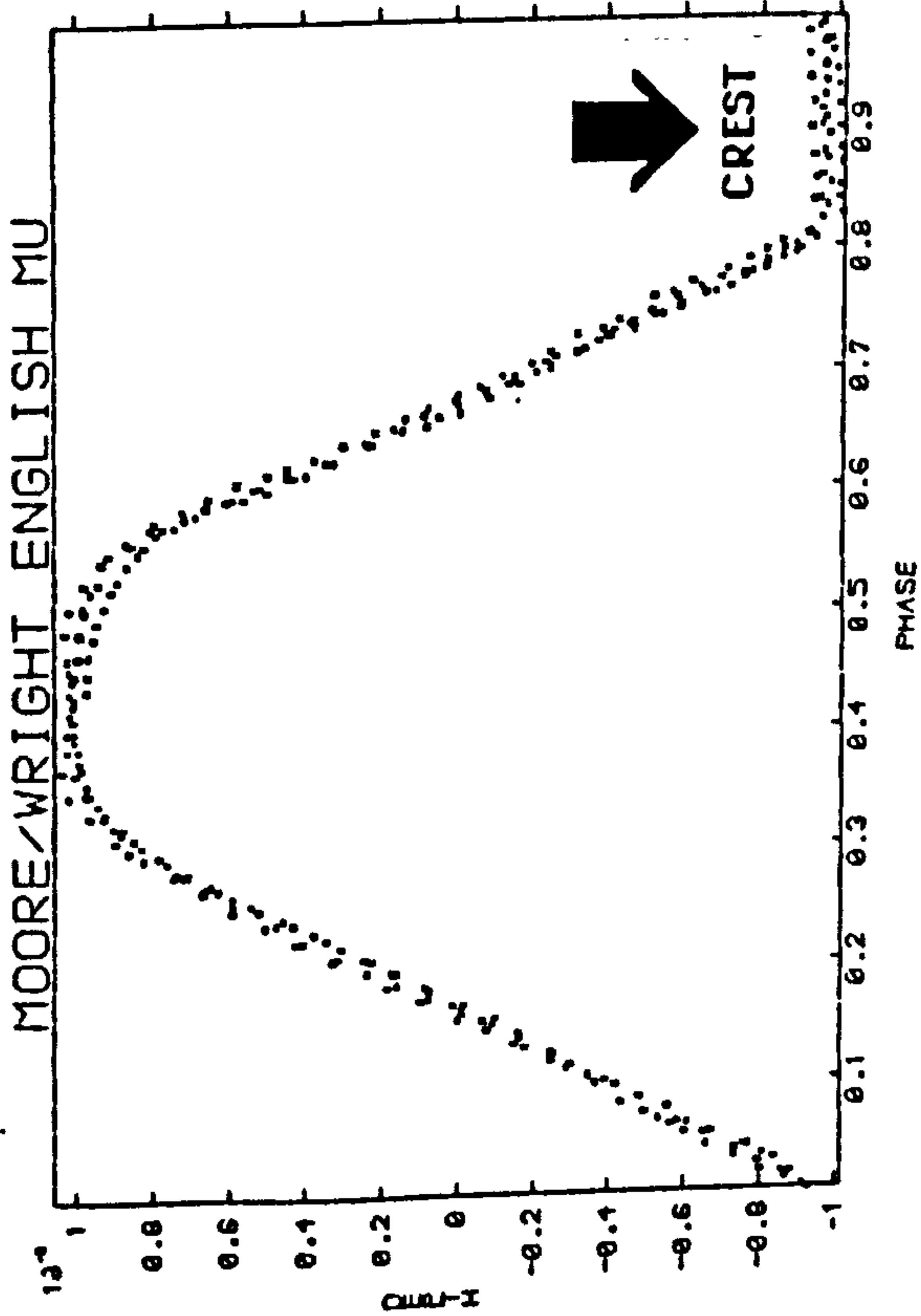
Study Code: Comparison

Instrument: Micrometer

Maker: Moore & Wright

Date: 3rd q 20th c

Ser./Acq. No.



Mu

Filar

Scale

Bench

Div. Eng.

Adjust.

Leveling

Focus

Eye P.

Tube

Tool

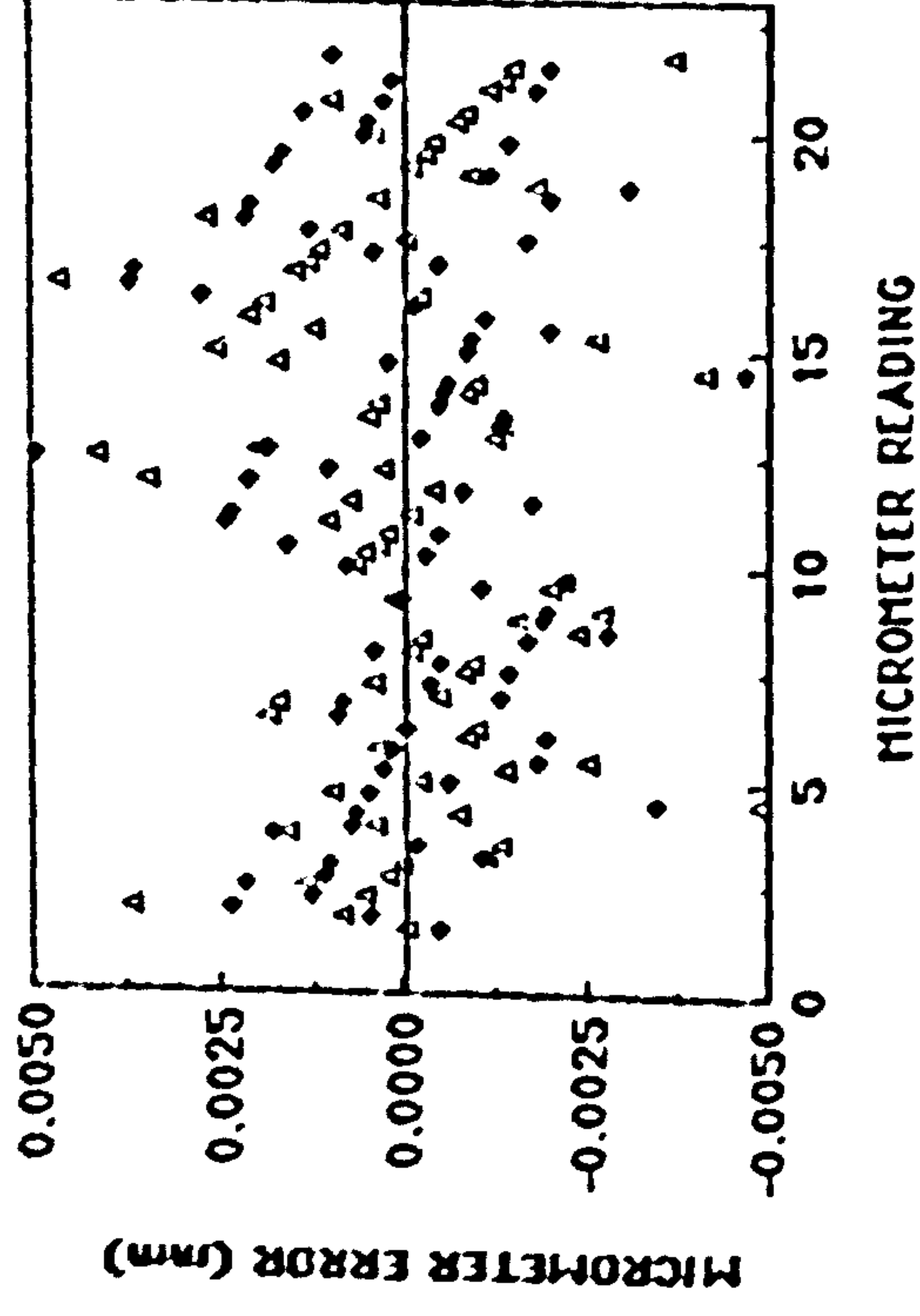
Gauge

Blinding

Misc.

(English Micrometer)

MOORE & WRIGHT (2 runs)



Characteristics:

Screw

Nut

Leng: 1.719" / 0.563"

Diameter: 0.3022"

Steel

Brass

Other:

Instrument Identification:

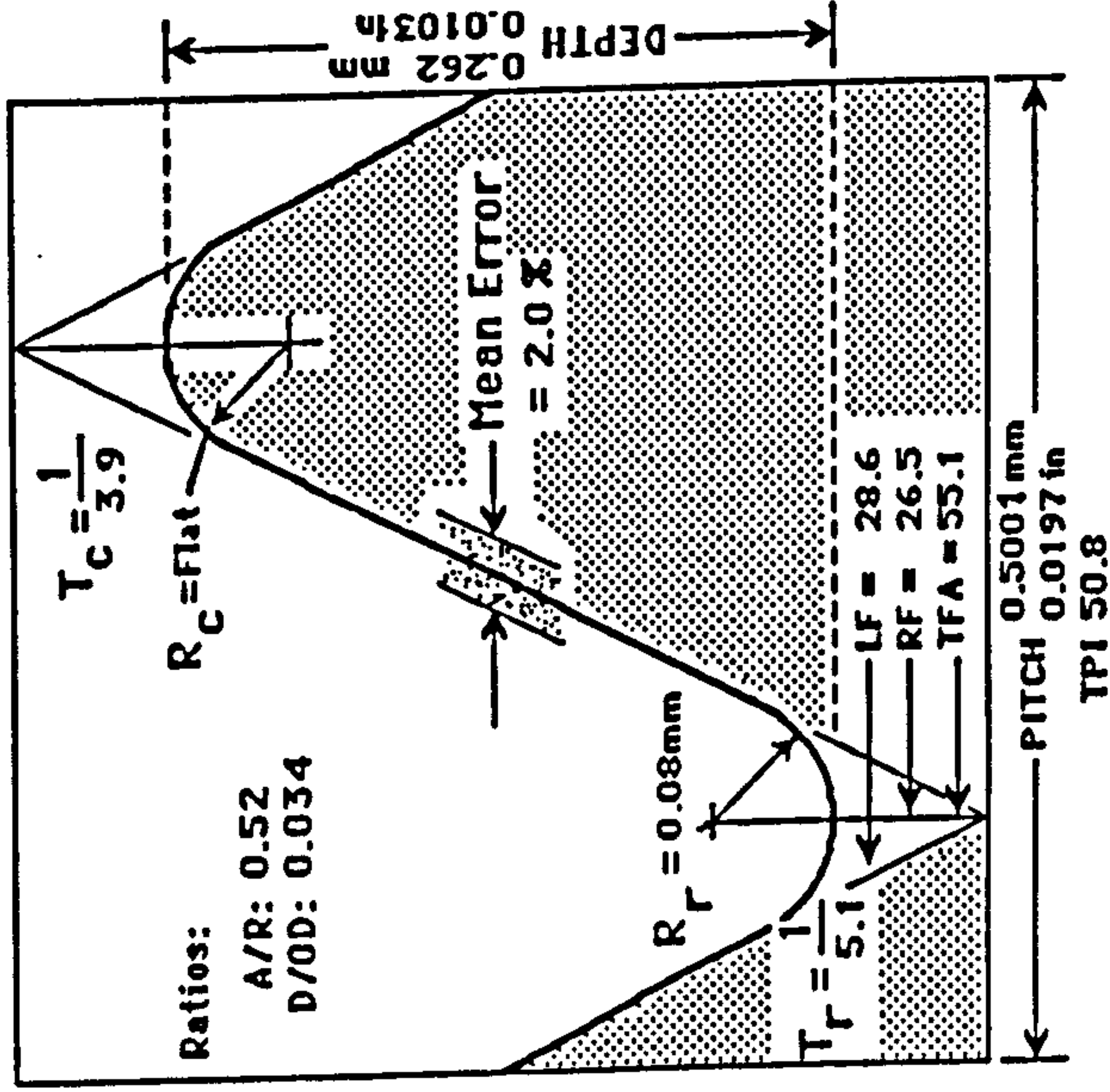
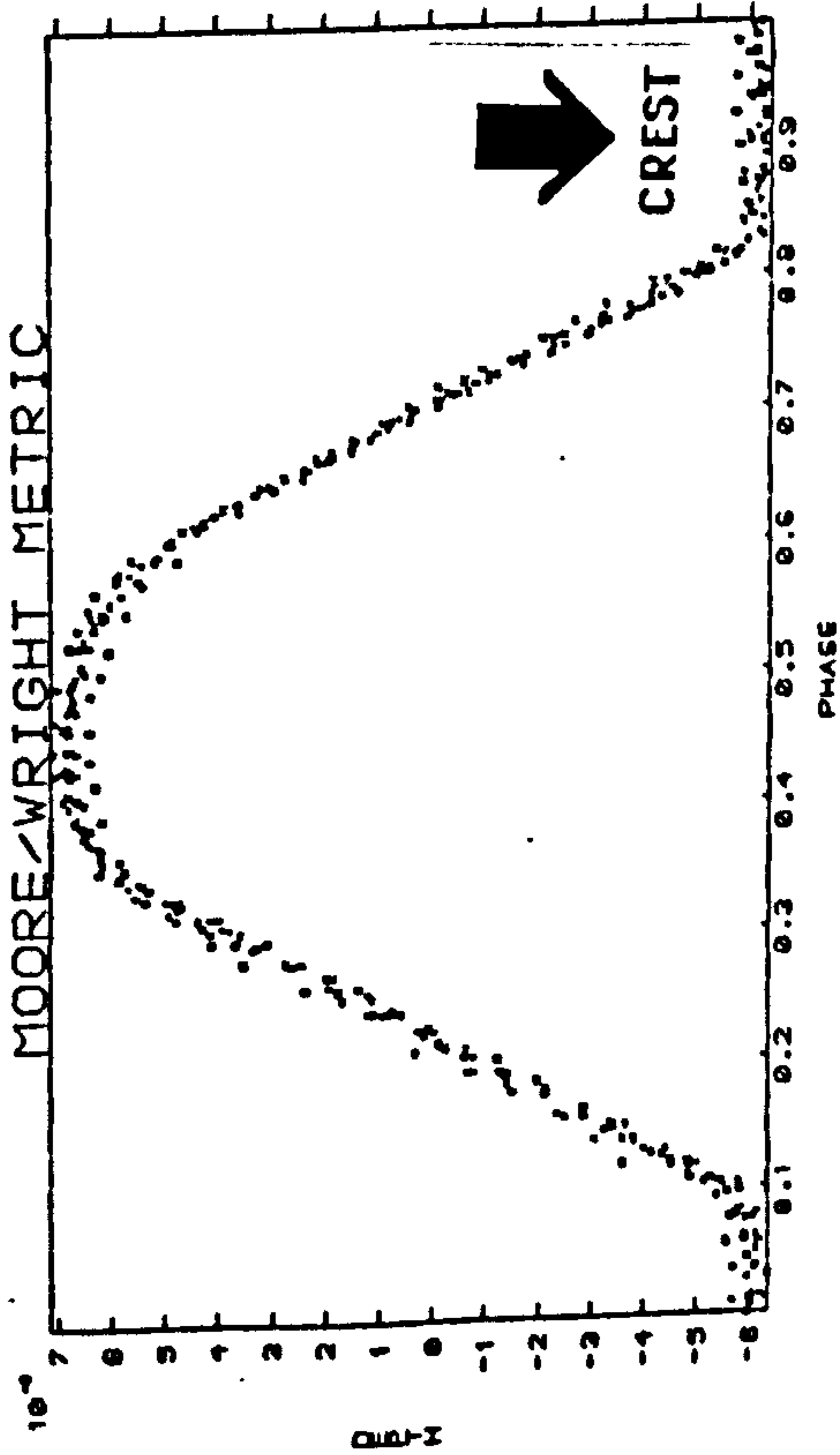
Study Code: Comparison

Instrument: Micrometer

Maker: Moore & Wright

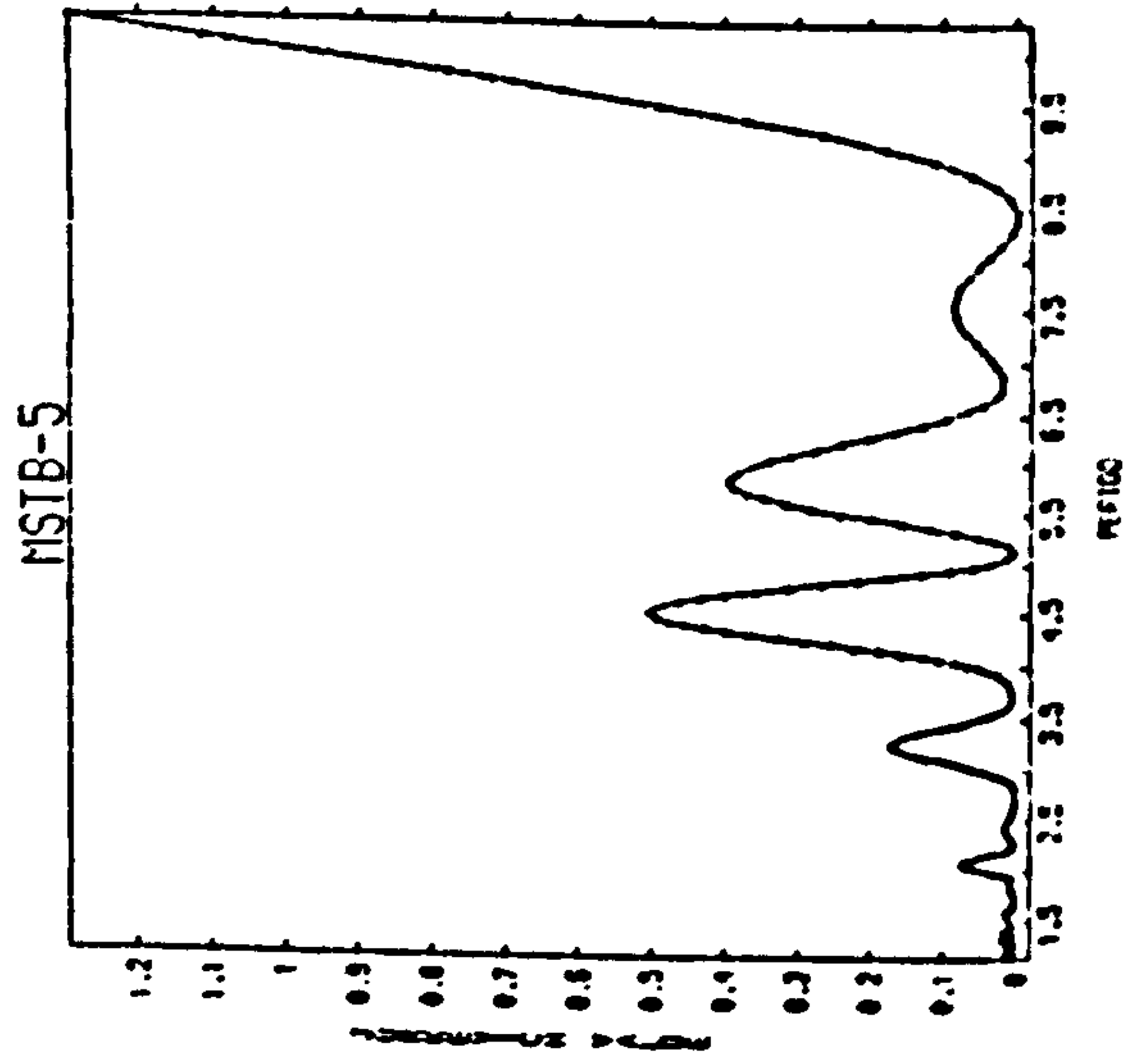
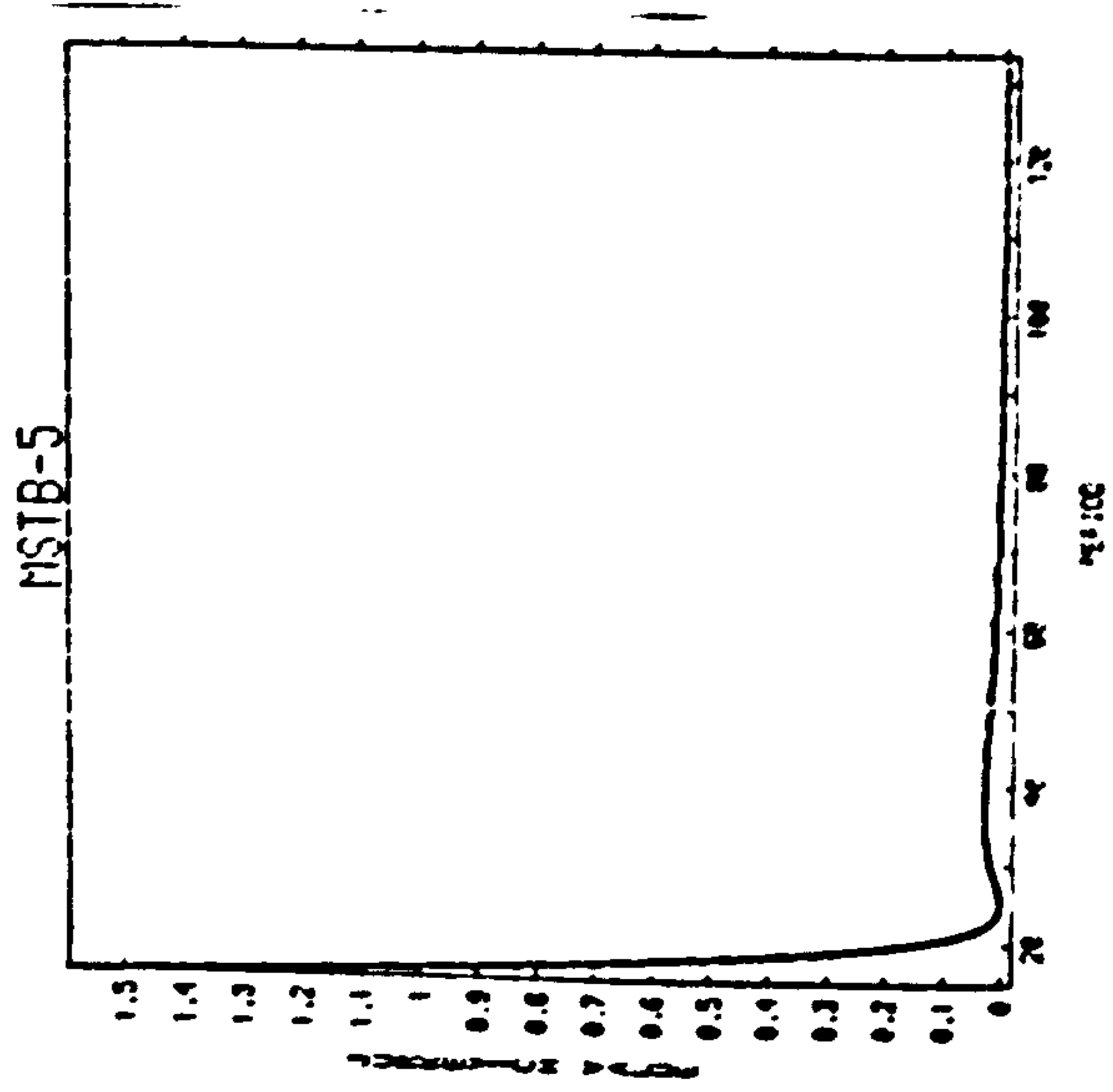
Date: 3rd q 20th c

Ser./Acq. No.



Mu	[	Filar	
		Scale	
		Bench	
		Div. Eng.	
		Adjust.	
		Leveling	
		Focus	
		Eye P.	
		Tube	
		Tool	
		Gauge	
		Binding	
		Misc.	

(Metric micrometer)





Characteristics:

Screw

Nut

Leng: ~2.0" / ~0.97"

Diameter: 0.3403"

Steel

Brass

Other:

Instrument Identification:

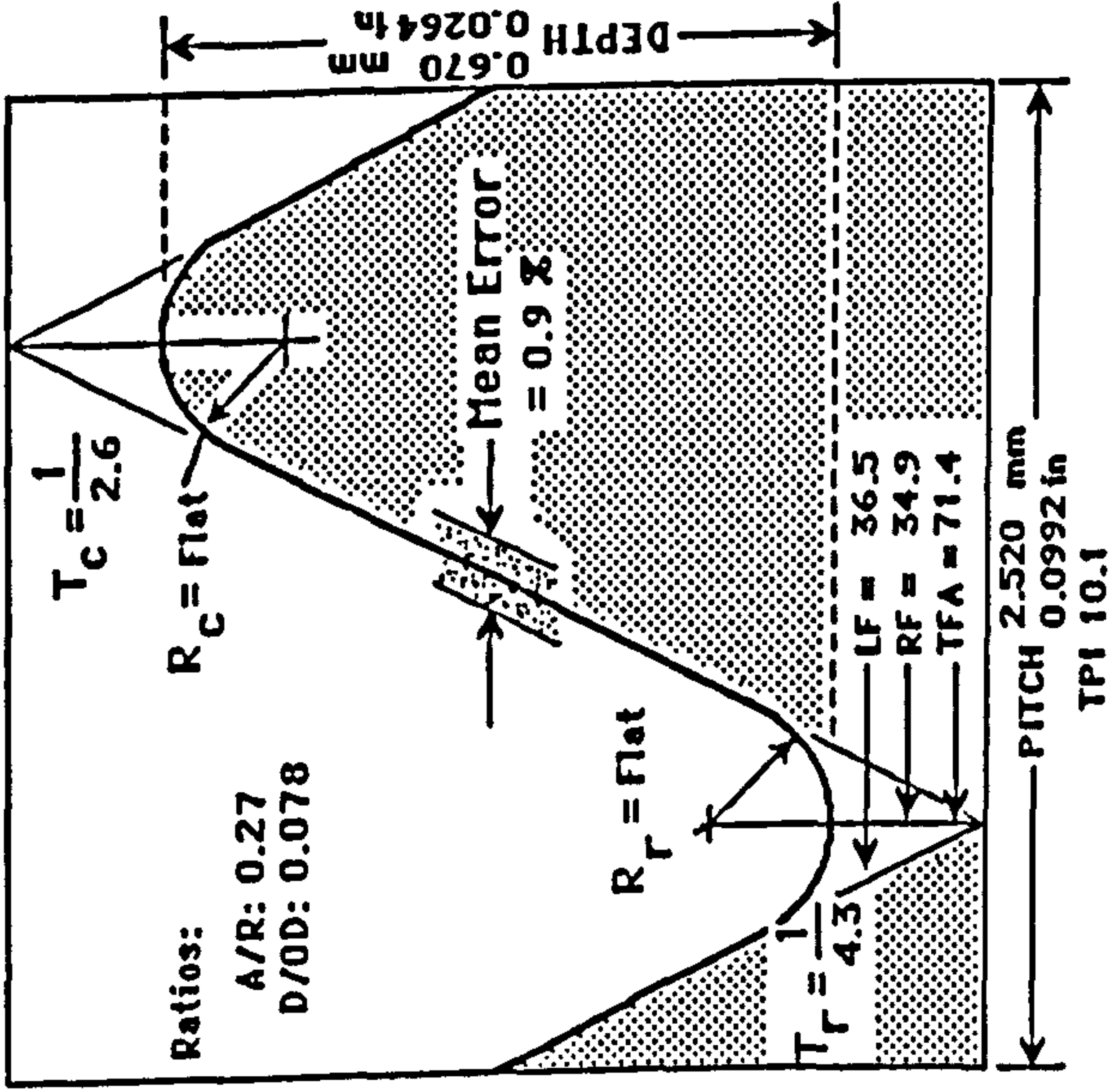
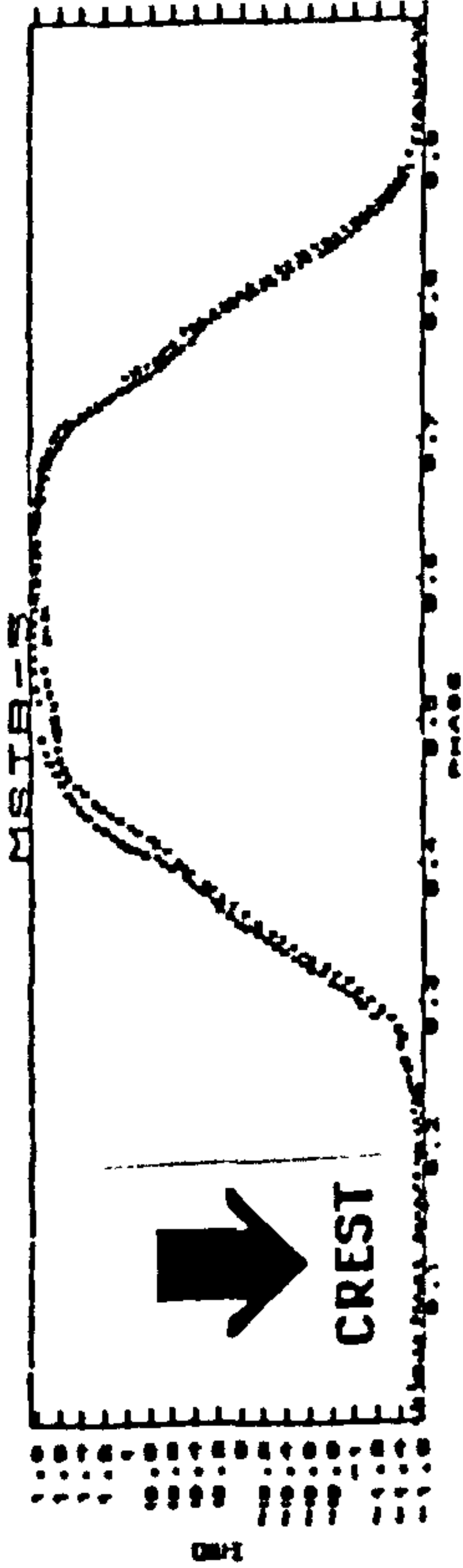
Study Code: MSTB-5

Instrument: Micrometer

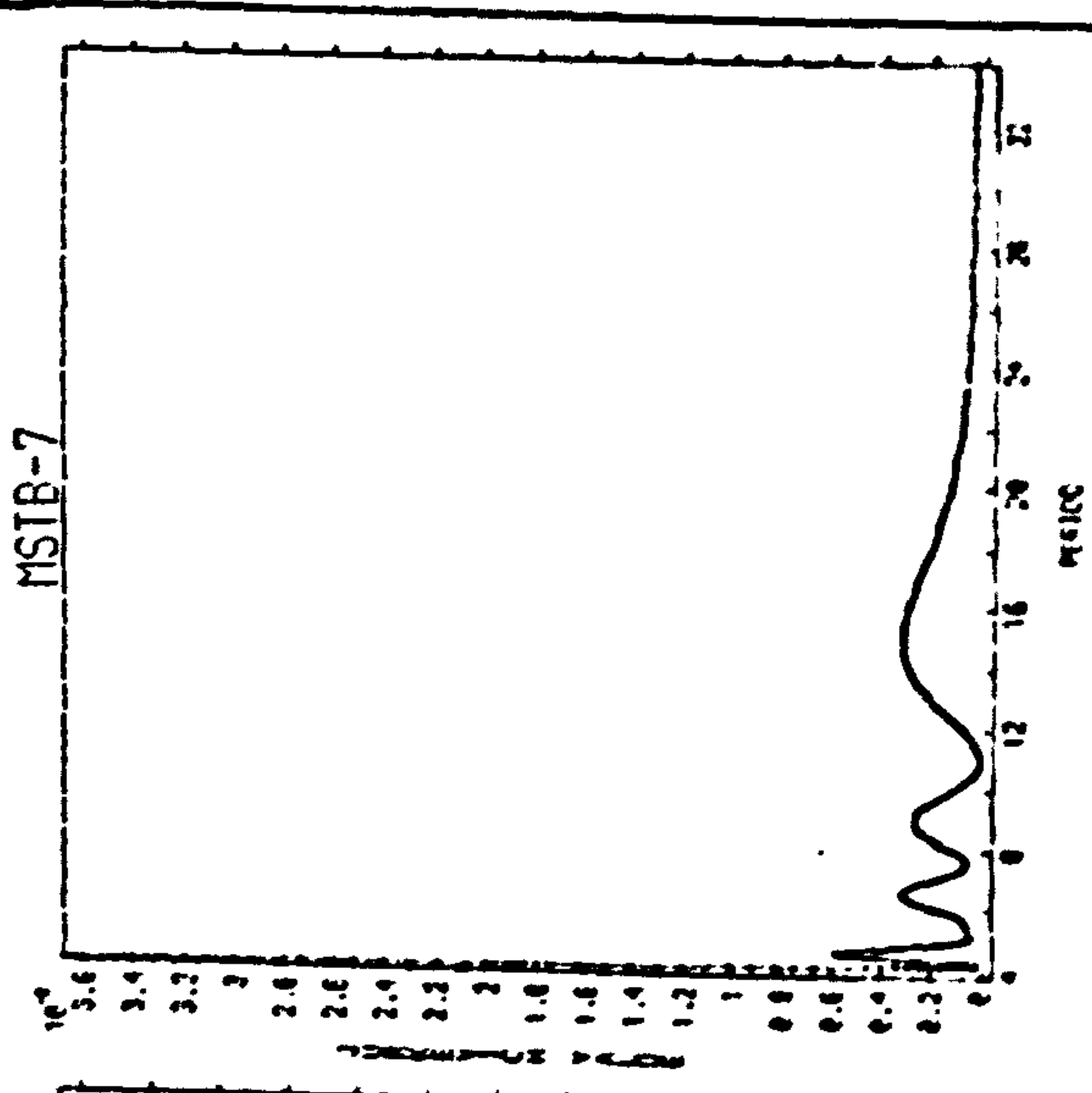
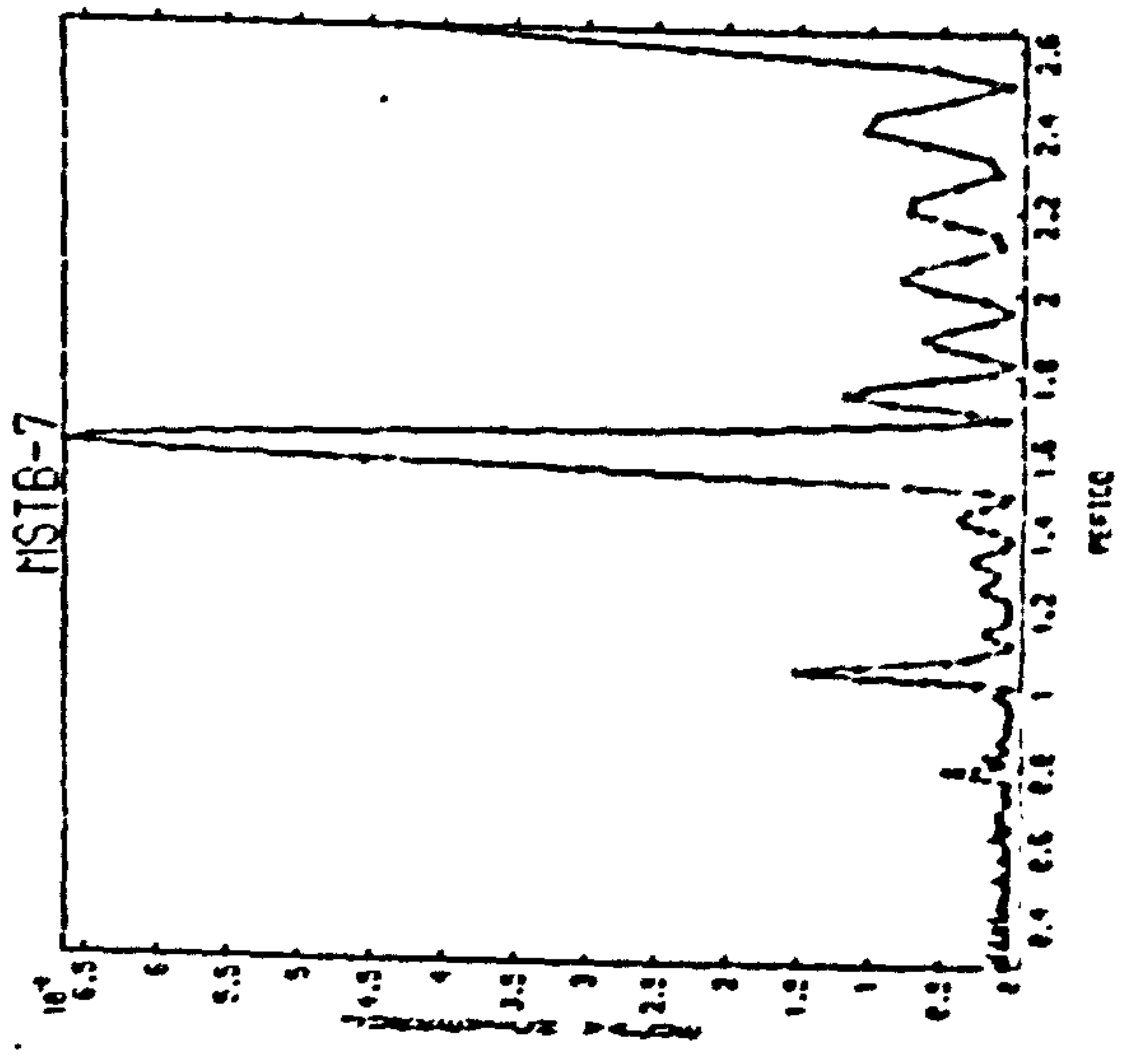
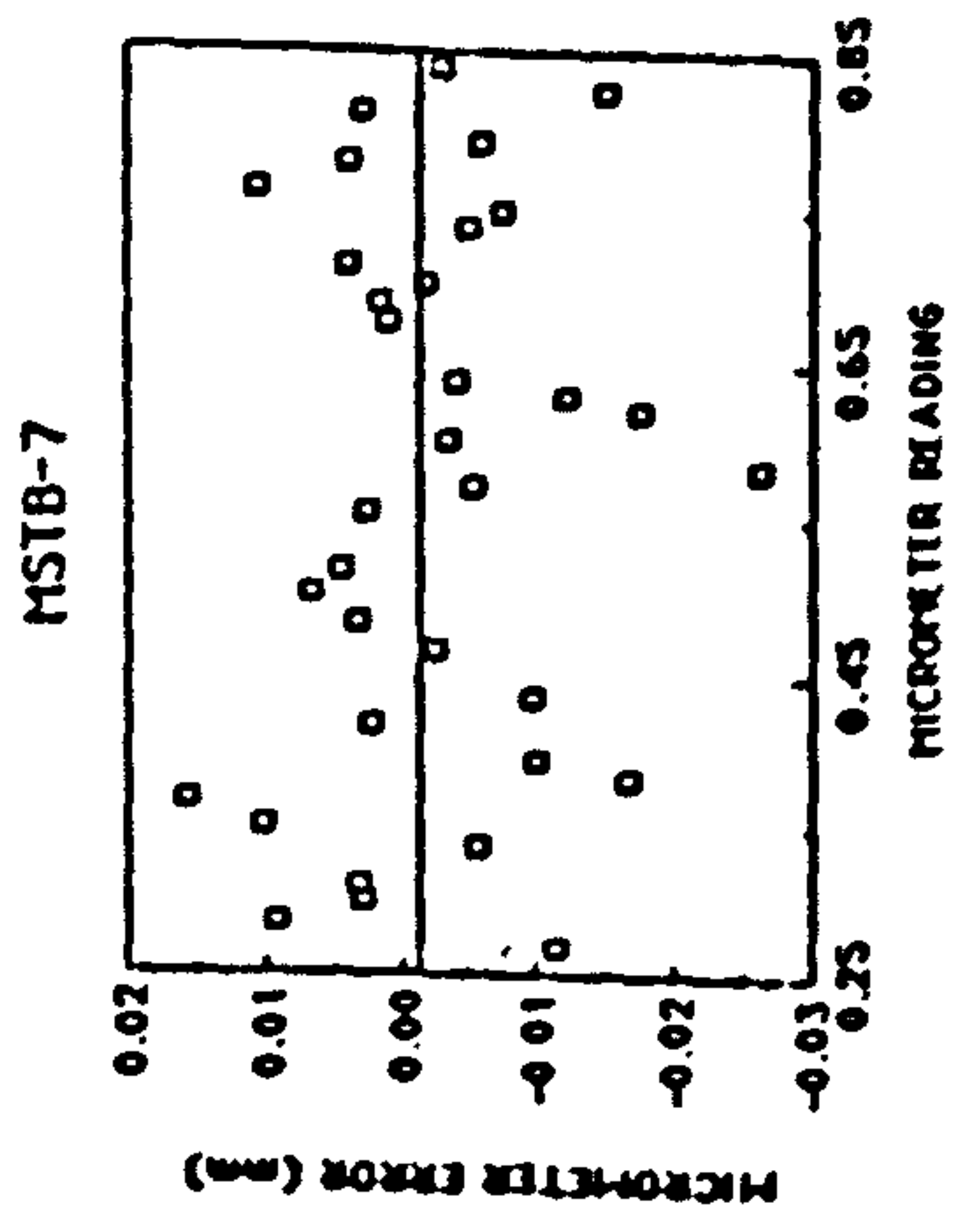
Maker: Humpage, Jacques & Pederson

Date: ca.1890

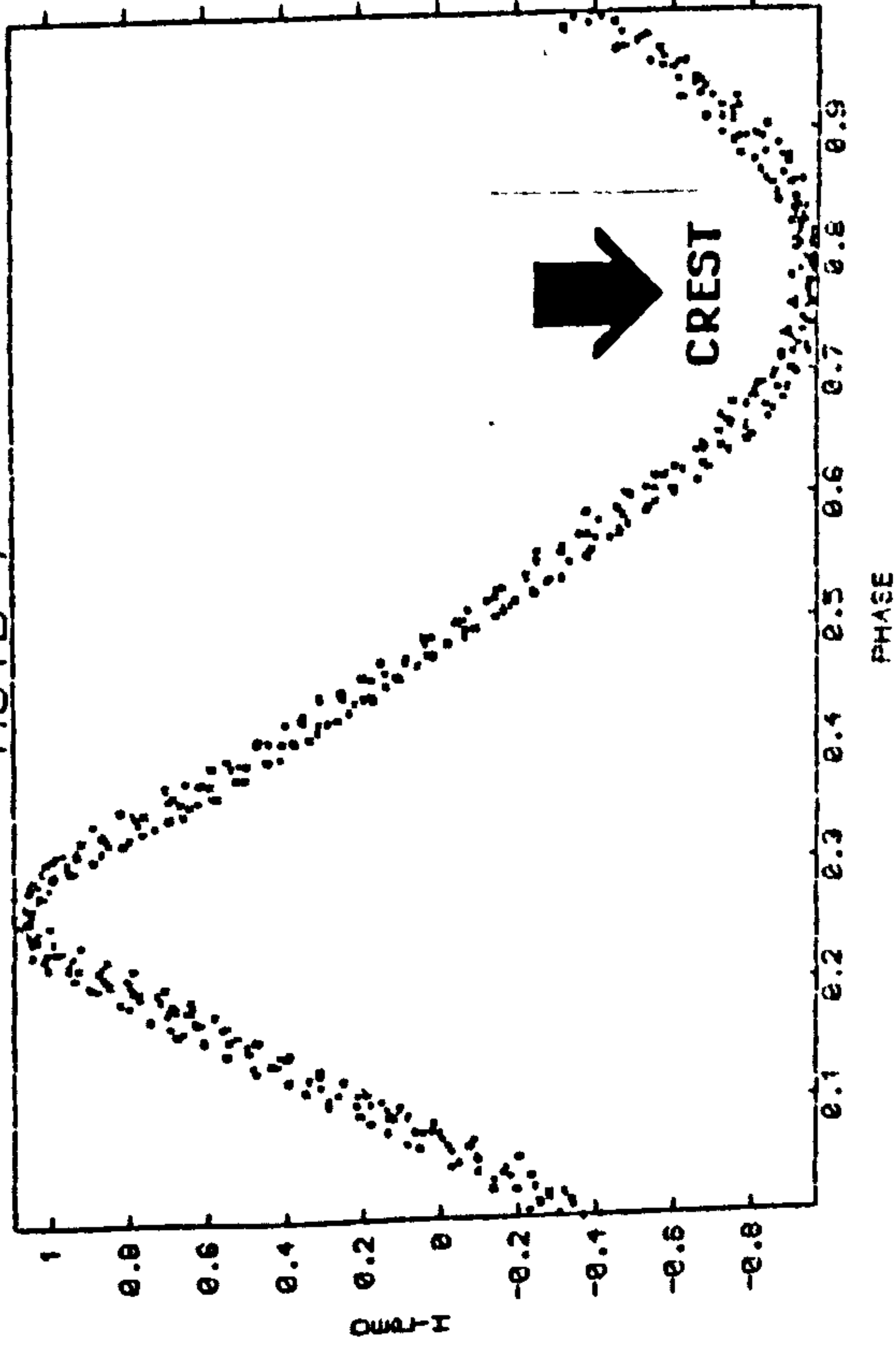
Ser./Acq. No. 59-1064



Mu — [ Filar Scale Bench Div. Eng. Adjust. Leveling Focus Eye P. Tube Tool Gauge Binding Misc. ]



MSTB-7



**Characteristics:**

Screw ☒ Nut ☐

Leng: ~2.5" / ~1.5"

Diameter: 0.244"

Steel ☒ Brass ☐

Other: ☐

**Instrument Identification:**

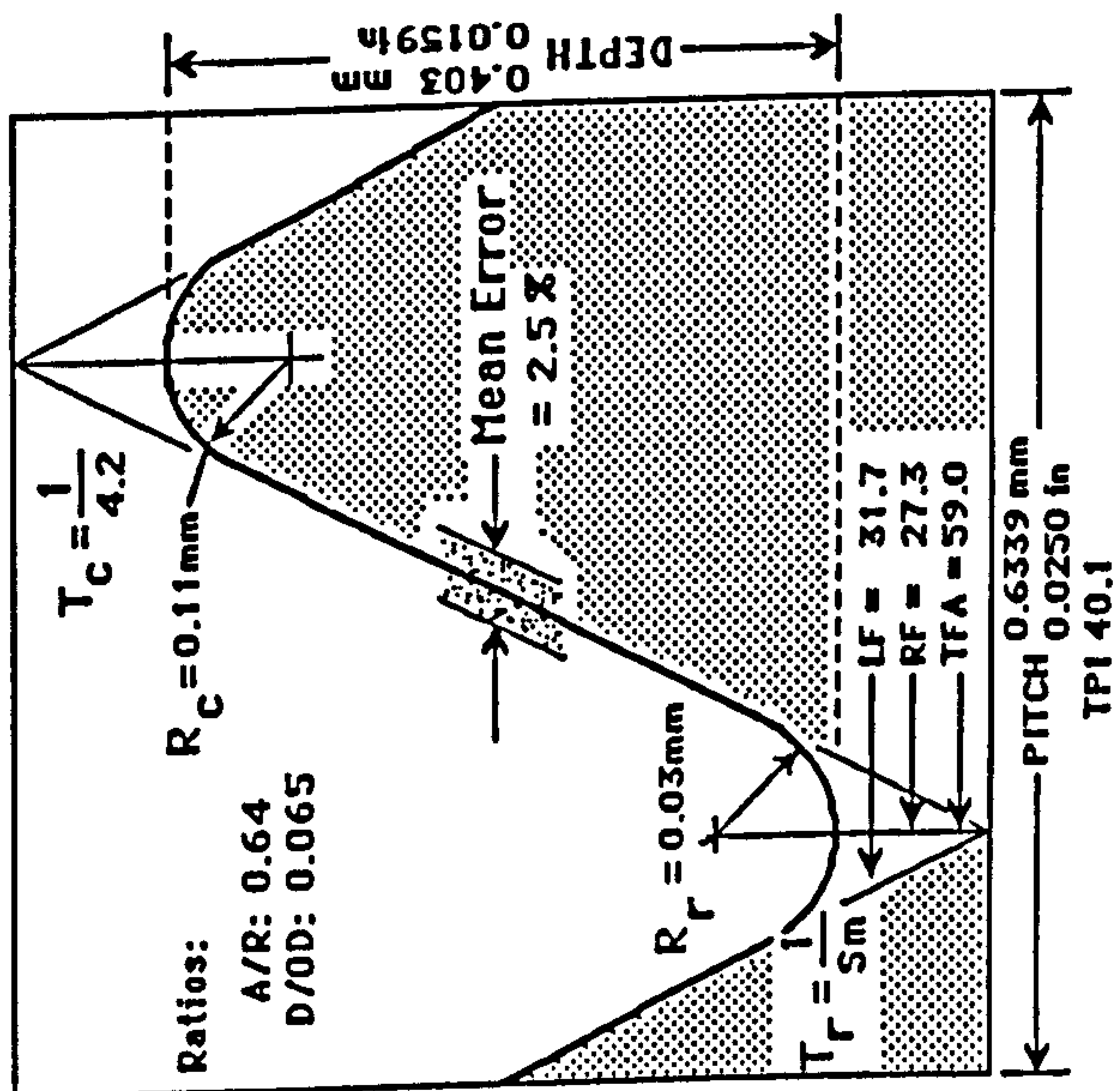
Study Code: MSTB-7

Instrument: Micrometer

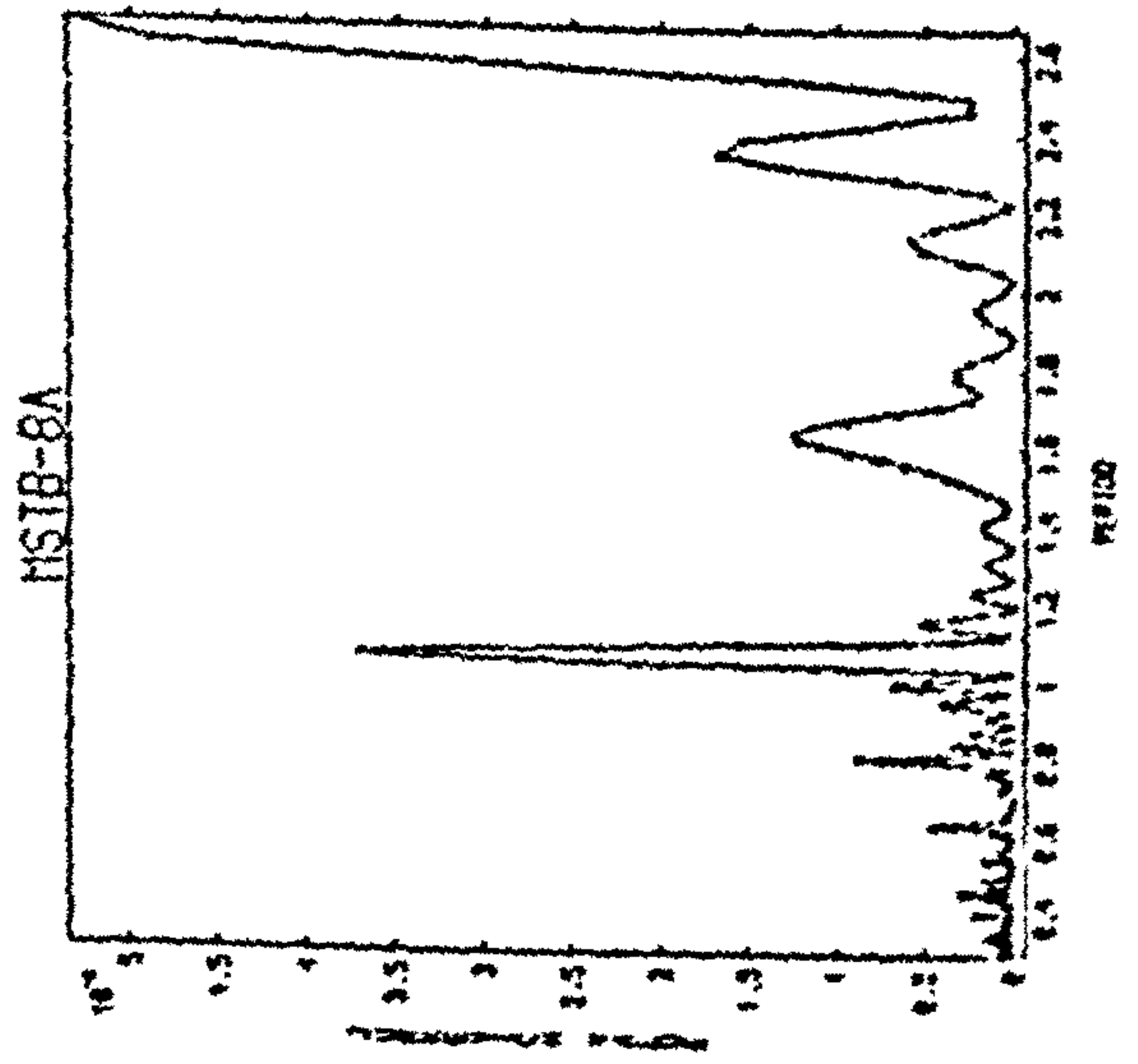
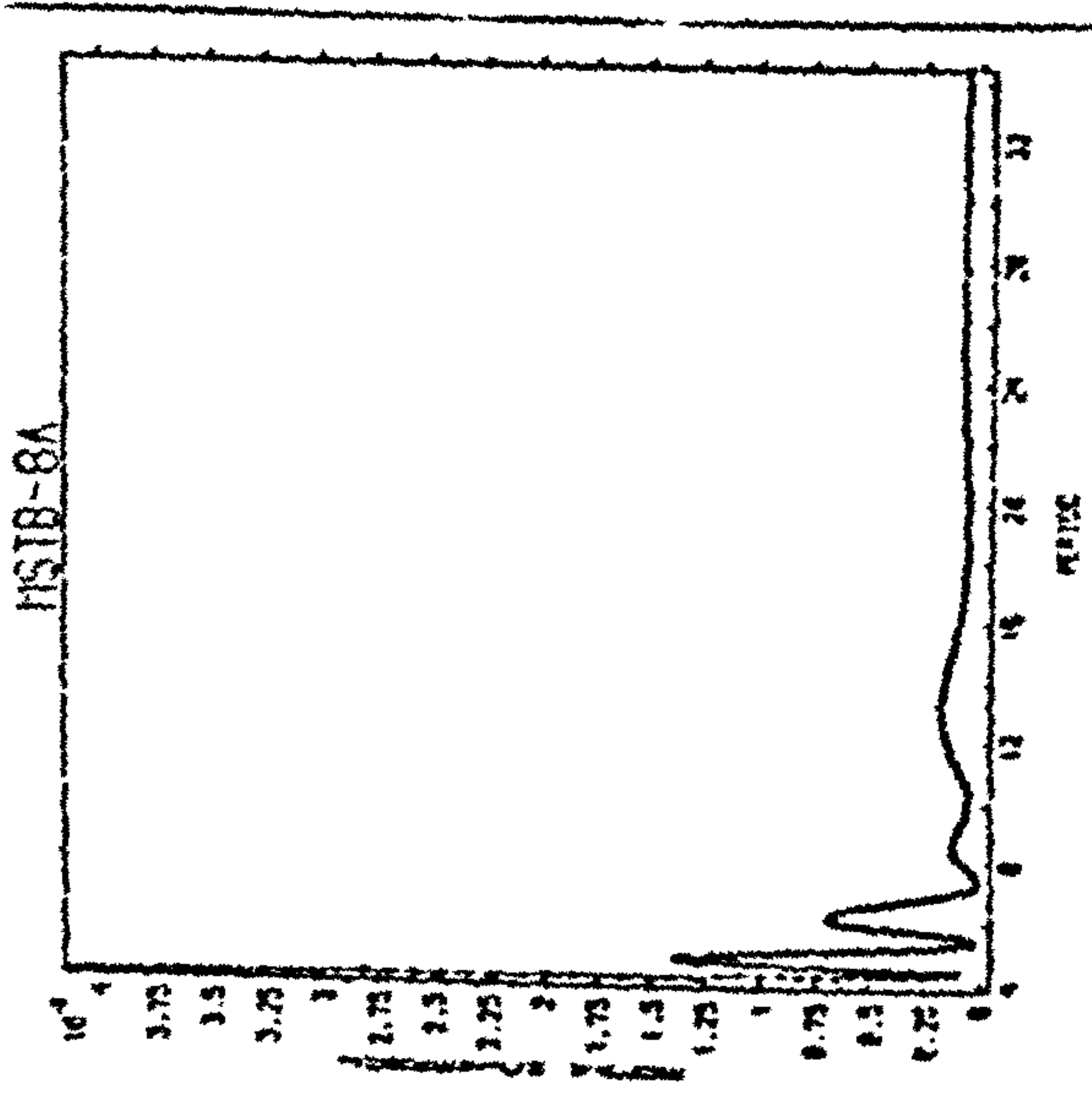
Maker: Brown & Sharpe

Date: ca.1877

Ser./Acq. No. 67-2201



- Mu — [
- Filar
  - Scale
  - Bench
  - Div. Eng.
  - Adjust.
  - Leveling
  - Focus
  - Eye P.
  - Tube
  - Tool
  - Gauge
  - Binding
  - Misc.





Characteristics:

Screw

Nut

Leng: 1.00"

Diameter: 0.175"

Steel

Brass

Other:

Instrument Identification:

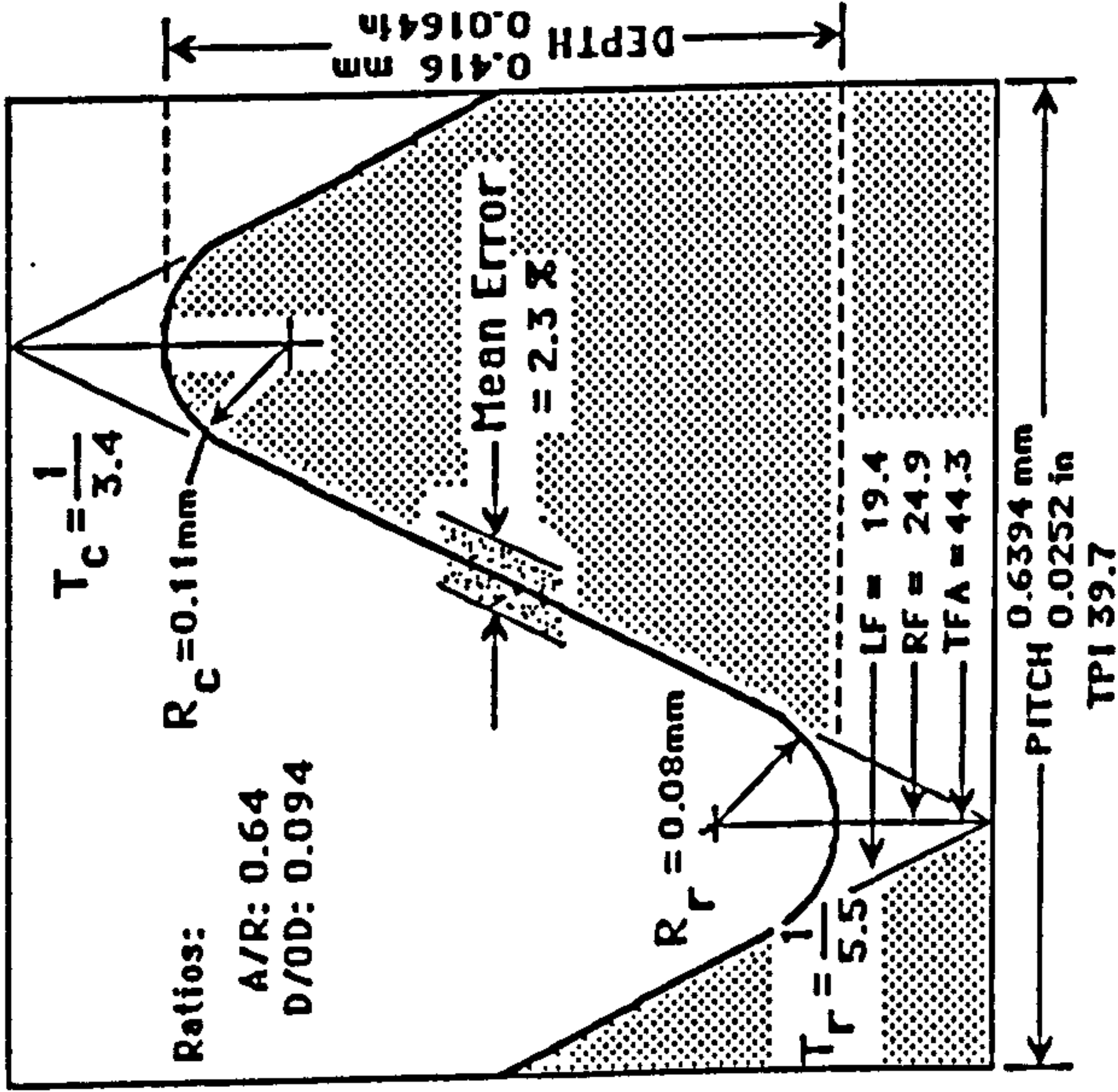
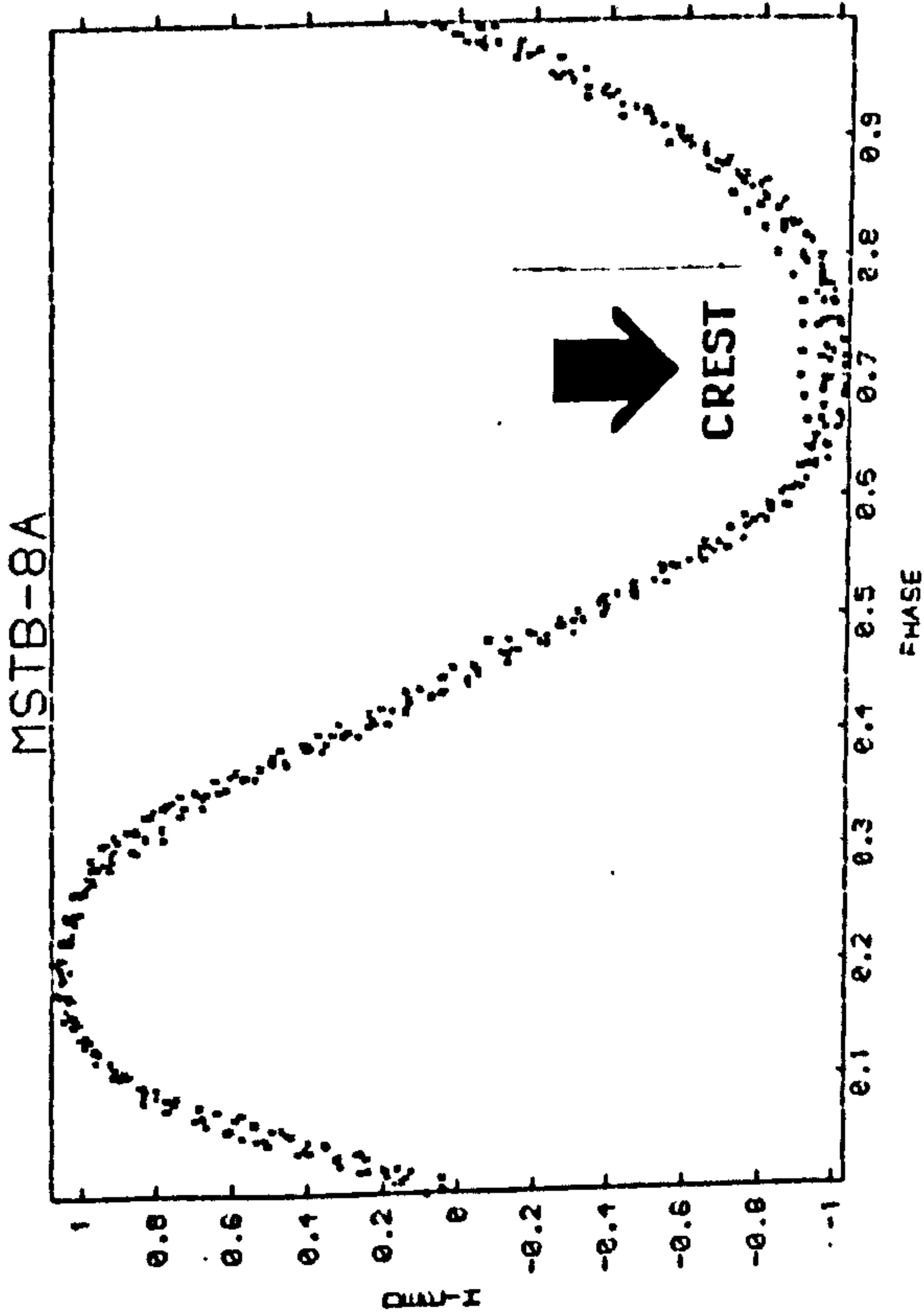
Study Code: MSTB-8a

Instrument: Micrometer

Maker: Holtzapffel & Co.

Date: ca.1870's

Ser./Acq. No.



Mu

Filar

Scale

Bench

Div. Eng.

Adjust.

Leveling

Focus

Eye P.

Tube

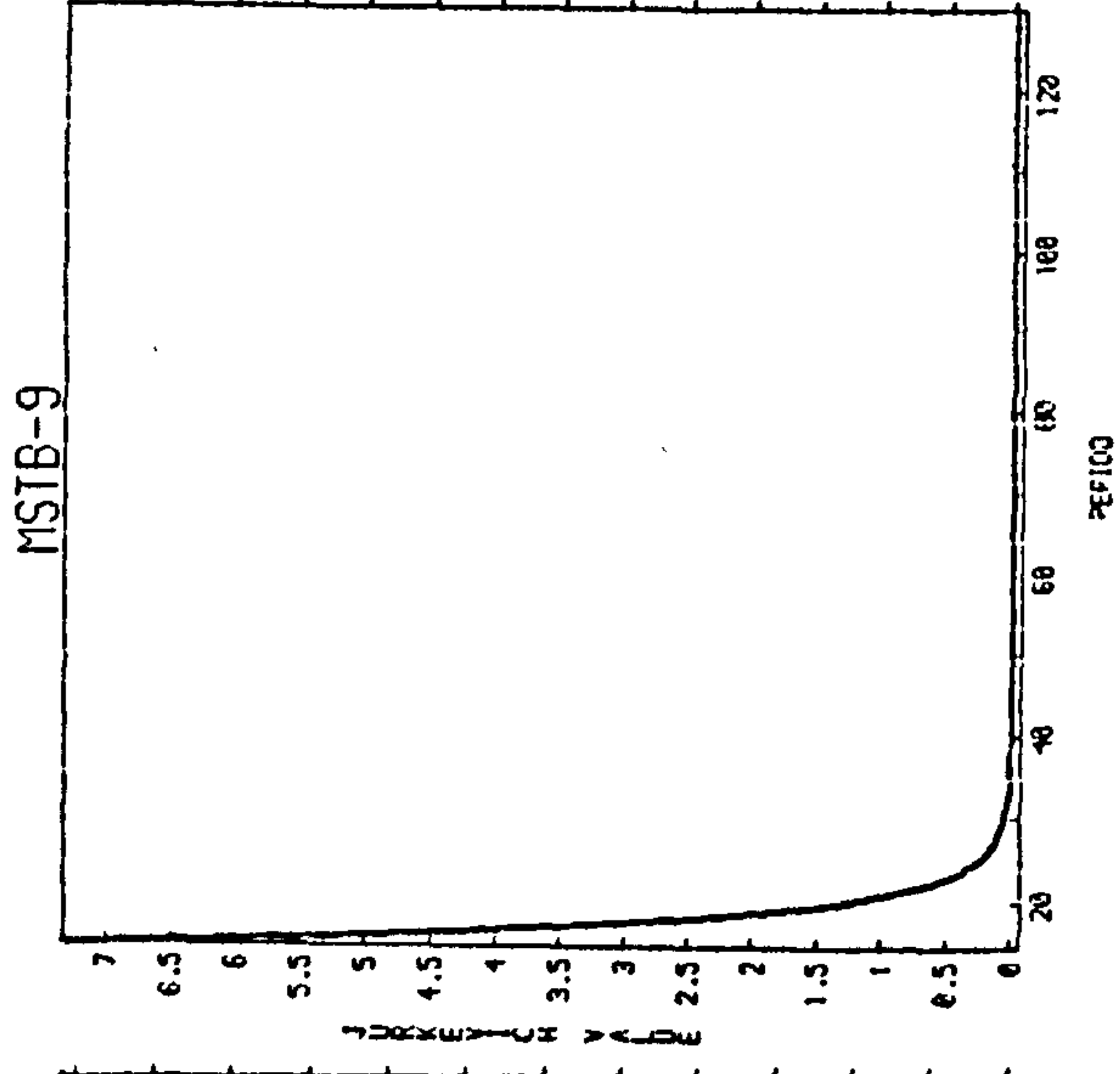
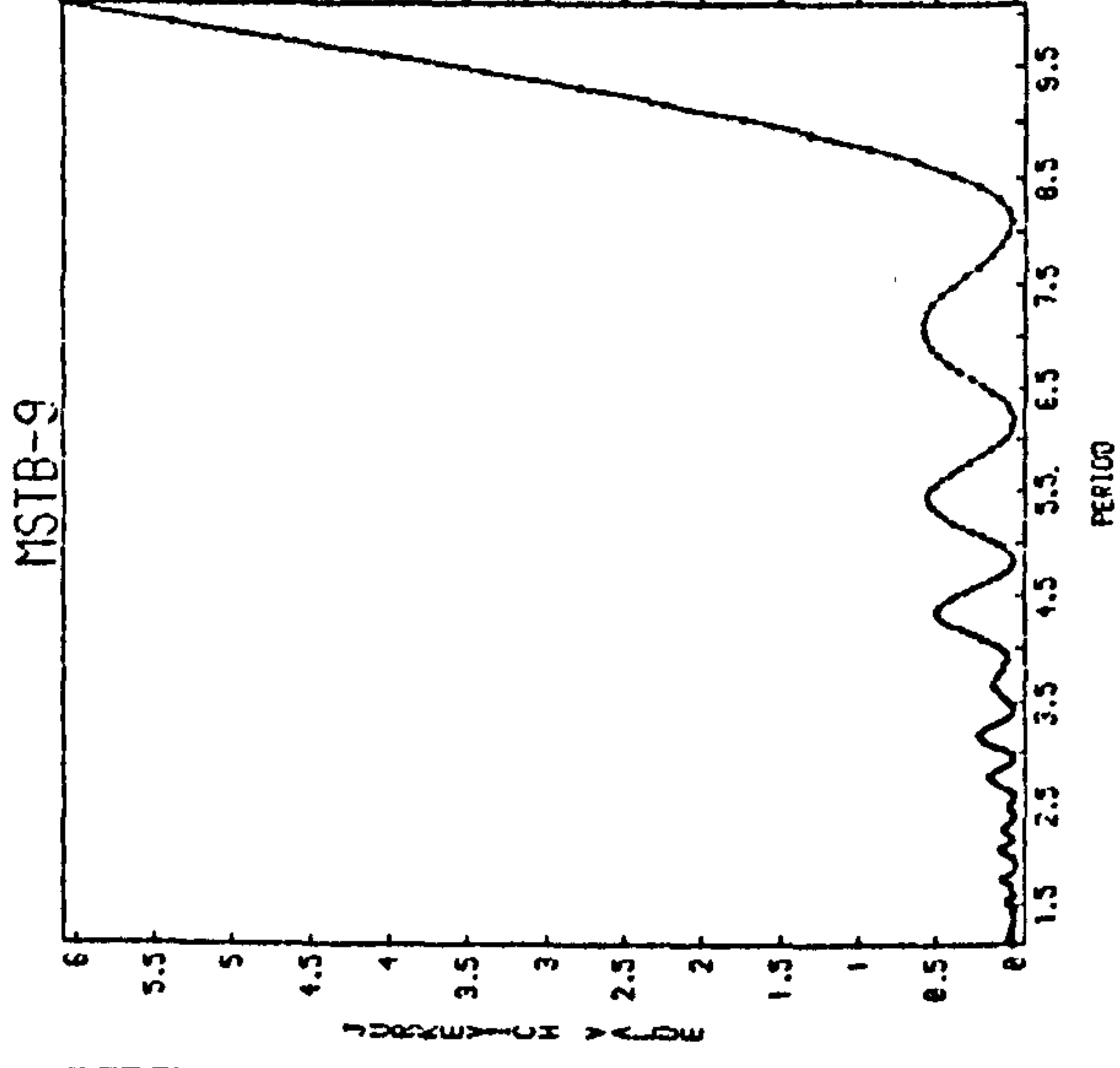
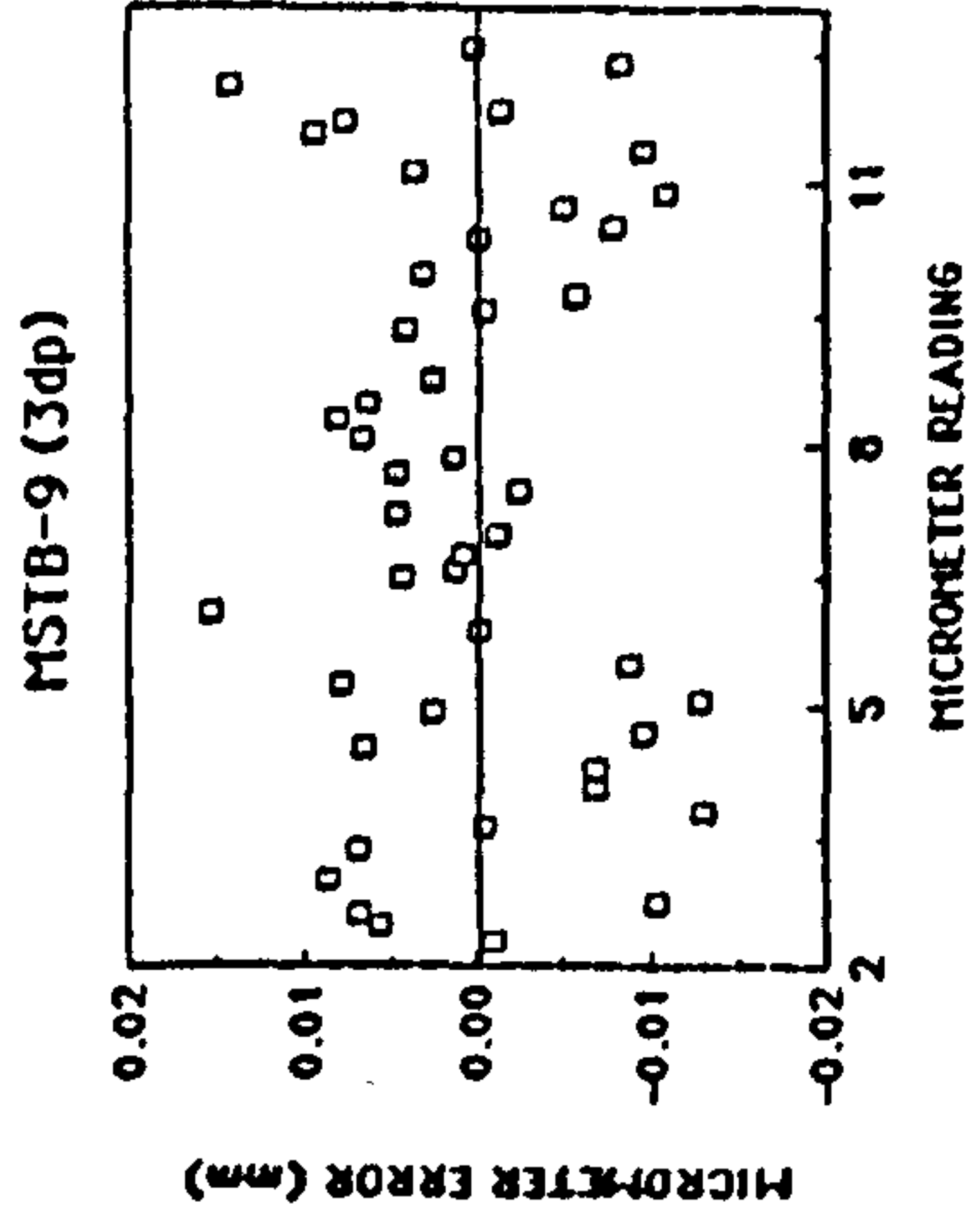
Tool

Gauge

Binding

Misc.

(internal gauge?) :



Characteristics:

Screw

Nut

Leng: 4.50" / 1.875"

Diameter: 0.6189"

Steel

Brass

Other:

Instrument Identification:

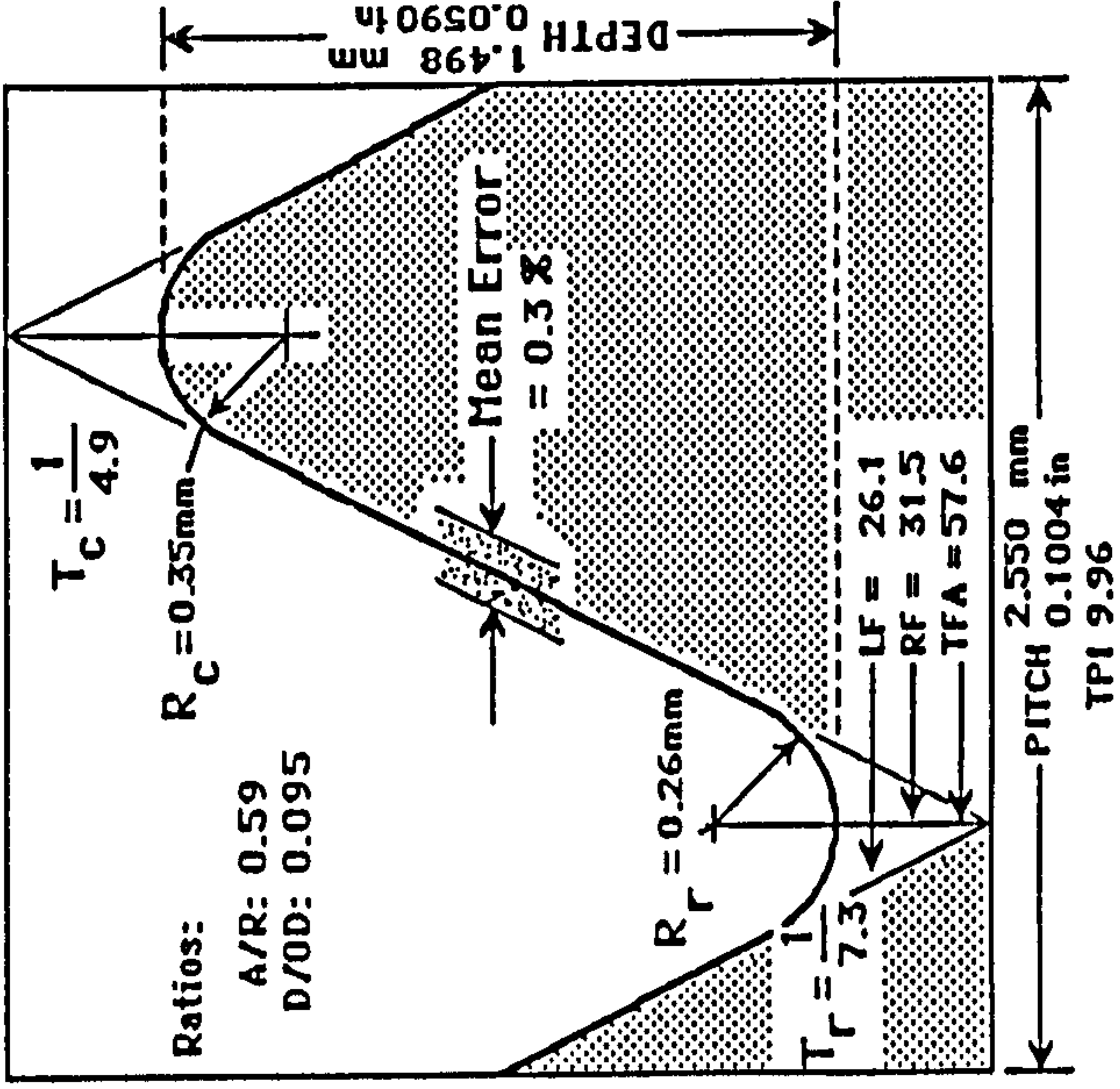
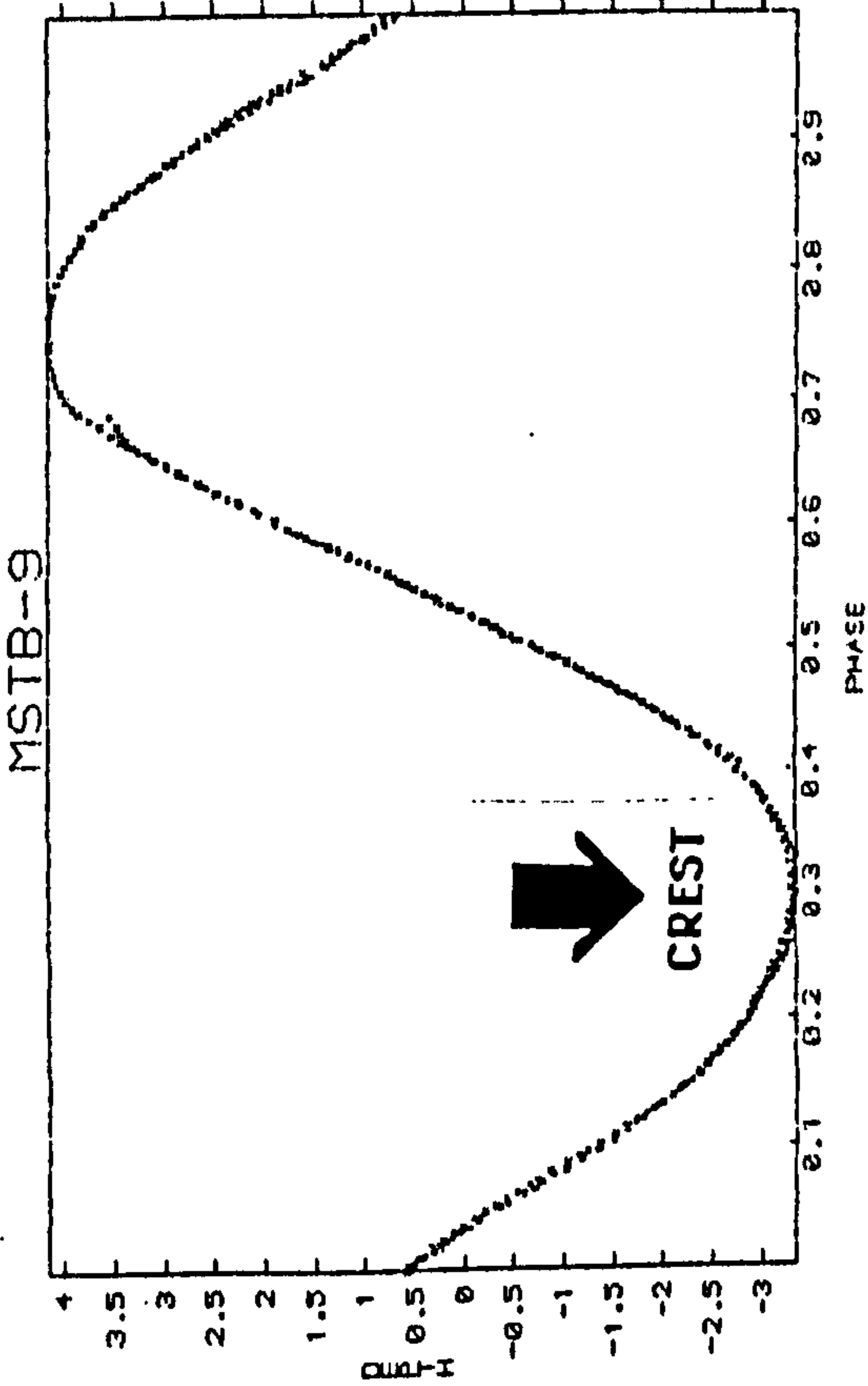
Study Code: MSTB-9

Instrument: Micrometer, C-type

Maker: H.J.W. King, Glasgow

Date: ca.1850

Ser./Acq. No. 64-1372



Mu

Filar

Scale

Bench

Div. Eng.

Adjust.

Leveling

Focus

Eye P.

Tube

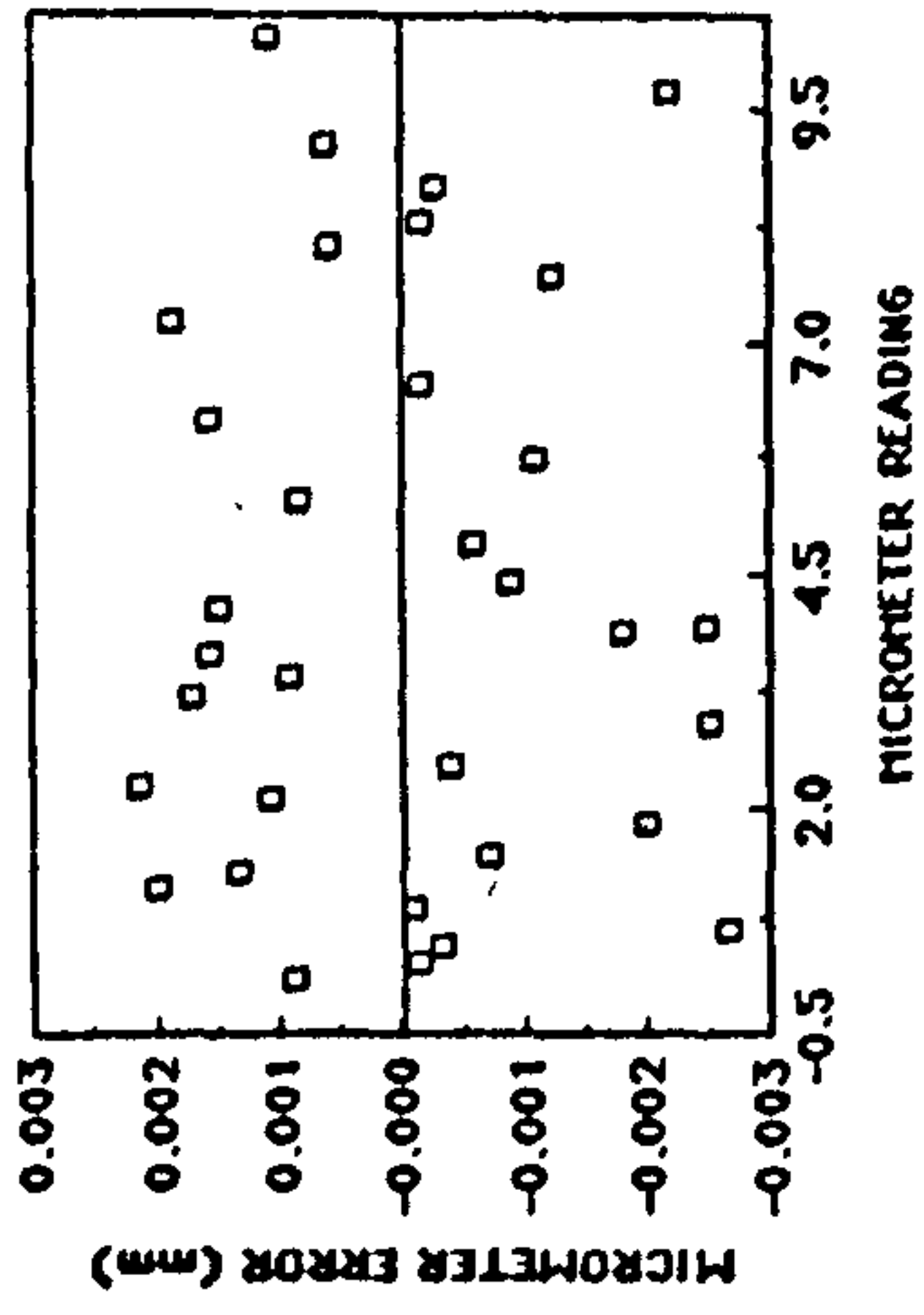
Tool

Gauge

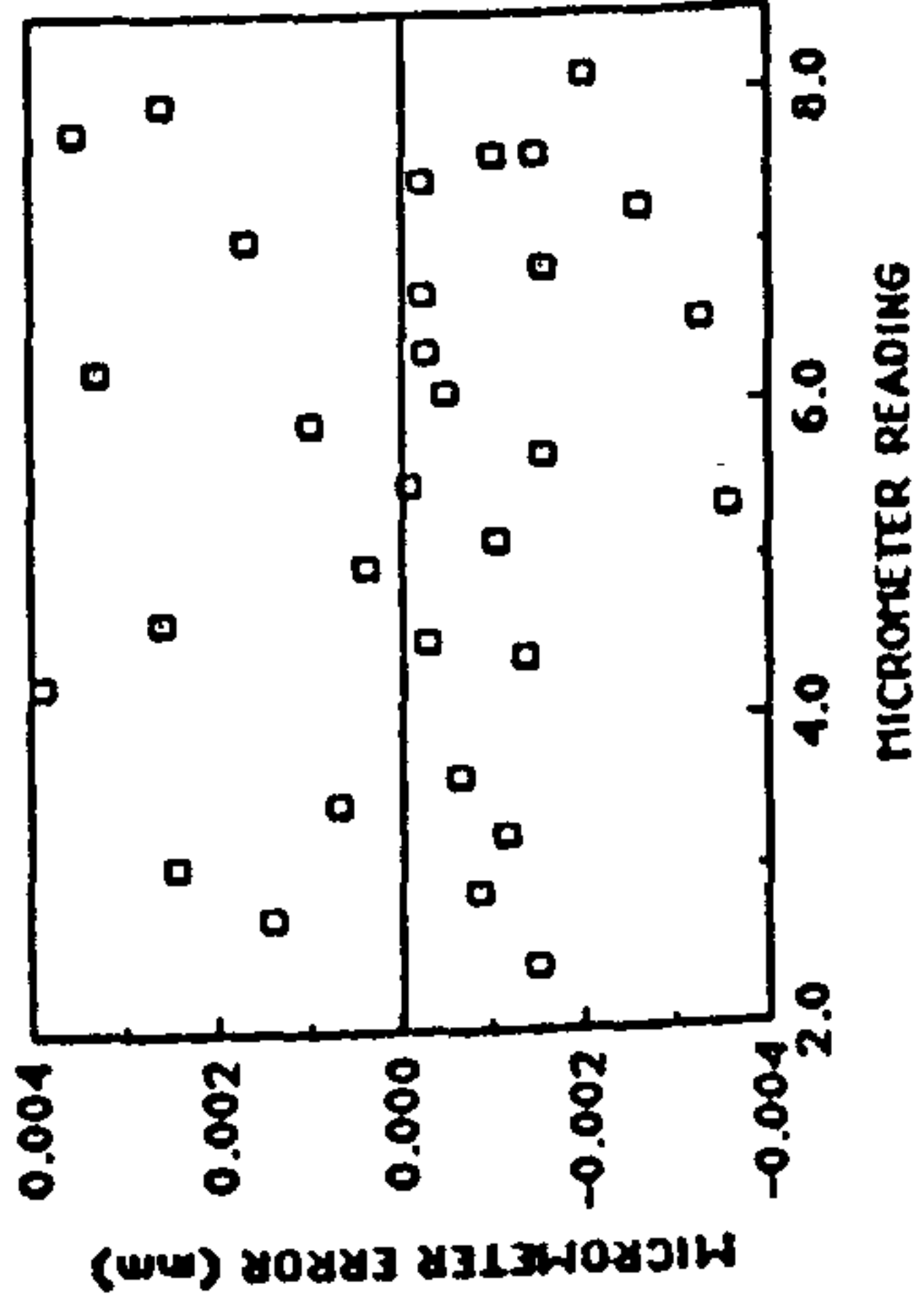
Binding

Misc.

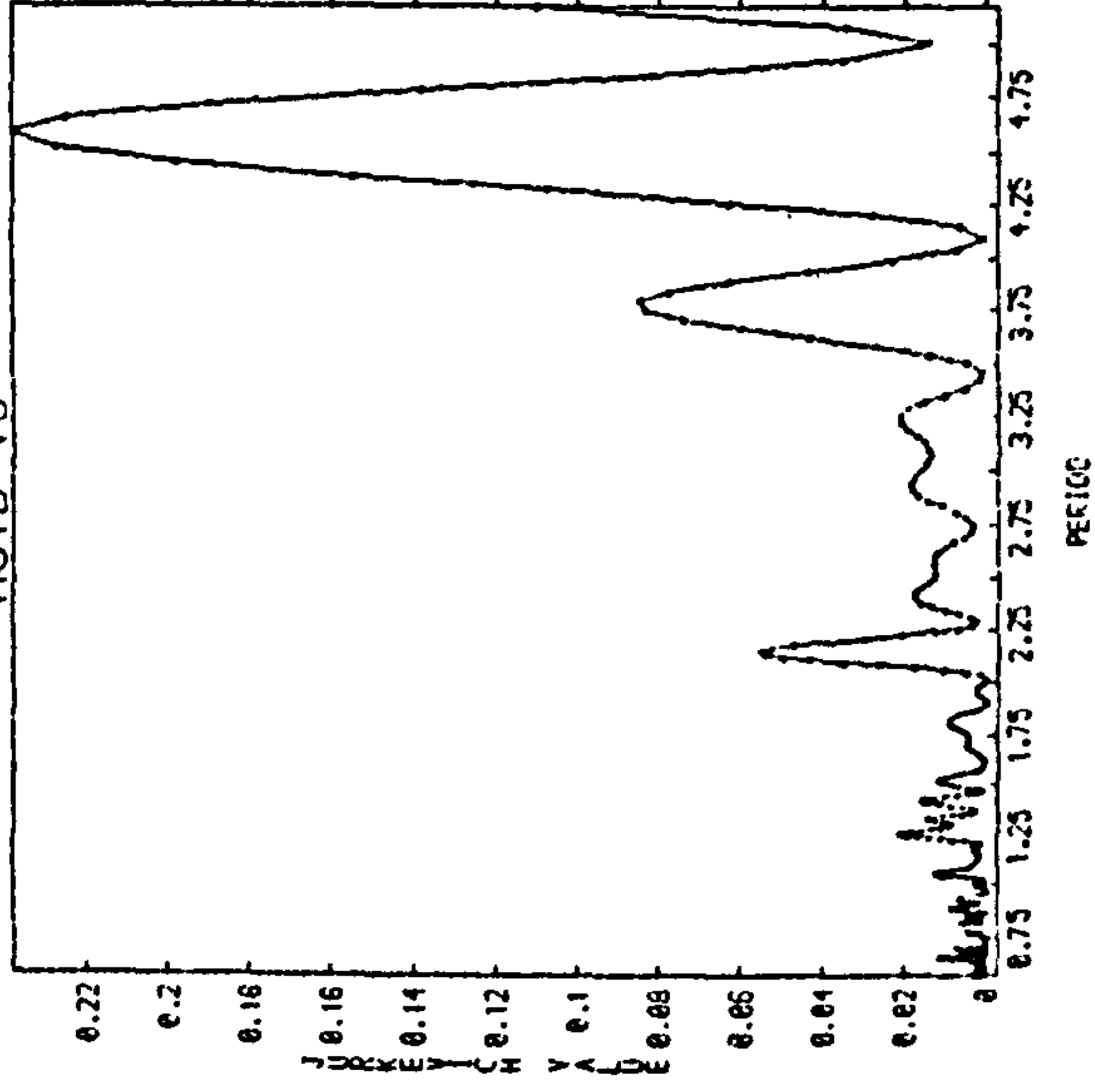
MSTB10-1A



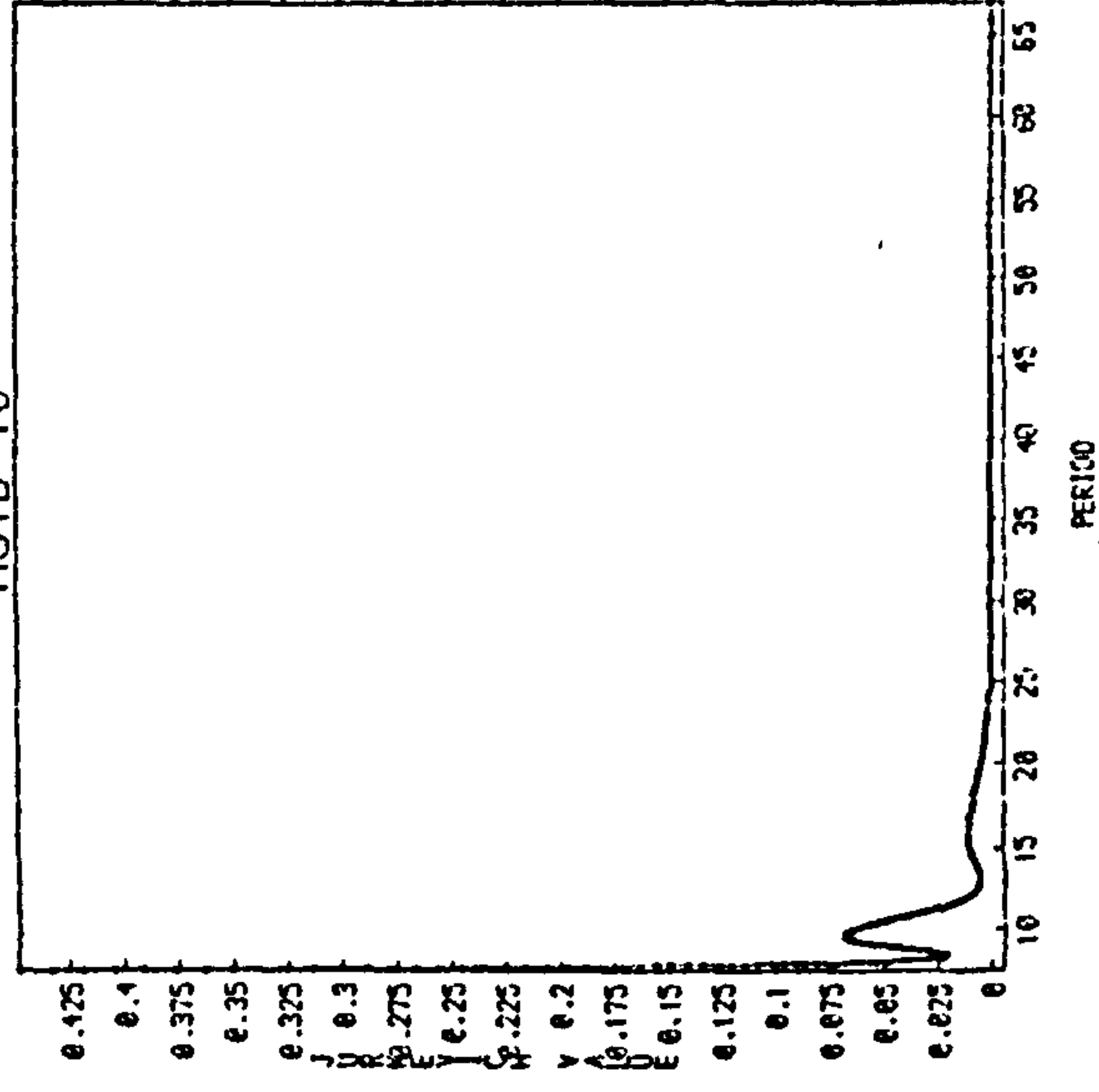
MB-10 (RUN 3)



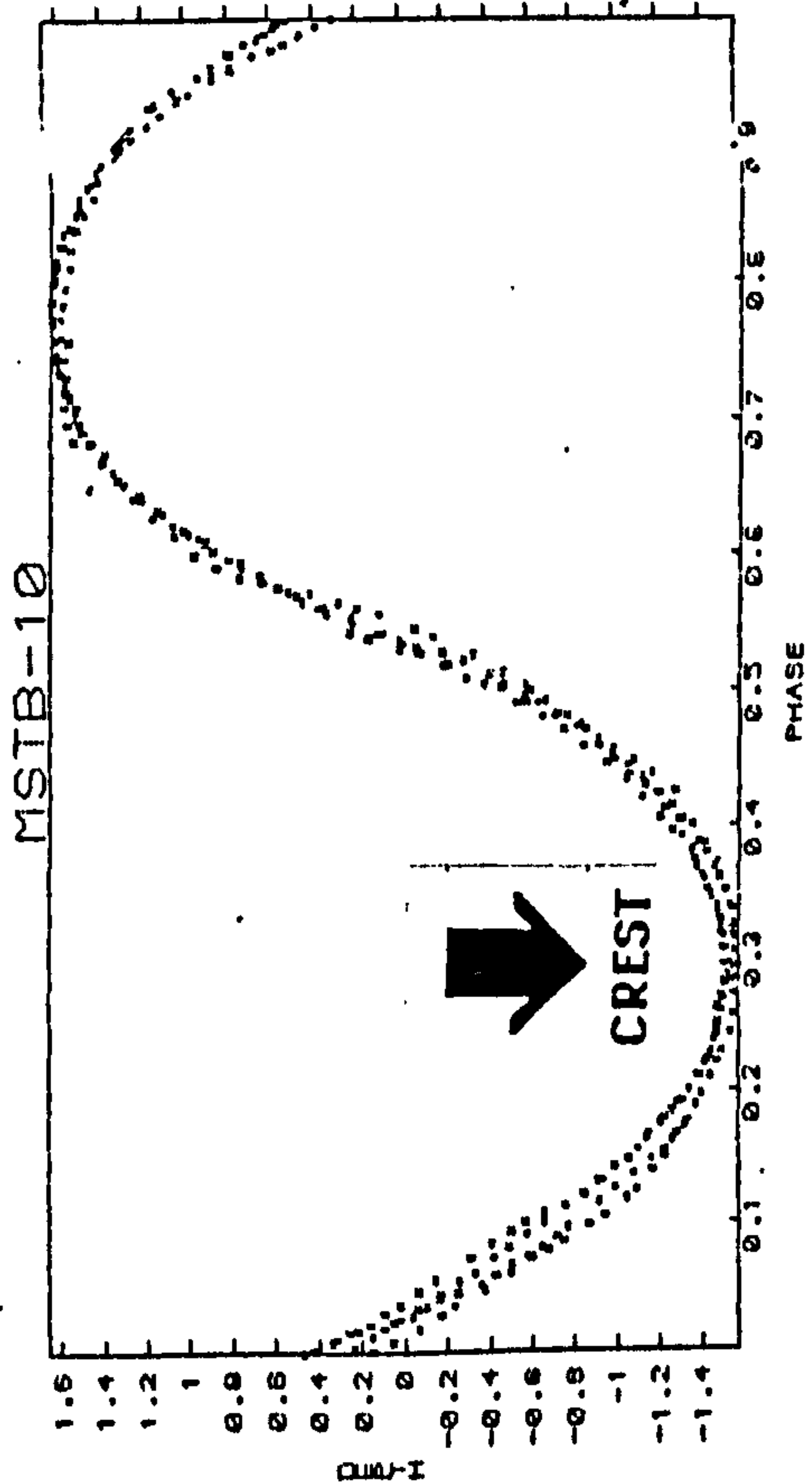
MSTB-10



MSTB-10







Characteristics:

Screw ☒ Nut ☐

Leng: 2.50"

Diameter: 0.3729"

Steel ☒ Brass ☐

Other:

Instrument Identification:

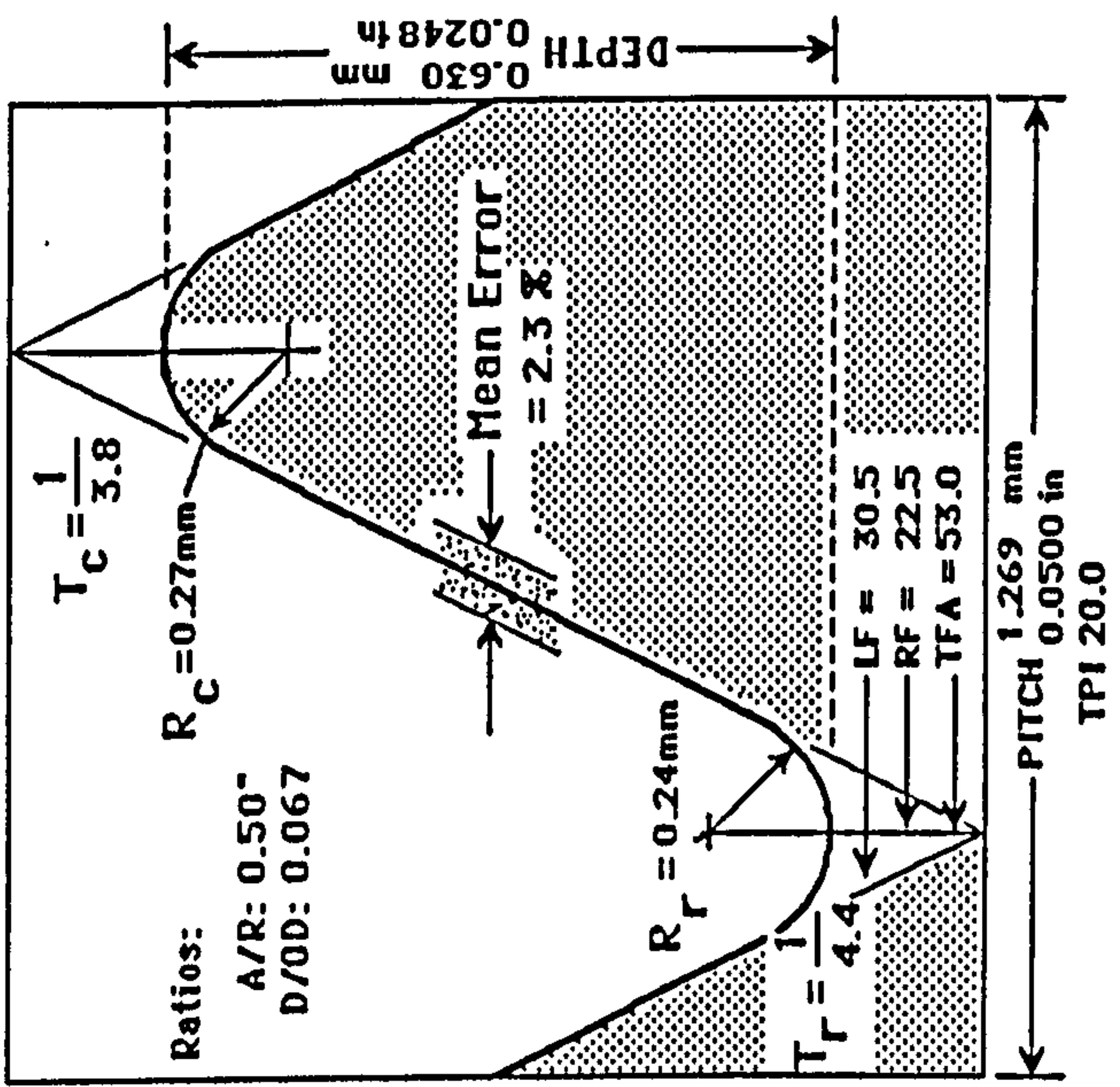
Study Code: MSTB-10

Instrument: 12" Comparator

Maker: Whitworth Comp.

Date: 1869

Ser./Acq. No.



Mu

Filar

Scale

Bench

Div. Eng.

Adjust.

Leveling

Focus

Eye P.

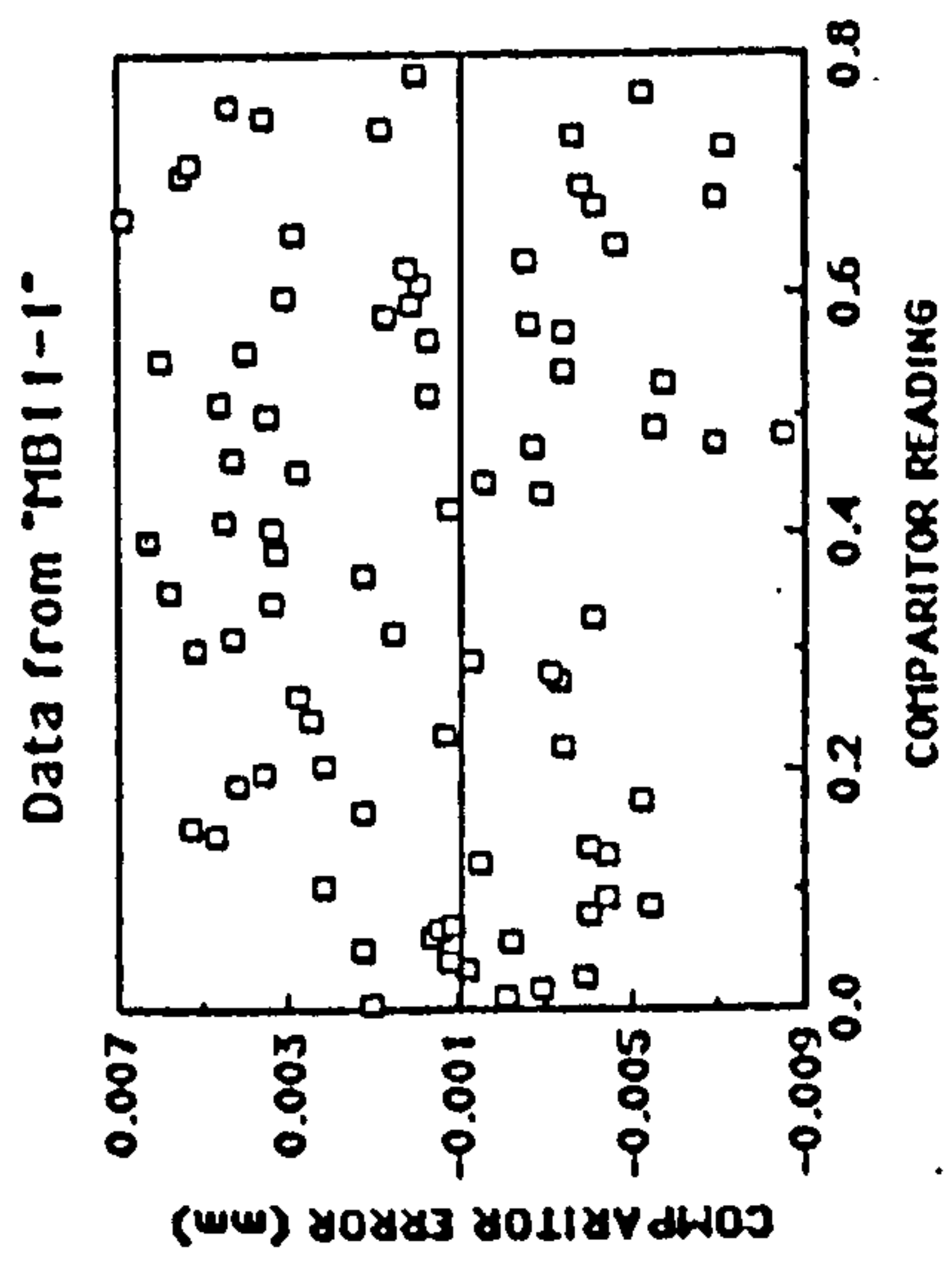
Tube

Tool

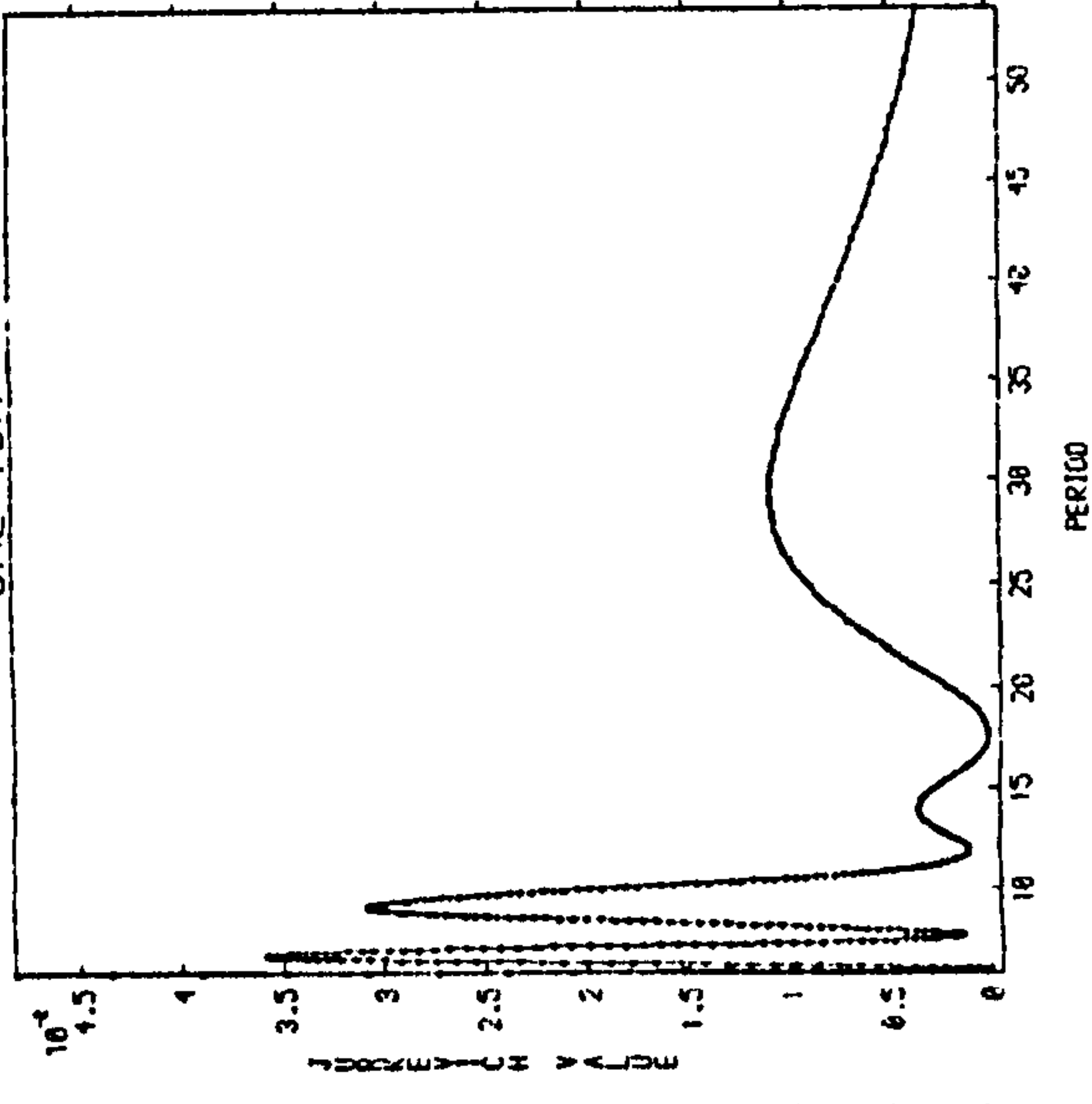
Gauge

Binding

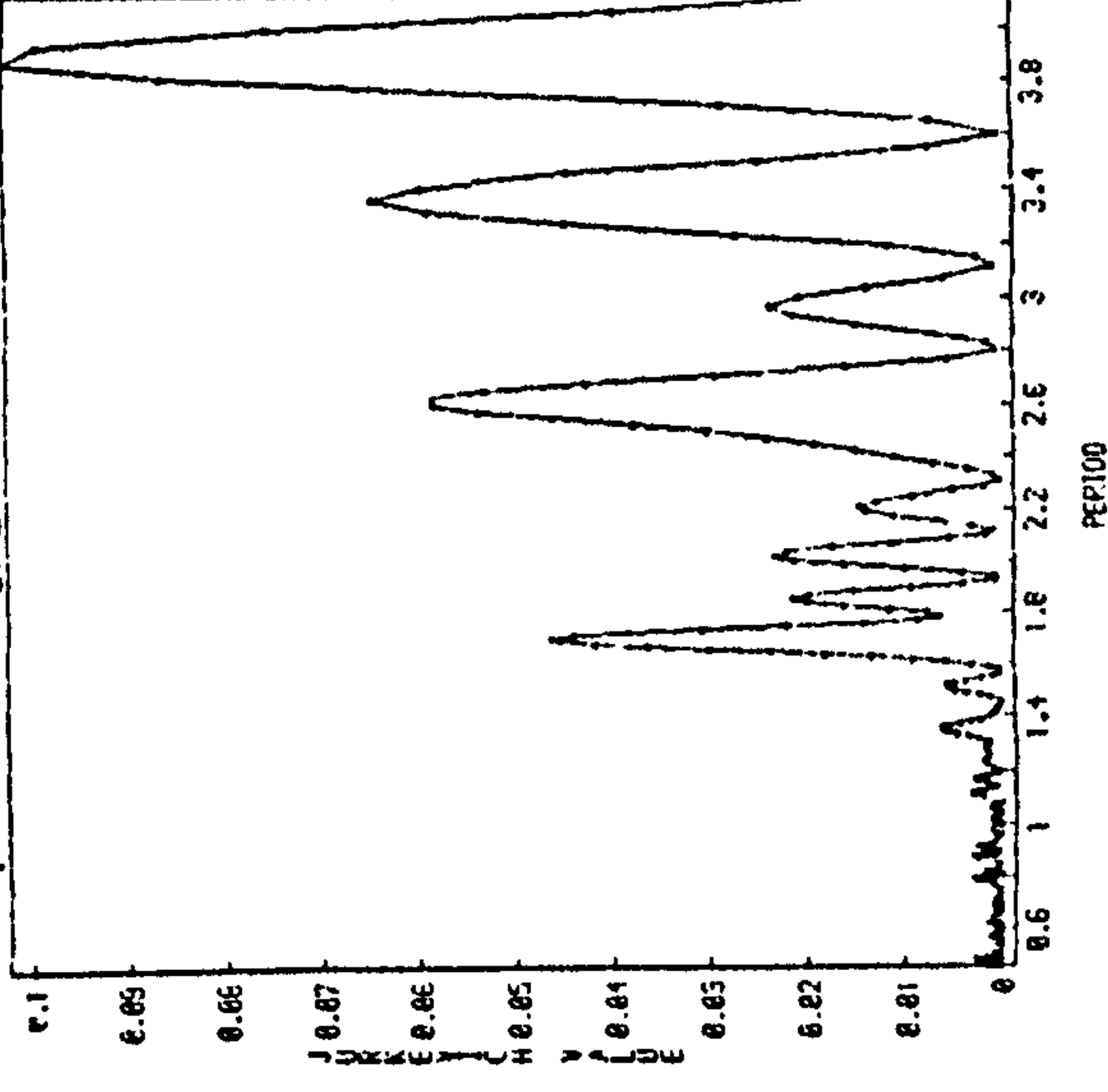
Misc.



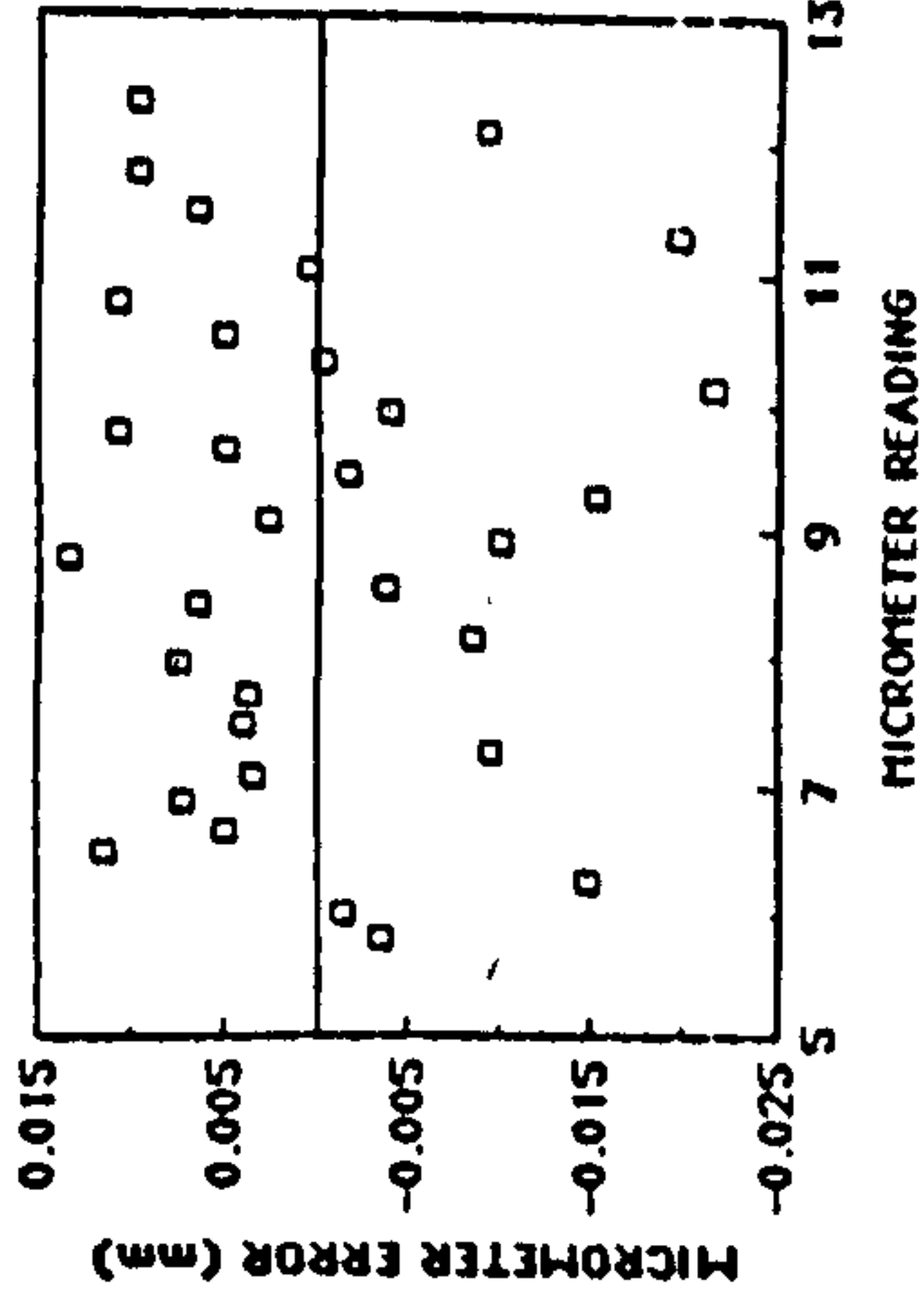
SML-19A



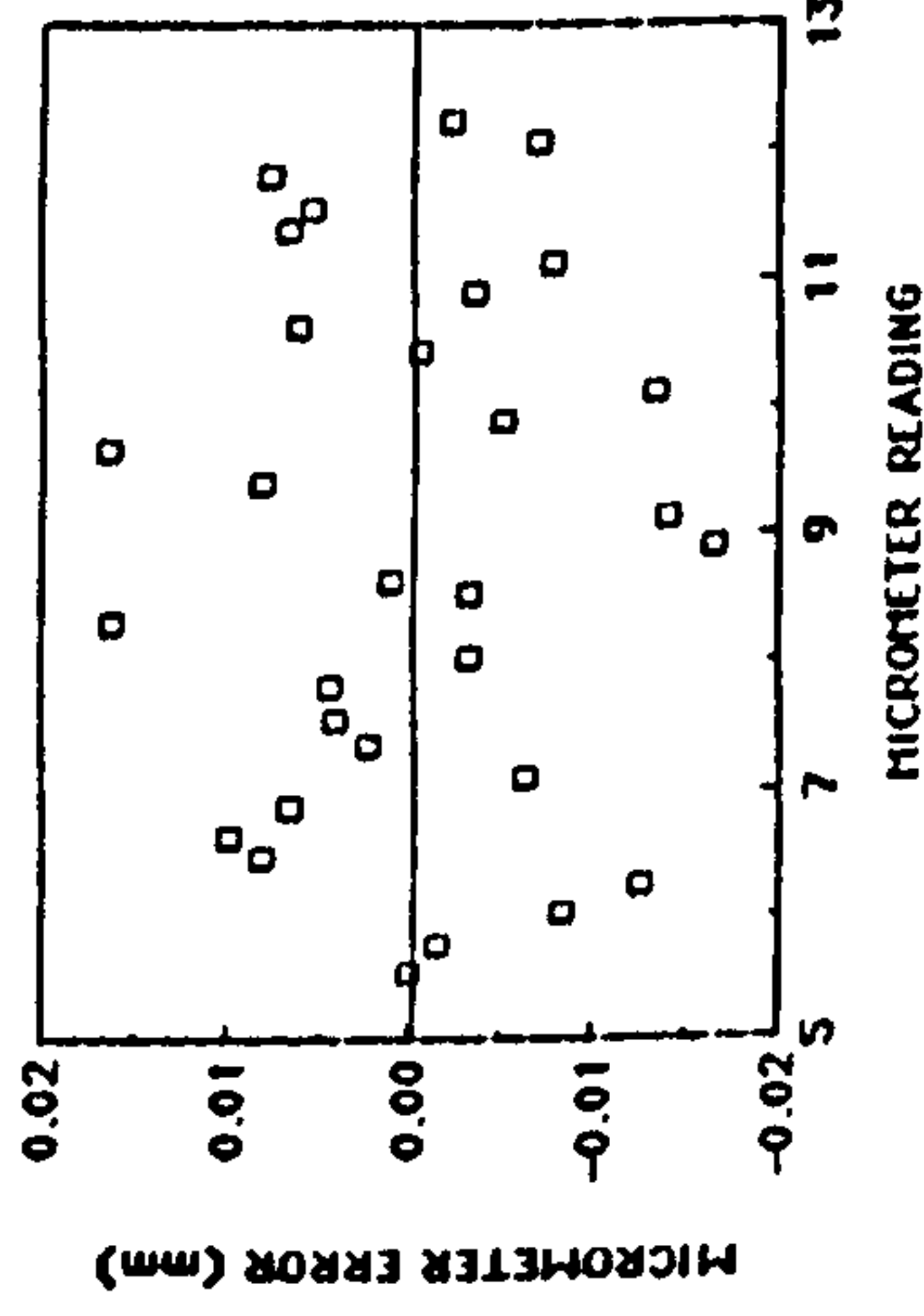
SML-19A



SML-19mm (run 1)



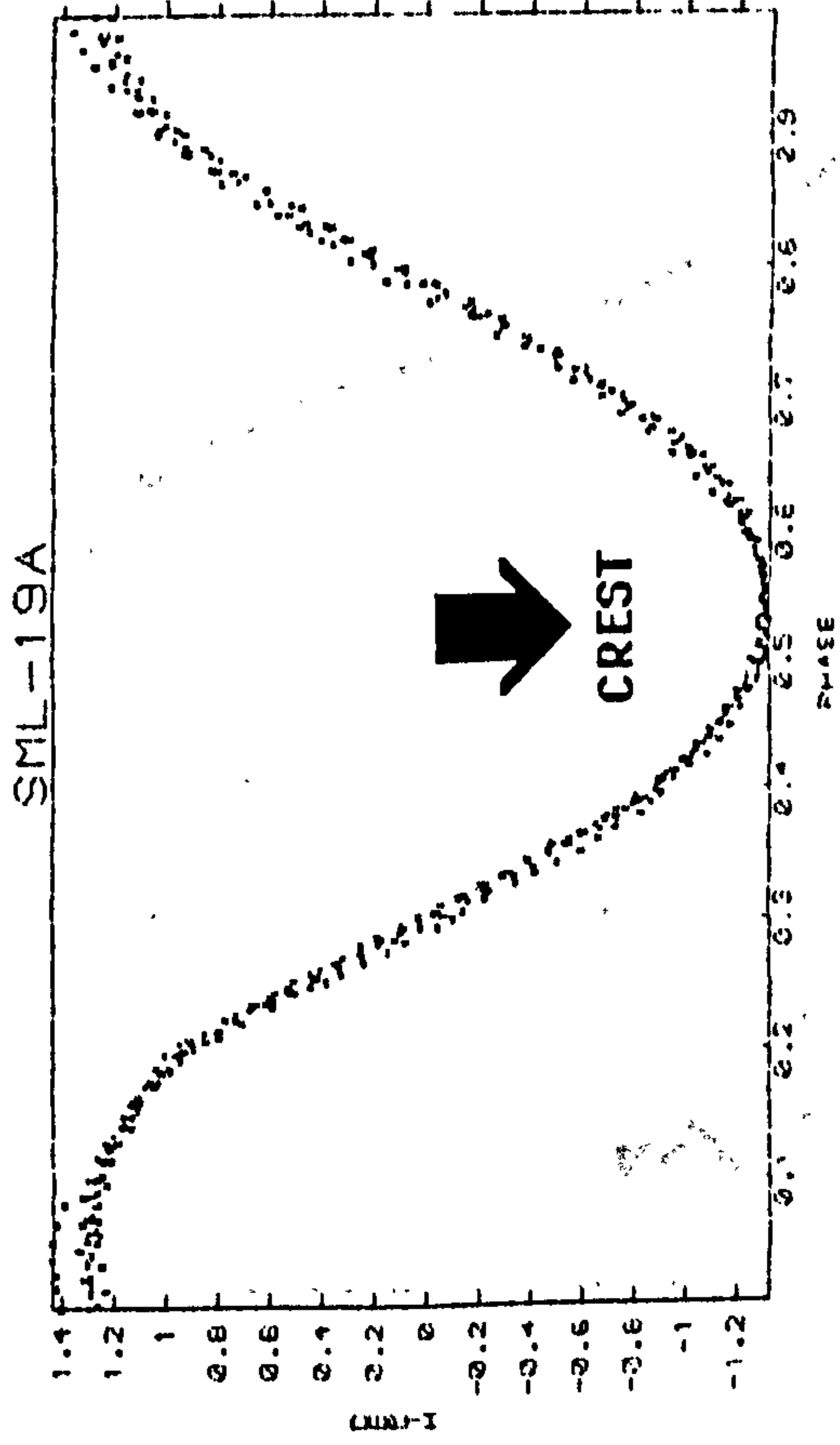
SML-19 (run 2)



PERIOD

PERIOD

MICROMETER READING



### Characteristics:

Screw ☒ Nut ☐

Leng: 1.50" / 1.063"

Diameter: 0.313"

Steel ☒ Brass ☐

Other: ☐

### Instrument Identification:

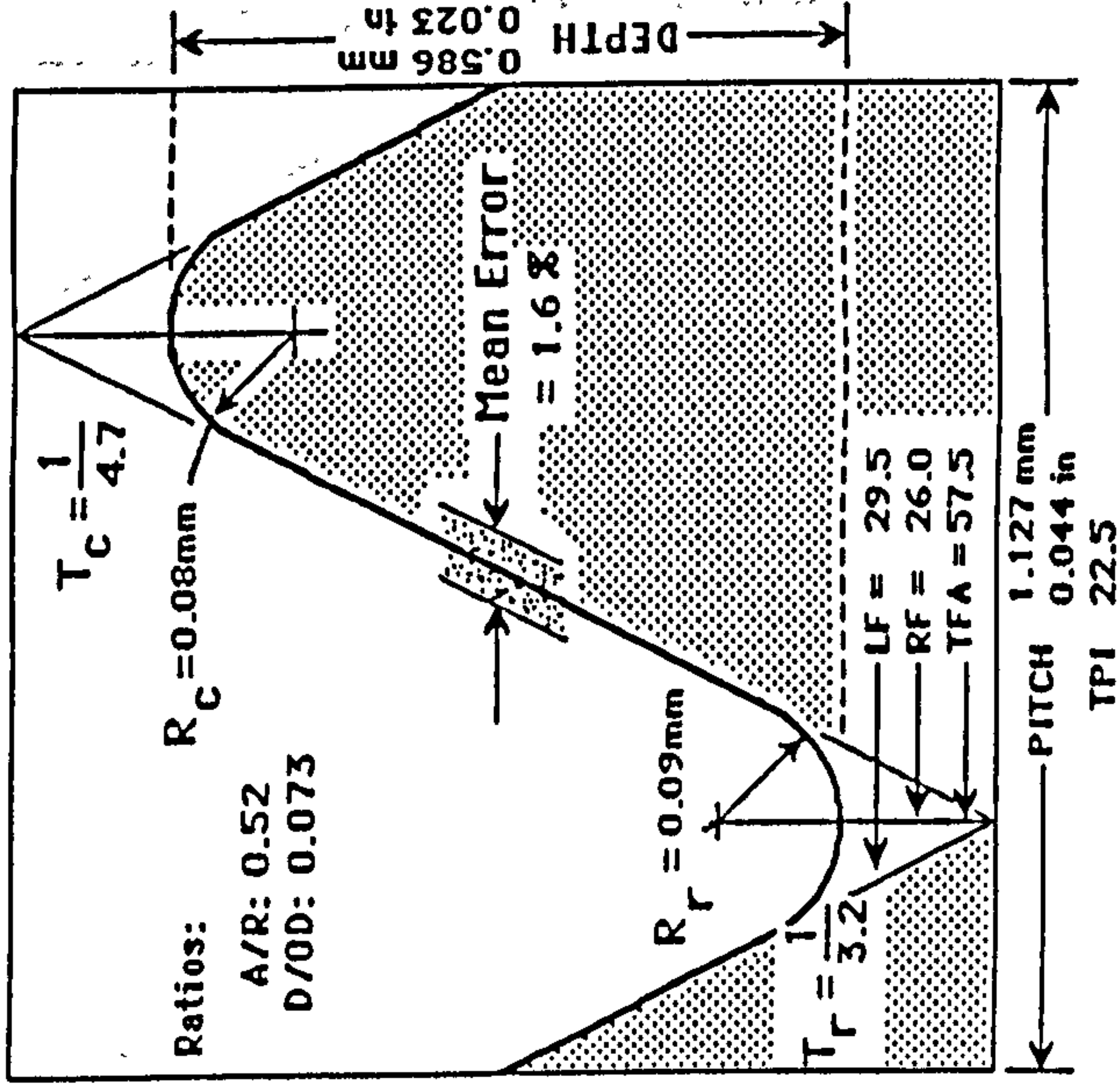
Study Code: SML-19a

Instrument: Micrometer

Maker: Siemens Bros.

Date: 1881

Ser./Acq. No. 1929-881; #152



Mu	Filar
	Scale
	Bench
	Div. Eng.
	Adjust.
	Leveling
	Focus
	Eye P.
	Tube
	Tool
	Gauge
	Binding
	Misc.



Characteristics:

Screw

Nut

Leng: 1.50" / 1.063"

Diameter: 0.344"

Steel

Brass

Other:

Instrument Identification:

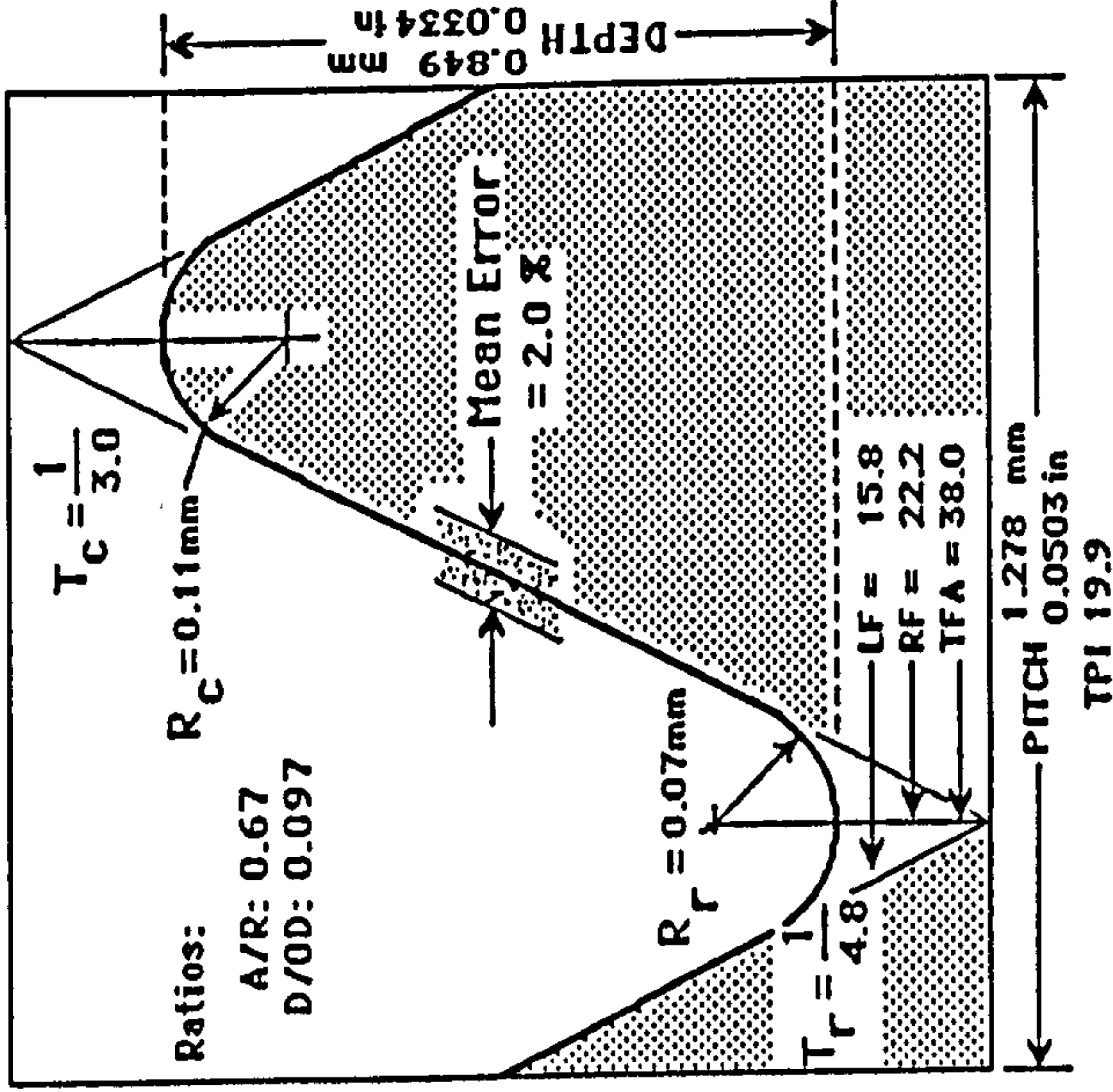
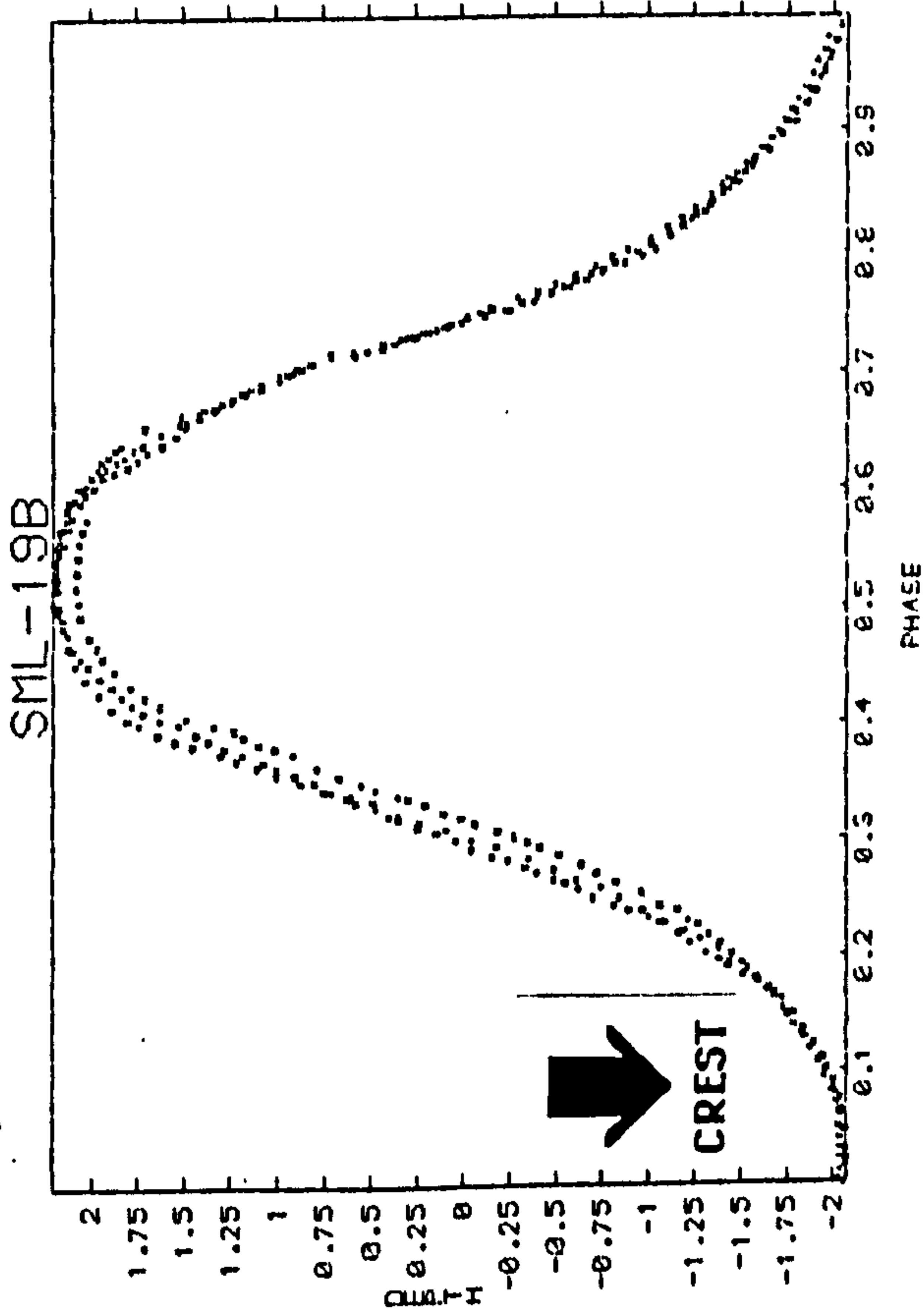
Study Code: SML-19b

Instrument: Micrometer

Maker: Siemens Bros.

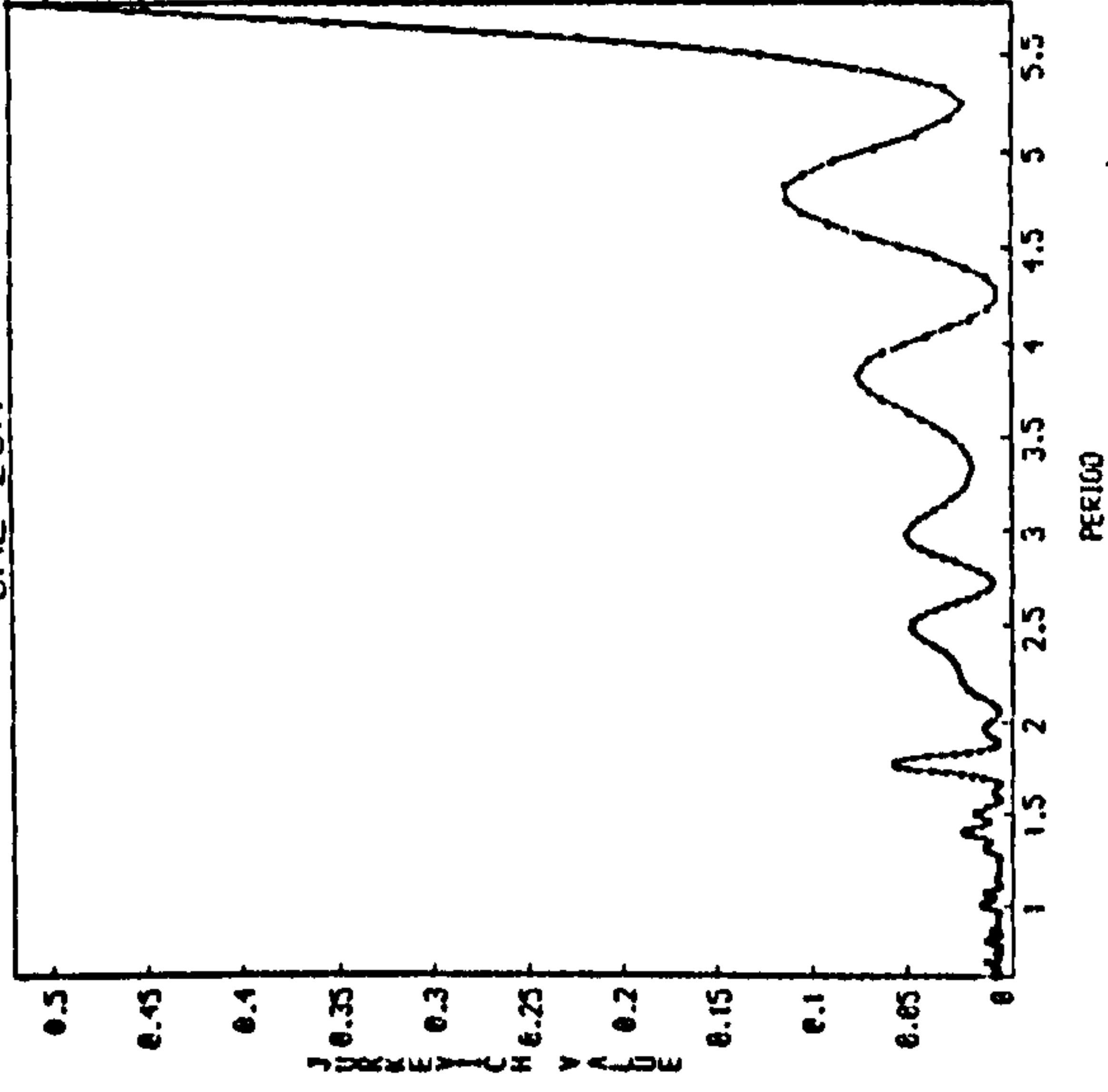
Date: 1881

Ser./Acq. No. 1929-881; #152

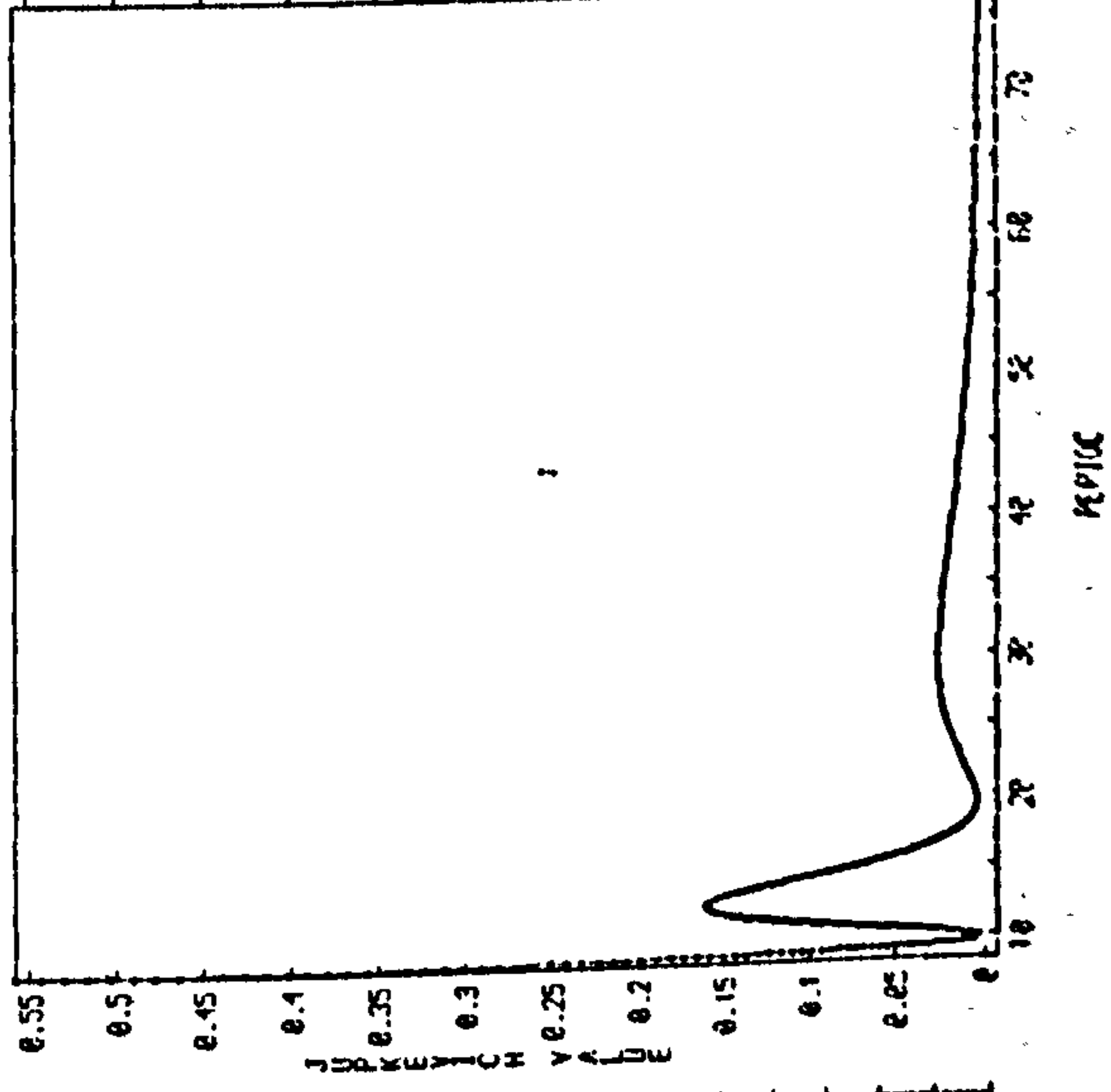
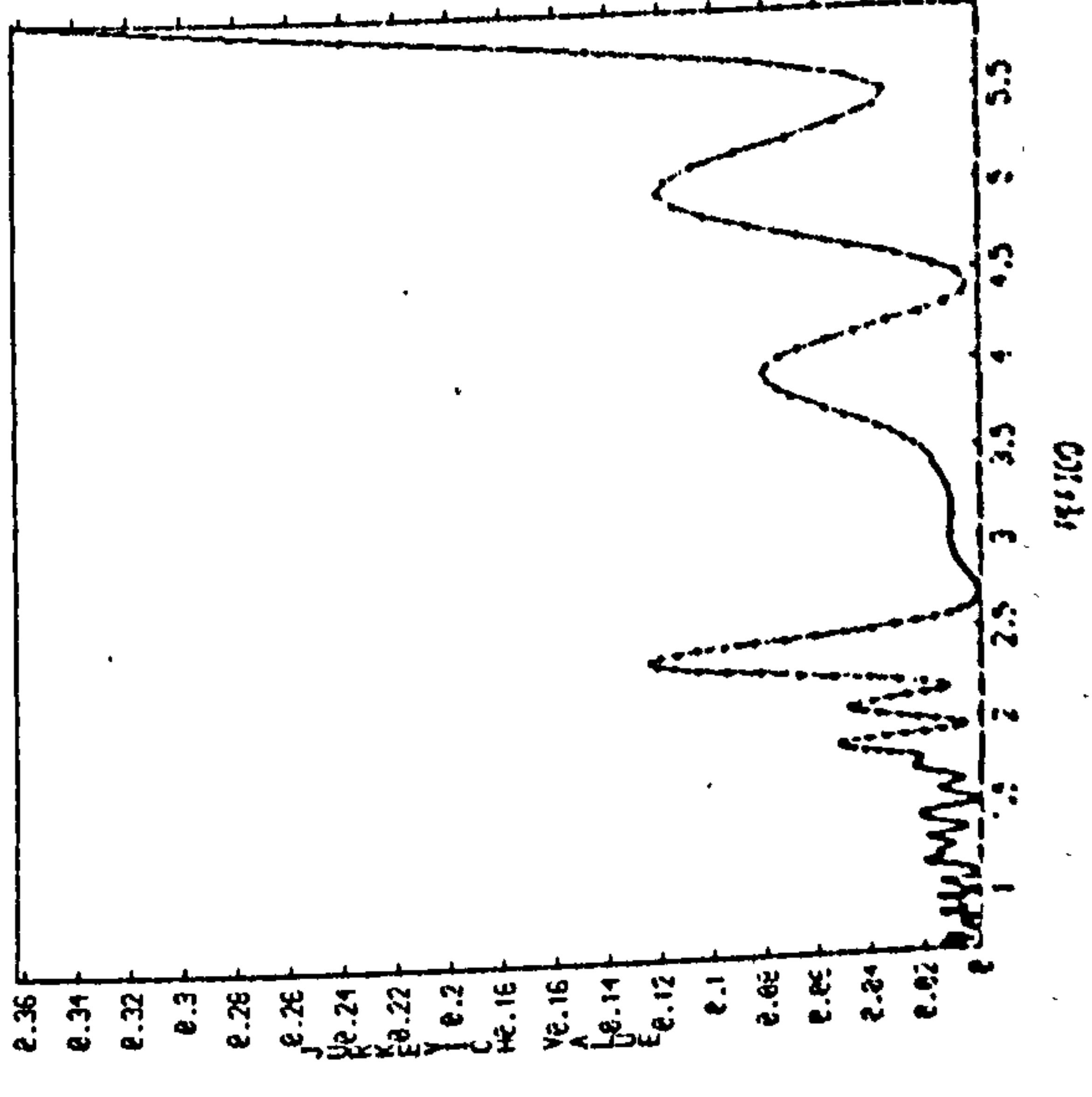
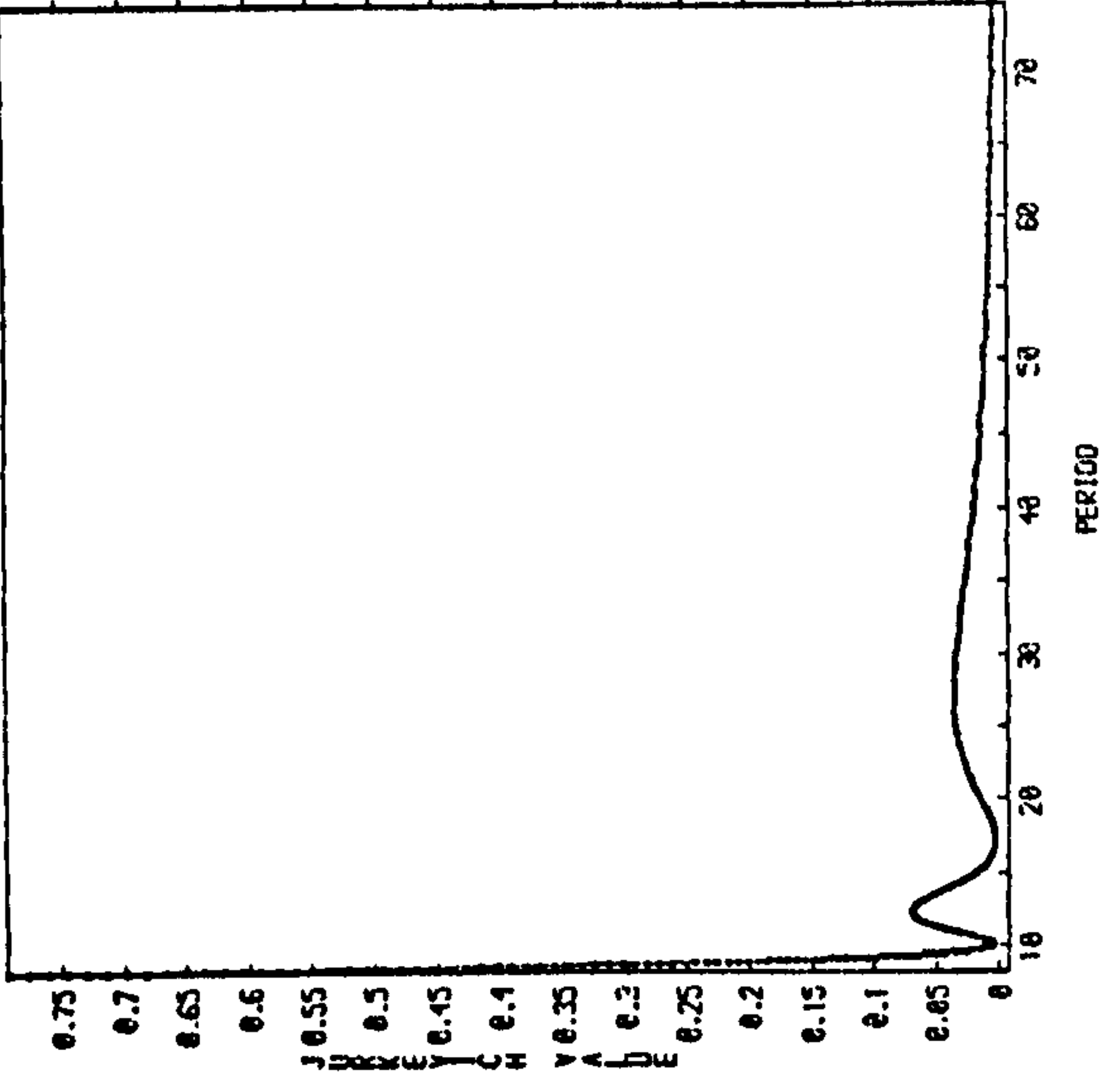


Mu	Filar
	Scale
	Bench
	Div. Eng.
	Adjust.
	Leveling
	Focus
	Eye P.
	Tube
	Tool
	Gauge
	Binding
	Misc.

SML-20A



SML-20A



Characteristics:

Screw

Nut

Leng: 2.50" / 0.75"

Diameter: 0.375"

Steel

Brass

Other:

Instrument Identification:

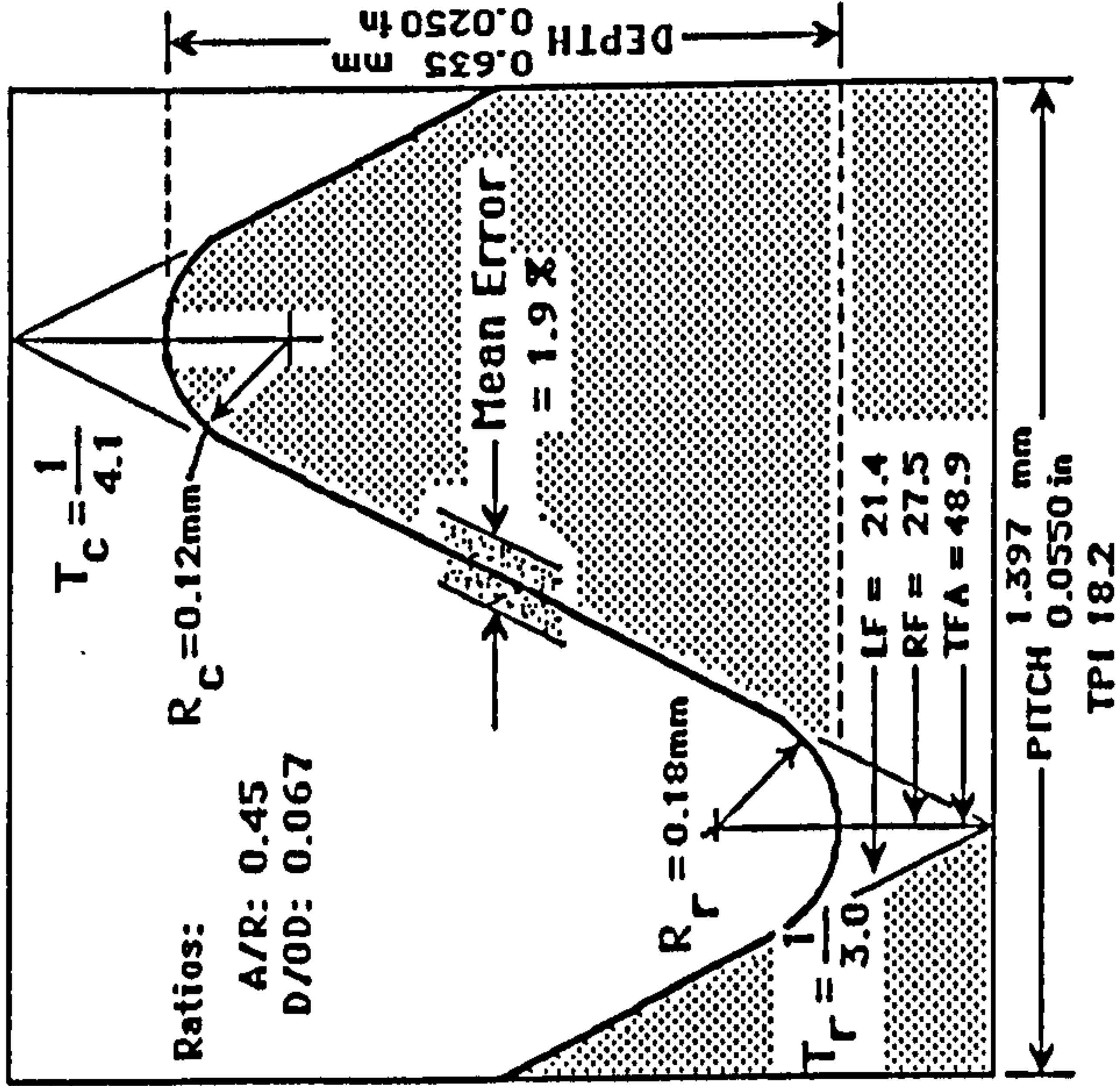
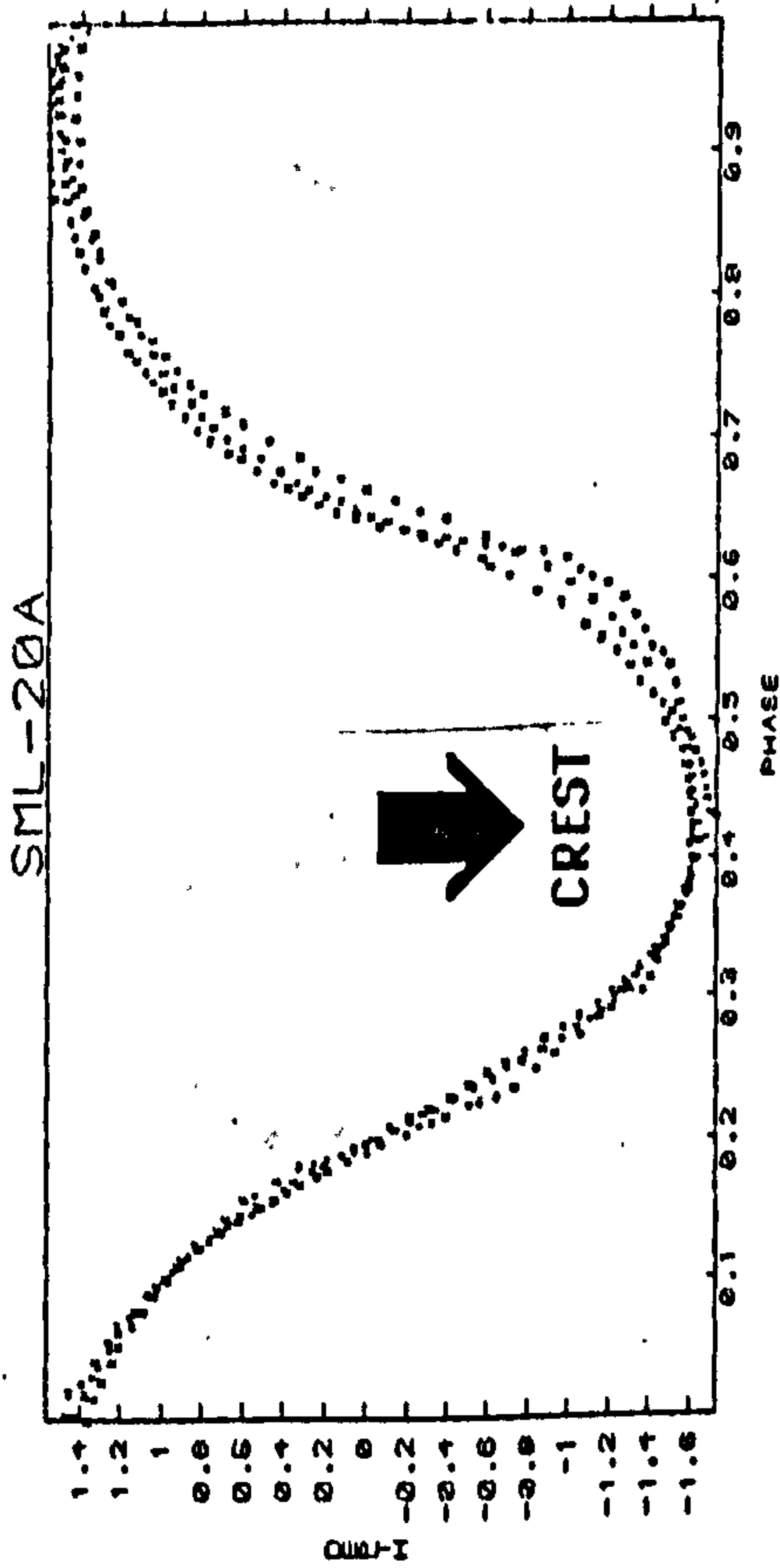
Study Code: SML-20a

Instrument: Micrometer

Maker: James Watt

Date: ca.1770

Ser./Acq. No. 1876-1370



Mu

Filar

Scale

Bench

Div. Eng.

Adjust.

Leveling

Focus

Eye P.

Tube

Tool

Gauge

Binding

Misc.

Characteristics:

Screw

☐

Nut

☒

Leng: 2.50" / 0.75"

Diameter: 0.375"

Steel

☒

Brass

☐

Other:

Instrument Identification:

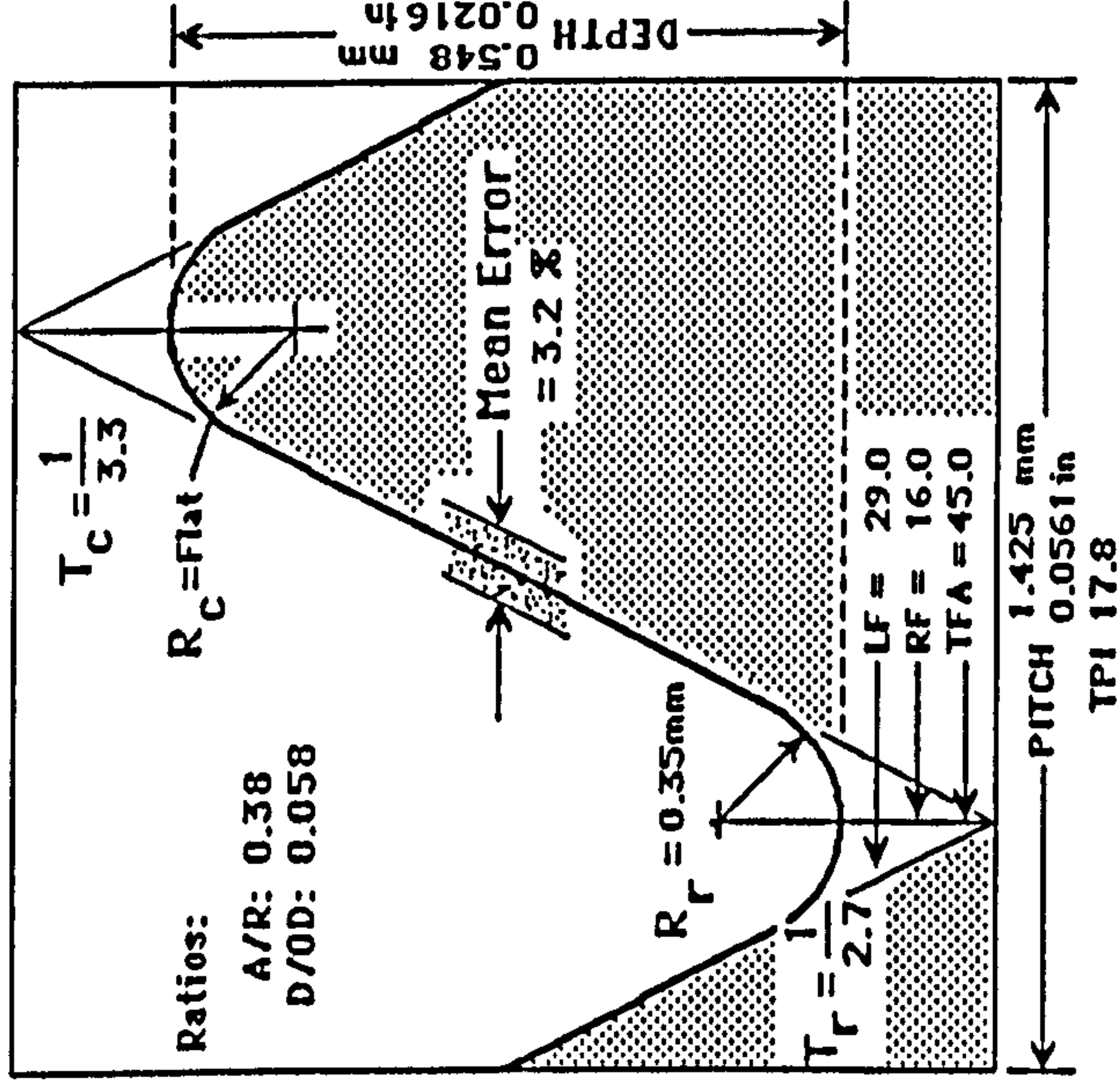
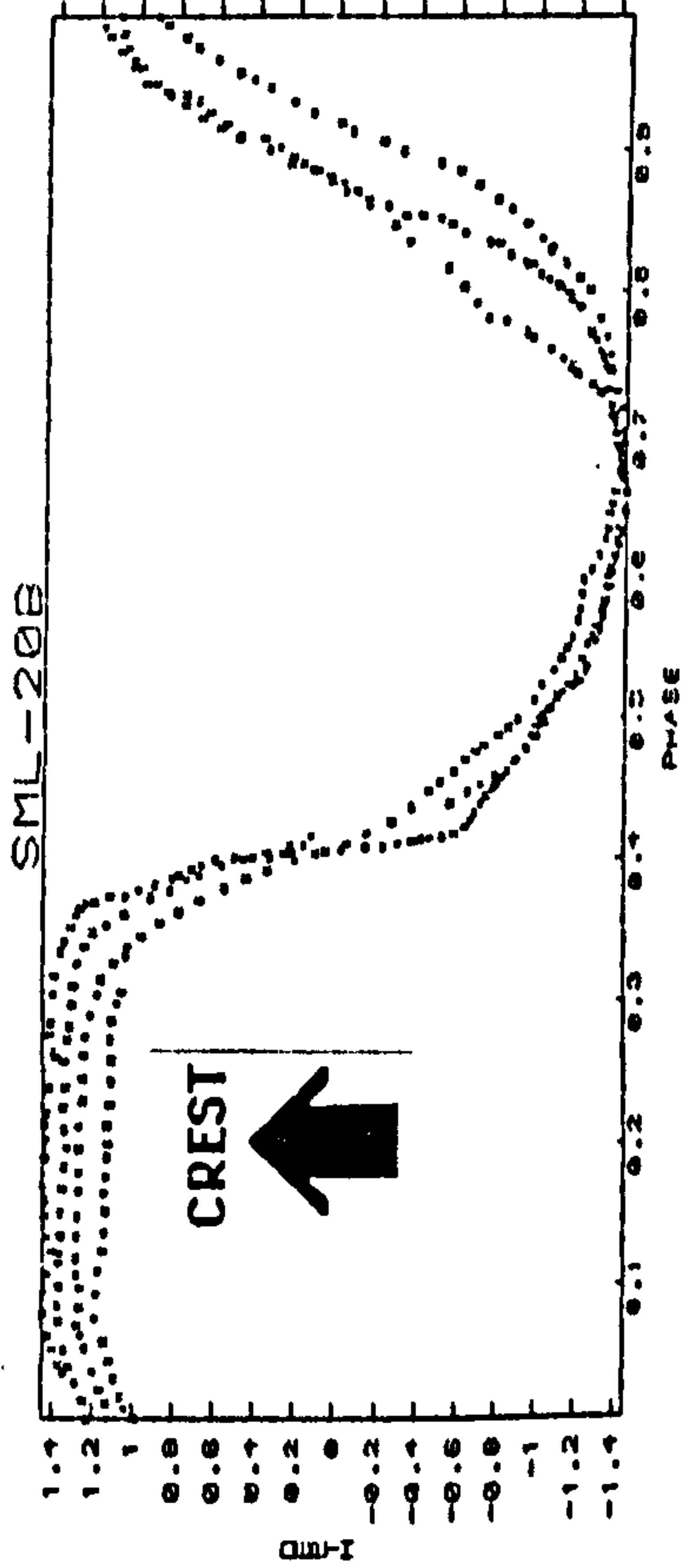
Study Code: SML-20b

Instrument: Micrometer

Maker: James Watt

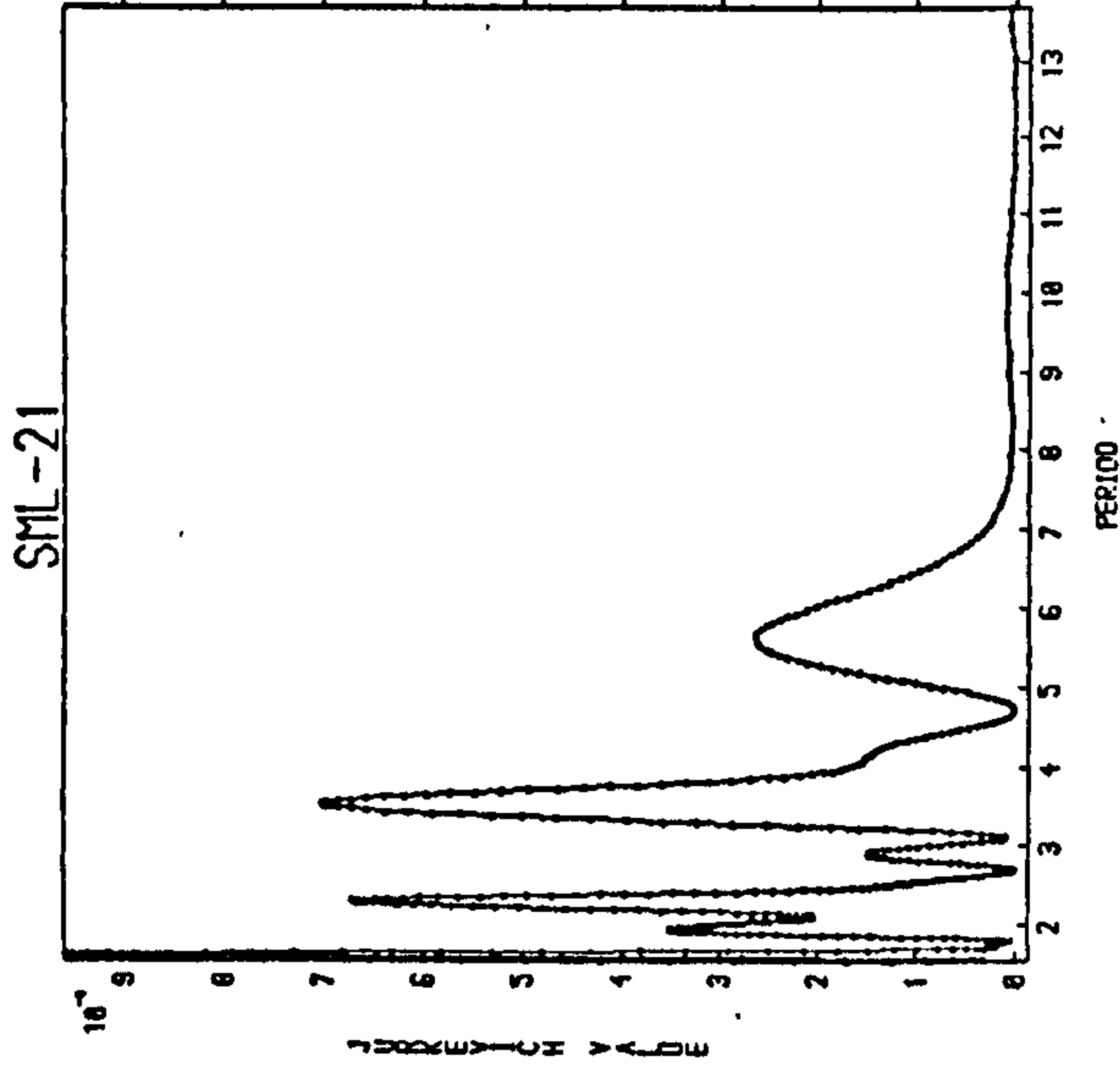
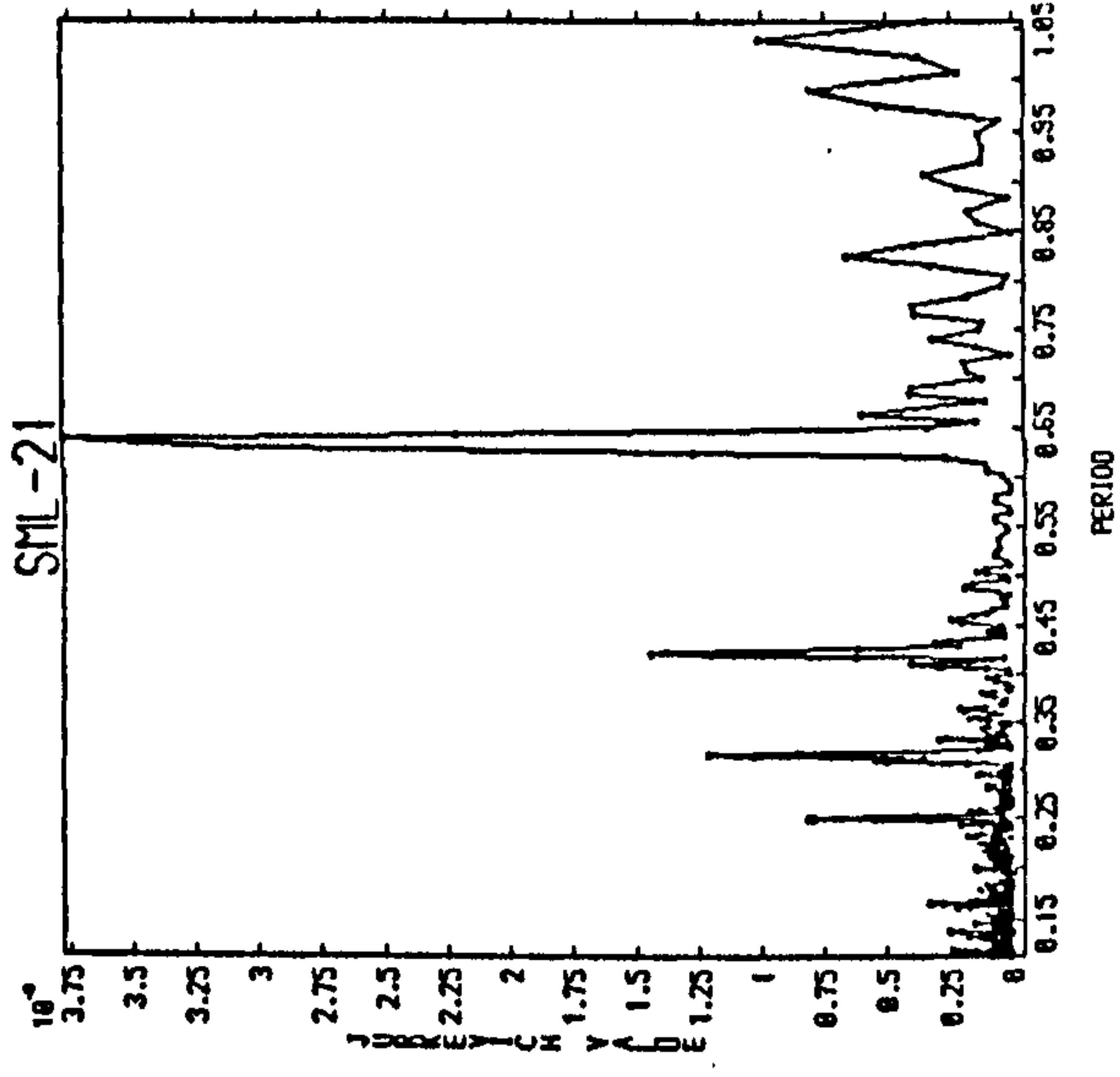
Date: ca.1770

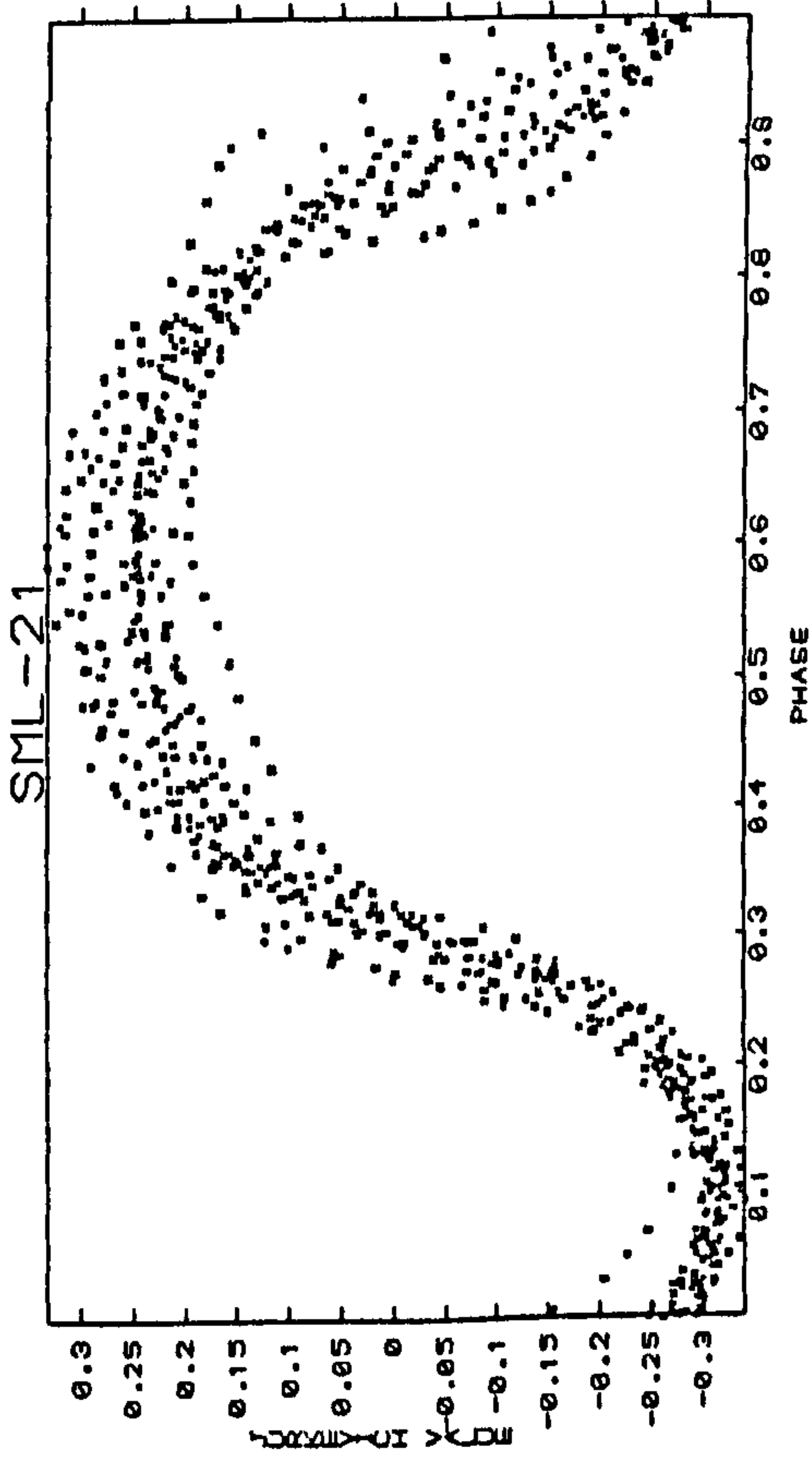
Ser./Acq. No. 1876-1370



Mu	Filar
	Scale
	Bench
	Div. Eng.
	Adjust.
	Leveling
	Focus
	Eye P.
	Tube
	Tool
	Gauge
	Binding
	Misc.







Characteristics:

Screw ☒ Nut ☐

Leng: 3.75"

Diameter: 0.156"

Steel ☒ Brass ☐

Other:

Instrument Identification:

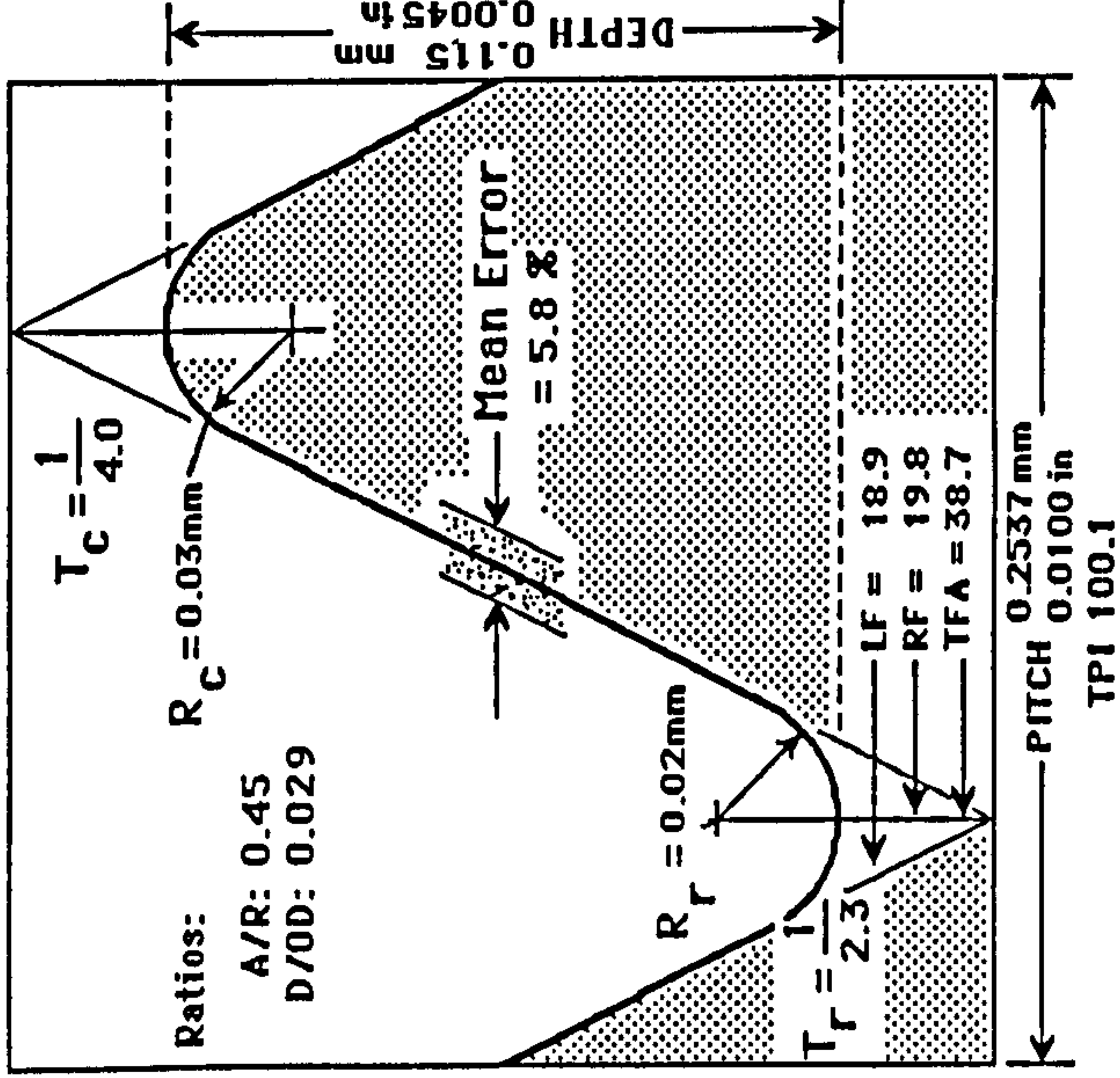
Study Code: SML-21

Instrument: Micrometer

Maker: Henry Maudslay

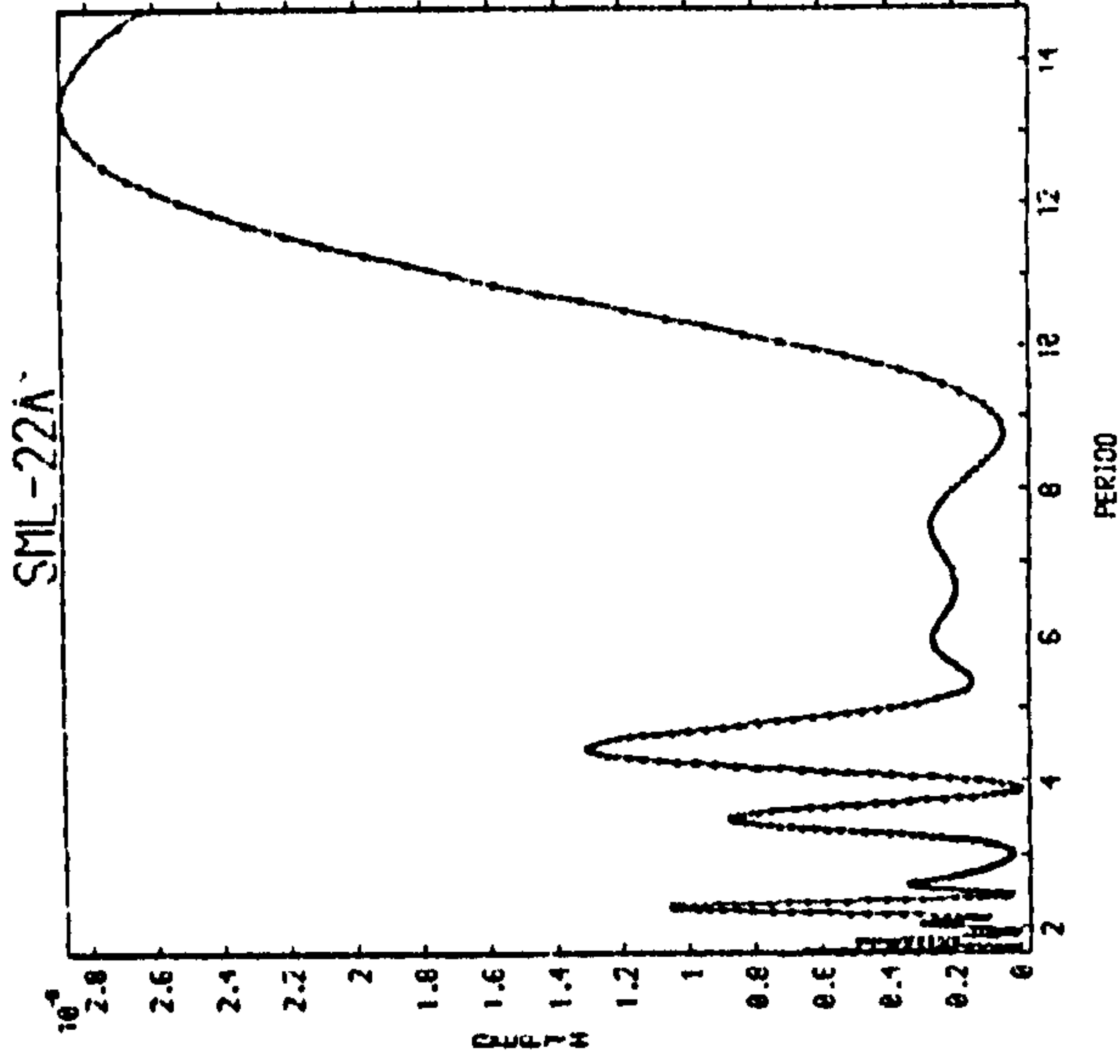
Date: <1800

Ser./Acq. No. 1900-75

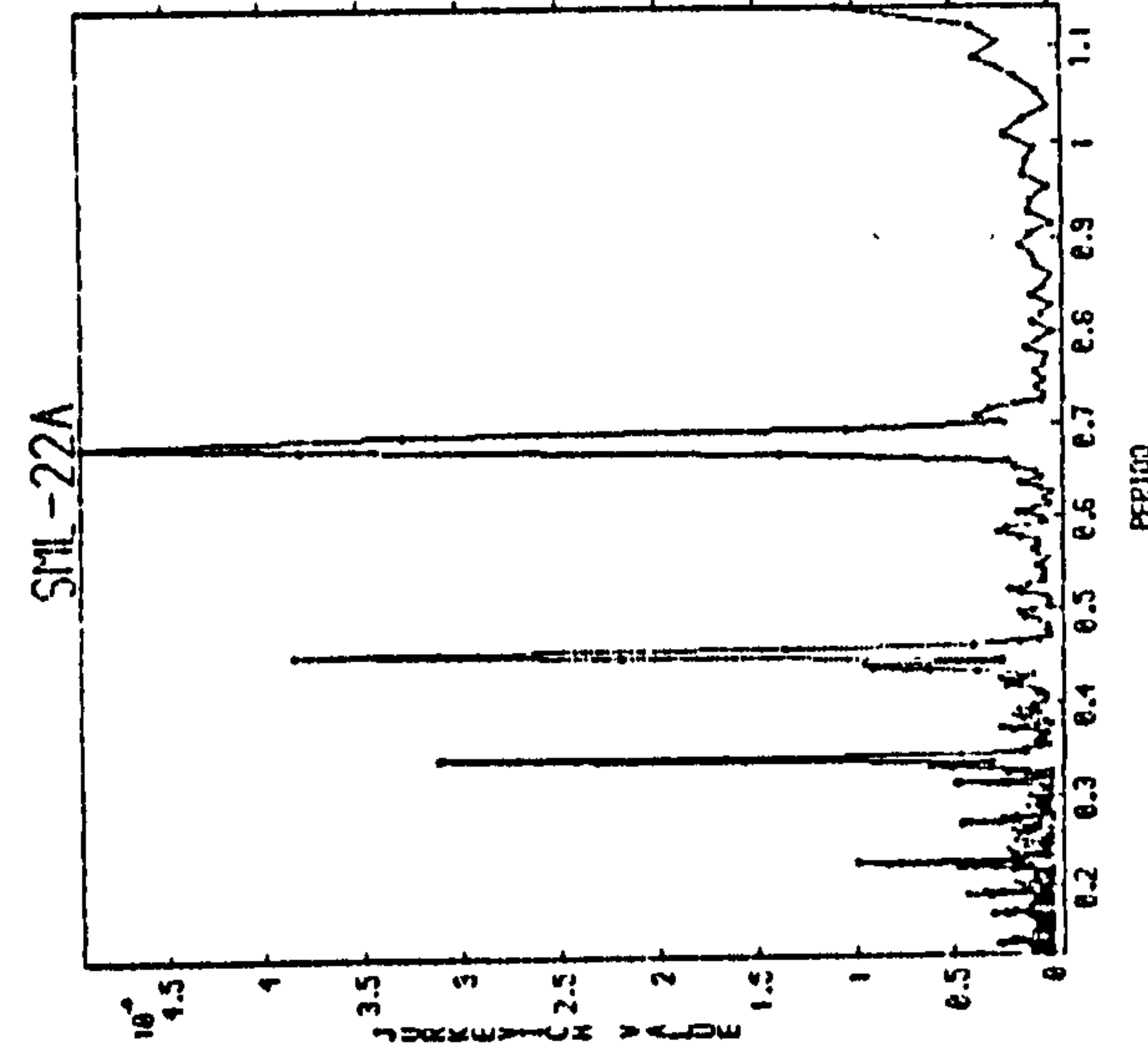


MU	—	Filar
		Scale
—	—	Bench
		Div. Eng.
—	—	Adjust.
		Leveling
—	—	Focus
		Eye P.
—	—	Tube
		Tool
—	—	Gauge
		Binding
—	—	Misc.

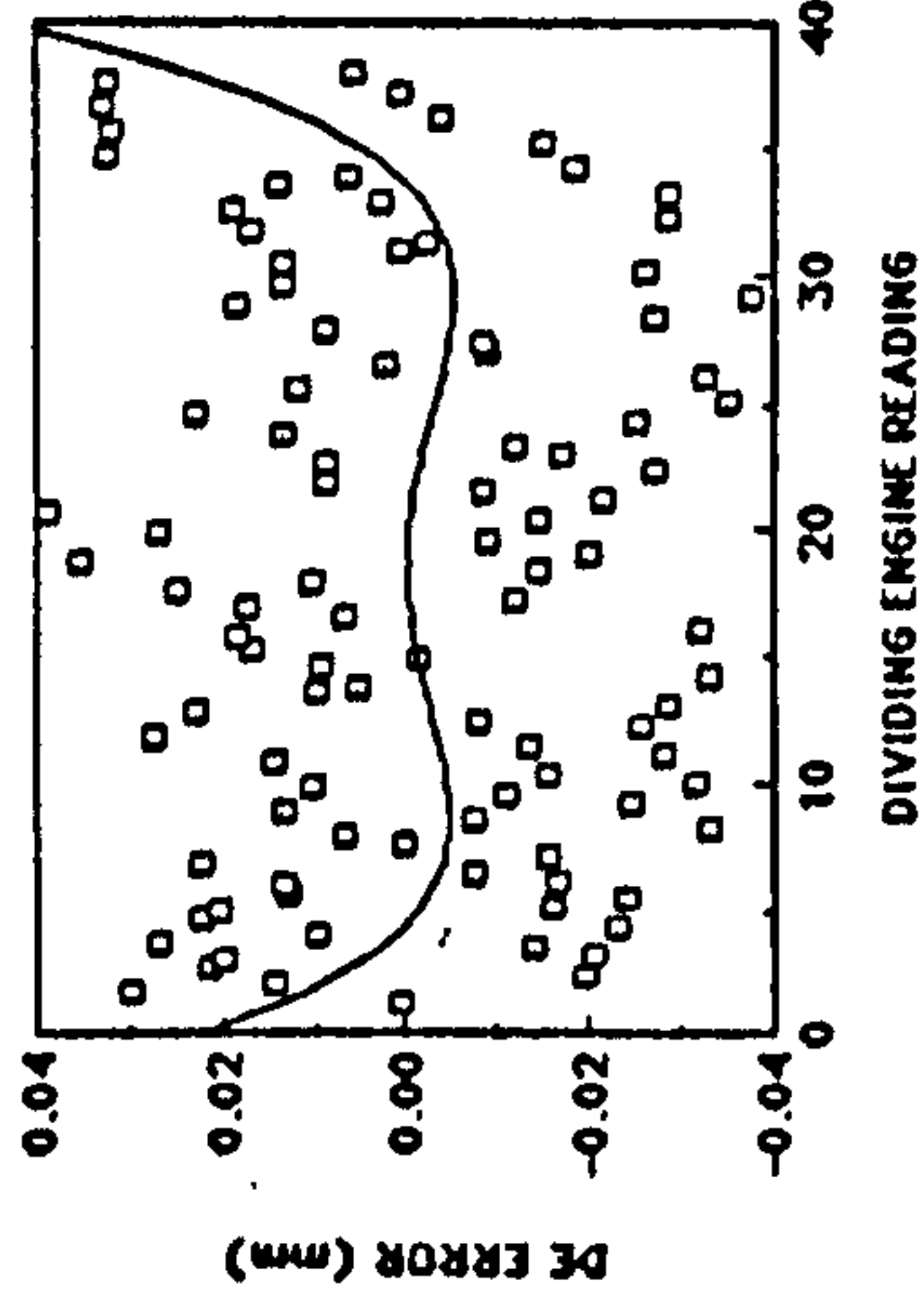
SML-22A



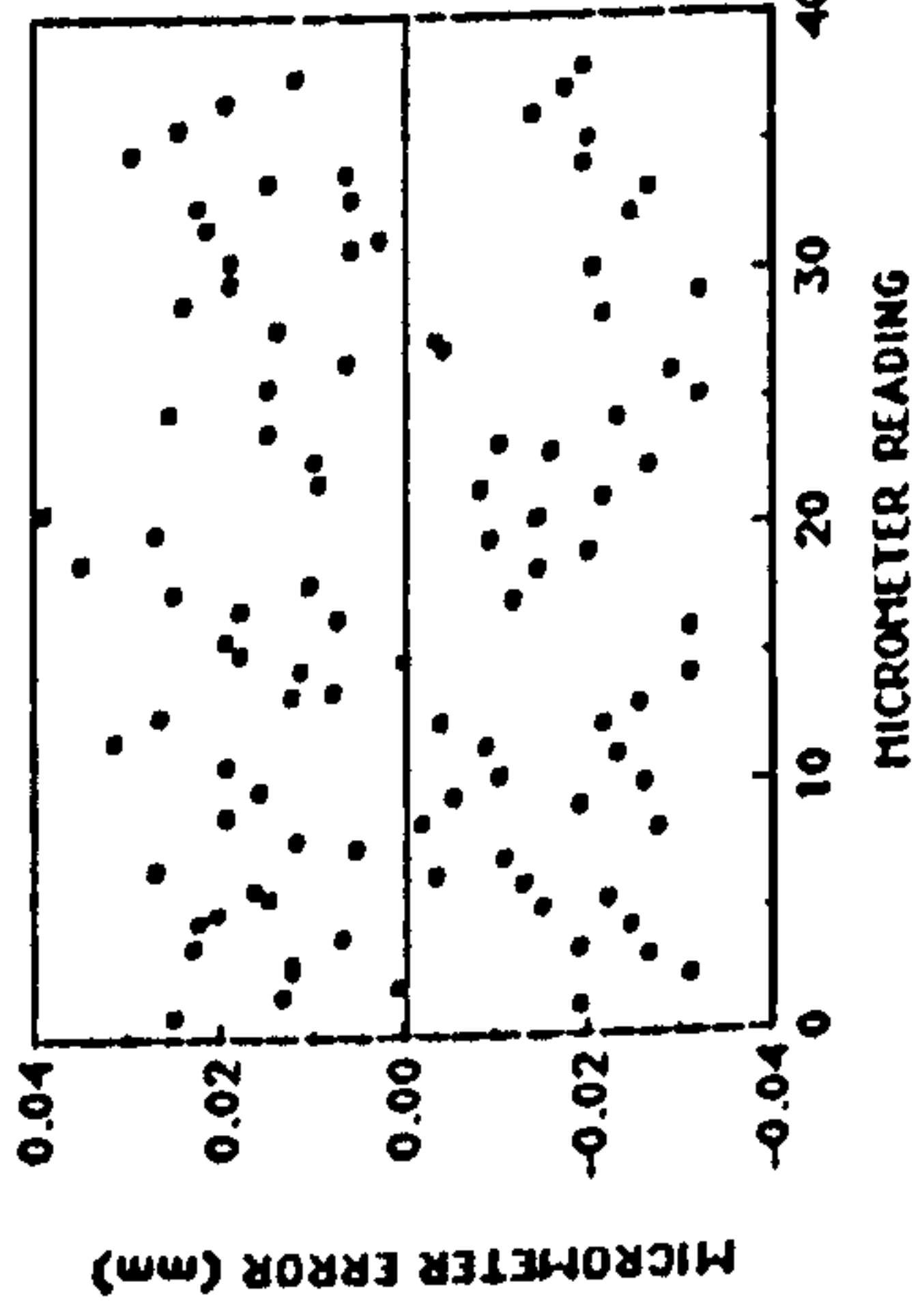
SML-22A



SML-22



SML-22 (4dp)



PERIOD

PERIOD

DIVIDING ENGINE READING

MICROMETER READING

PERIOD

PERIOD

Characteristics:

Screw

Nut

Leng: 1.875" / ~0.25"

Diameter: 0.984"

Steel

Brass

Other:

Instrument Identification:

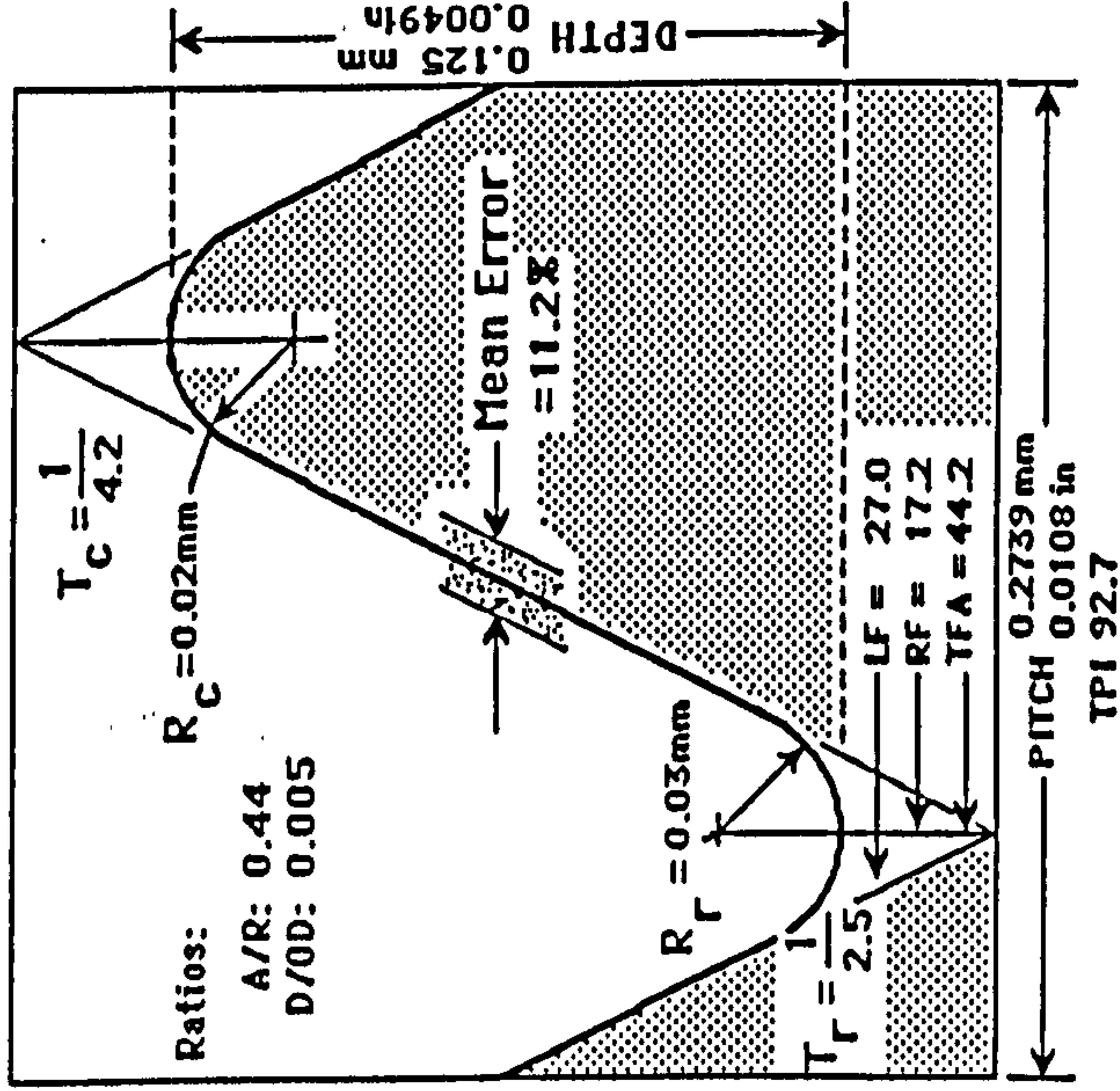
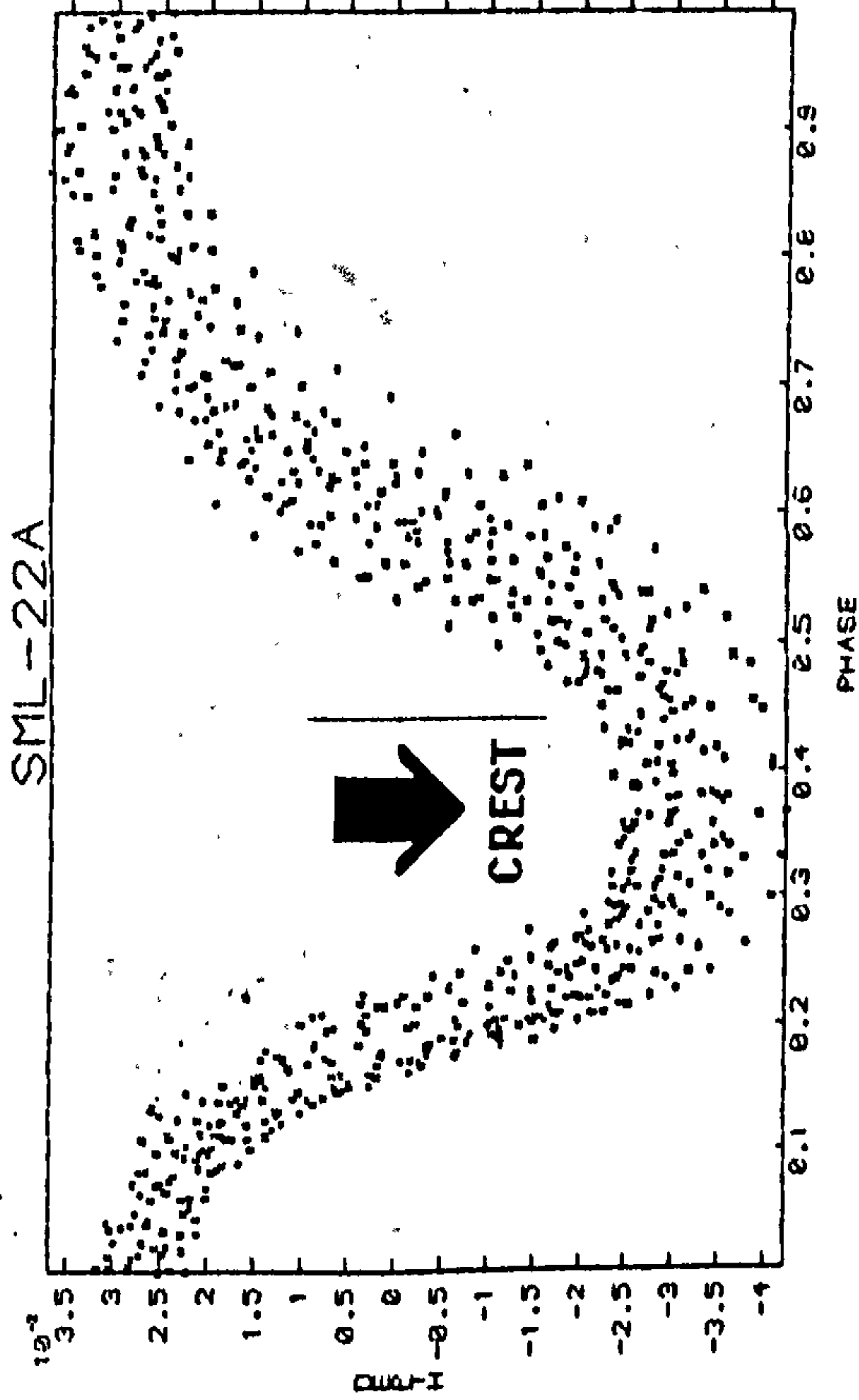
Study Code: SML-22a

Instrument: "Atometer"

Maker: John Barton

Date: 1806

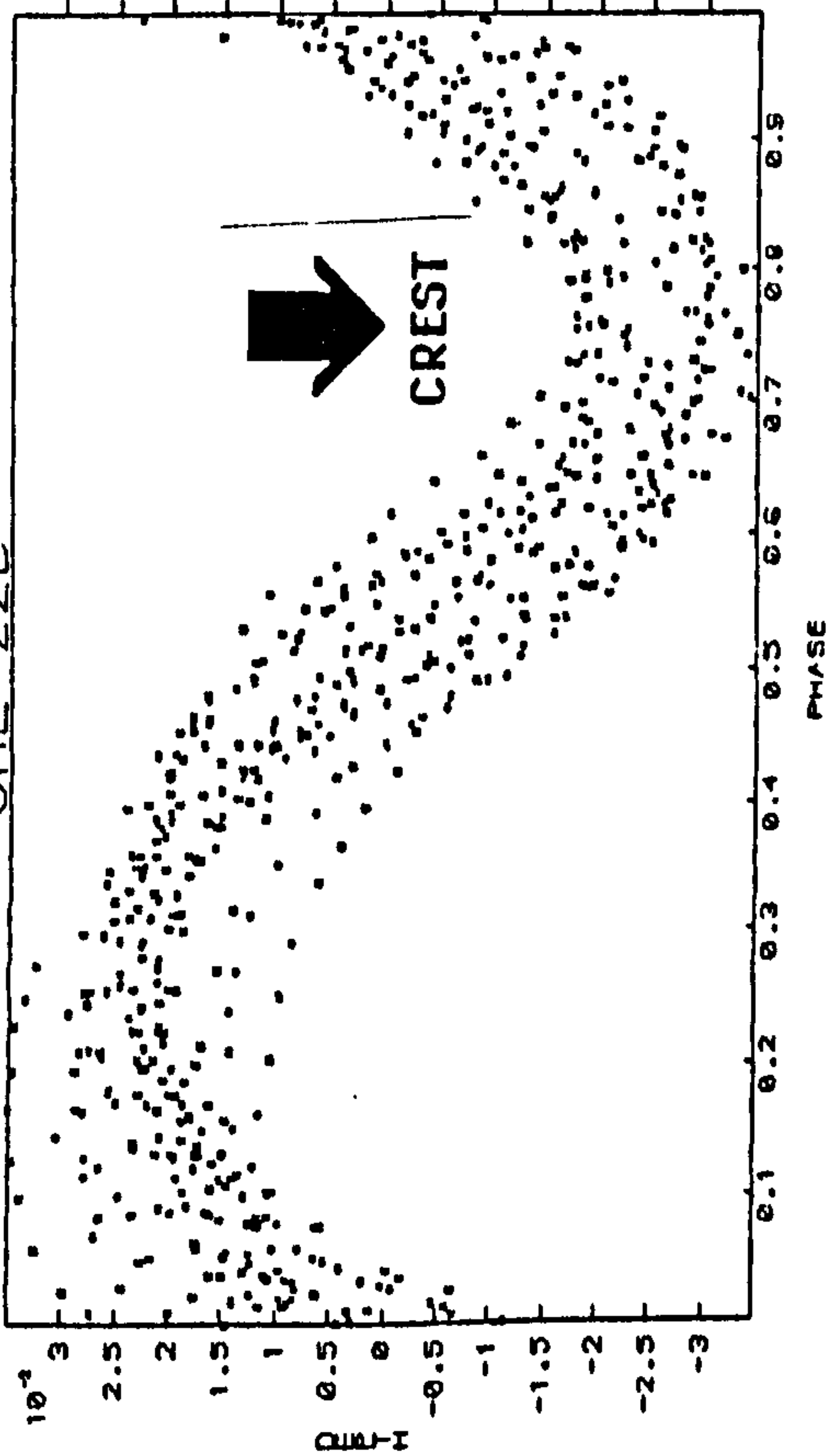
Ser./Acq. No. 1928-719



Mu	Filar
	Scale
	Bench
	Div. Eng.
	Adjust.
	Leveling
	Focus
	Eye P.
	Tube
	Tool
	Gauge
	Binding
	Misc.



SML-22B



Characteristics:

Screw ☒ Nut ☐

Leng: 1.875" / ~0.25"

Diameter: 0.984"

Steel ☐ Brass ☒

Other:

Instrument Identification:

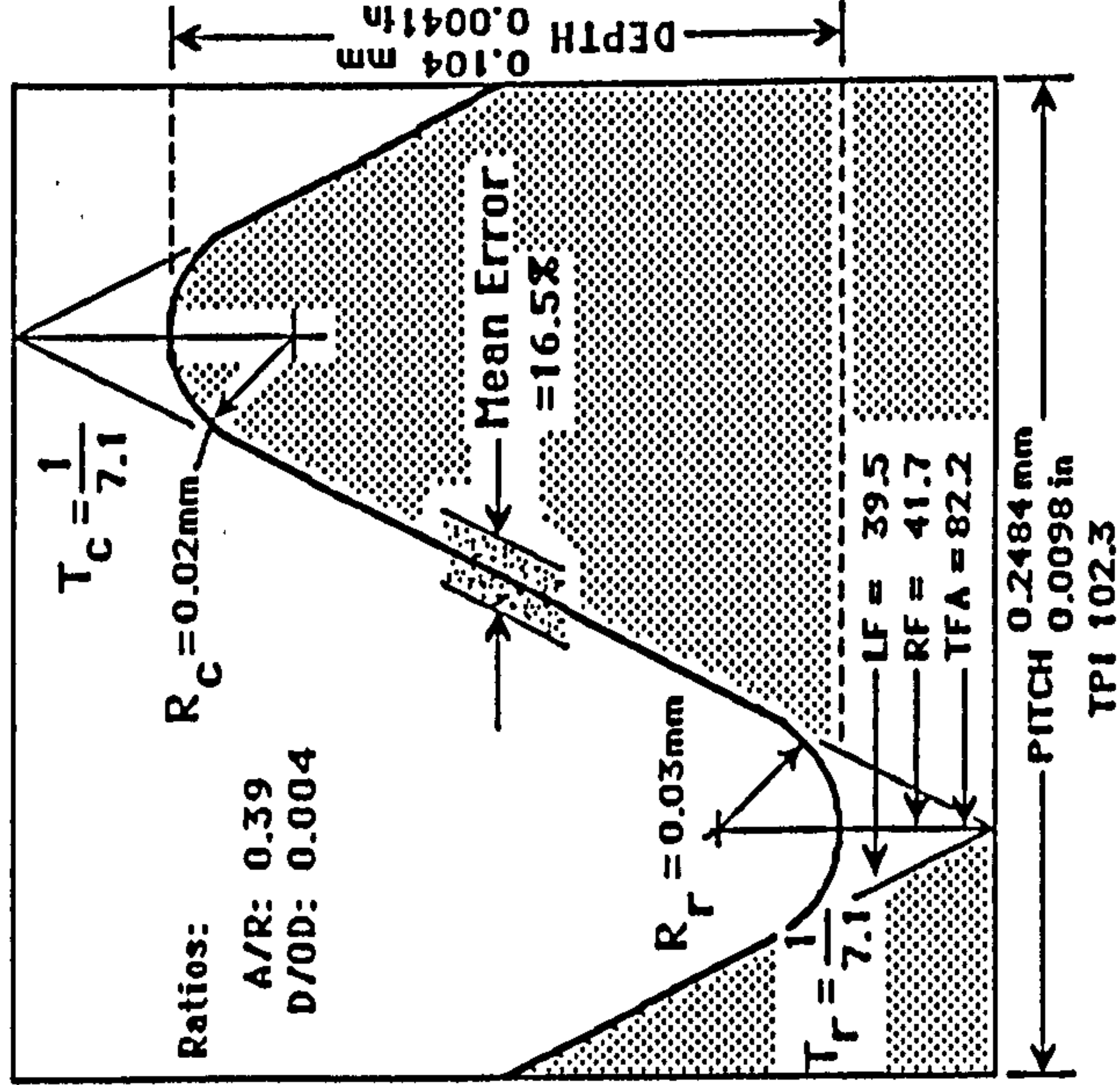
Study Code: SML-22b

Instrument: "Atometer"

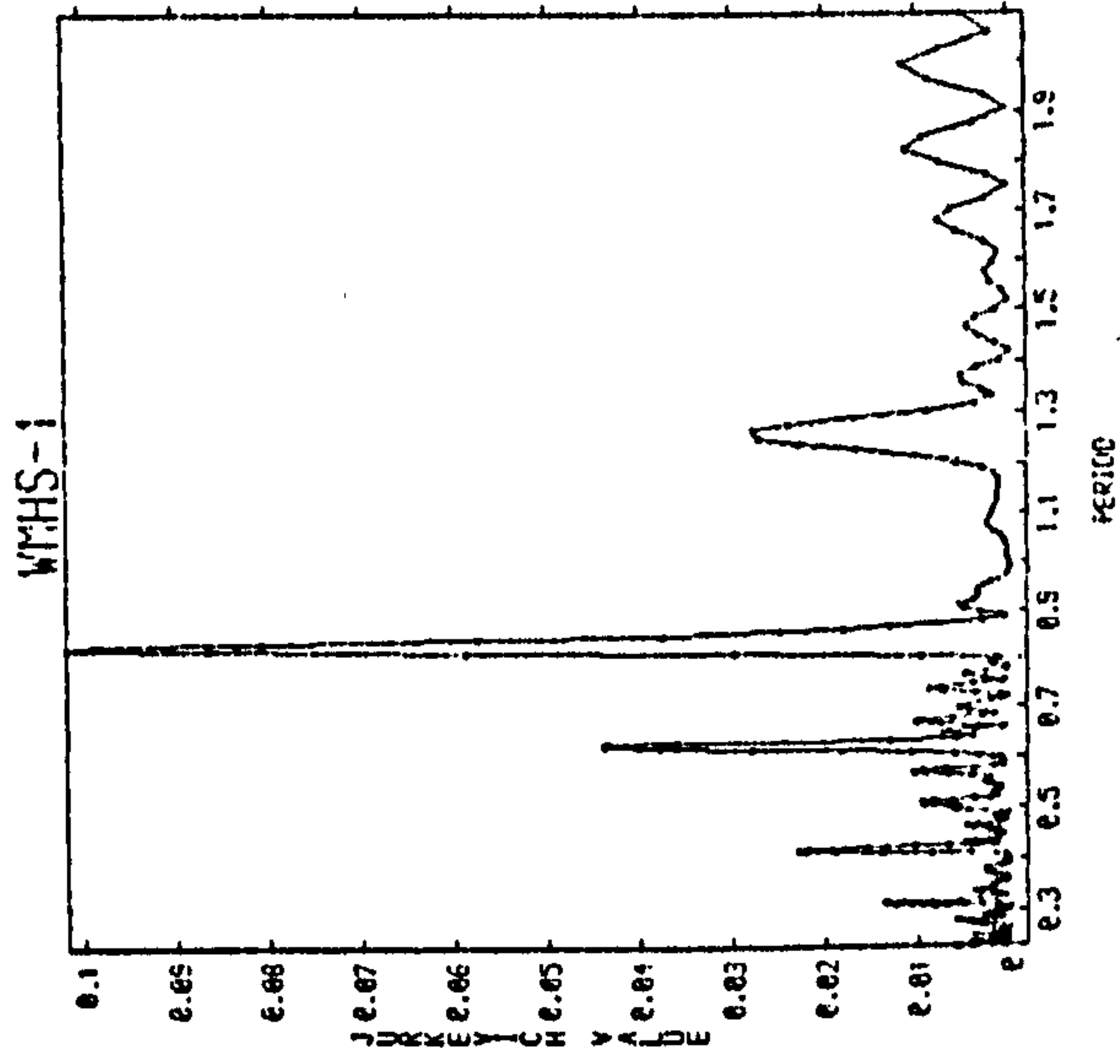
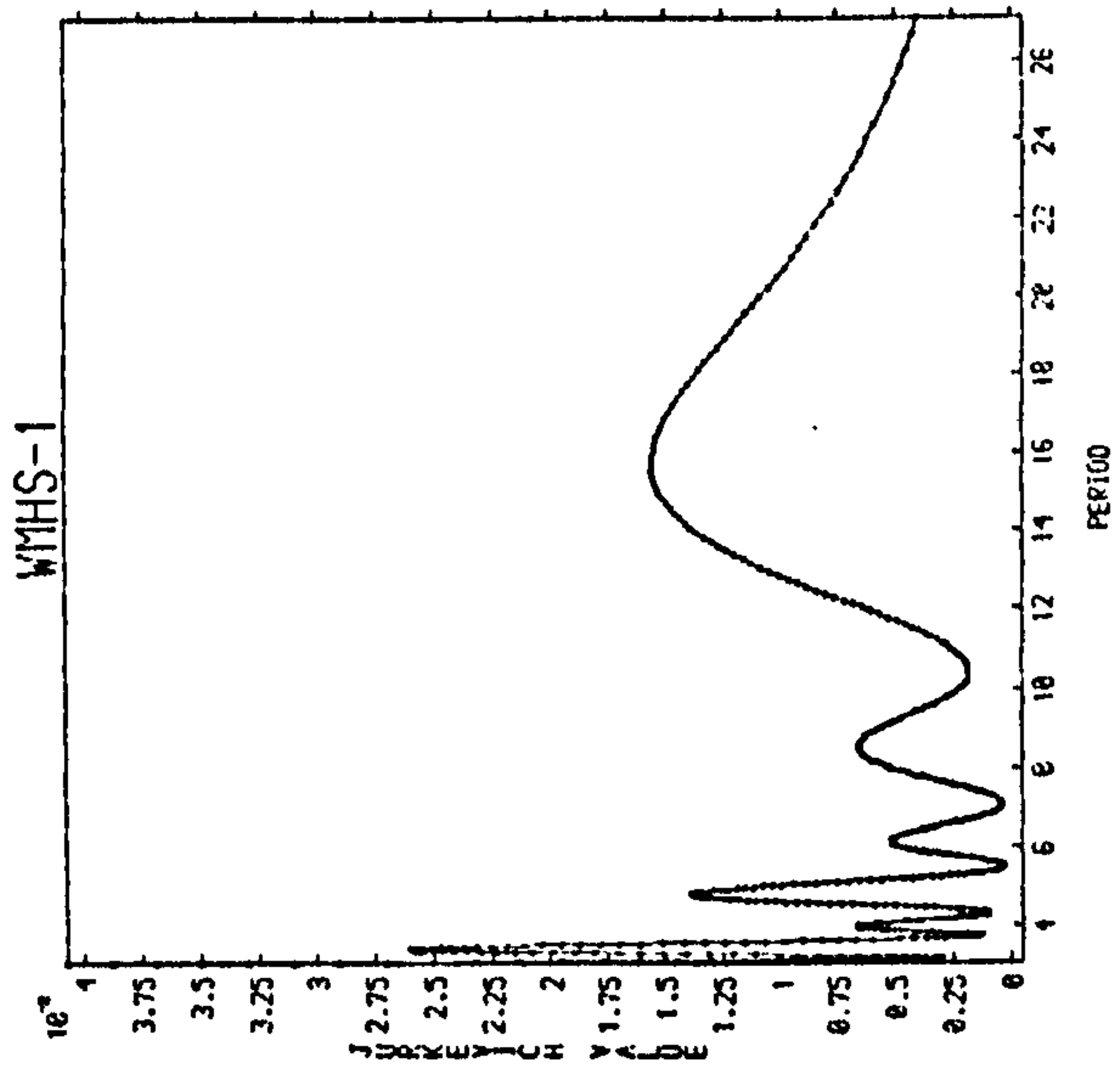
Maker: John Barton

Date: 1806

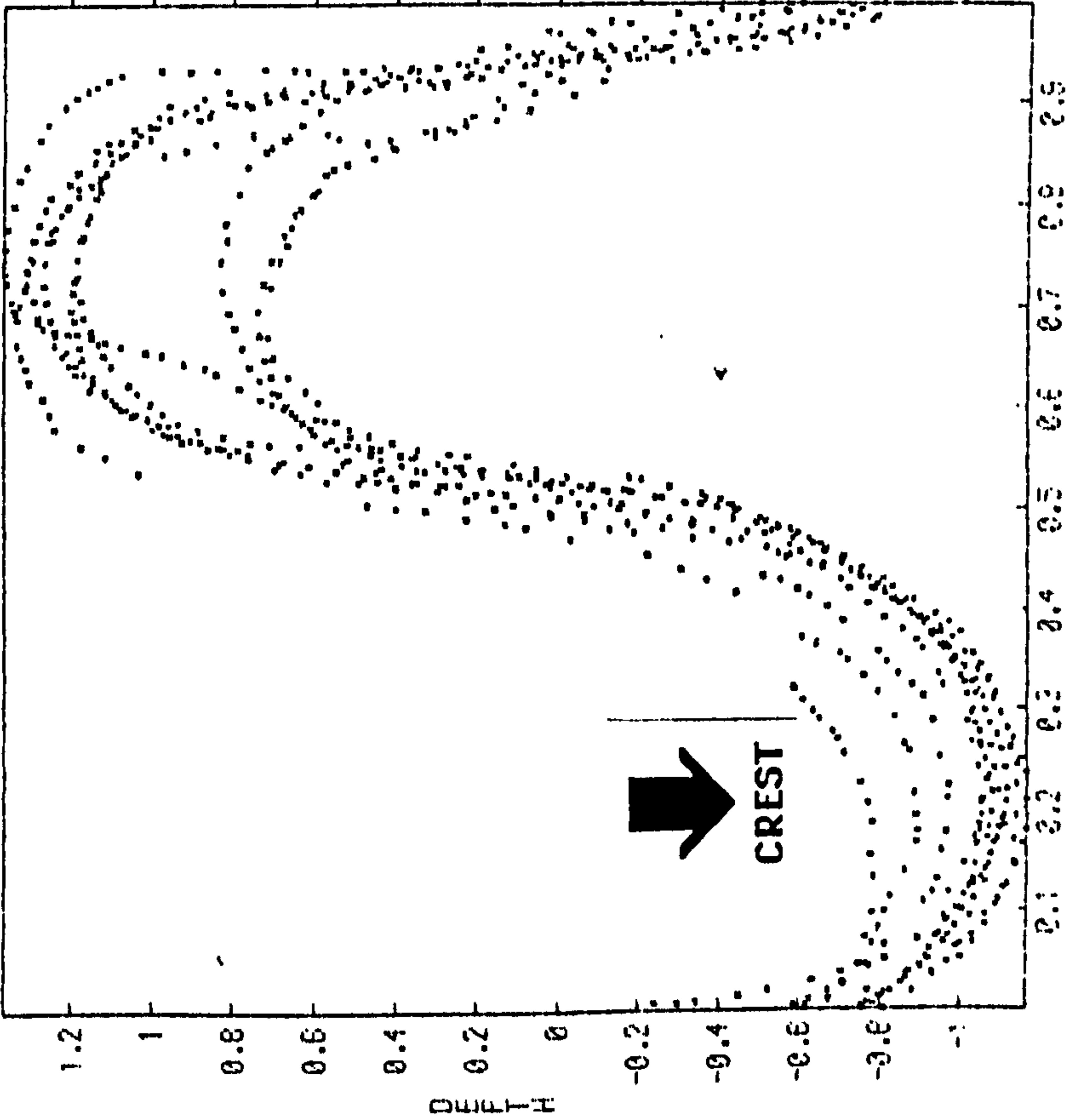
Ser./Acq. No. 1928-719



Mu	Filar
	Scale
	Bench
	Div. Eng.
	Adjust.
	Leveling
	Focus
	Eye P.
	Tube
	Tool
	Gauge
	Binding
	Misc.



WMHS-1



Characteristics:

Screw ☒ Nut ☐

Leng: 1.25" / 0.50"

Diameter: 0.2402"

Steel ☒ Brass ☐

Other:

Instrument Identification:

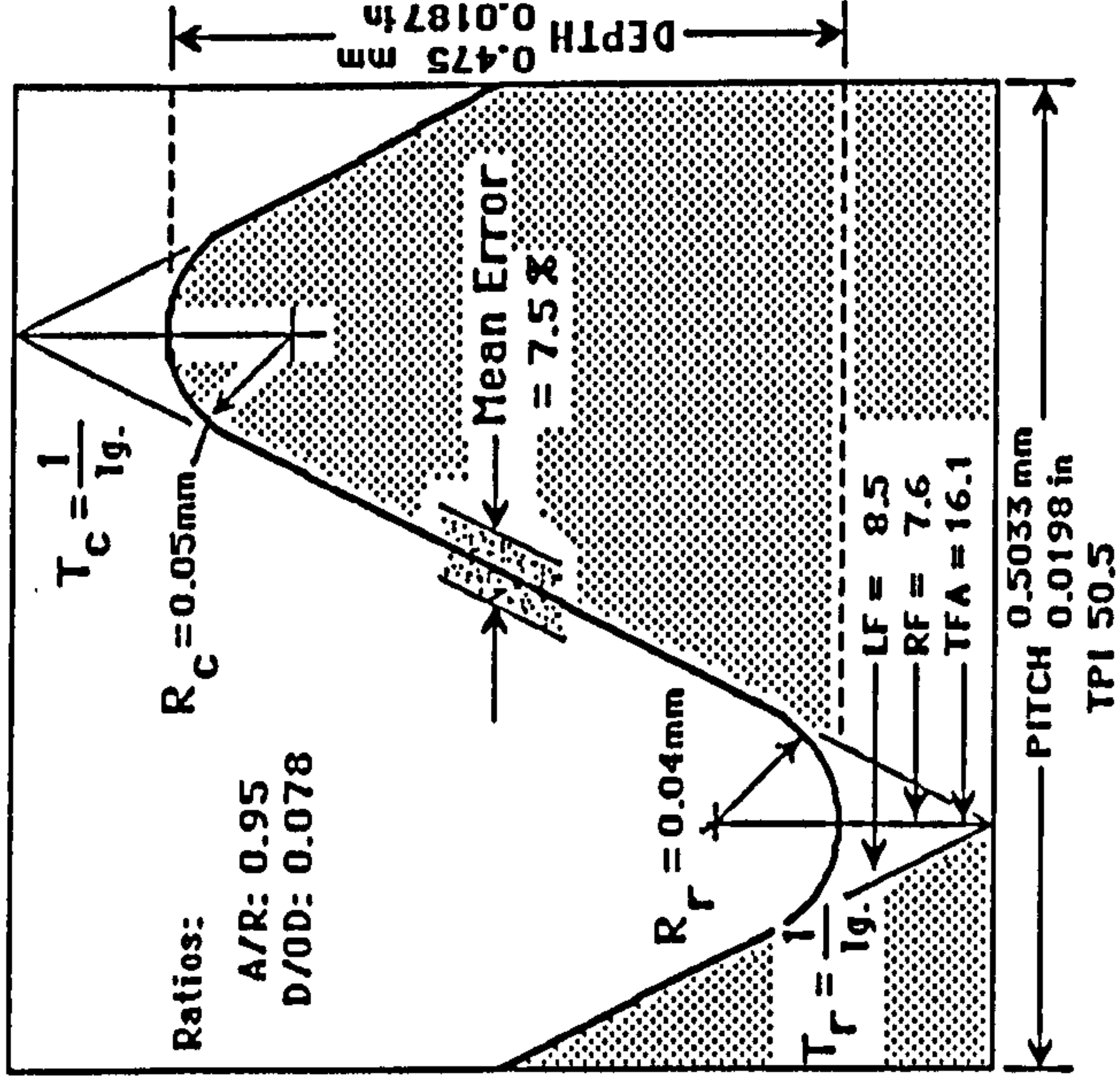
Study Code: WMHS-1

Instrument: 15" Bubble level tester

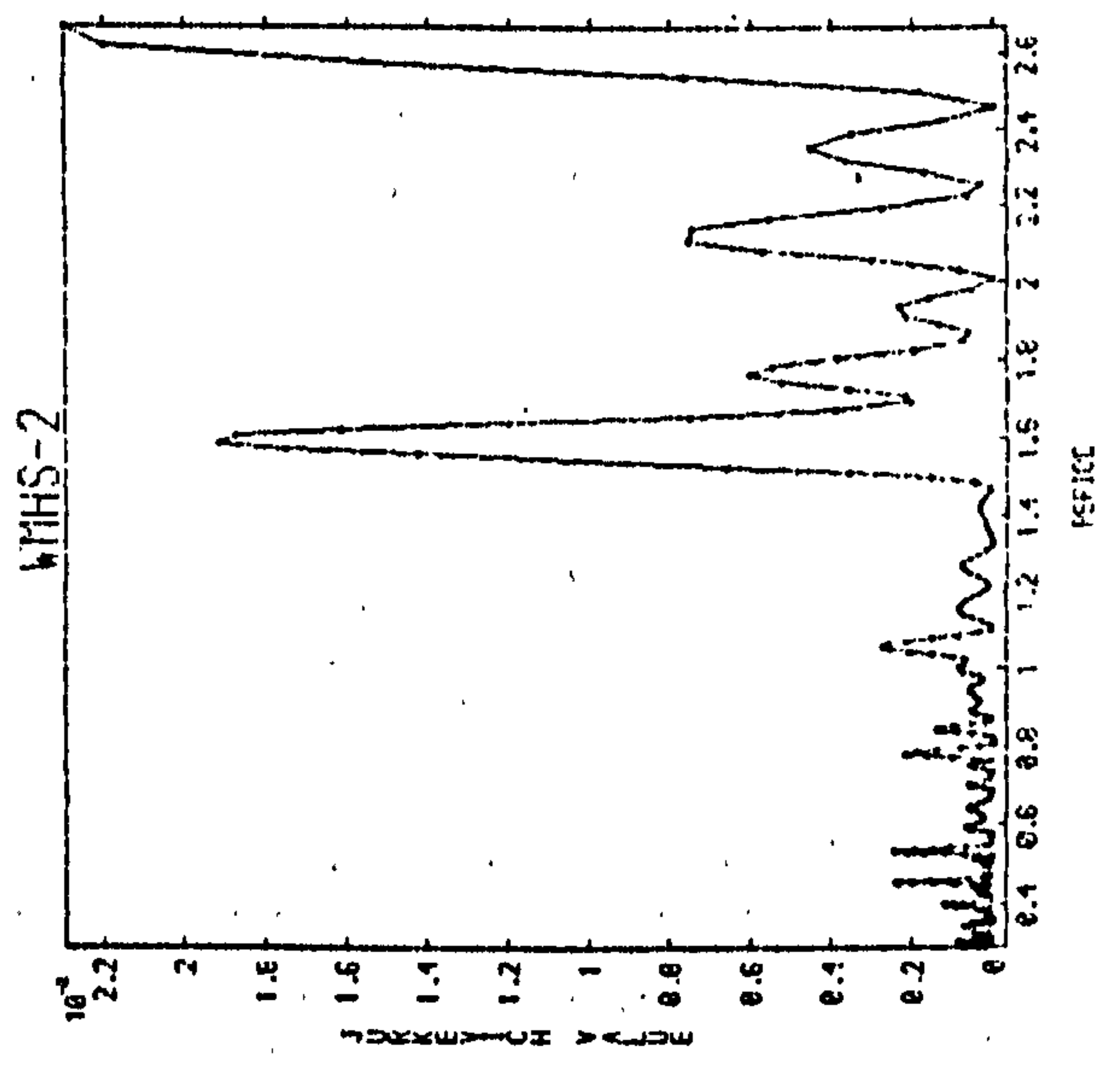
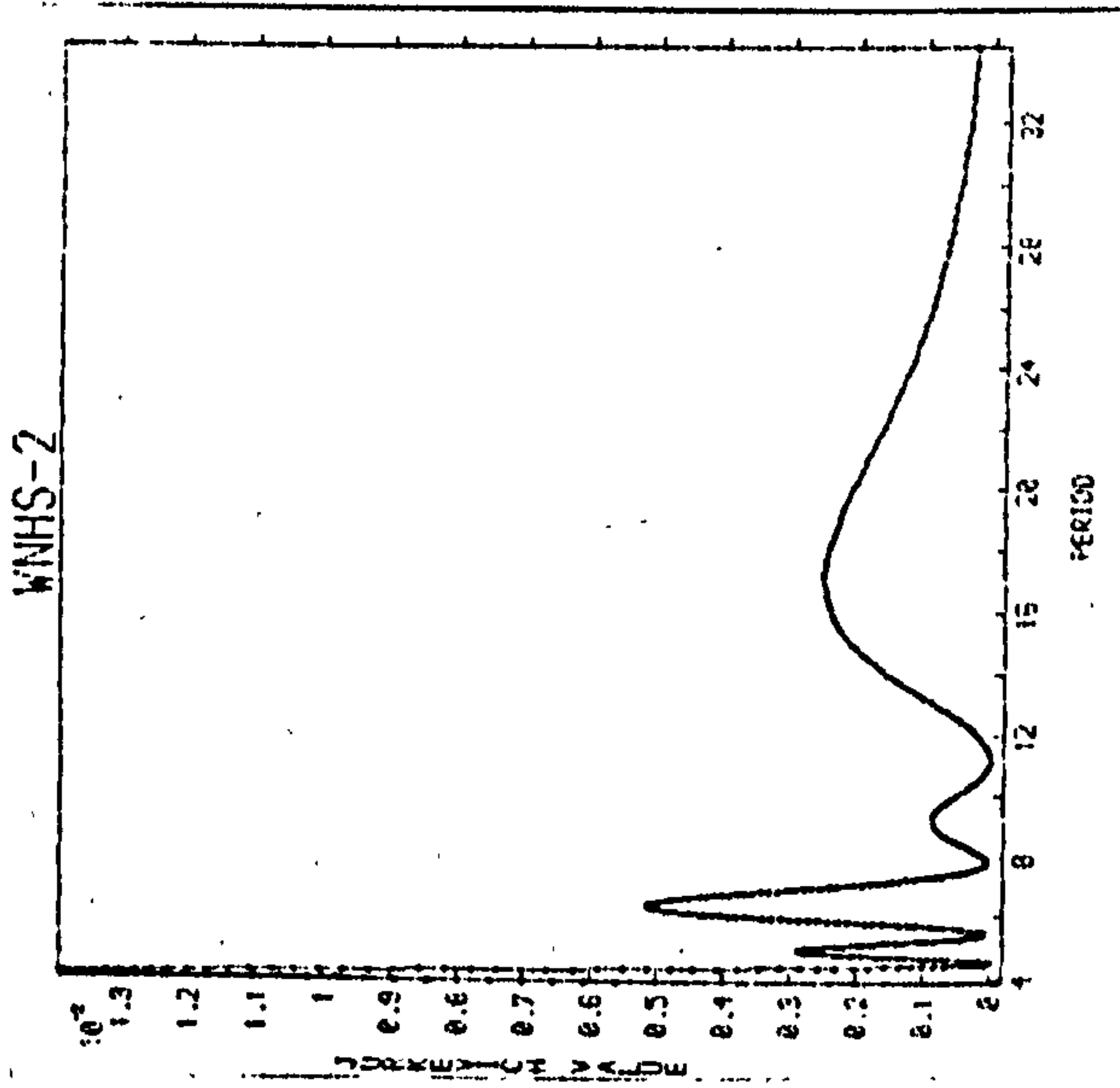
Maker: Troughton & Simms

Date: m-1 19th c

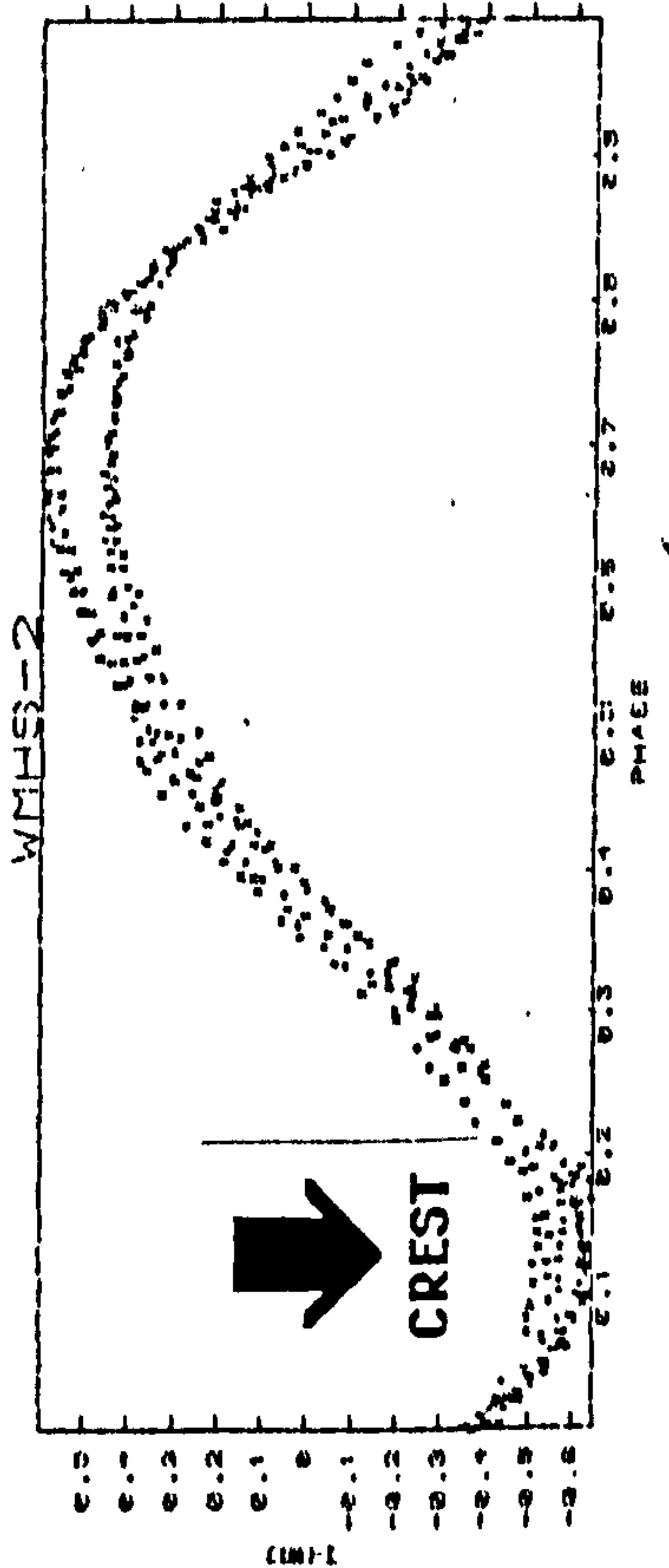
Ser./Acq. No. 2118



Mu	[	Filar
		Scale
[	]	Bench
		Div. Eng.
[	]	Adjust.
		Leveling
[	]	Focus
		Eye P.
[	]	Tube
		Tool
[	]	Gauge
		Binding
[	]	Misc.







Characteristics:

Screw ☒ Nut ☐

Leng: 4.00" / 0.563"

Diameter: 0.1739"

Steel ☒ Brass ☐

Other:

Instrument Identification:

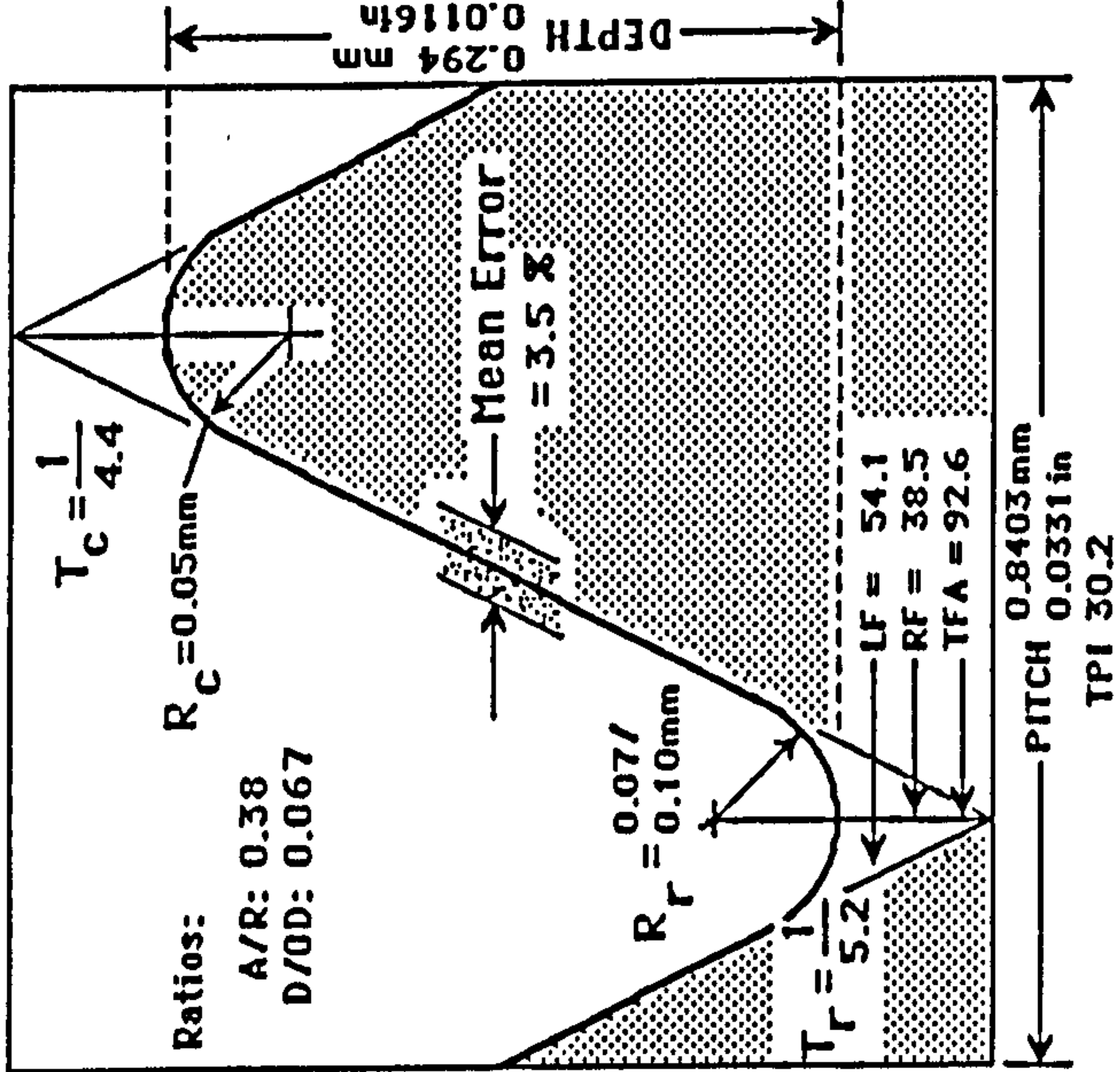
Study Code: WMHS-2

Instrument: Beam compass

Maker: Baradelle

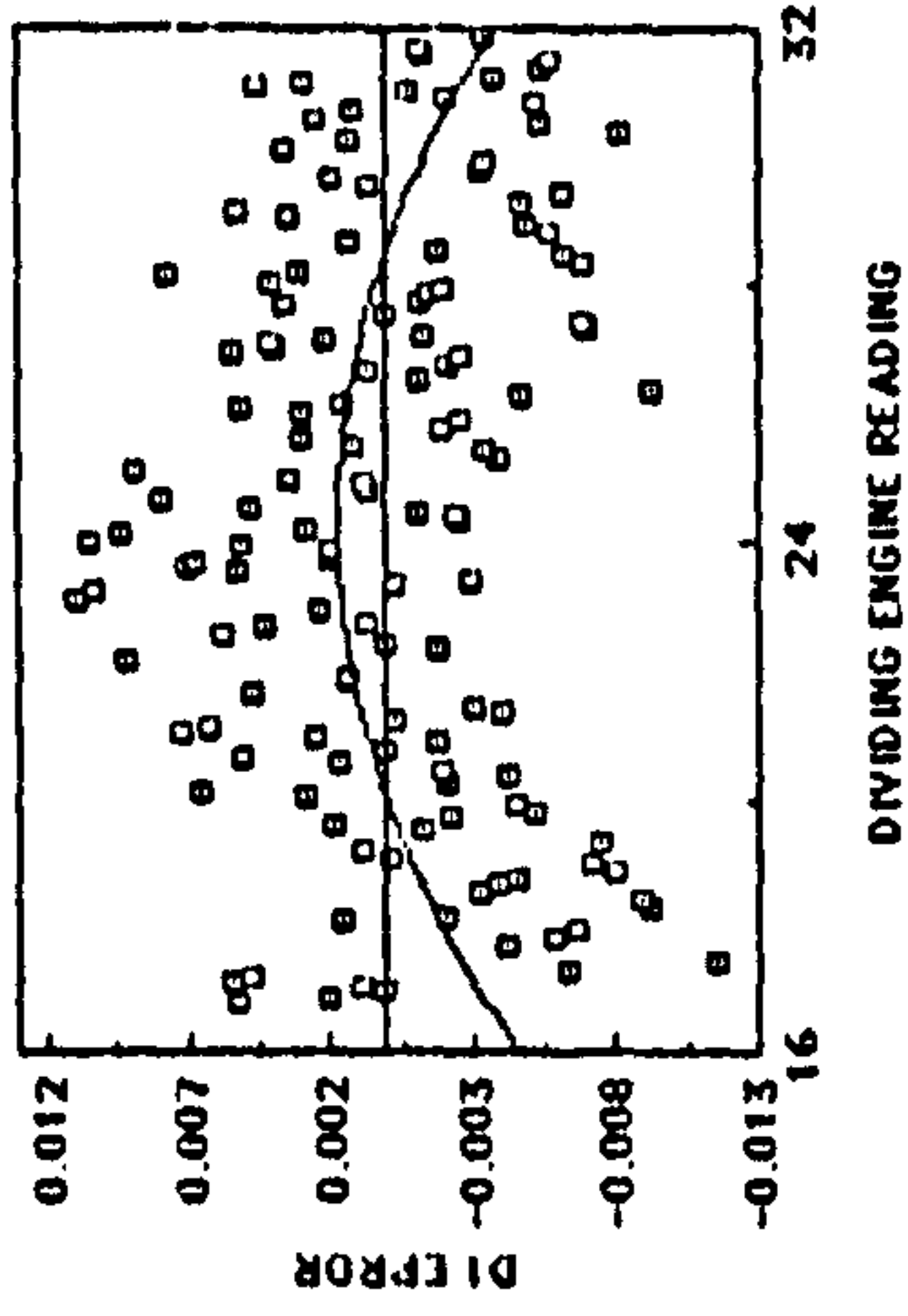
Date: ca.1775

Ser./Acq. No. 1616

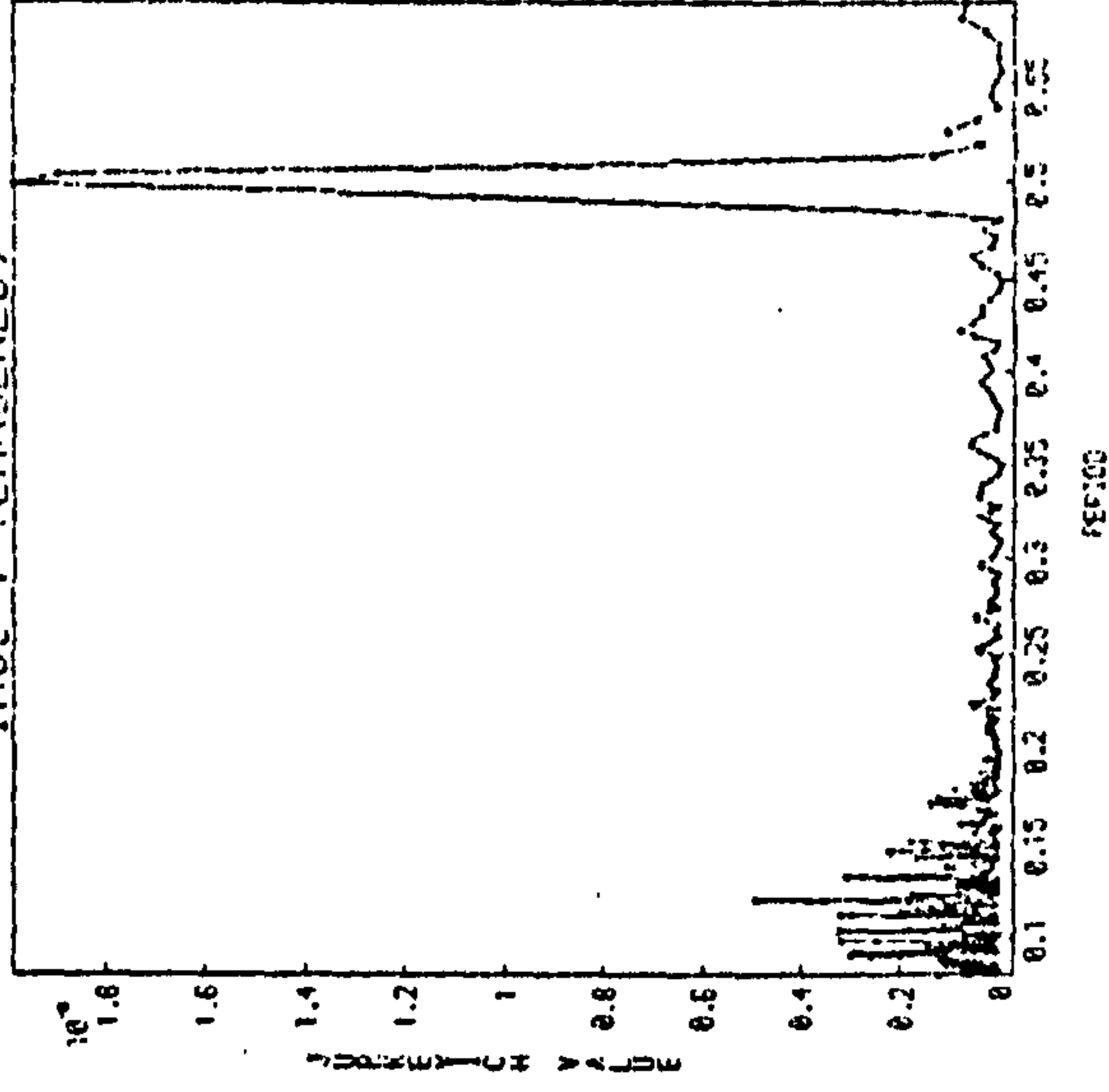


Mu	[	Filar	
		Scale	
[	]	Bench	
		Div. Eng.	
[	]	Adjust.	
		Leveling	
[	]	Focus	
		Eye P.	
[	]	Tube	
		Tool	
[	]	Gauge	
		Binding	
[	]	Misc.	

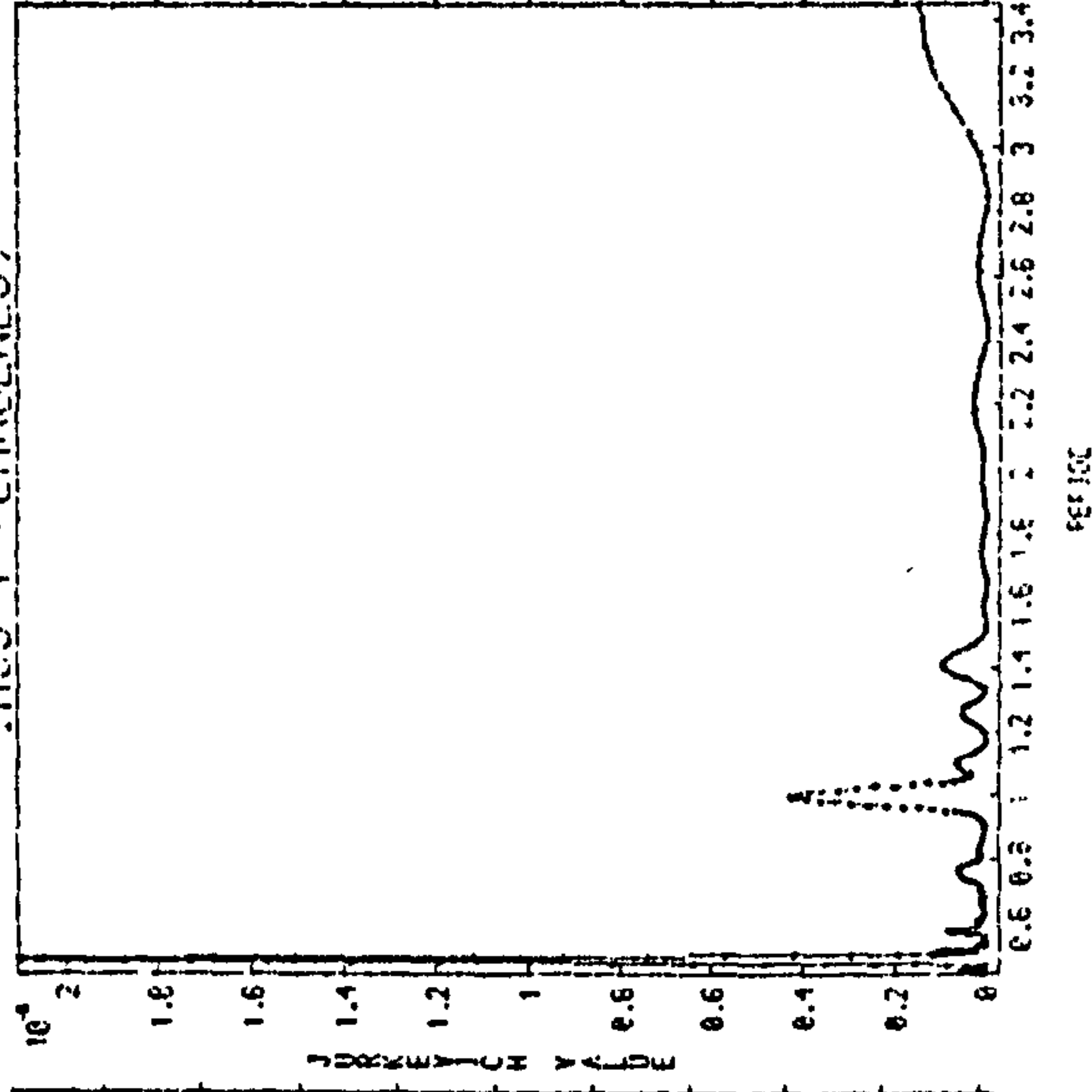
IMSS-1 (not corrected)



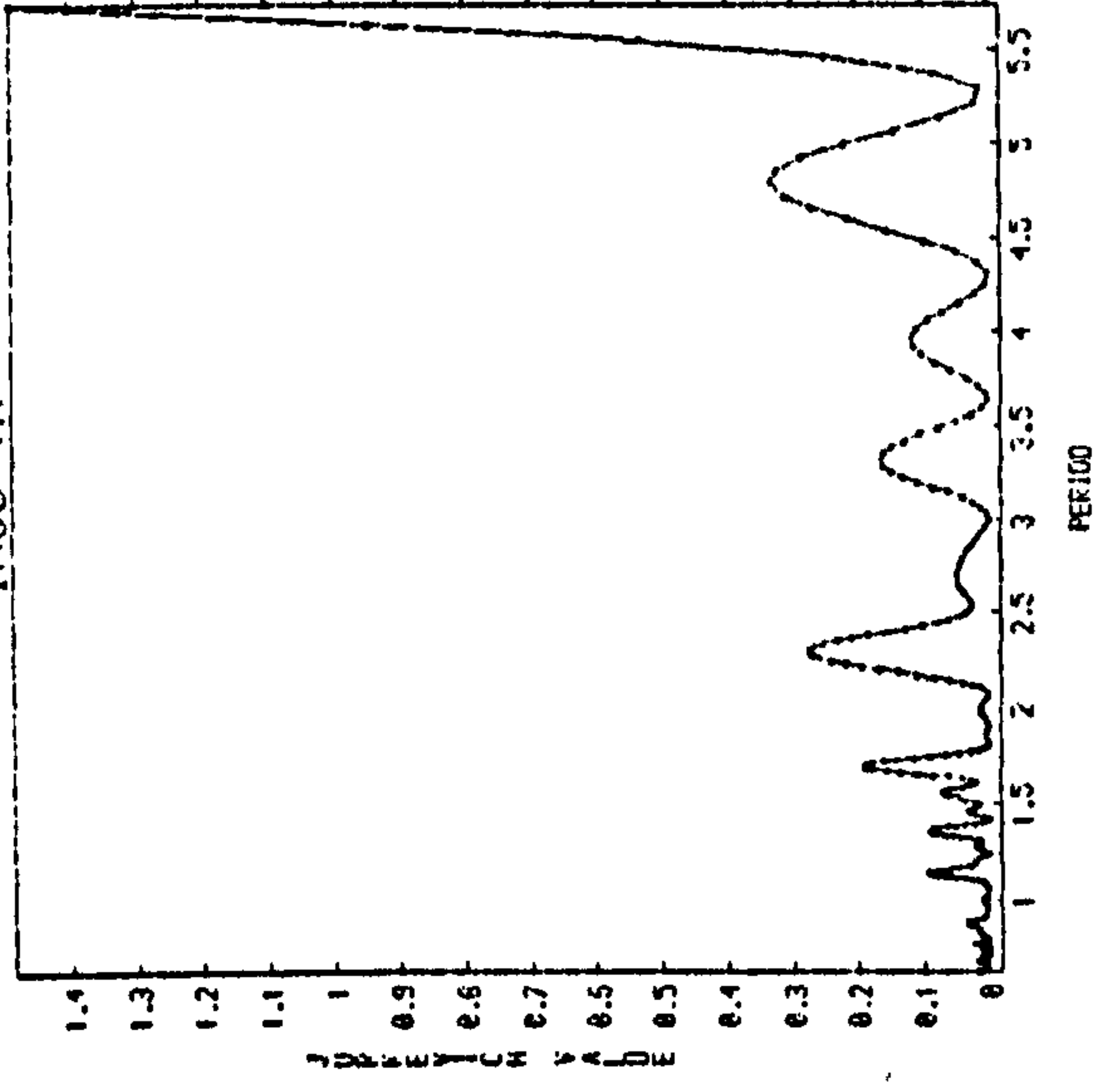
IMSS-1 (CHAULNES)



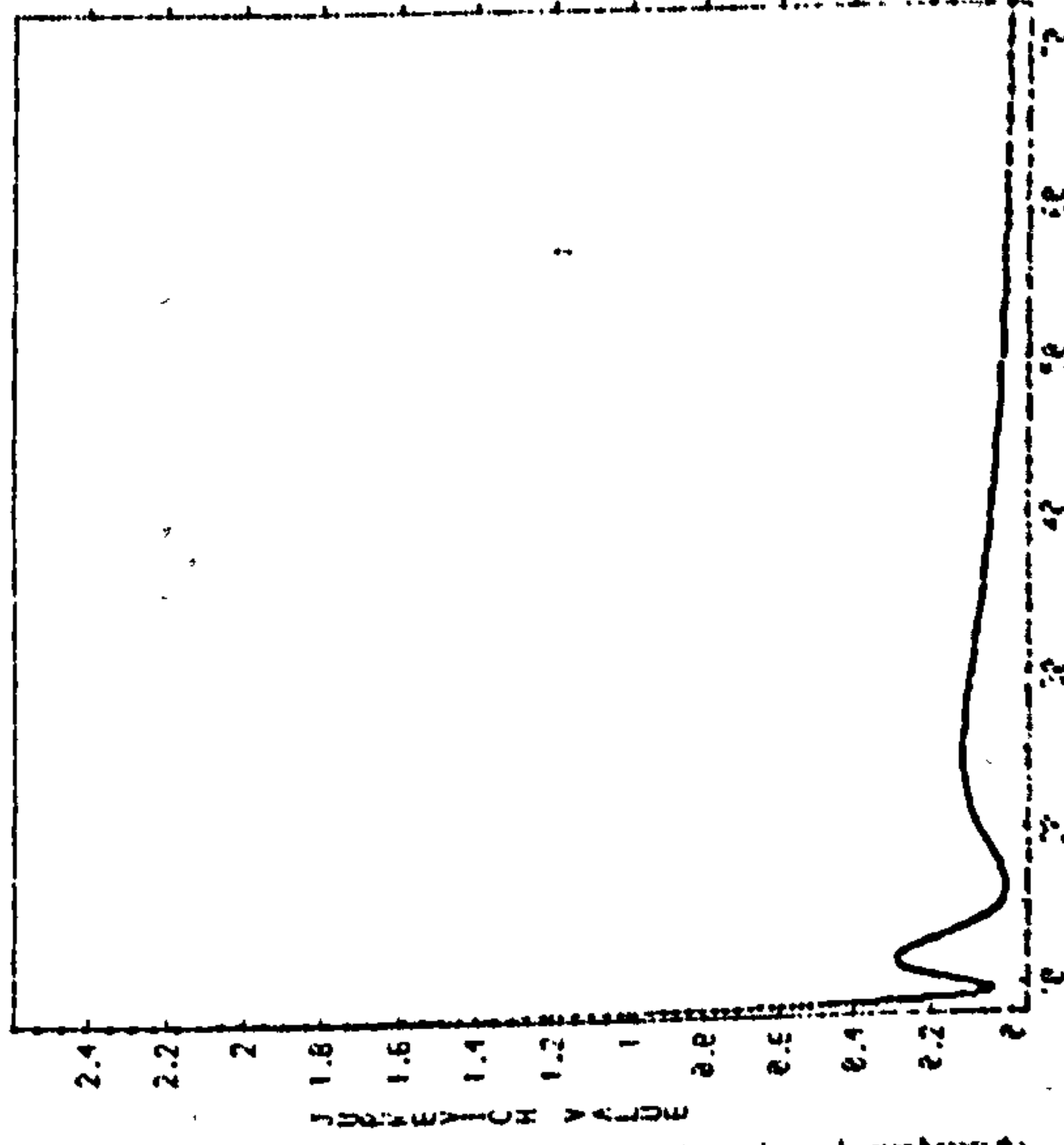
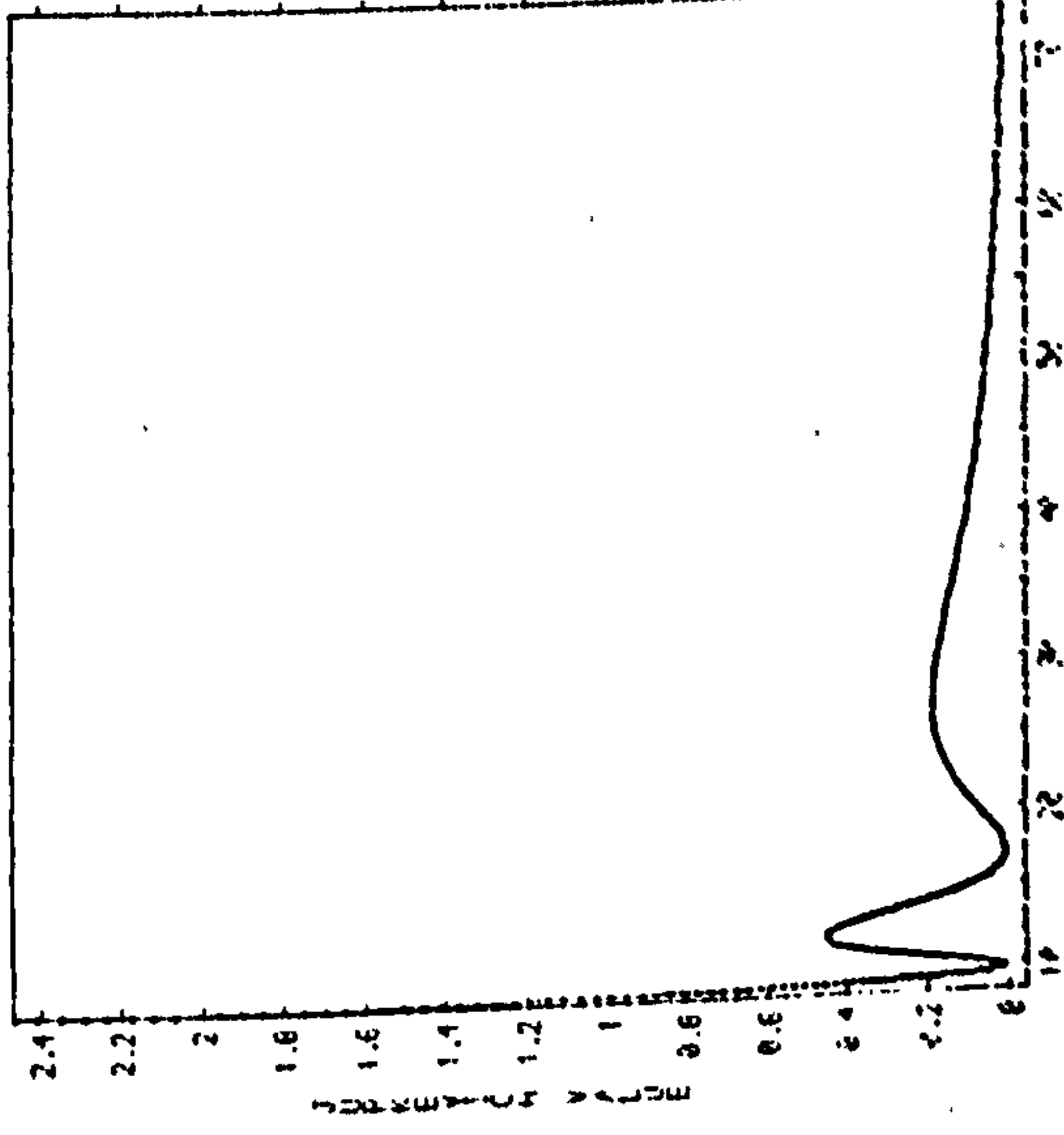
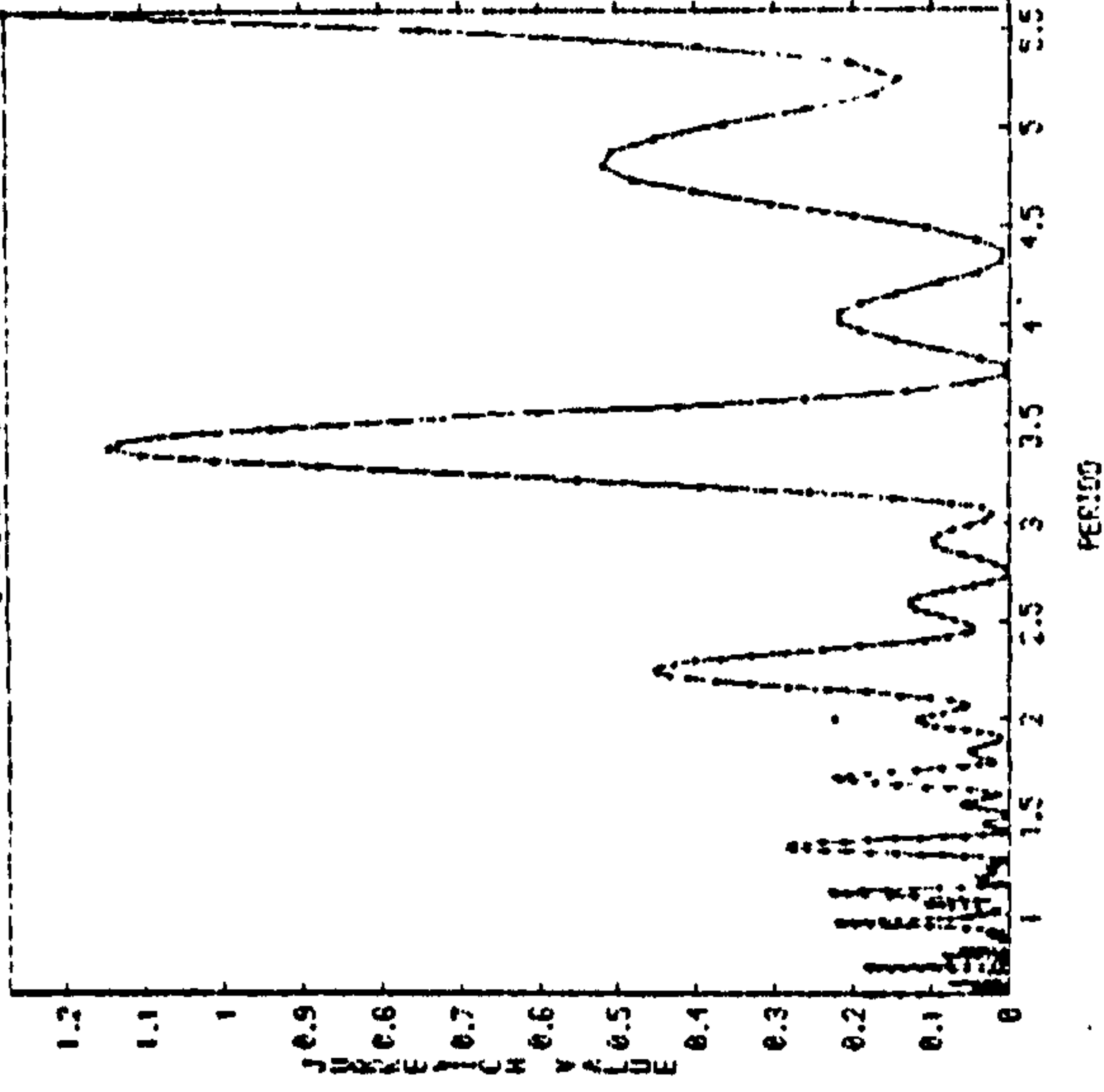
IMSS-1 (CHAULNES)



IMES-1A

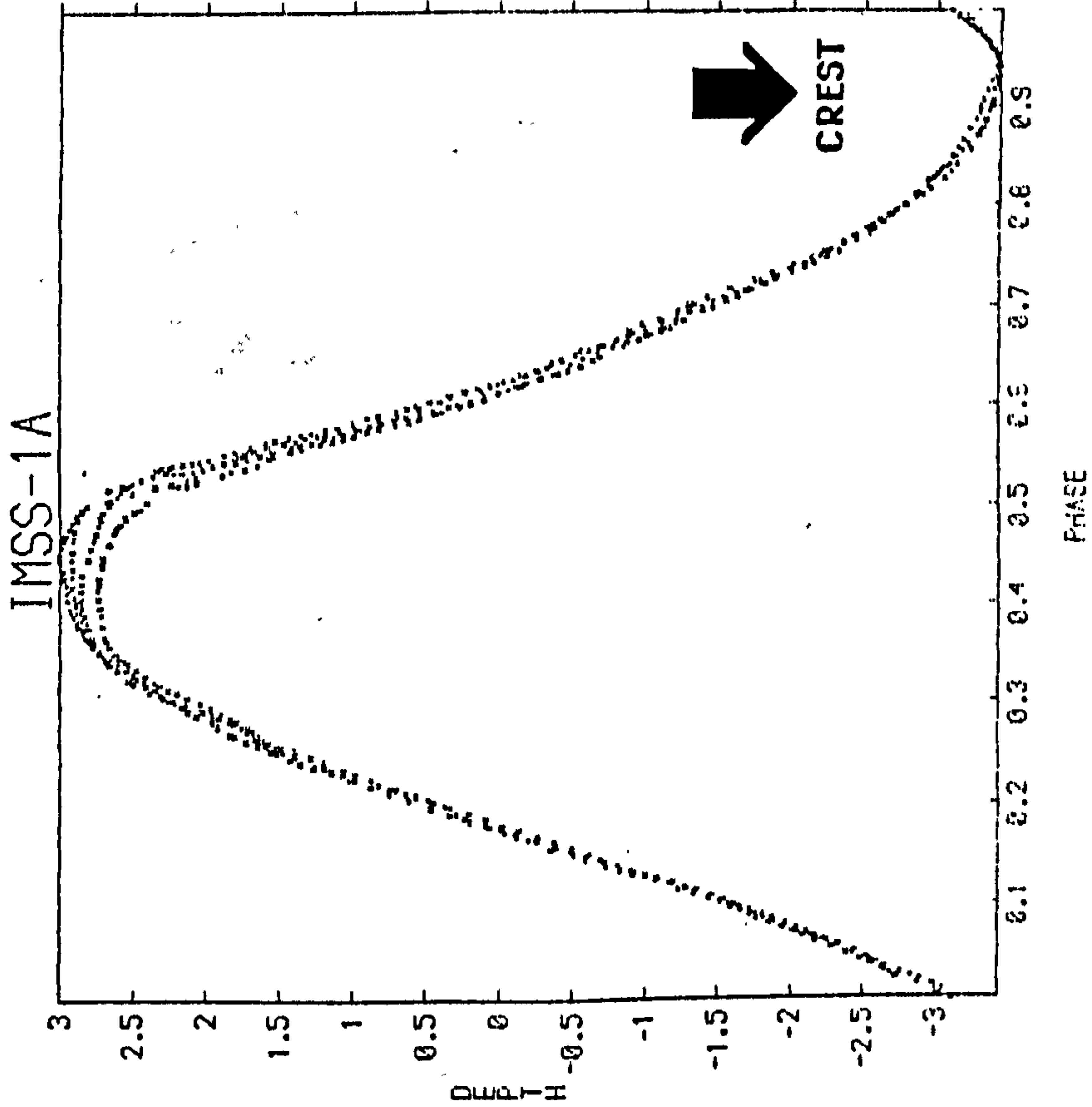


IMES-1B



IMES-1C

IMES-1D



Characteristics:

Screw ☒ Nut ☐

Leng: 1.313" / circular

Diameter: 0.720"

Steel ☐ Brass ☒

Other:

Instrument Identification:

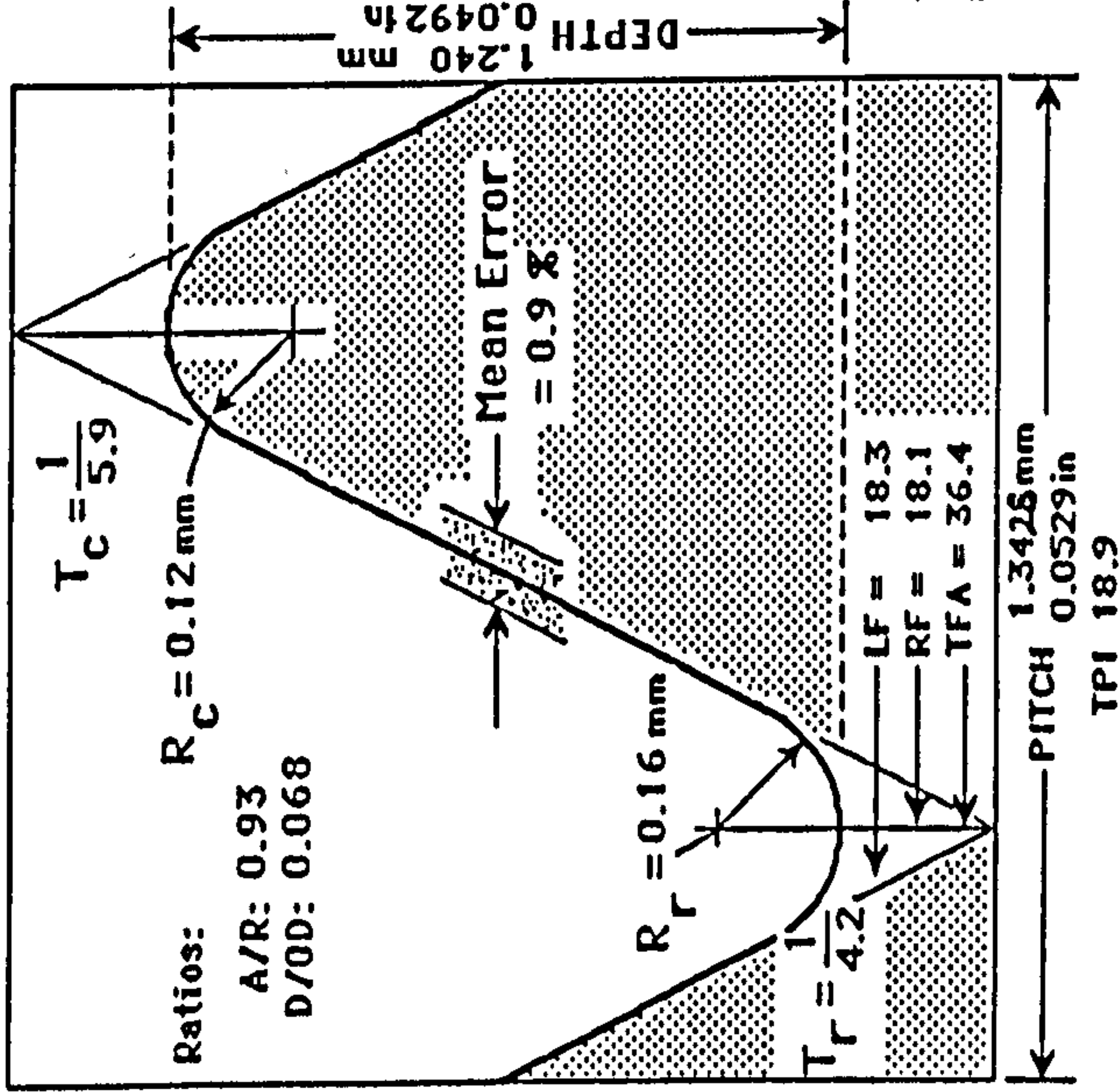
Study Code: IMSS-1a

Instrument: Circular dividing eng.

Maker: Chaulnes

Date: 1762

Ser./Acq. No. .

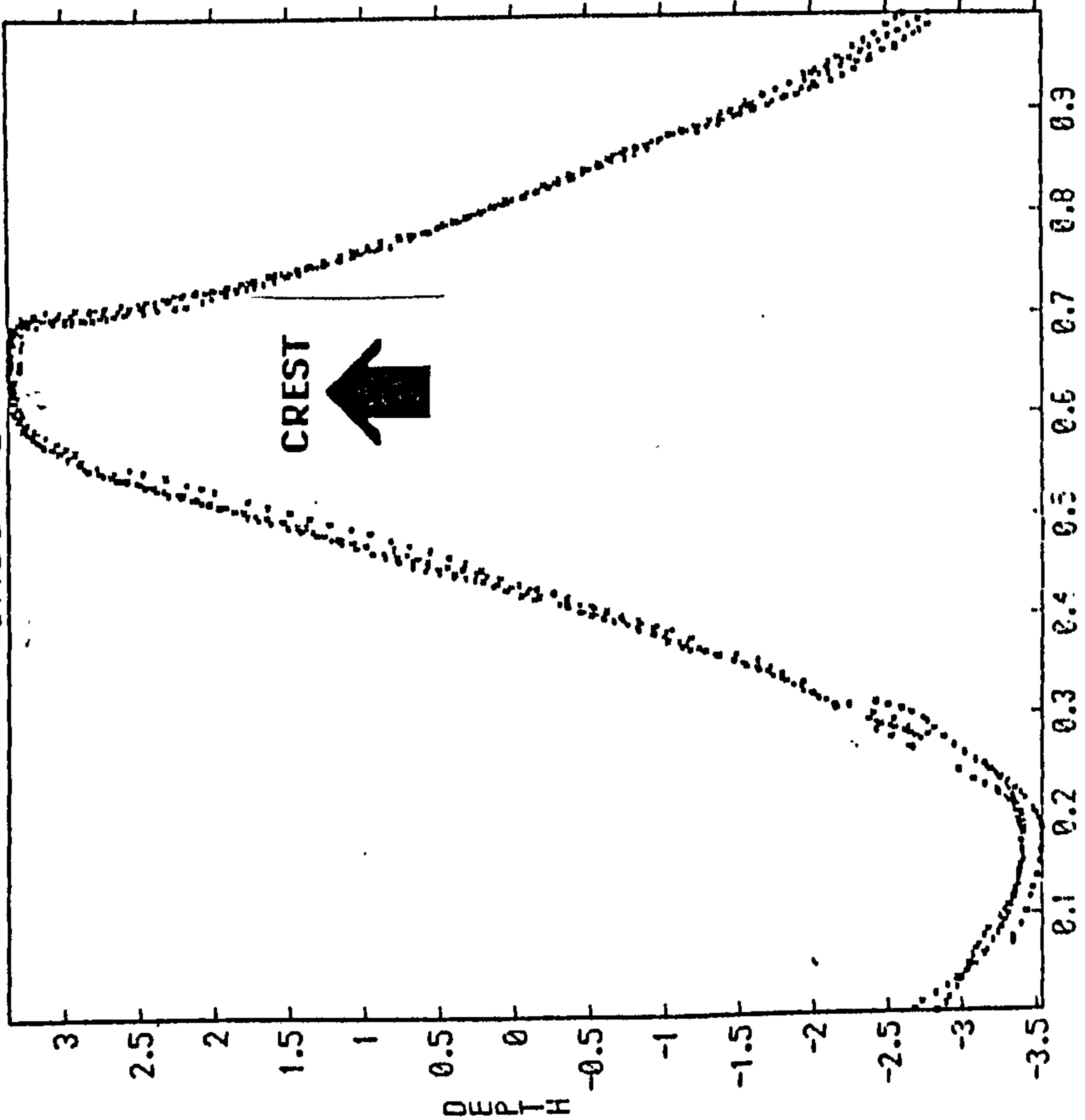


The wheel is  $\approx 85 \text{ cm}$  in diameter  
and  $\approx 9/16$ " thick

Mu	Filar	
		Scale
	Bench	
		Div. Eng.
	Adjust.	
		Leveling
	Focus	
		Eye P.
	Tube	
		Tool
	Gauge	
		Binding
	Misc.	



IMSS-1B

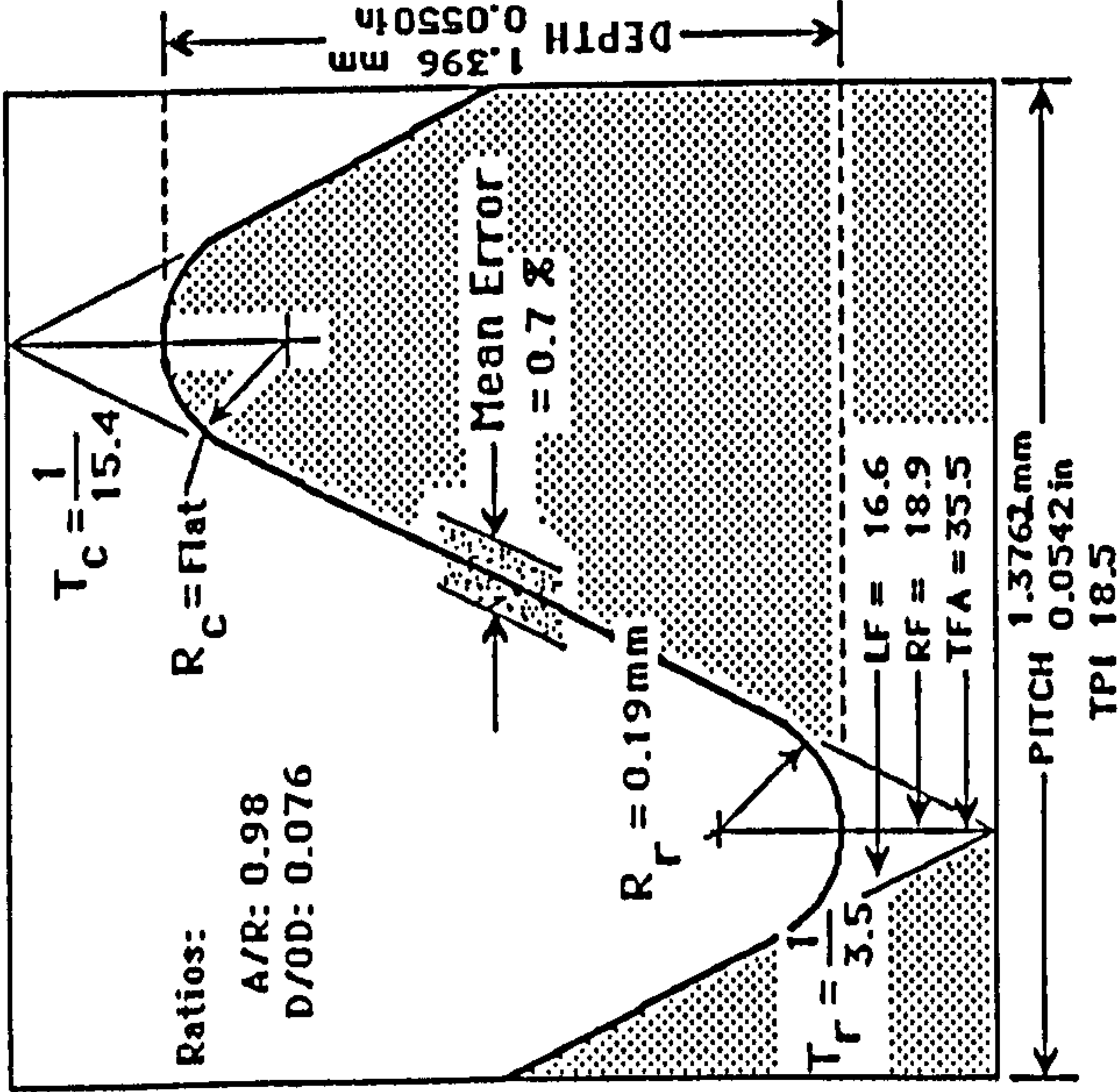


Characteristics:

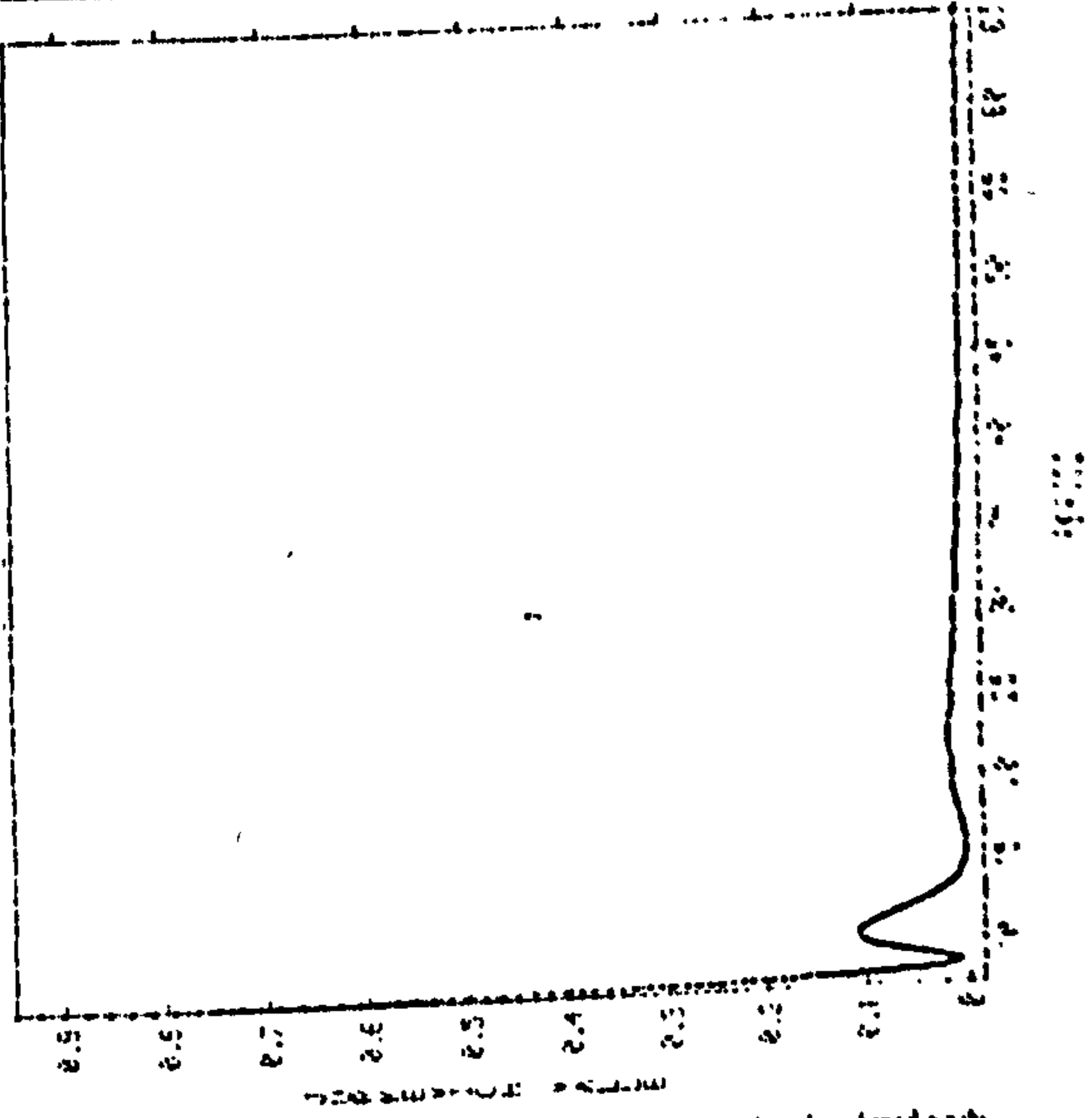
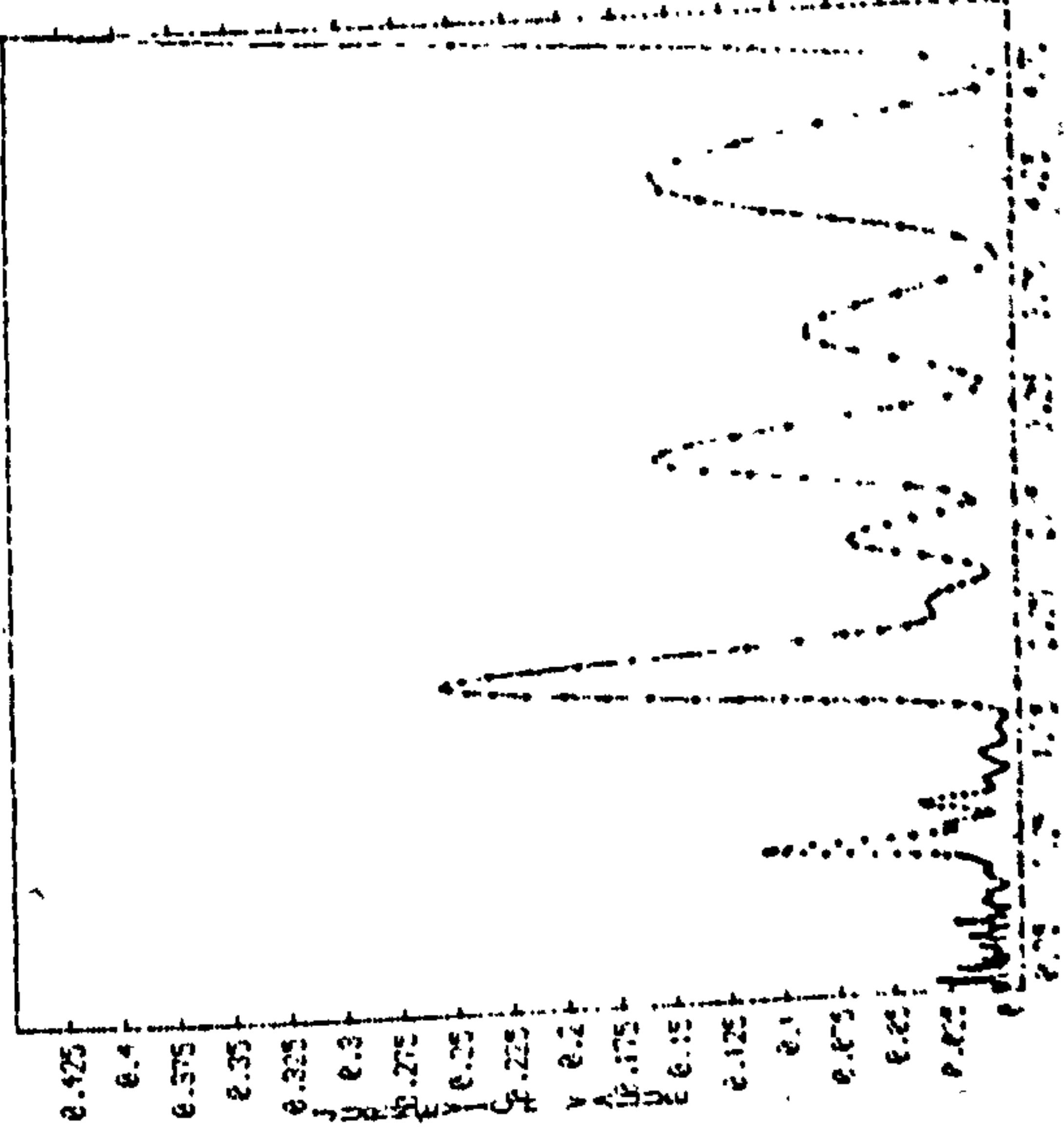
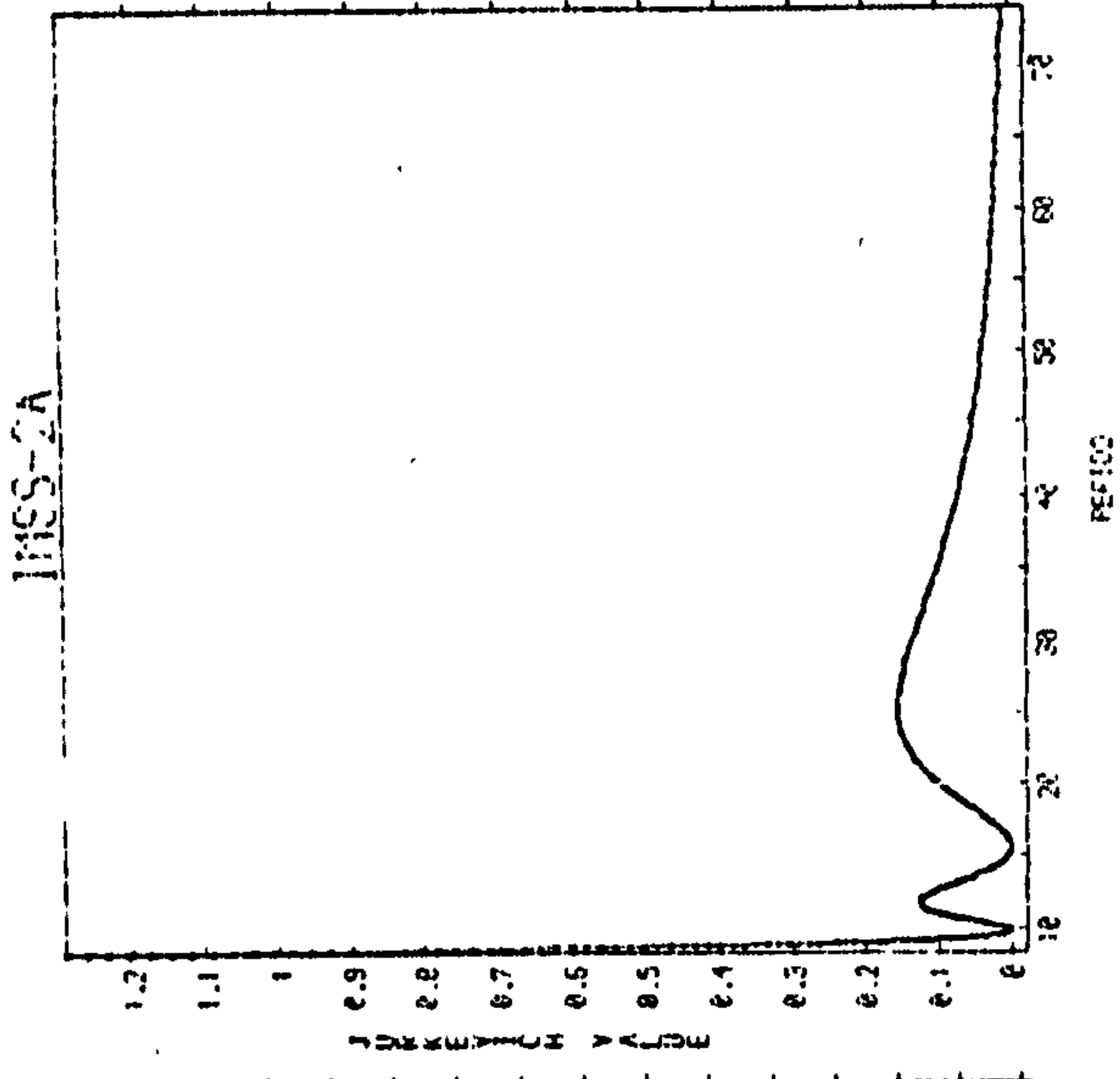
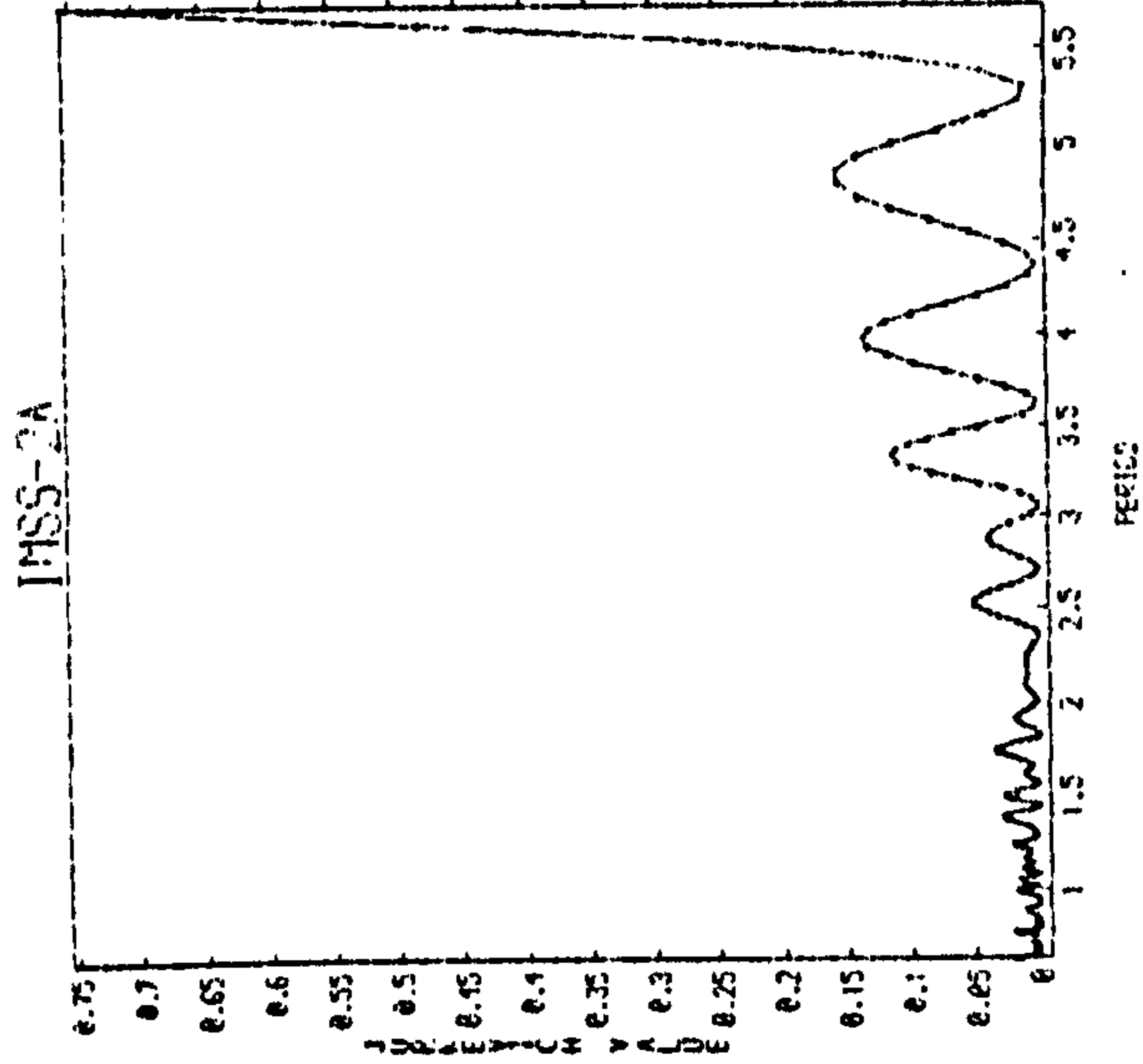
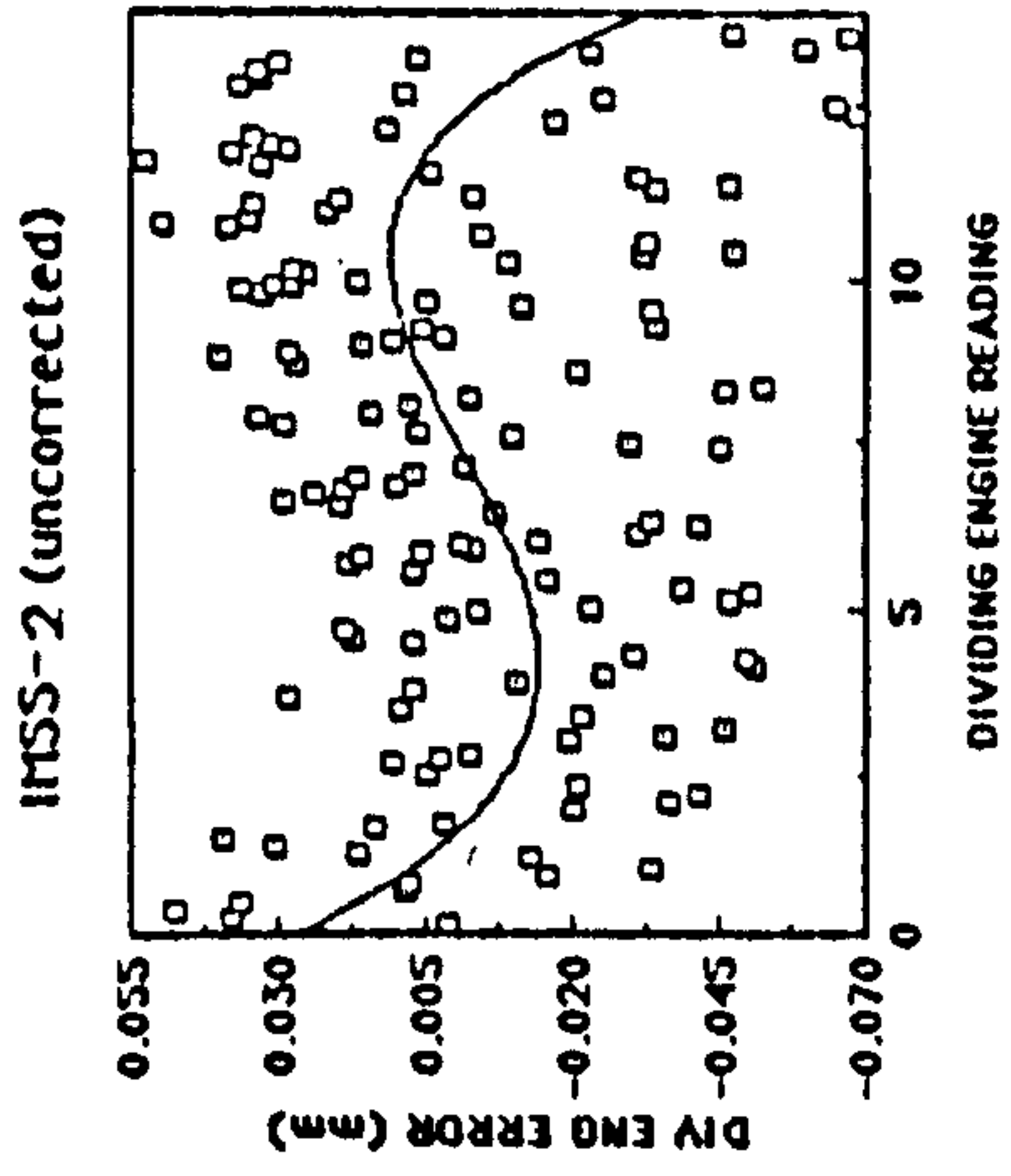
Screw ☐ Nut ☒  
Leng: 1.313" /  $\approx 0.563"$   
Diameter:  $\approx 0.720"$   
Steel ☐ Brass ☒  
Other:

Instrument Identification:

Study Code: IMSS-1b  
Instrument: Circular dividing eng.  
Maker: Duc de Chaulnes  
Date: 1762  
Ser./Acq. No.



Mu — [ Filar Scale Bench Div. Eng. Adjust. Leveling Focus Eye P. Tube Tool Gauge Binding Misc. ]



Characteristics:

Screw

☒

Nut

☐

Leng: 2.125" / 16.5"

Diameter: ~0.220"

Steel

☒

Brass

☐

Other:

Instrument Identification:

Study Code:

IMSS-2a

Instrument:

Linear Dividing Eng.

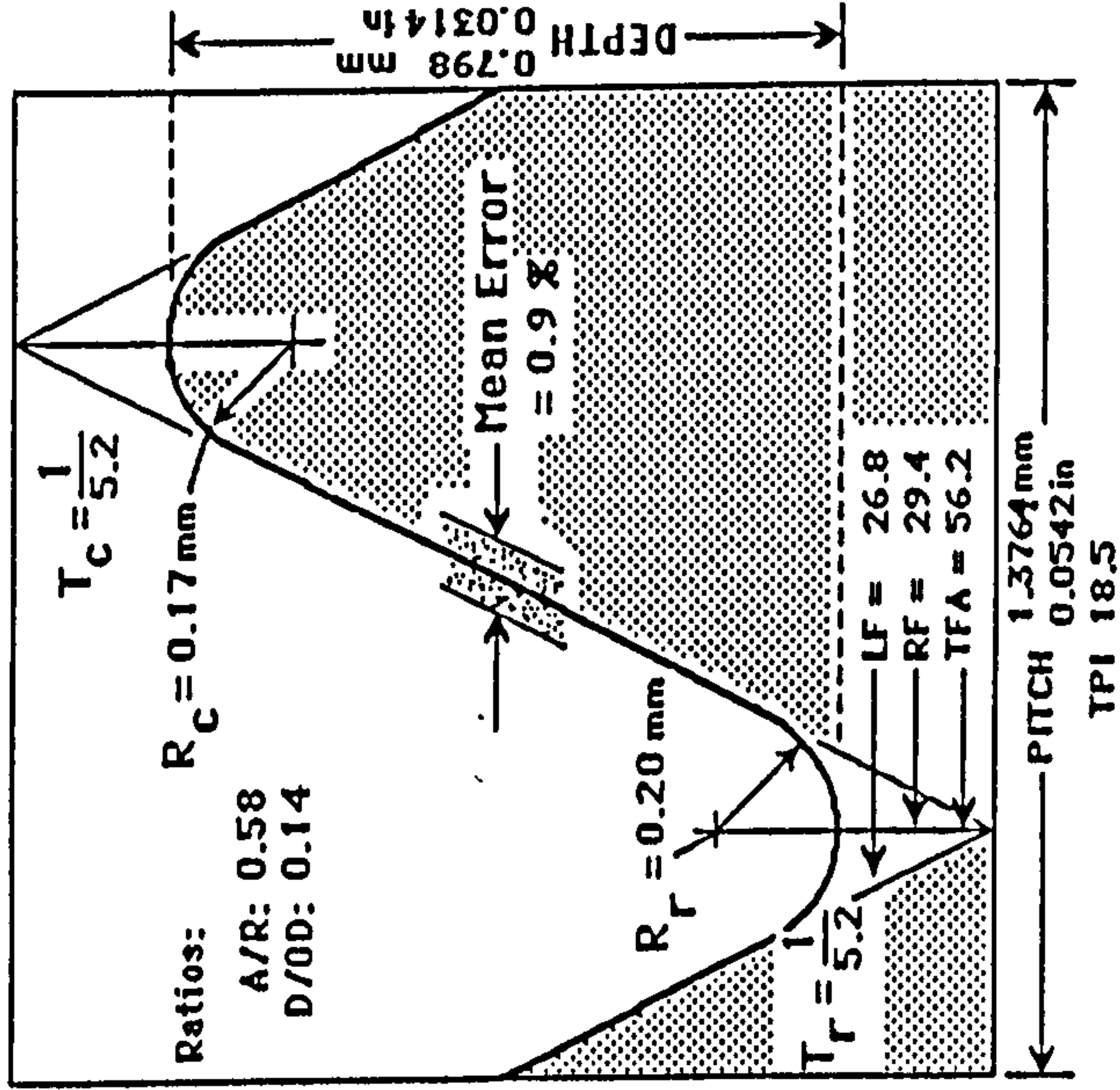
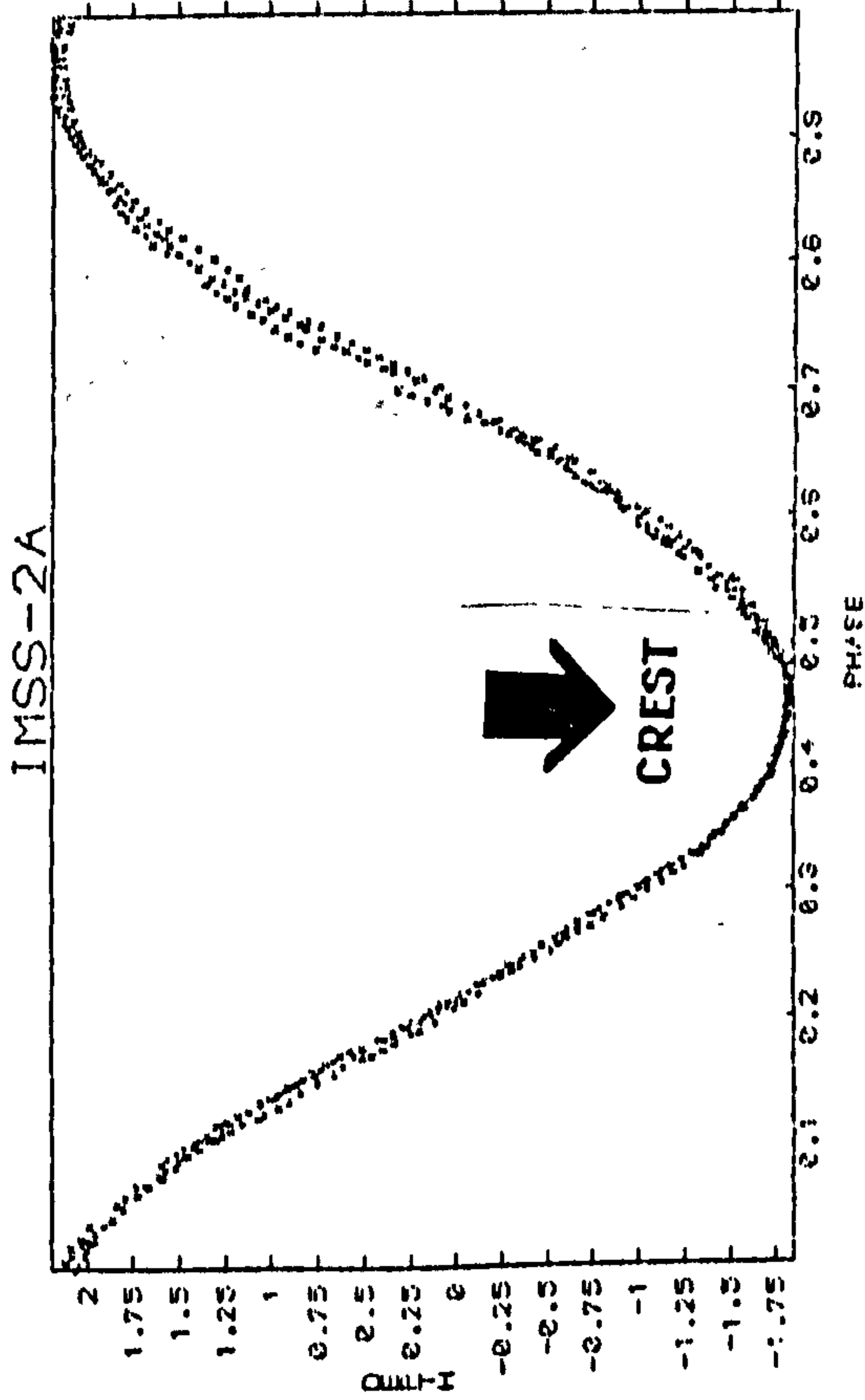
Maker:

Chaulnes(?)

Date:

ca.1762(?)

Ser./Acq. No. .



Mu

Filar

Scale

Bench

Div. Eng.

Adjust.

Leveling

Focus

Eye P.

Tube

Tool

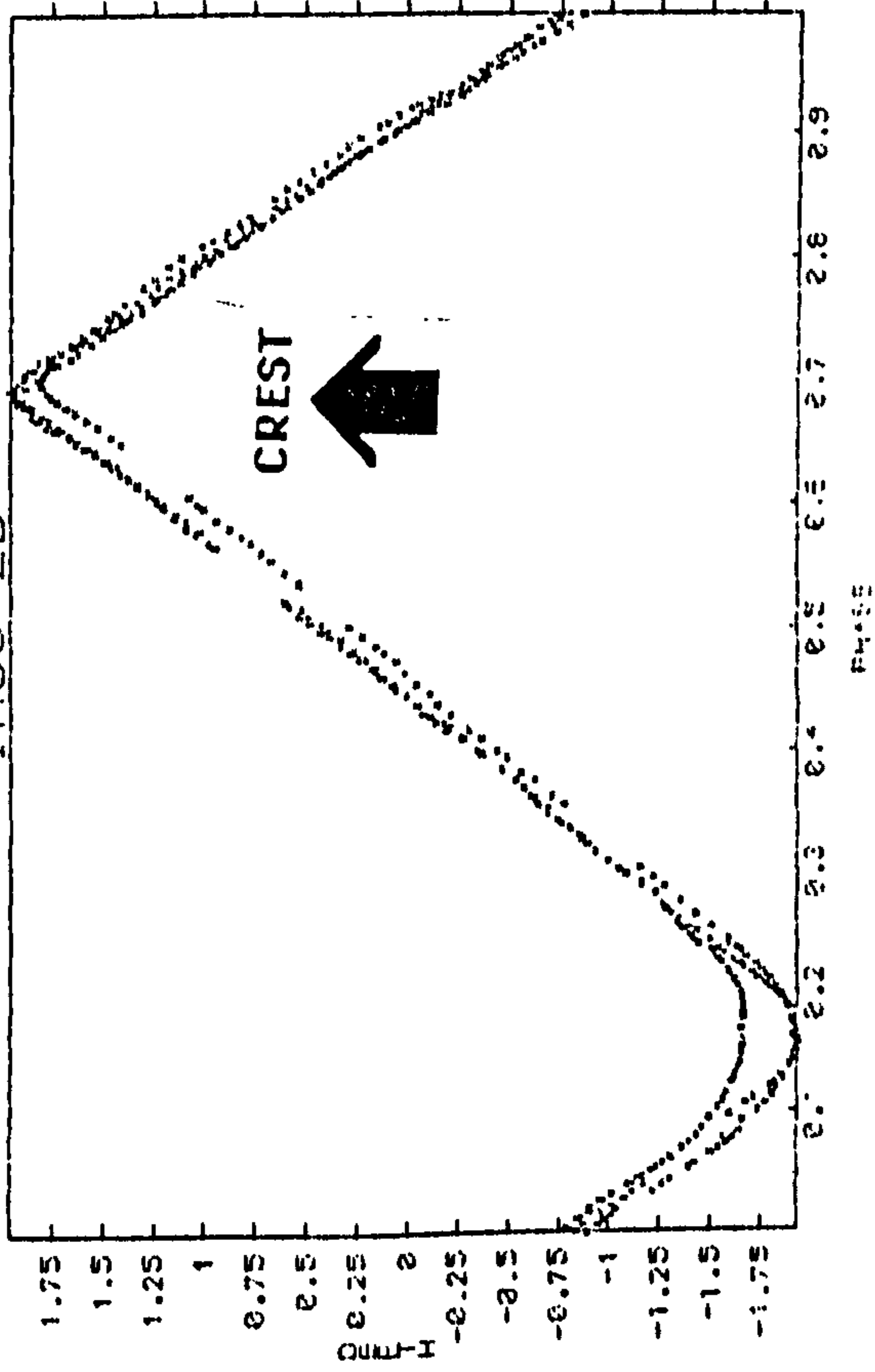
Gauge

Binding

Misc.

The nut is in fact a long half nut

IMSS-2B



Characteristics:

Screw ☐ Nut ☒

Leng: 2.125" / 16.5"

Diameter:  $\approx 0.218$ "

Steel ☐ Brass ☒

Other:

Instrument Identification:

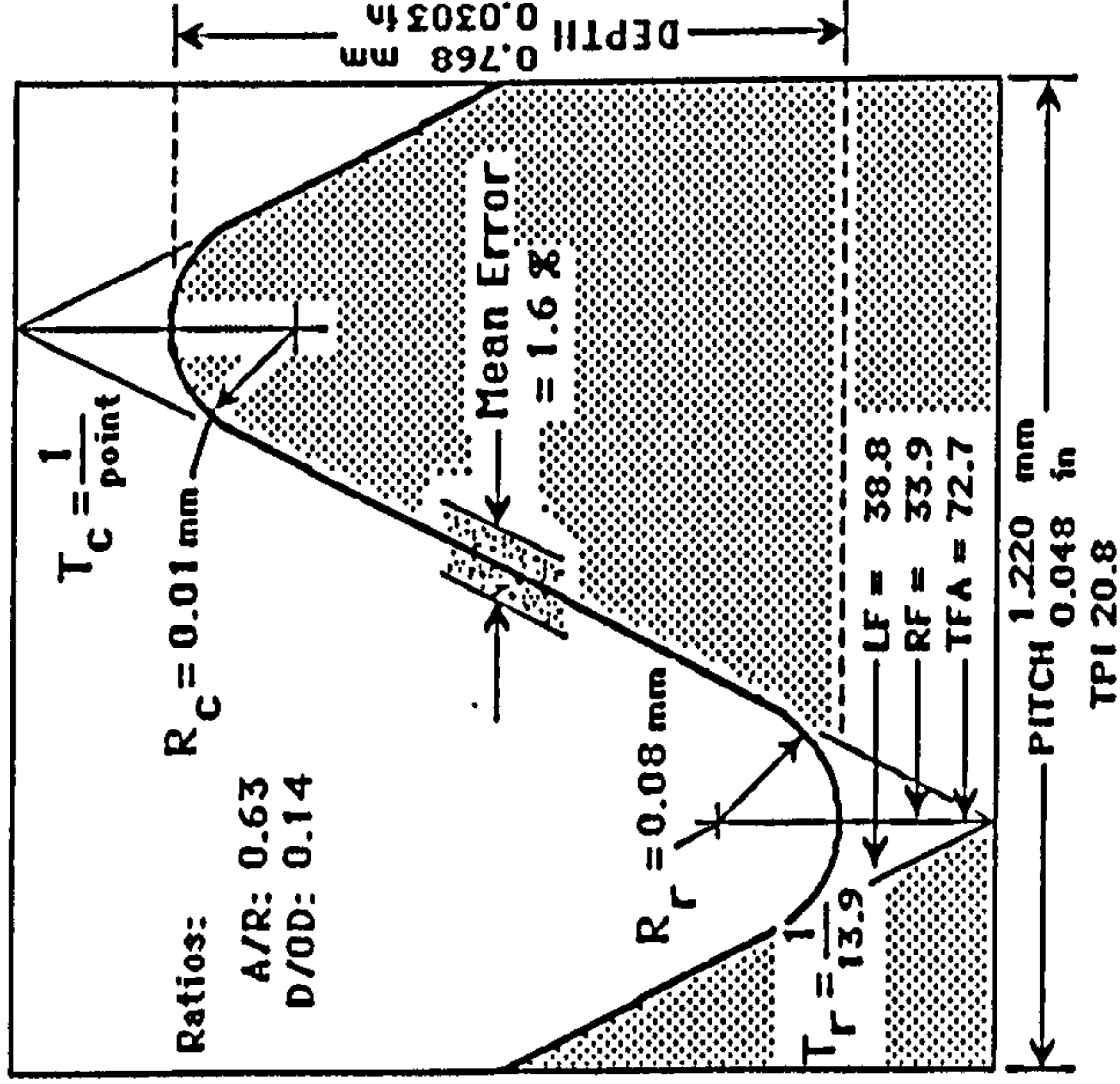
Study Code: IMSS-2b

Instrument: Linear Dividing Eng.

Maker: Chaulnes(?)

Date: 1762(?)

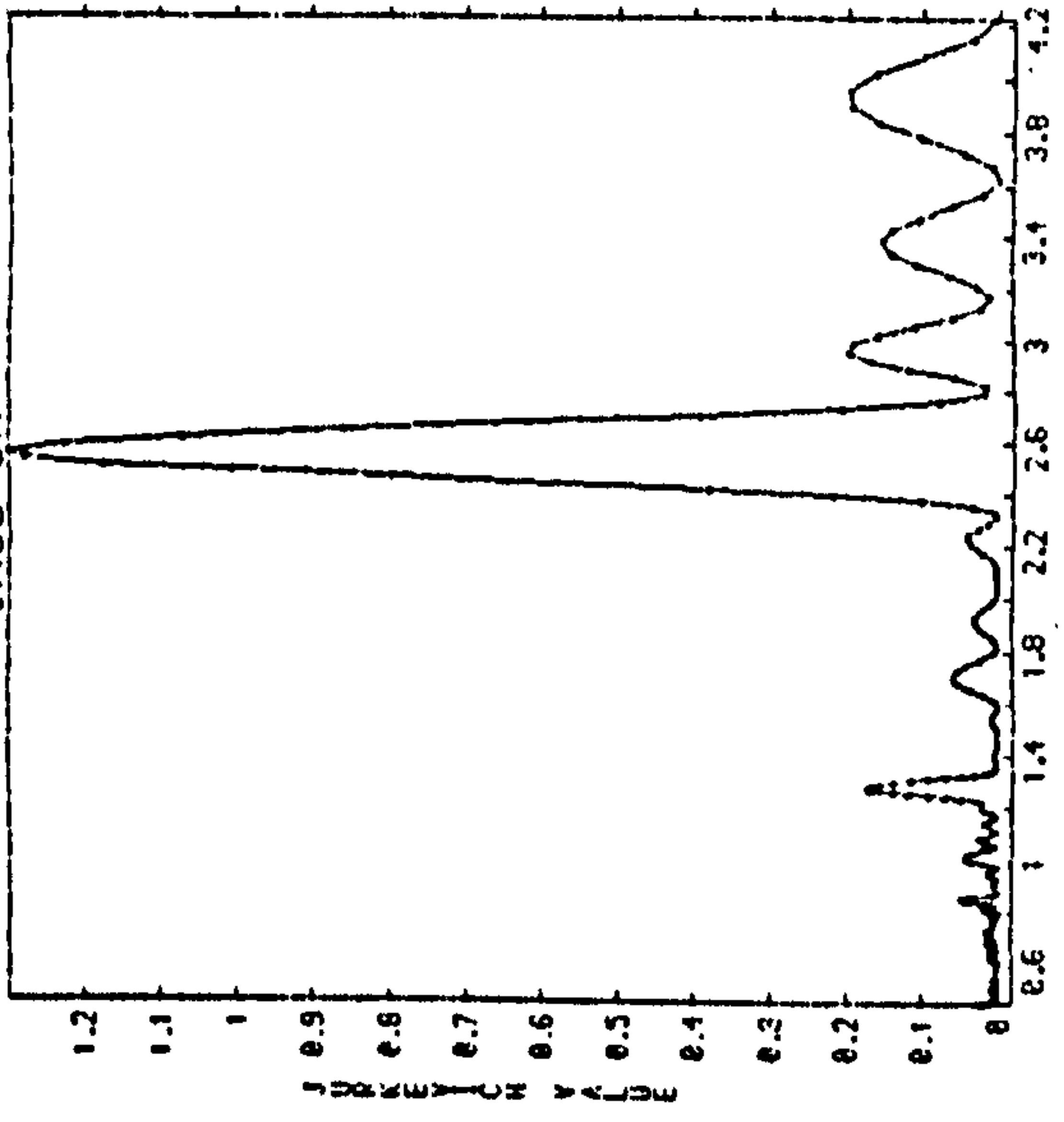
Ser./Acq. No. .



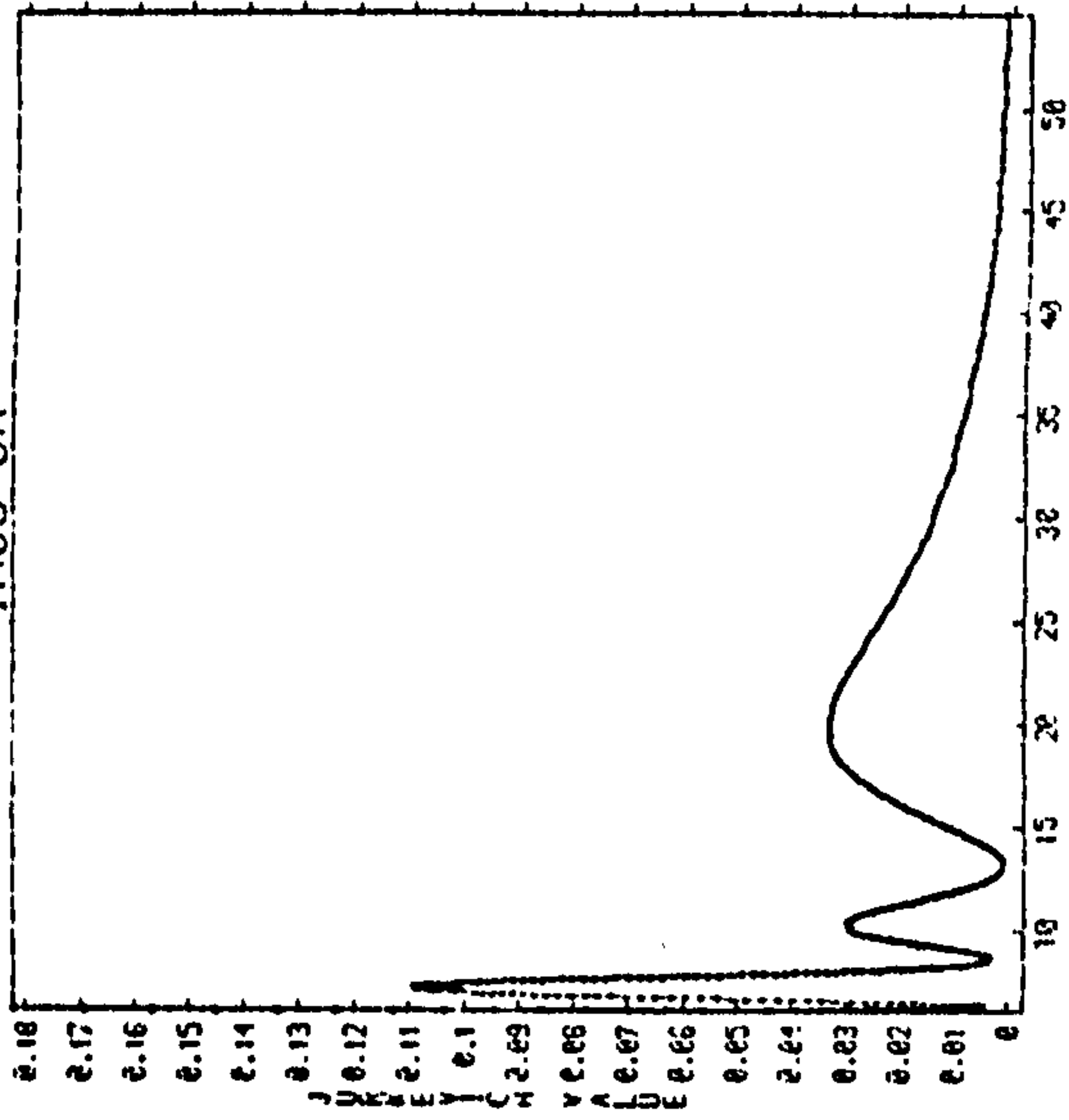
MU	[	Filar
		Scale
[	]	Bench
		Div. Eng.
[	]	Adjust.
		Leveling
[	]	Focus
		Eye P.
[	]	Tube
		Tool
[	]	Gauge
		Binding
[	]	Misc.



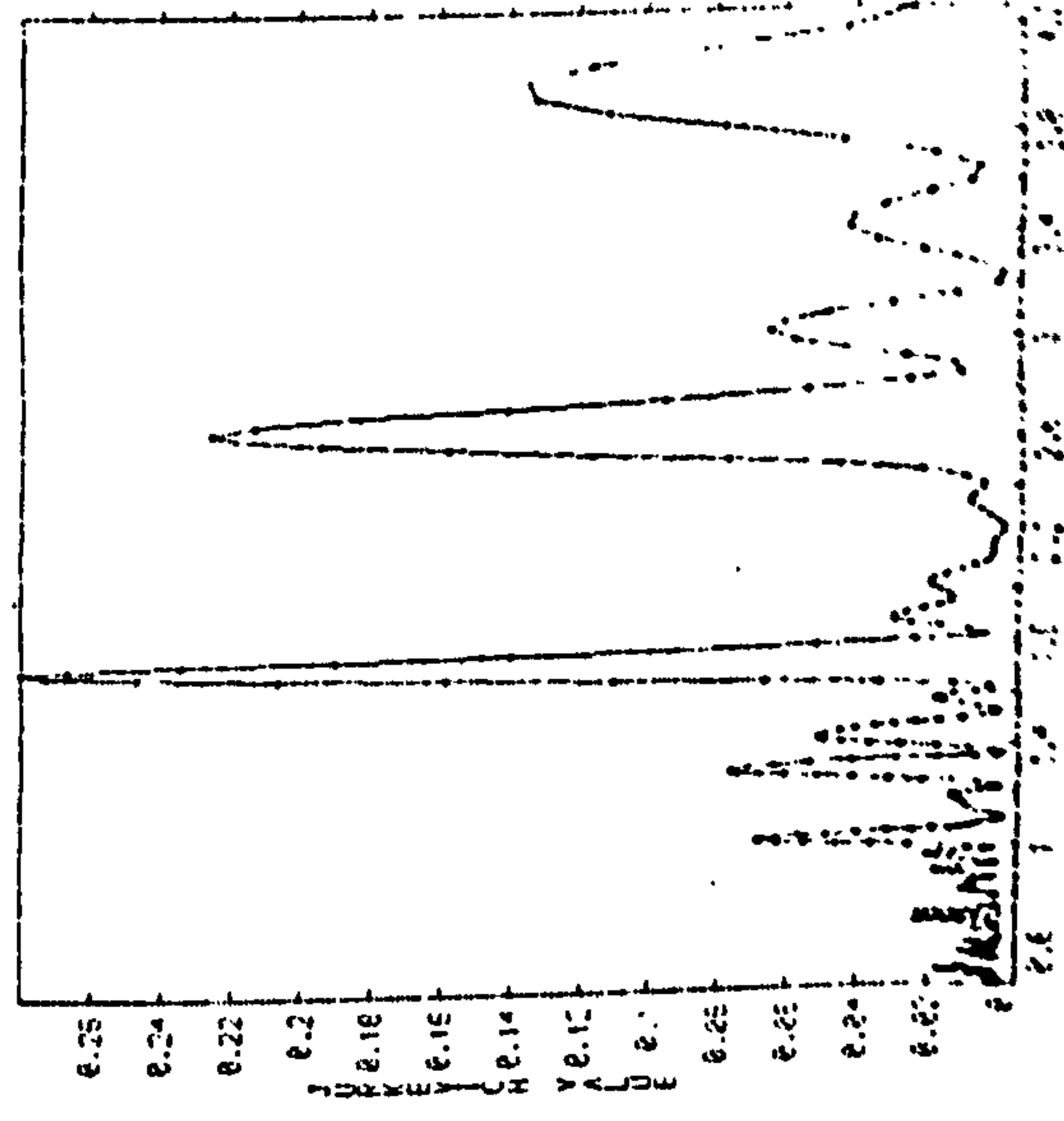
INSS-3A



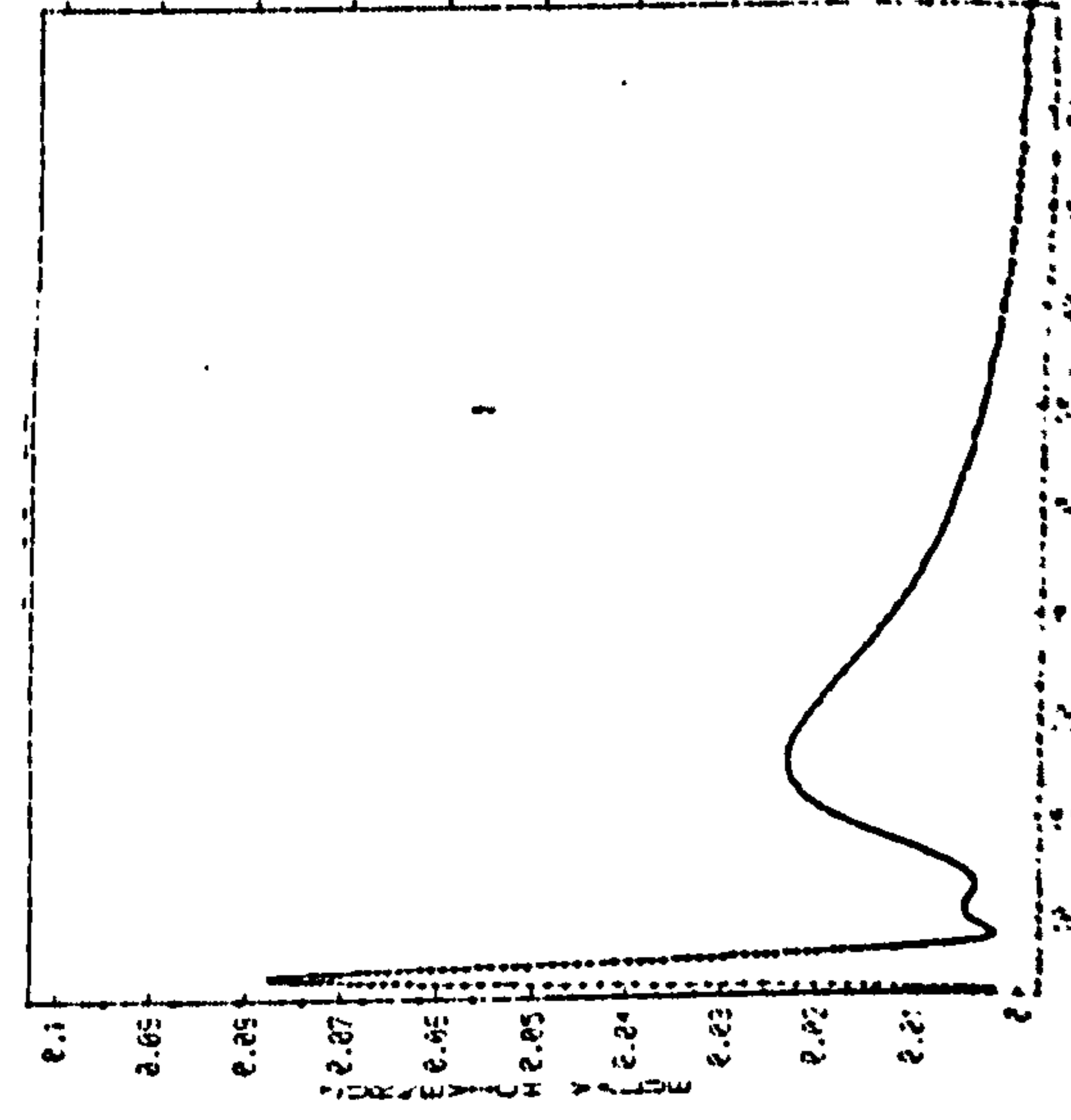
INSS-3A



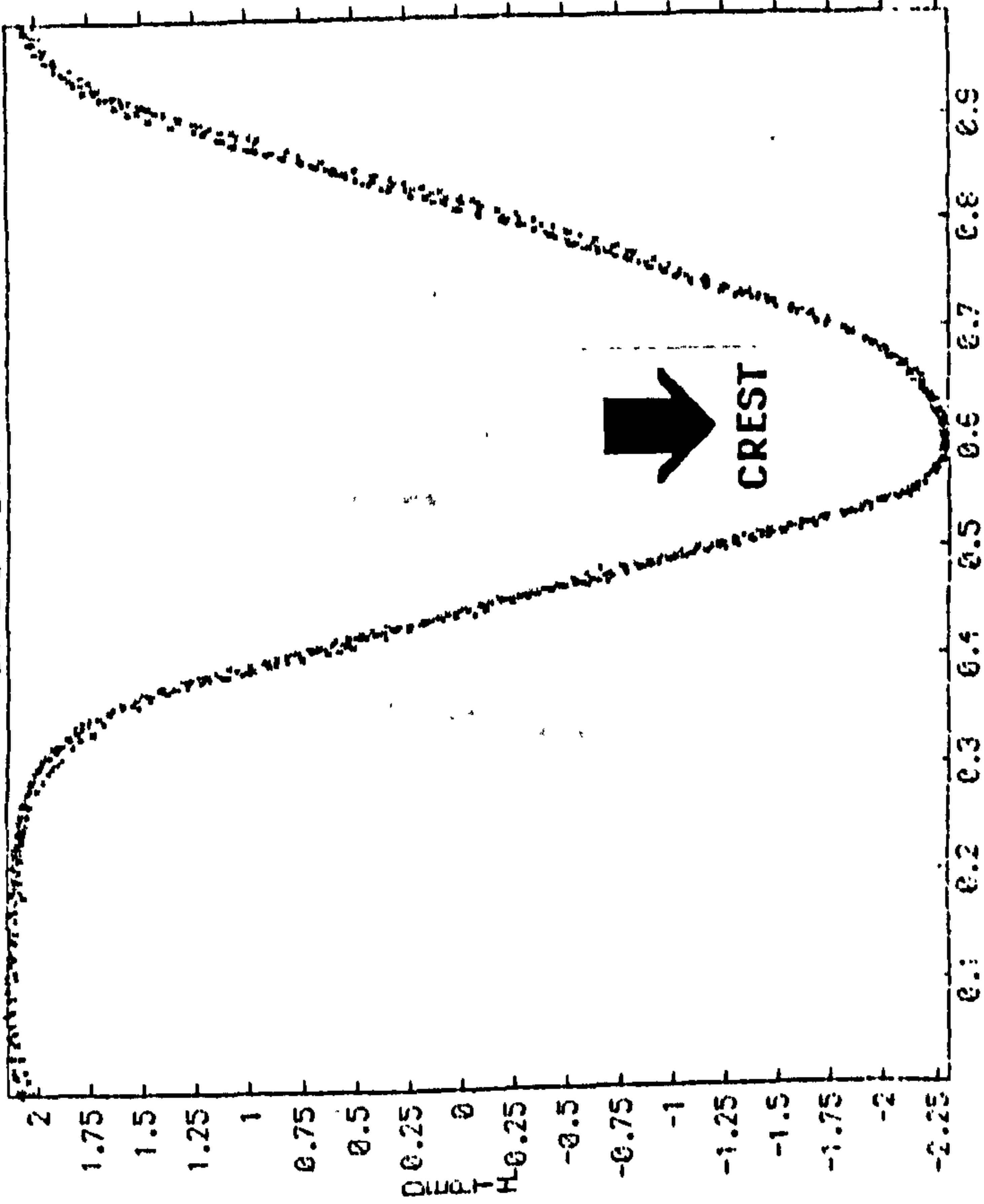
INSS-3A



INSS-3A



IMSS-3A



PHASE

Characteristics:

Screw ☒ Nut ☐

Leng: 1.25" / 0.88"

Diameter:  $\approx 0.35$ "

Steel ☒ Brass ☐

Other:

Instrument Identification:

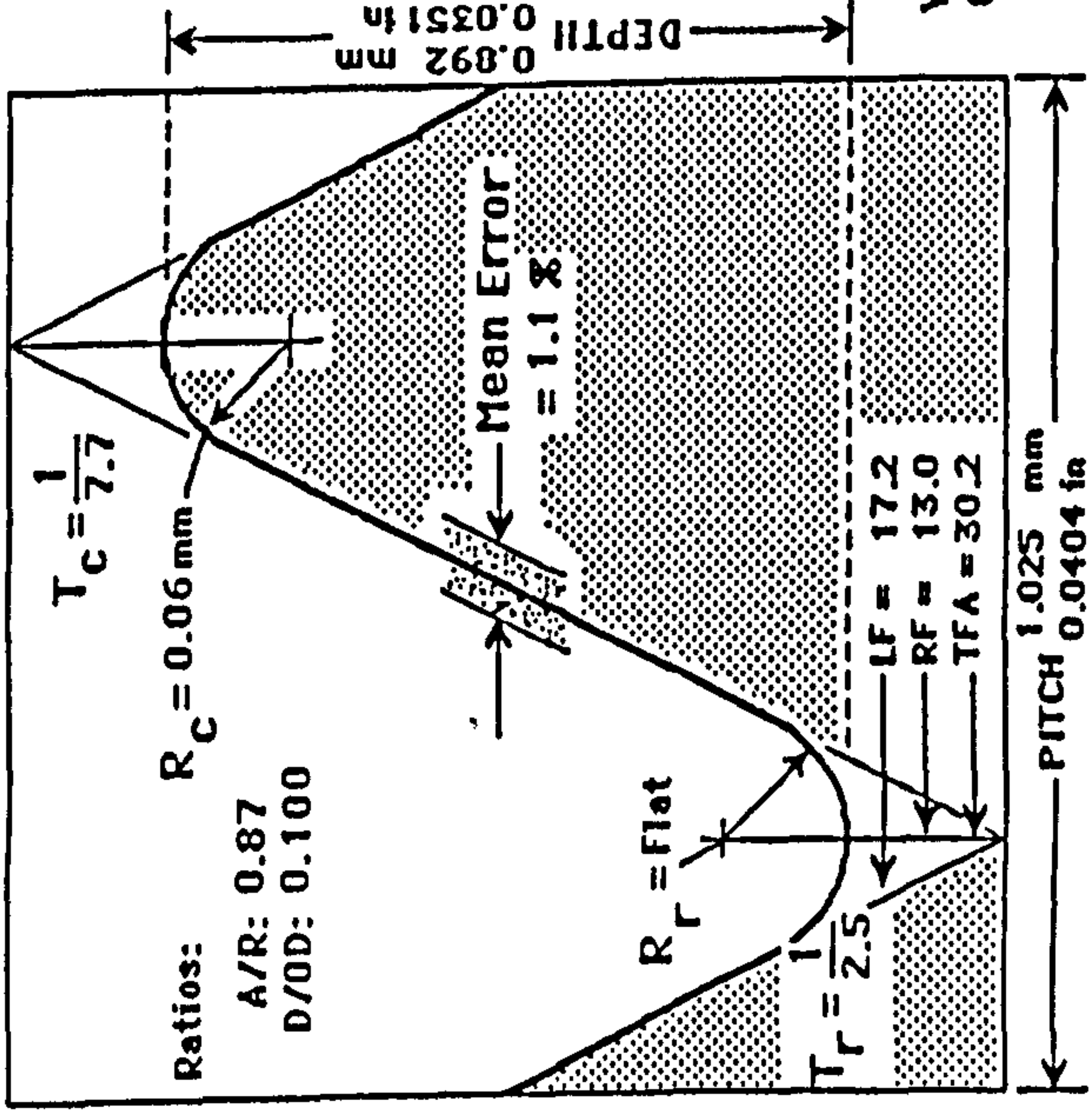
Study Code: IMSS-3a

Instrument: Circular dividing eng.

Maker: Amici (attributed)

Date: ca.1820(?)

Ser./Acq. No. .



Mu	[	Filar
		Scale
[	]	Bench
		Div. Eng.
[	]	Adjust.
		Leveling
[	]	Focus
		Eye P.
[	]	Tube
		Tool
[	]	Gauge
		Binding
[	]	Misc.

Wheel radius  $\approx 14$ " and 0.88" thick

Characteristics:

Screw

Nut

Leng: 1.25" / 0.88"

Diameter: 0.35"

Steel

Brass

Other:

Instrument Identification:

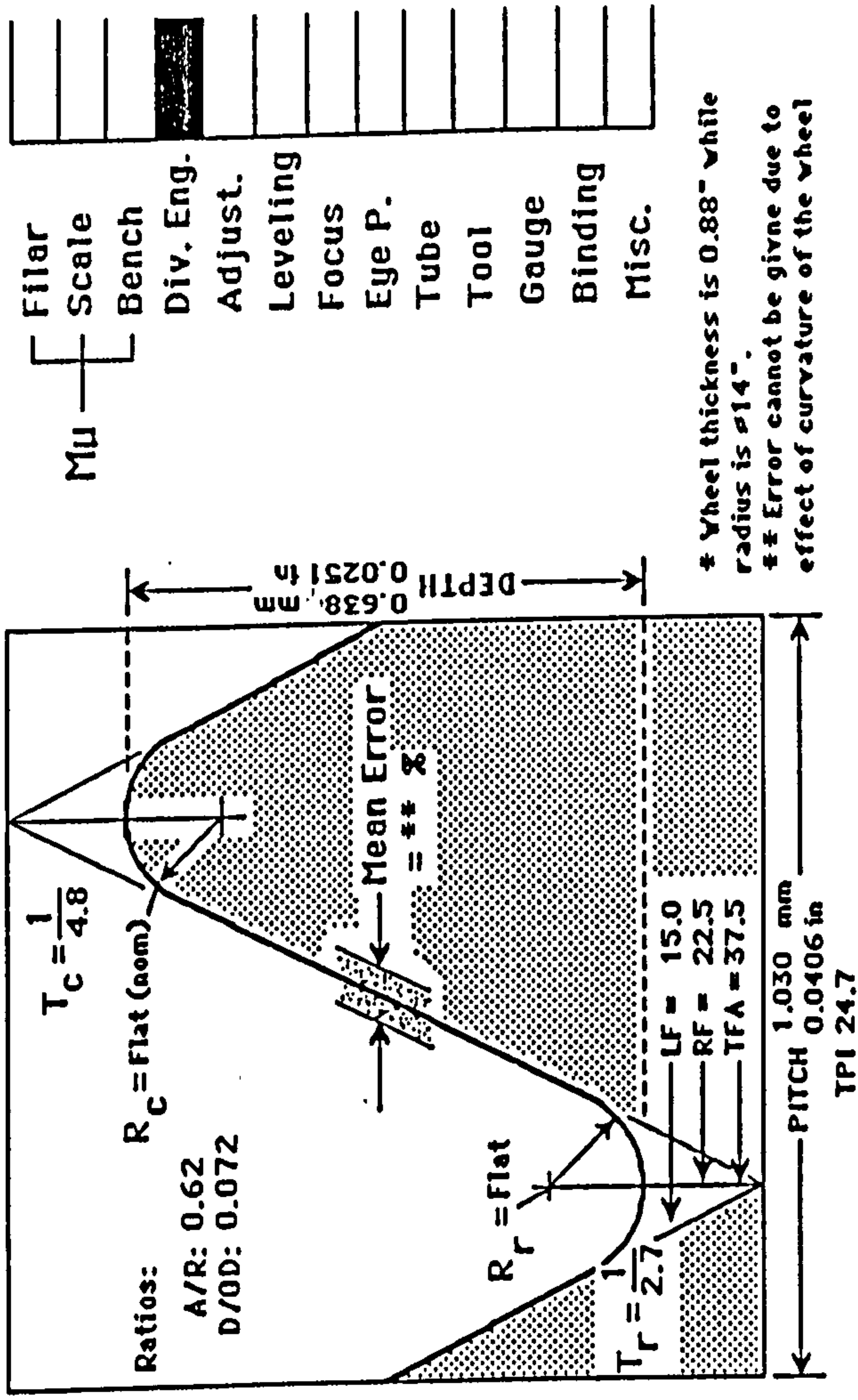
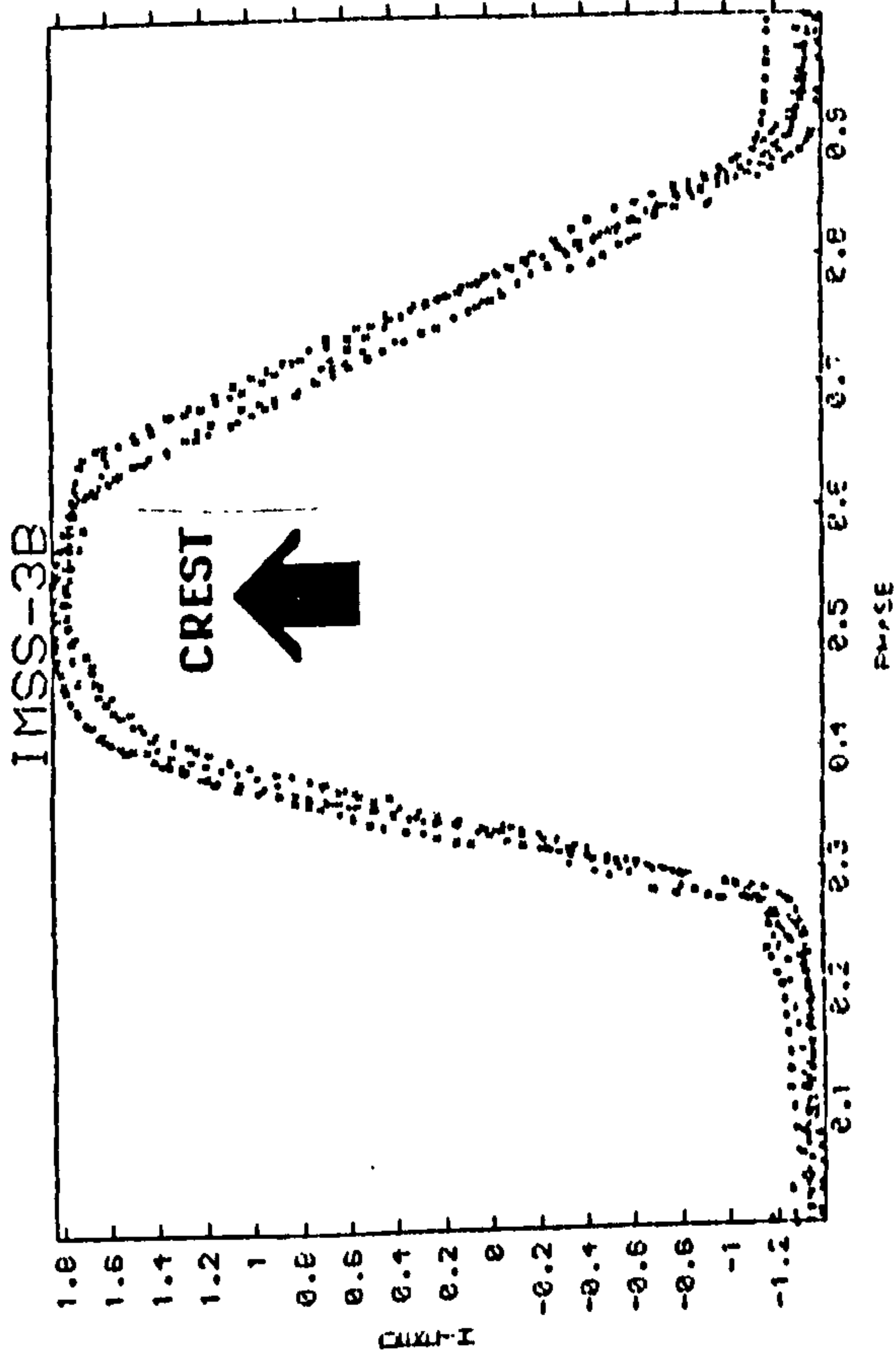
Study Code: IMSS-3b

Instrument: Circular dividing eng.

Maker: Amici (attributed)

Date: ca.1820

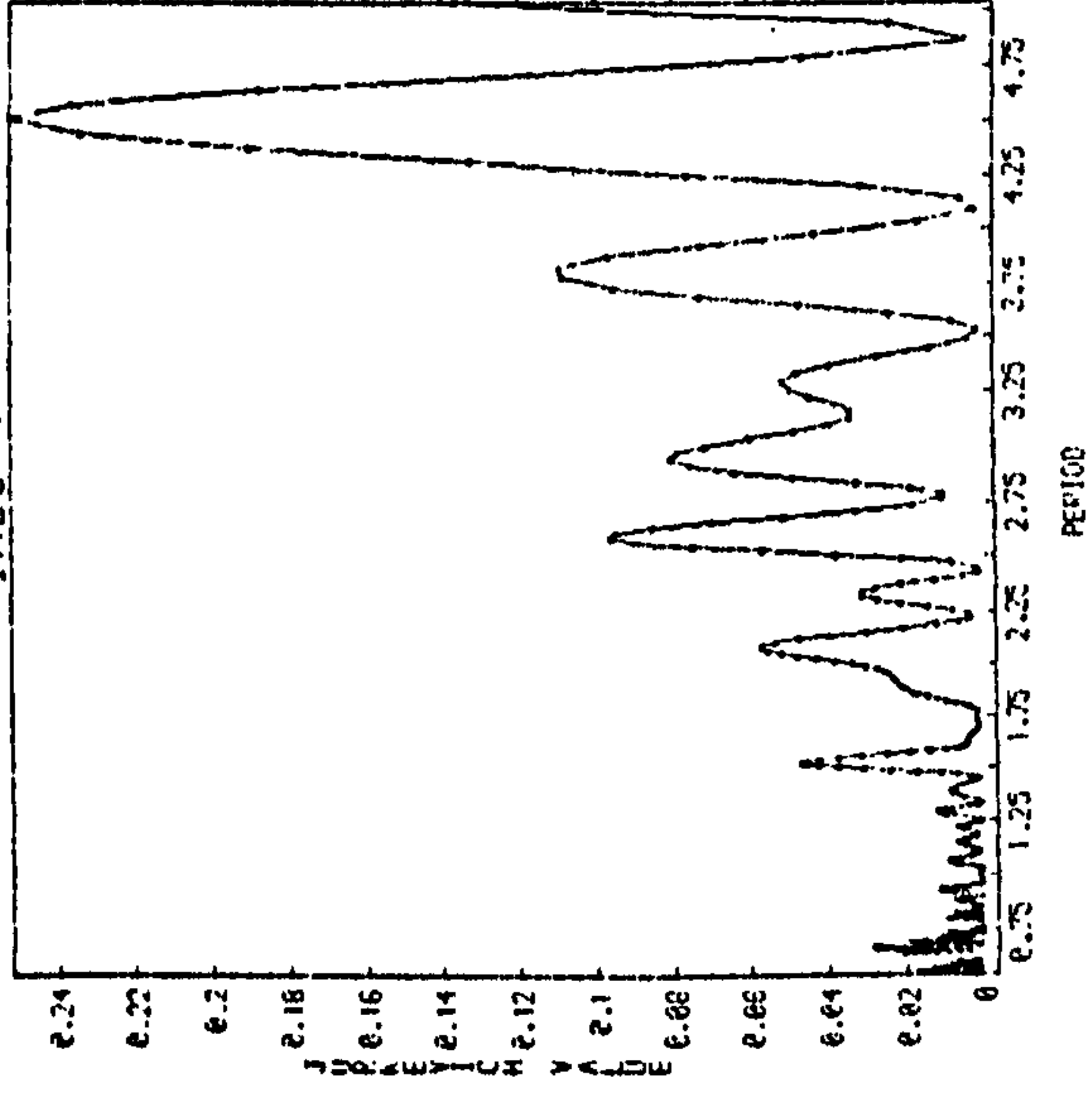
Ser./Acq. No. .



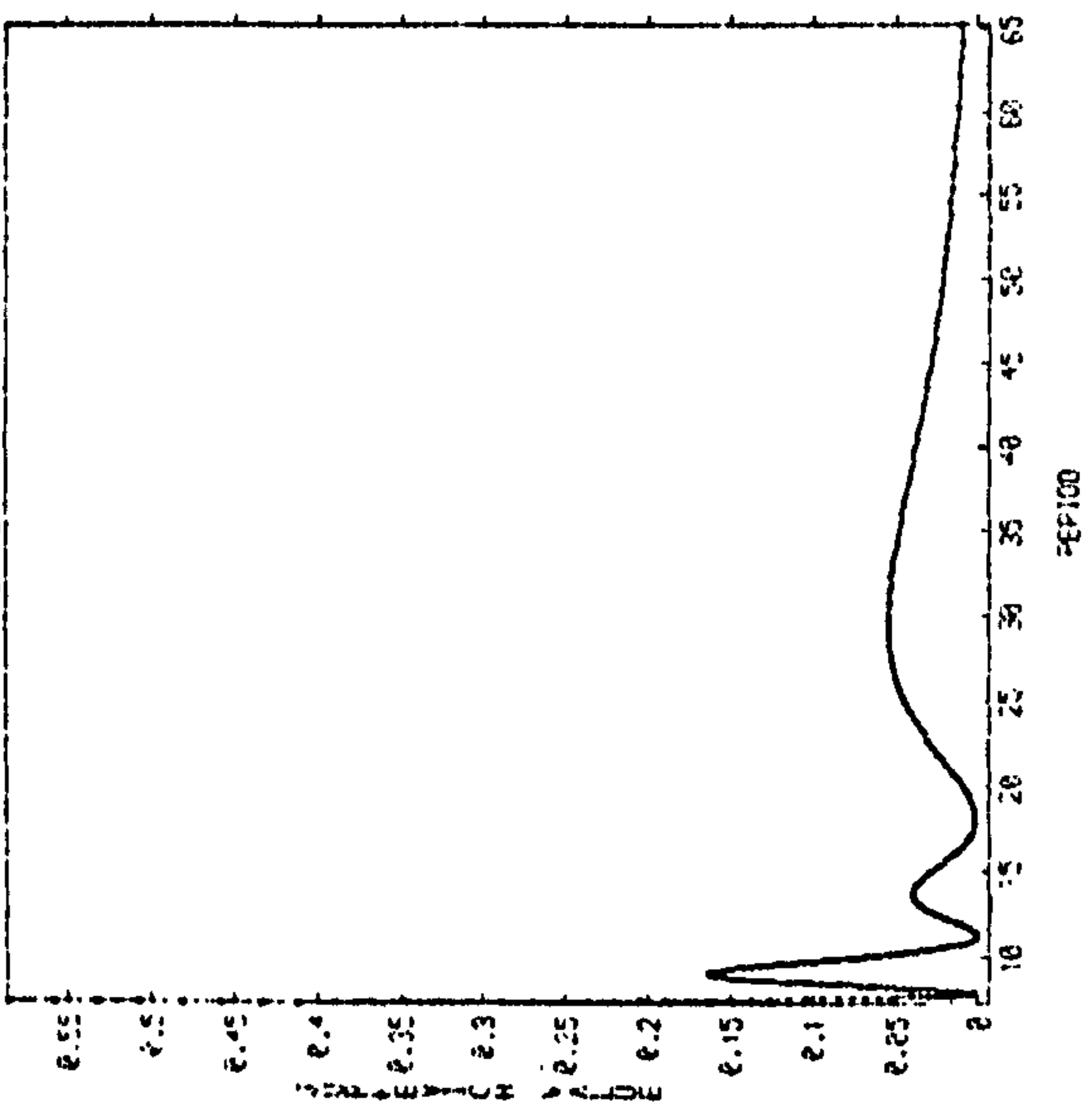
\* Wheel thickness is 0.88" while radius is 14".

\*\* Error cannot be given due to effect of curvature of the wheel

IMSS-4



IMSS-4





Characteristics:

Screw

Nut

Leng: 7.64" / 1.26"

Diameter: ~0.40"

Steel

Brass

Other:

Instrument Identification:

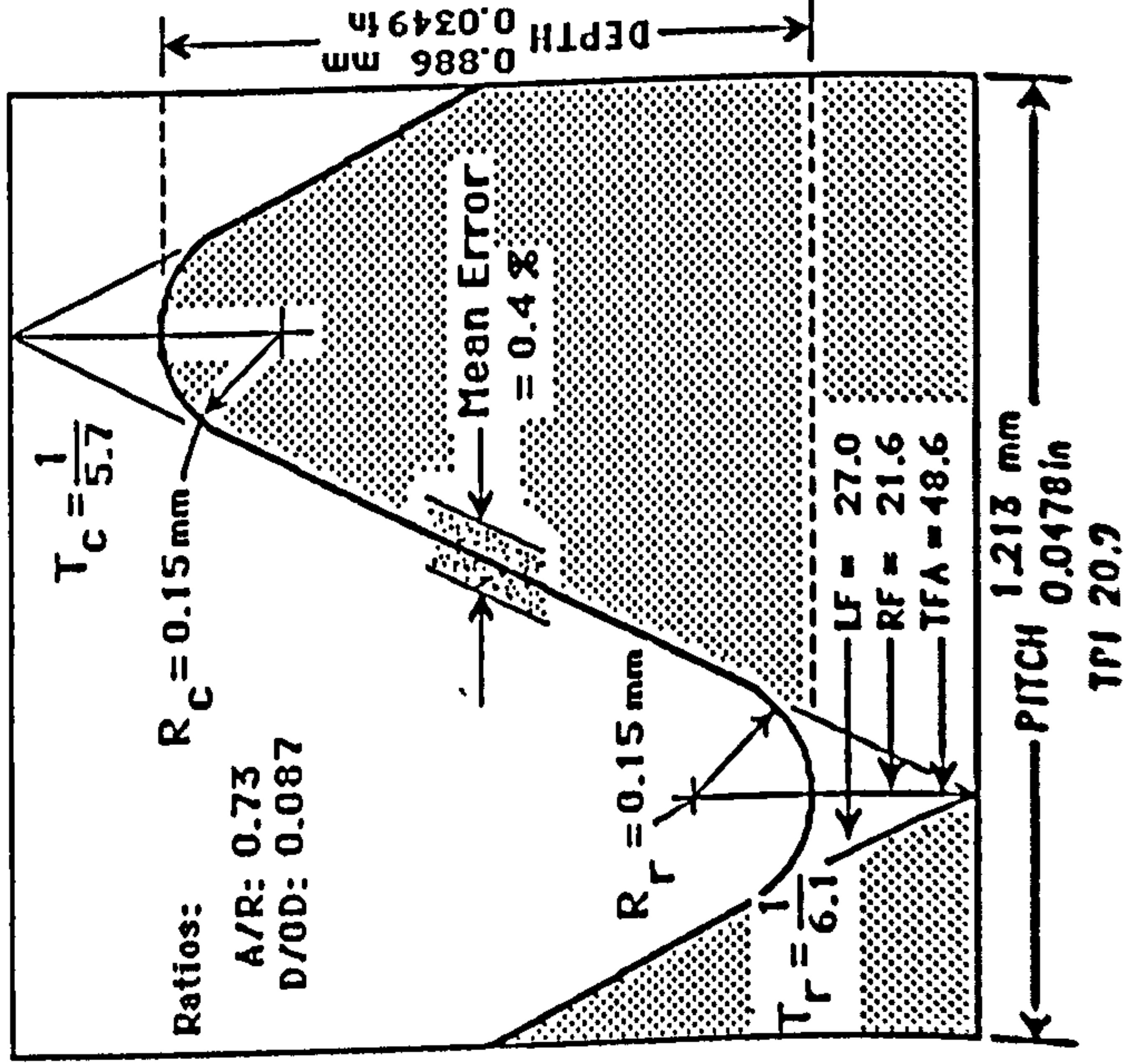
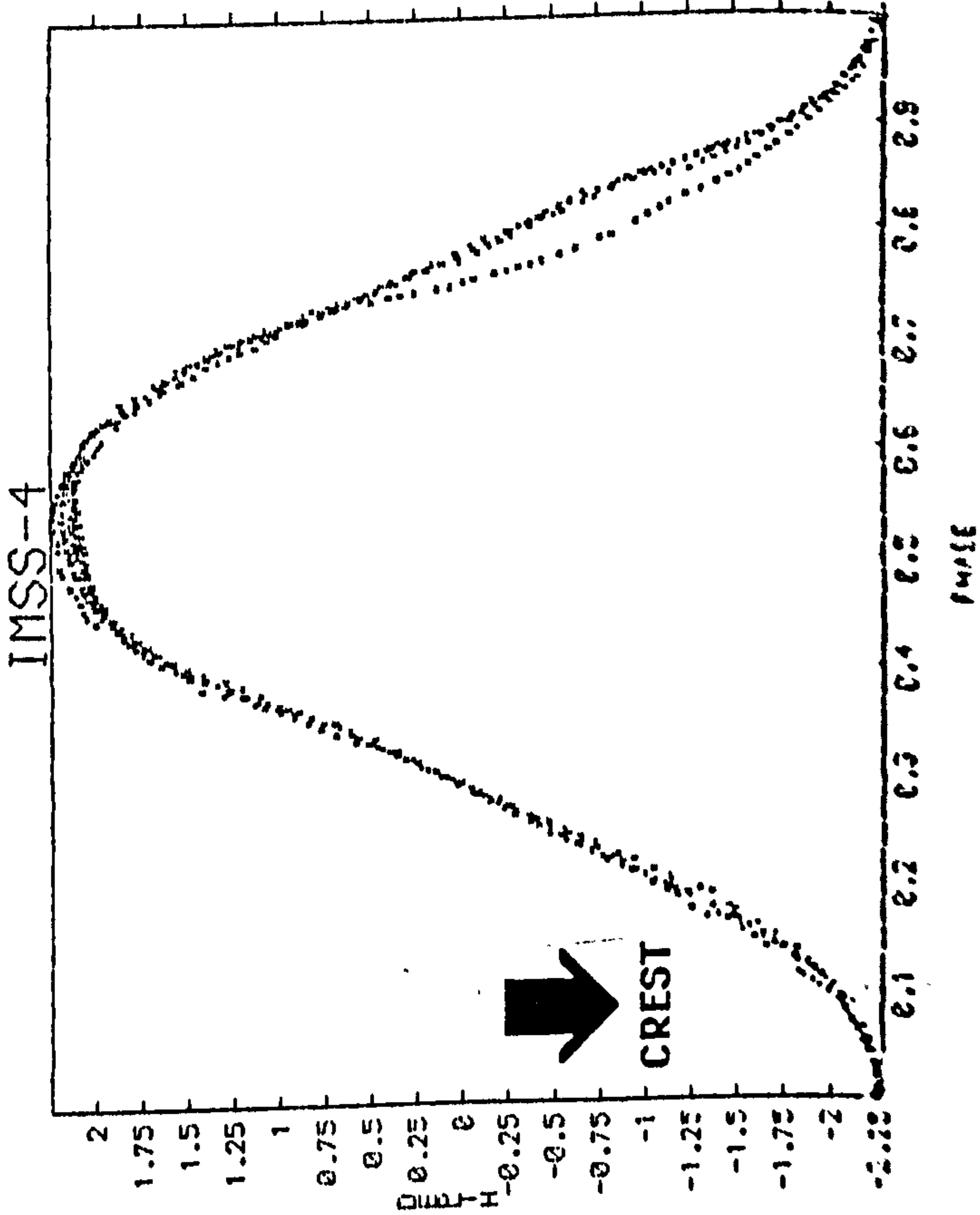
Study Code: IMSS-4

Instrument: Linear dividing eng.?

Maker: N/S (Chaulnes?)

Date: 2nd h 18th c

Ser./Acq. No. .



MU

Filar

Scale

Bench

Div. Eng.

Adjust.

Leveling

Focus

Eye P.

Tube

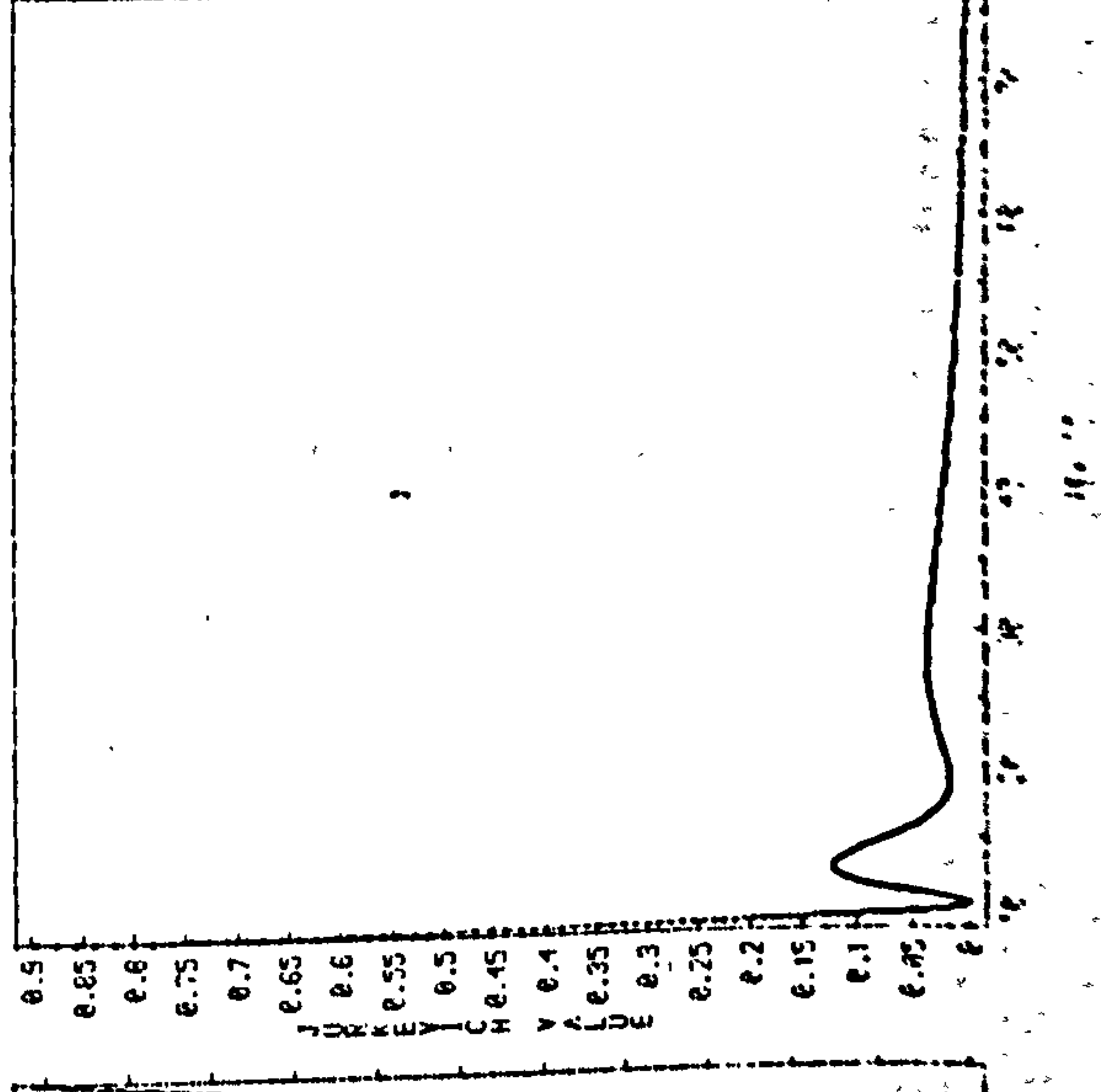
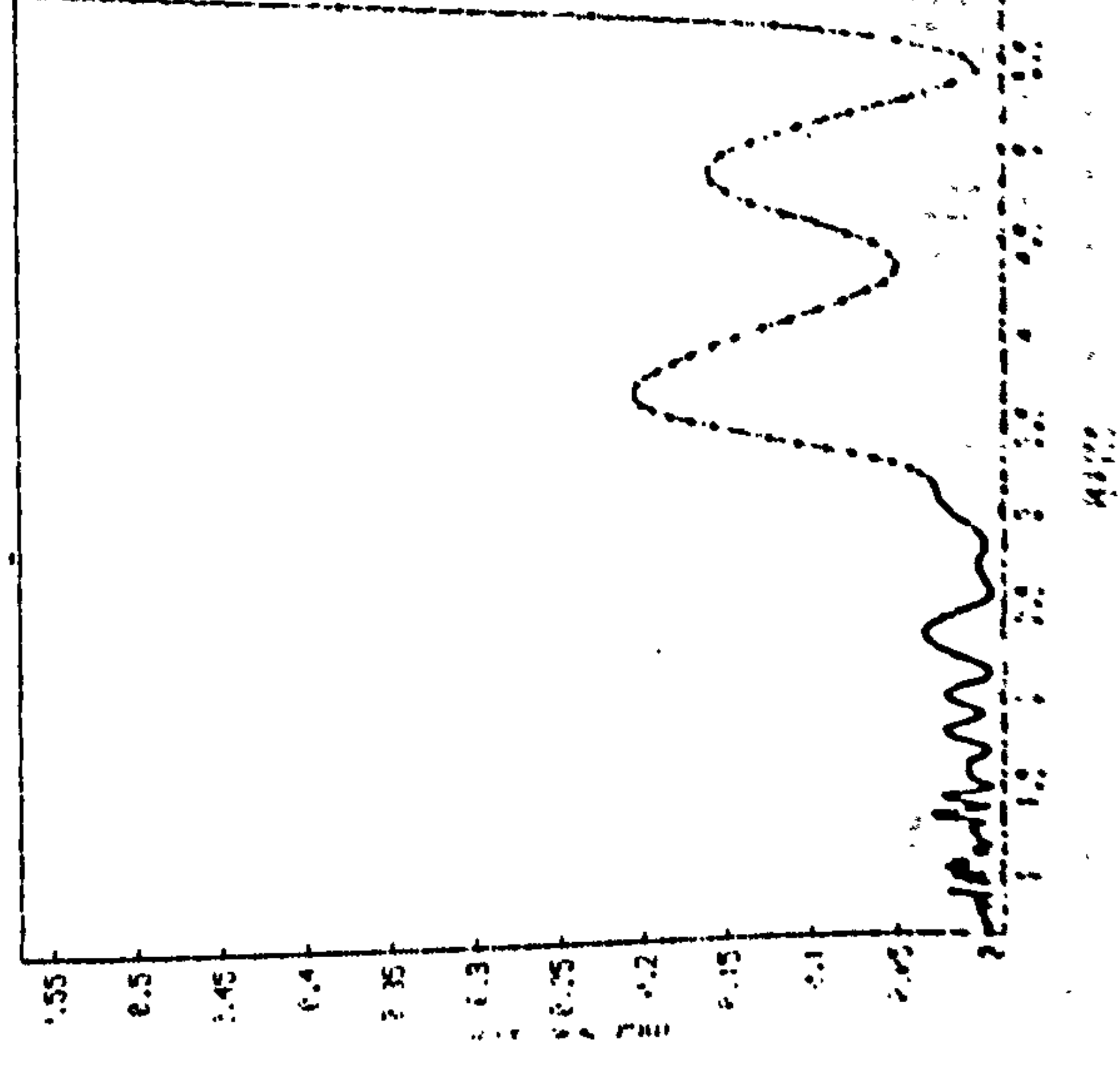
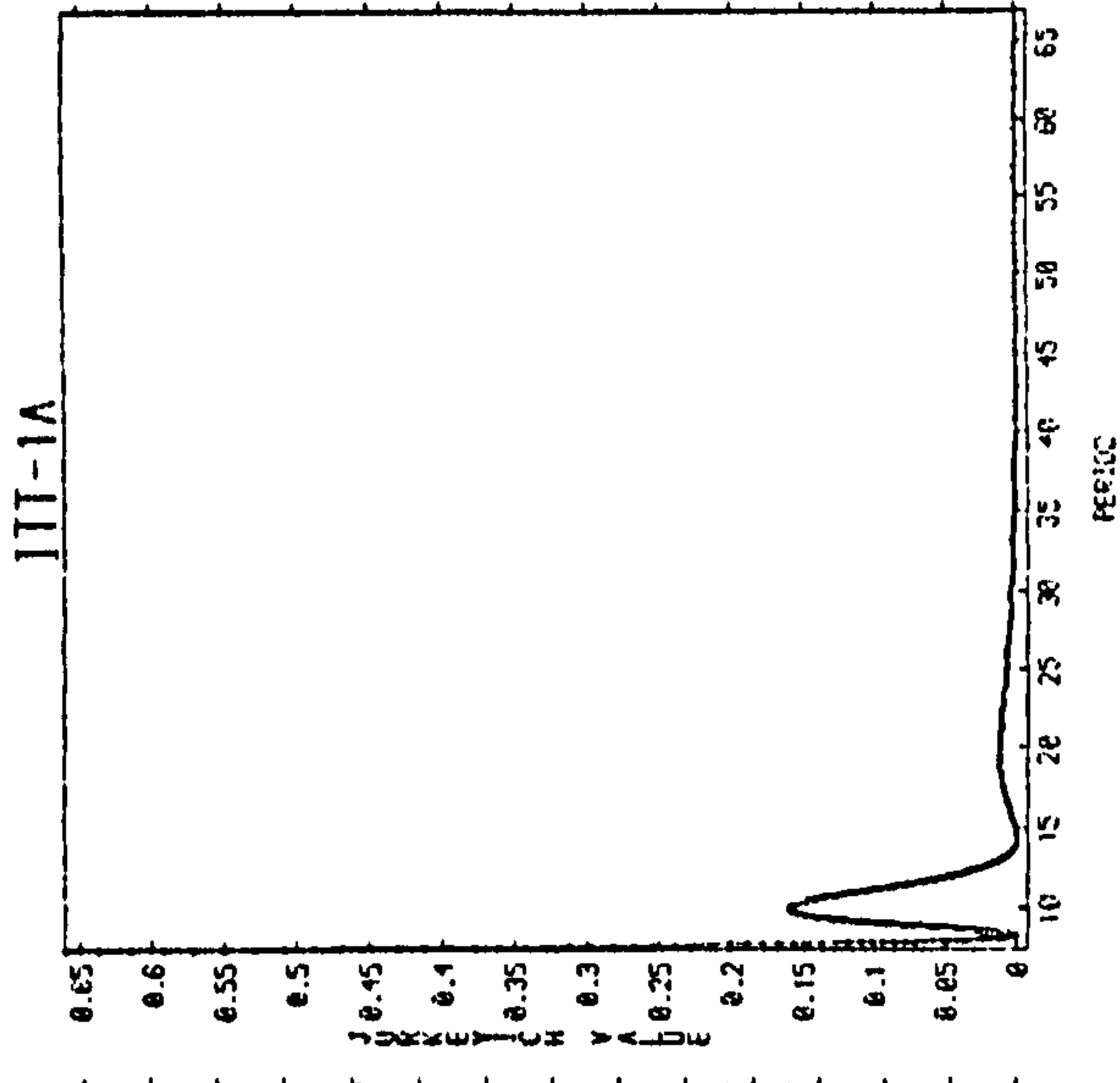
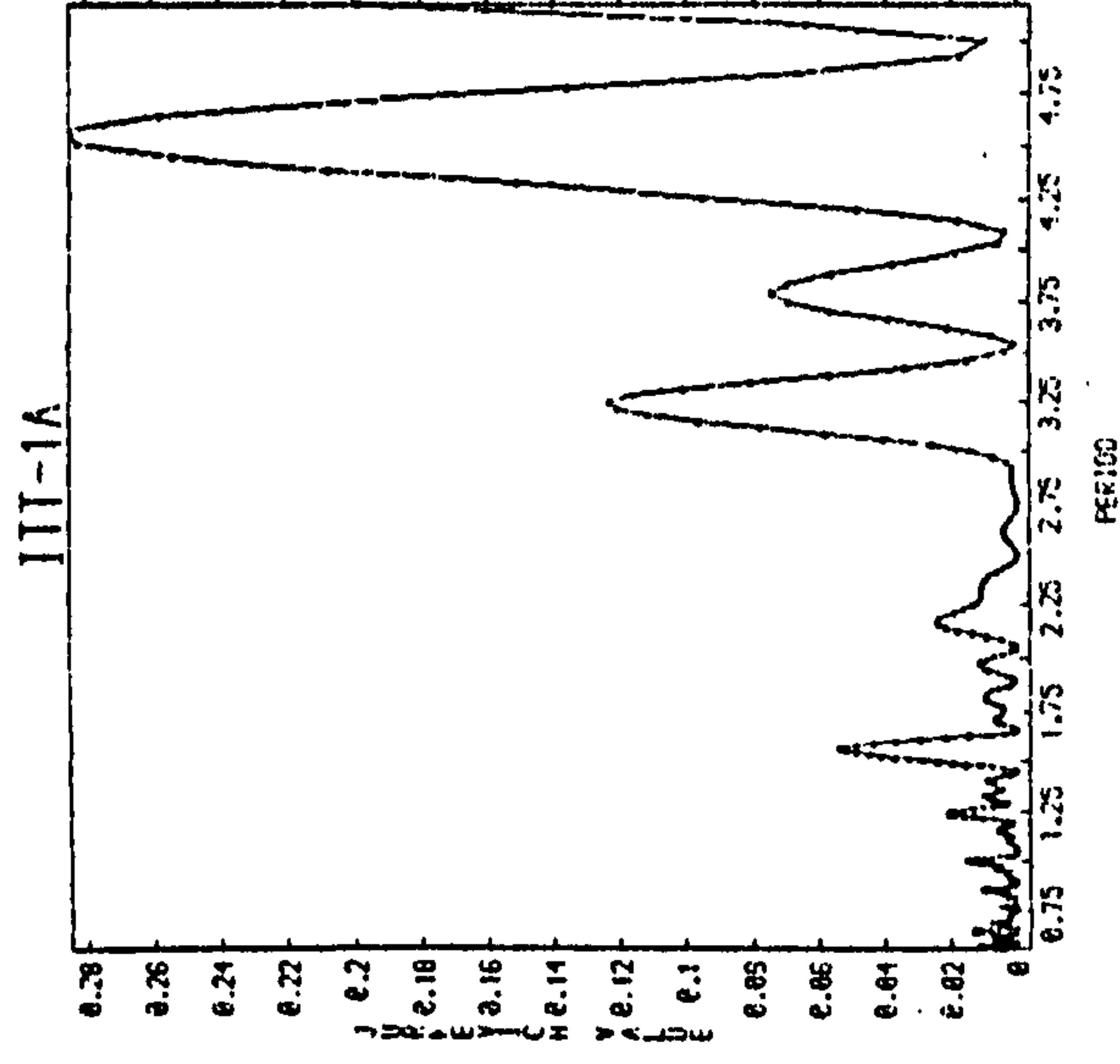
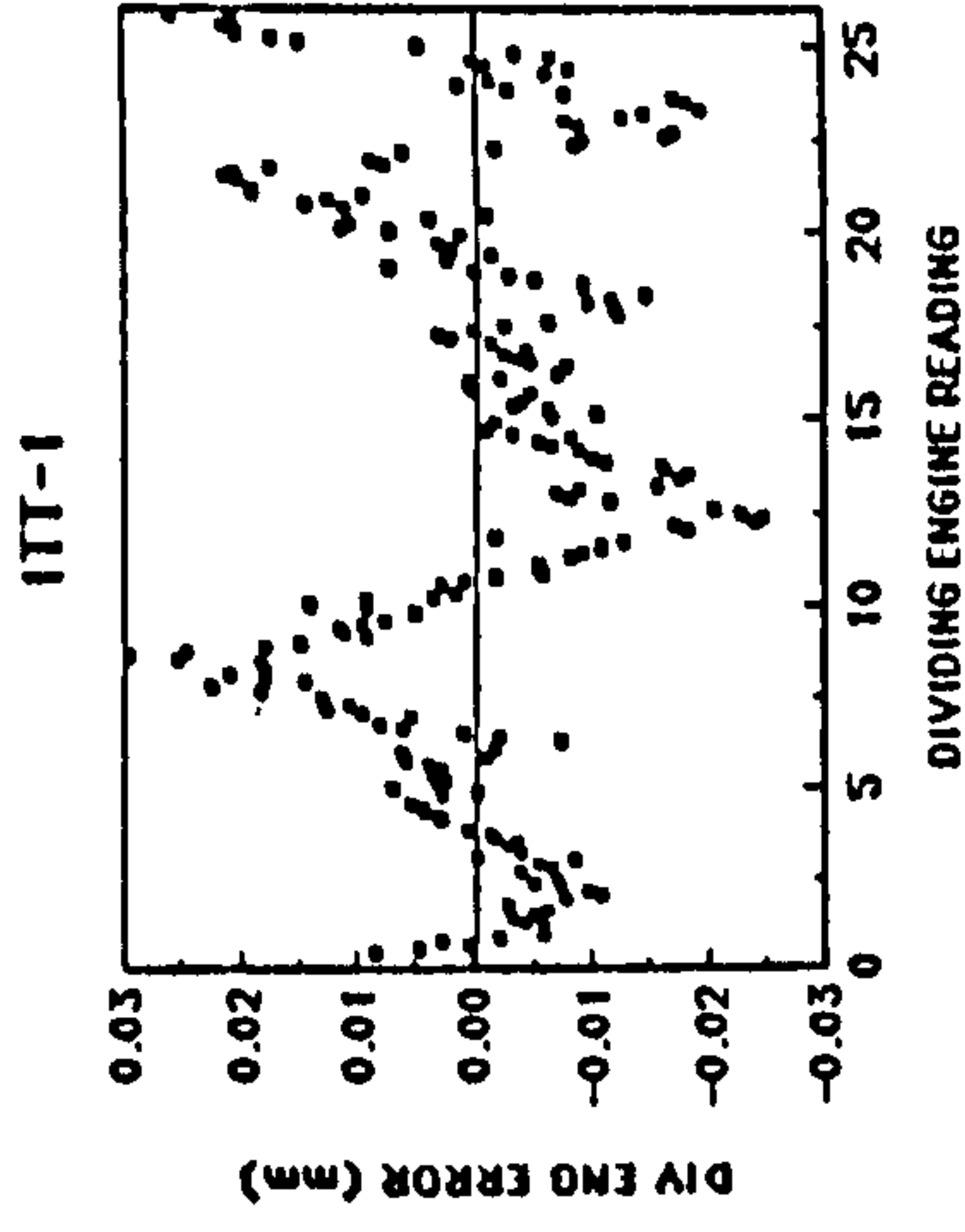
Tool

Gauge

Binding

Misc.

The function of this unusual instrument is not known but may be a DE or possibly was for ruling gratings on glass though the lines would have been slightly curved.



Characteristics:

Screw

Nut

Leng: 1.831"/r=5.55"

Diameter: 0.6205"

Steel

Brass

Other:

Instrument Identification:

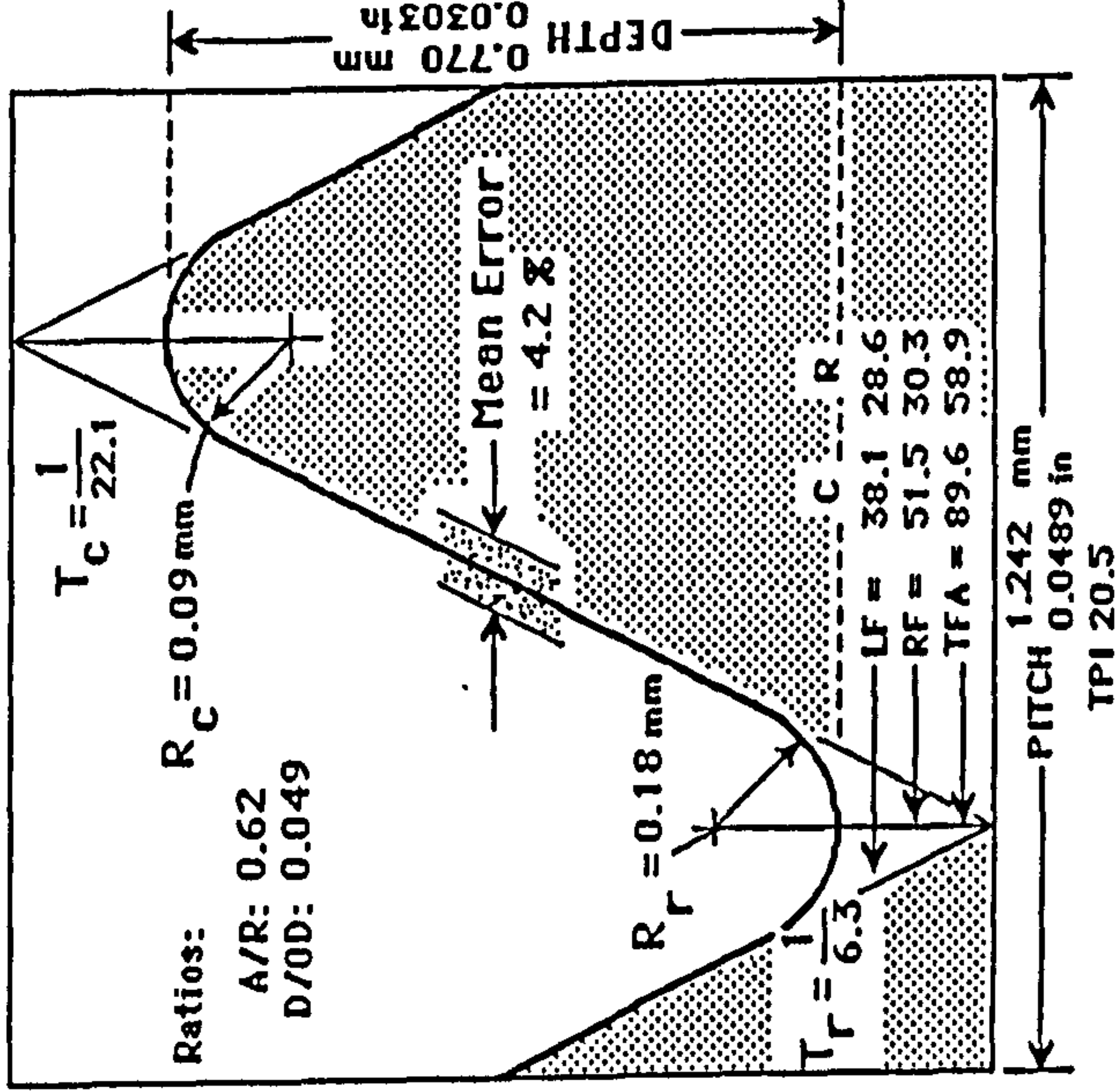
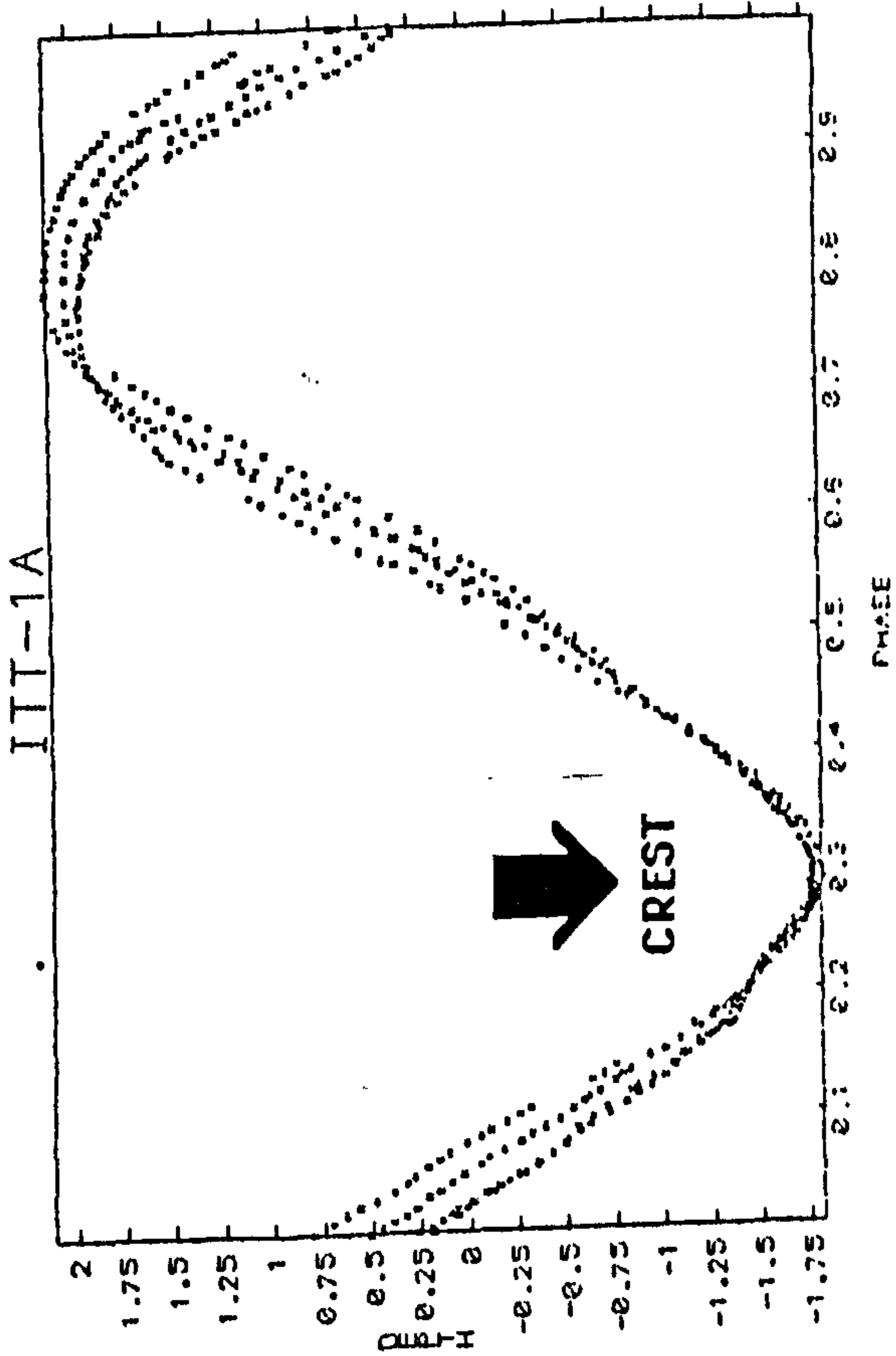
Study Code: ITT-1a

Instrument: Circular dividing eng.

Maker: Perreaux

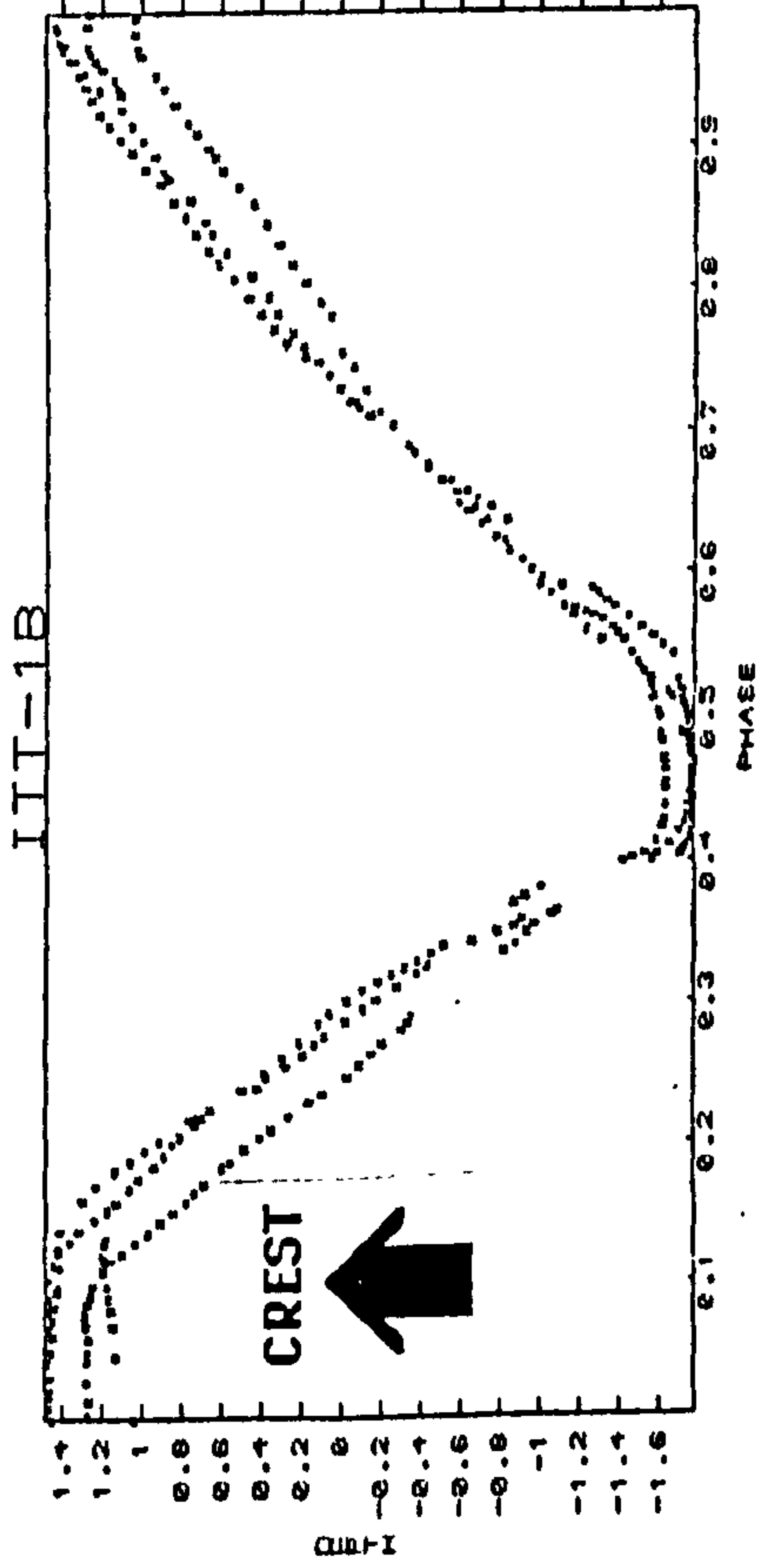
Date: 1855

Ser./Acq. No. A176/1855



Mu	Filar	
	Scale	
	Bench	
	Div. Eng.	
	Adjust.	
	Leveling	
	Focus	
	Eye P.	
	Tube	
	Tool	
	Gauge	
	Binding	
	Misc.	

Perreux was at de l'Orne in Paris



**Characteristics:**

Screw ☐ Nut ☒

Leng: 1.831"/R=5.55"

Diameter:  $\approx 0.75$ " thick

Steel ☐ Brass ☒

Other:

**Instrument Identification:**

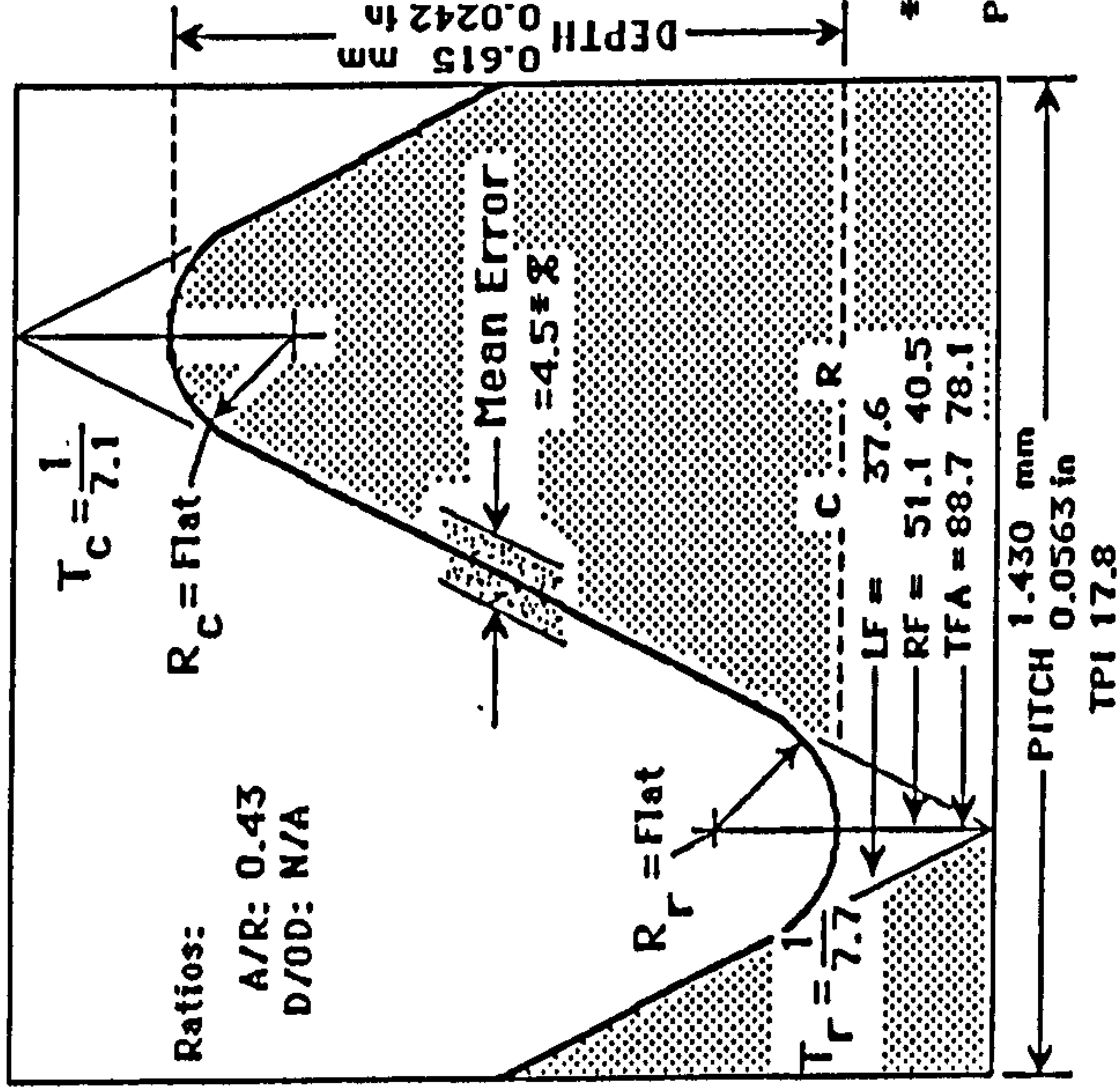
Study Code: ITT-1b

Instrument: Circular dividing eng.

Maker: Perreaux

Date: 1855

Ser./Acq. No. A176/1855

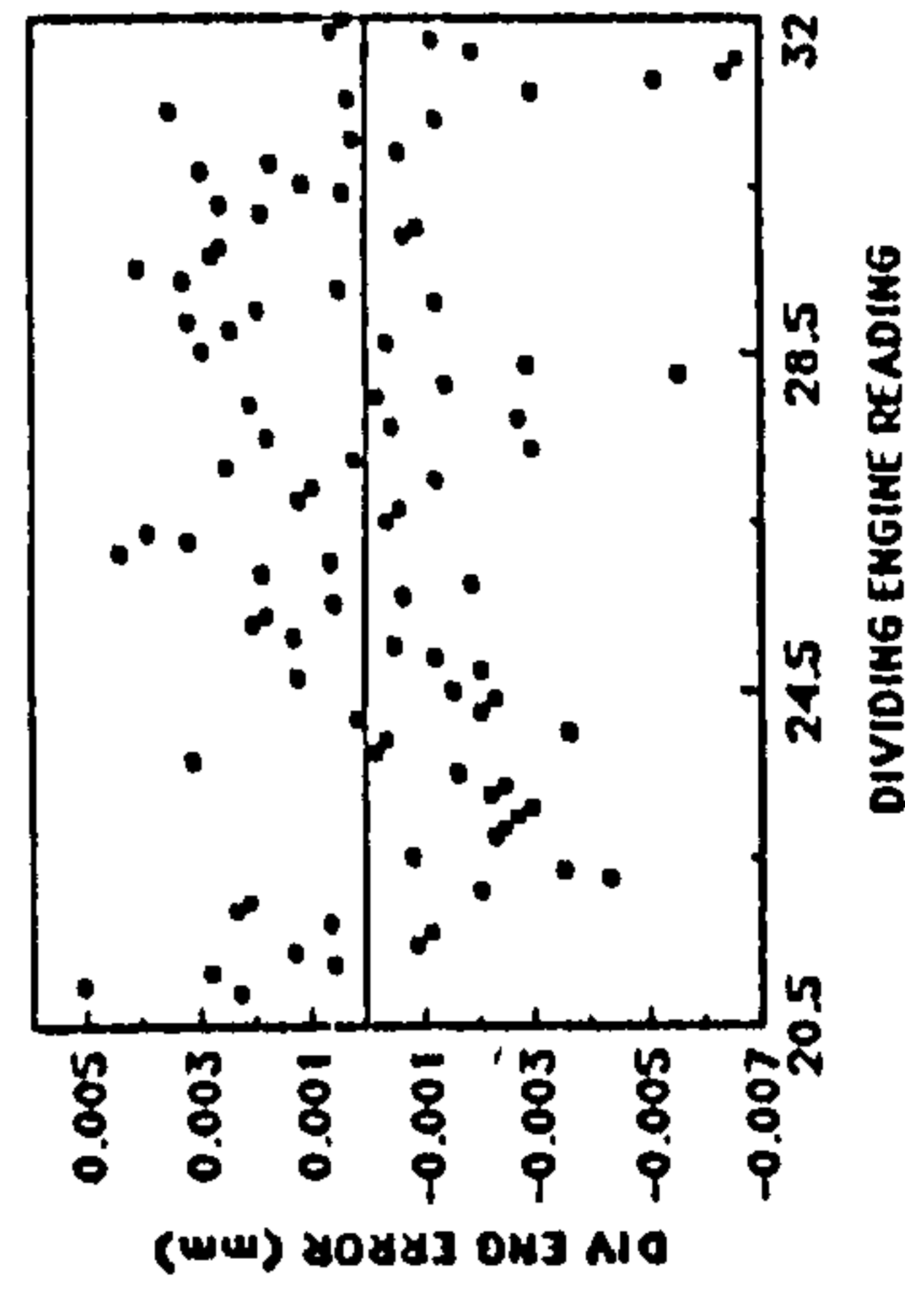


Mu — [ Filar Scale Bench Div. Eng. Adjust. Leveling Focus Eye P. Tube Tool Gauge Binding Misc. ]

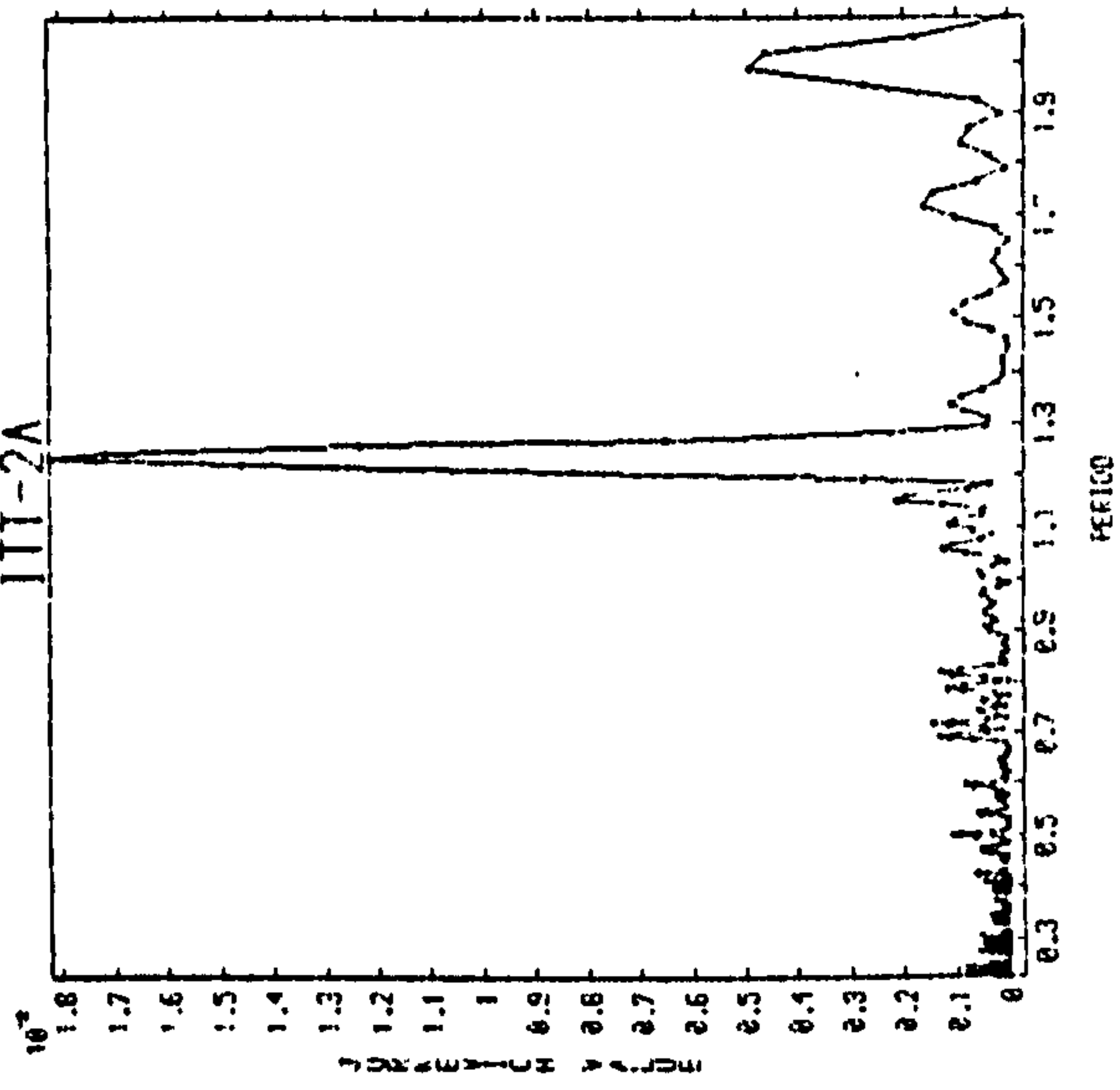
\* Error is affected by the curvature of the wheel.  
Purchased at the Paris Exhibition



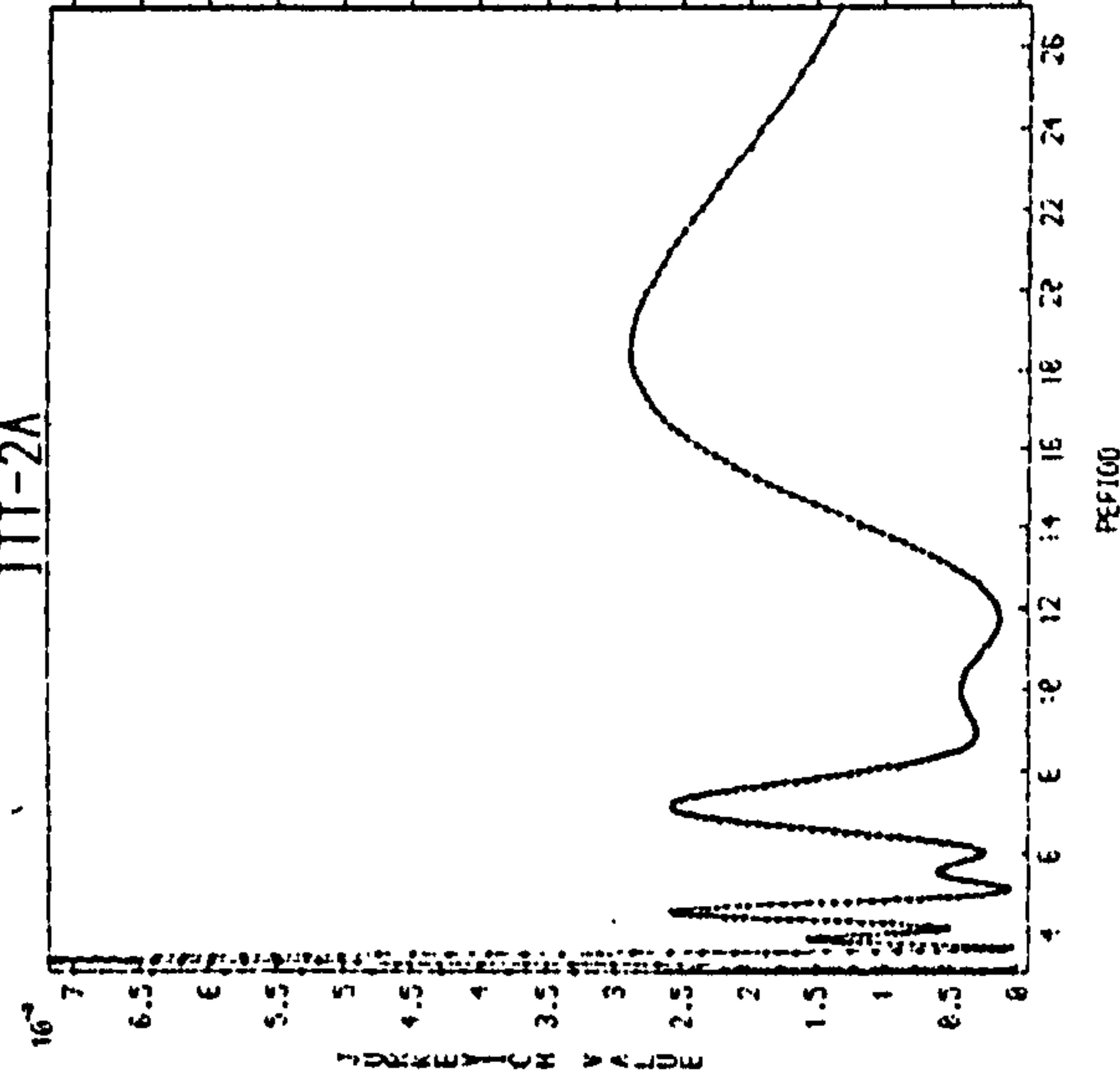
III-2

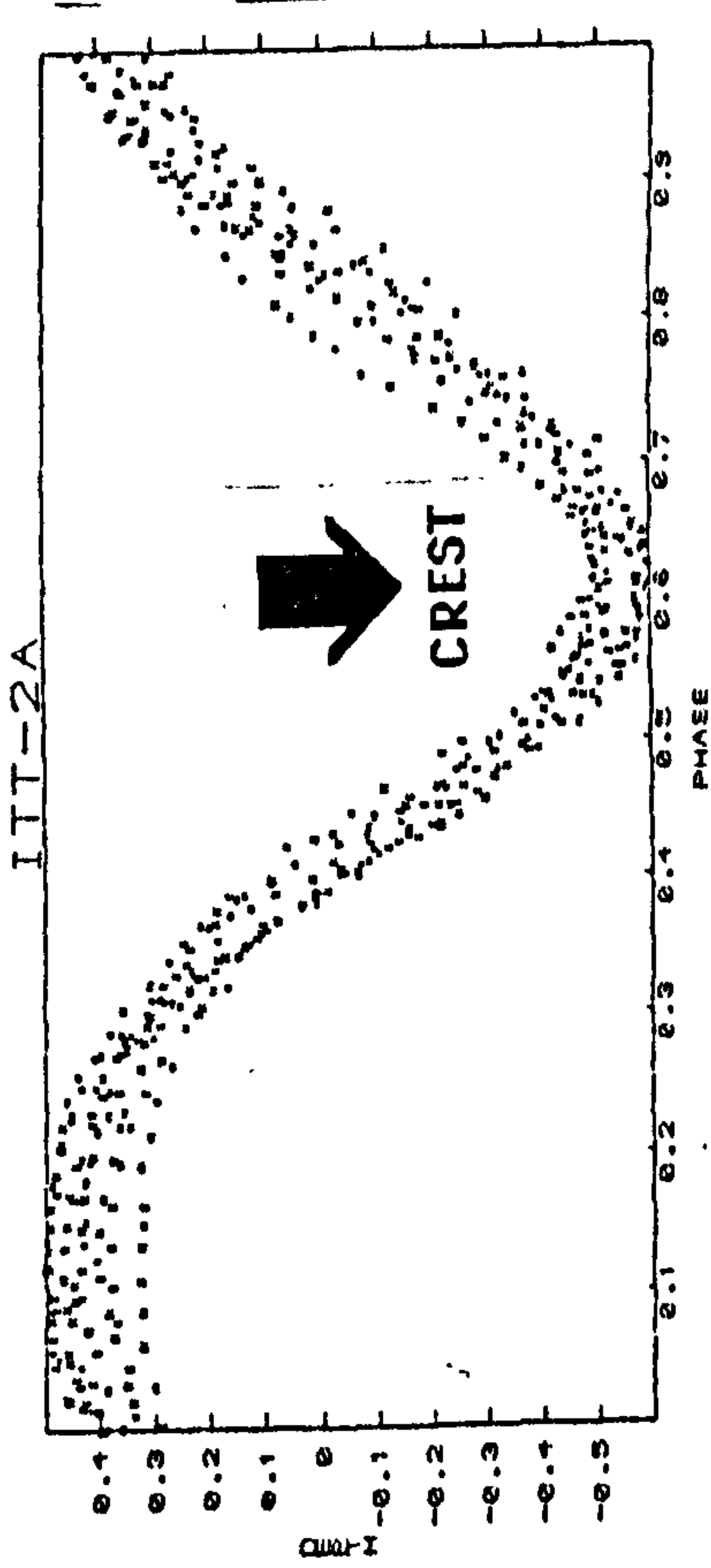


III-2A



III-2A





### Characteristics:

Screw ☒ Nut ☐

Leng: 24.0" / 1.67"

Diameter: 0.669"

Steel ☒ Brass ☐

Other: ☐

### Instrument Identification:

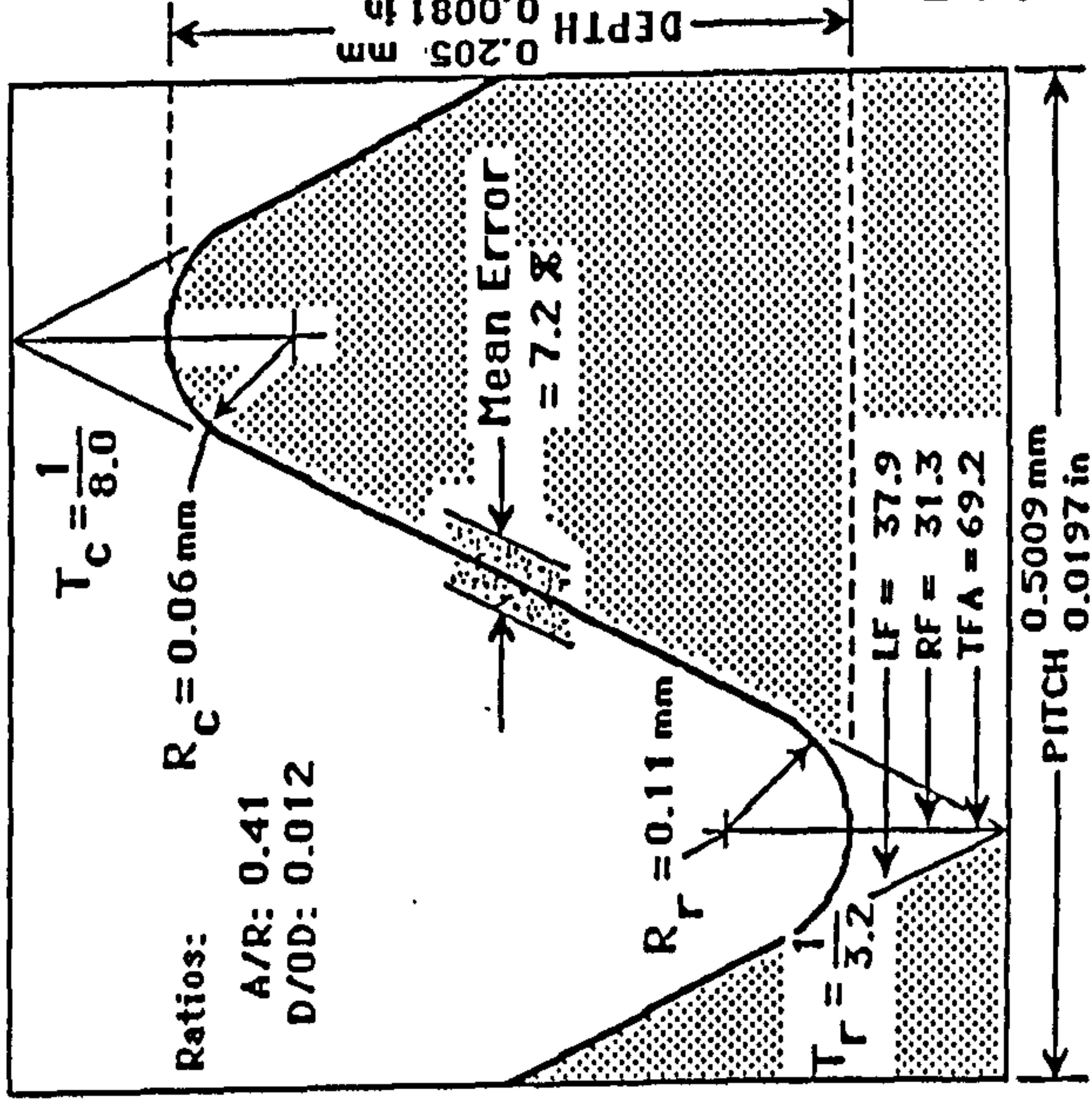
Study Code: ITT-2a

Instrument: Linear dividing eng.

Maker: Perreaux

Date: 1855

Ser./Acq. No. A177/1855

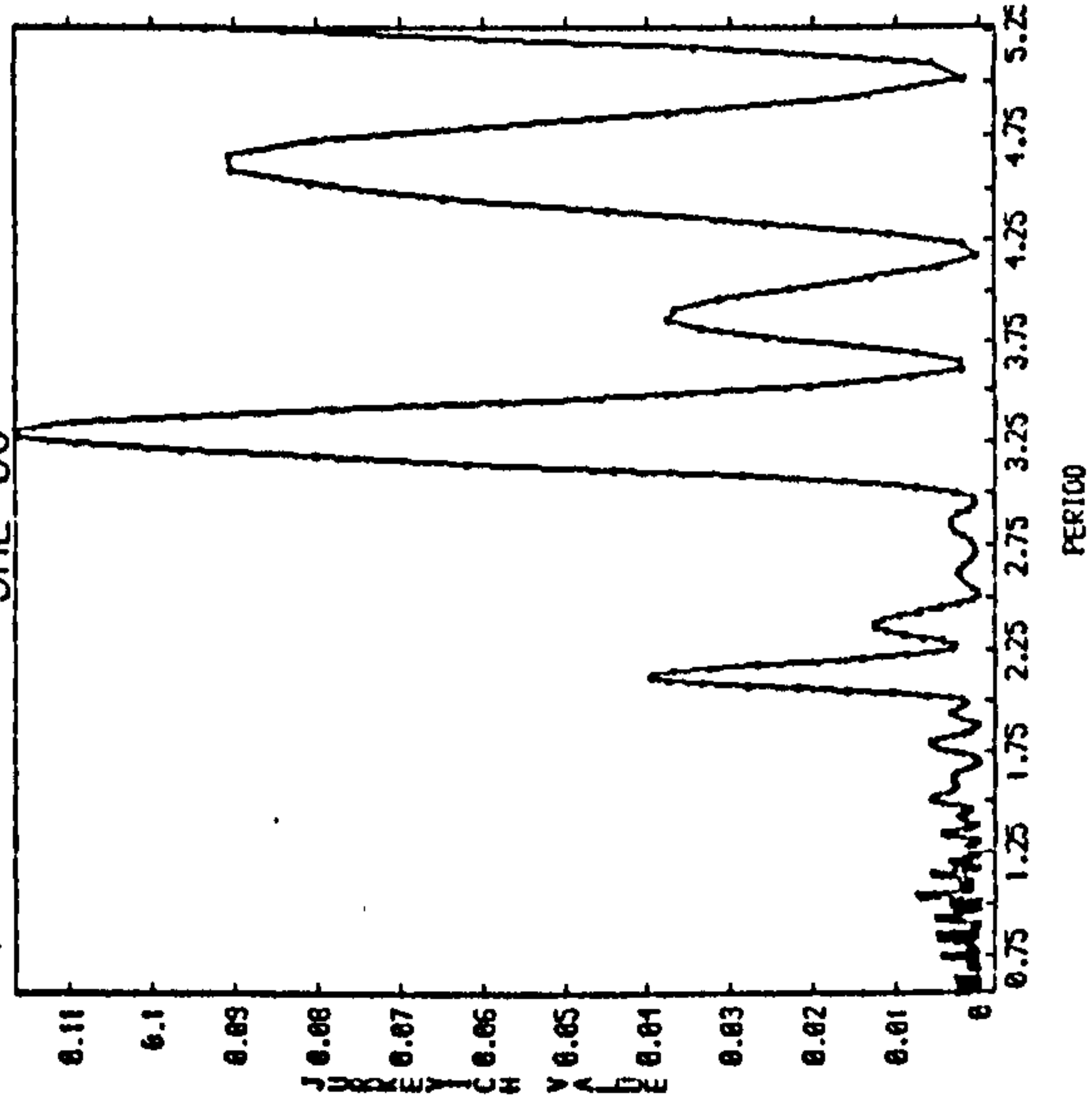


Mu	Filar
	Scale
	Bench
	Div. Eng.
	Adjust.
	Leveling
	Focus
	Eye P.
	Tube
	Tool
	Gauge
	Binding
	Misc.

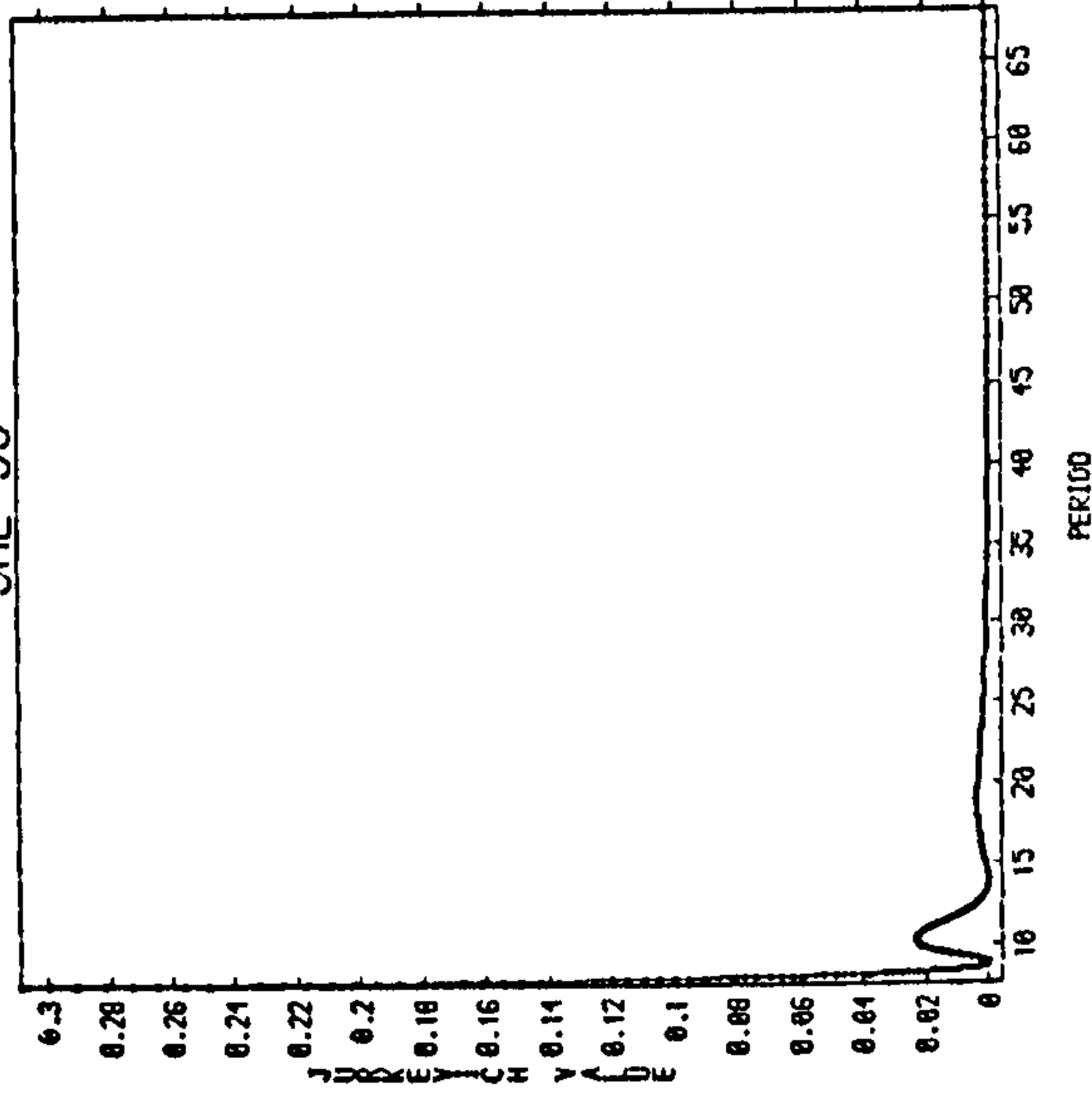
Drum has R=10.7cm and is divided 0-400 with a resolution of ±0.1 div.

Purchased at the Paris Exhibition

SML-33



SML-33



Characteristics:

Screw ☒ Nut ☐

Length: 12.0"

Diameter: 1.438"

Steel ☒ Brass ☐

Other:

Instrument Identification:

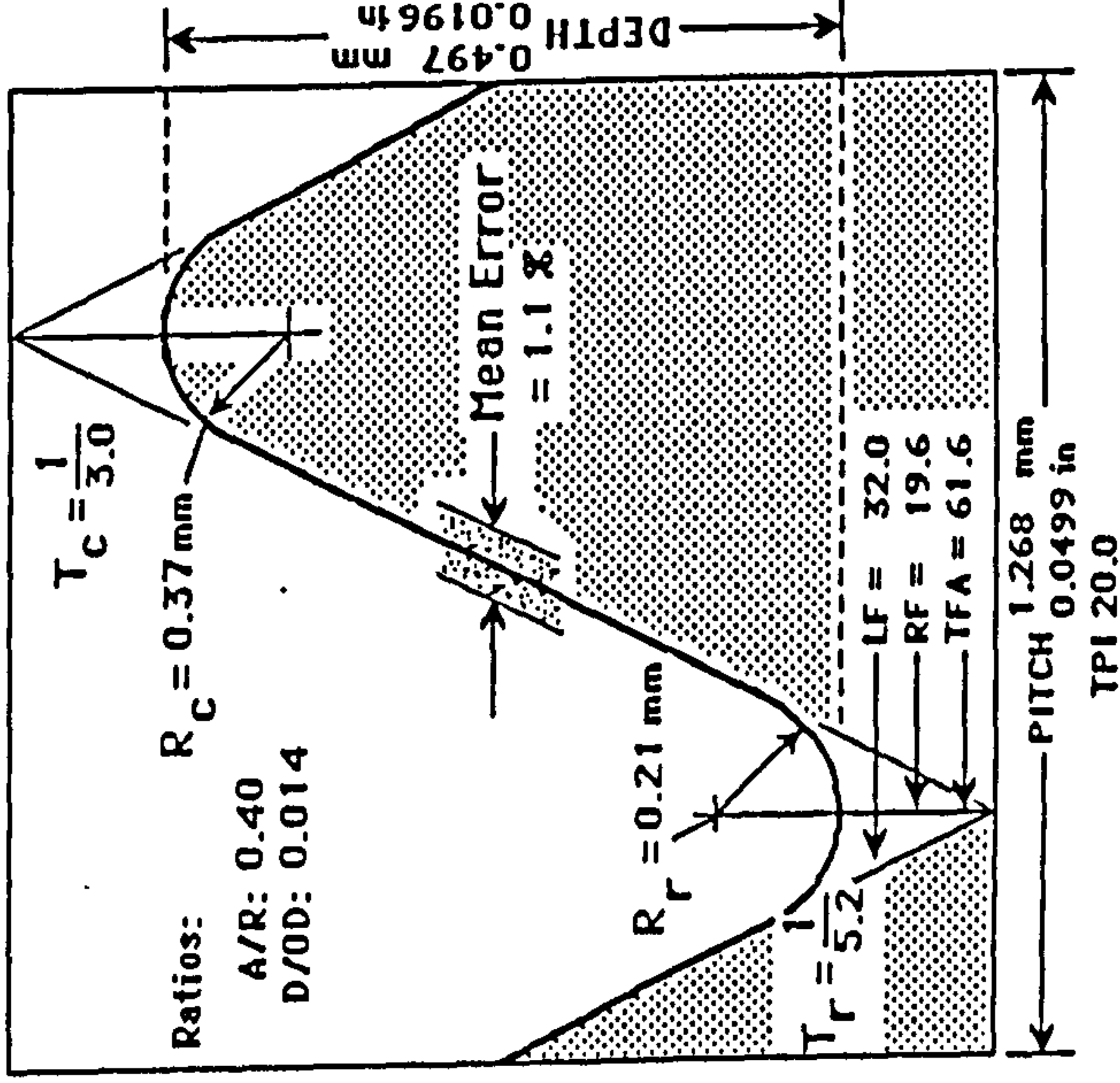
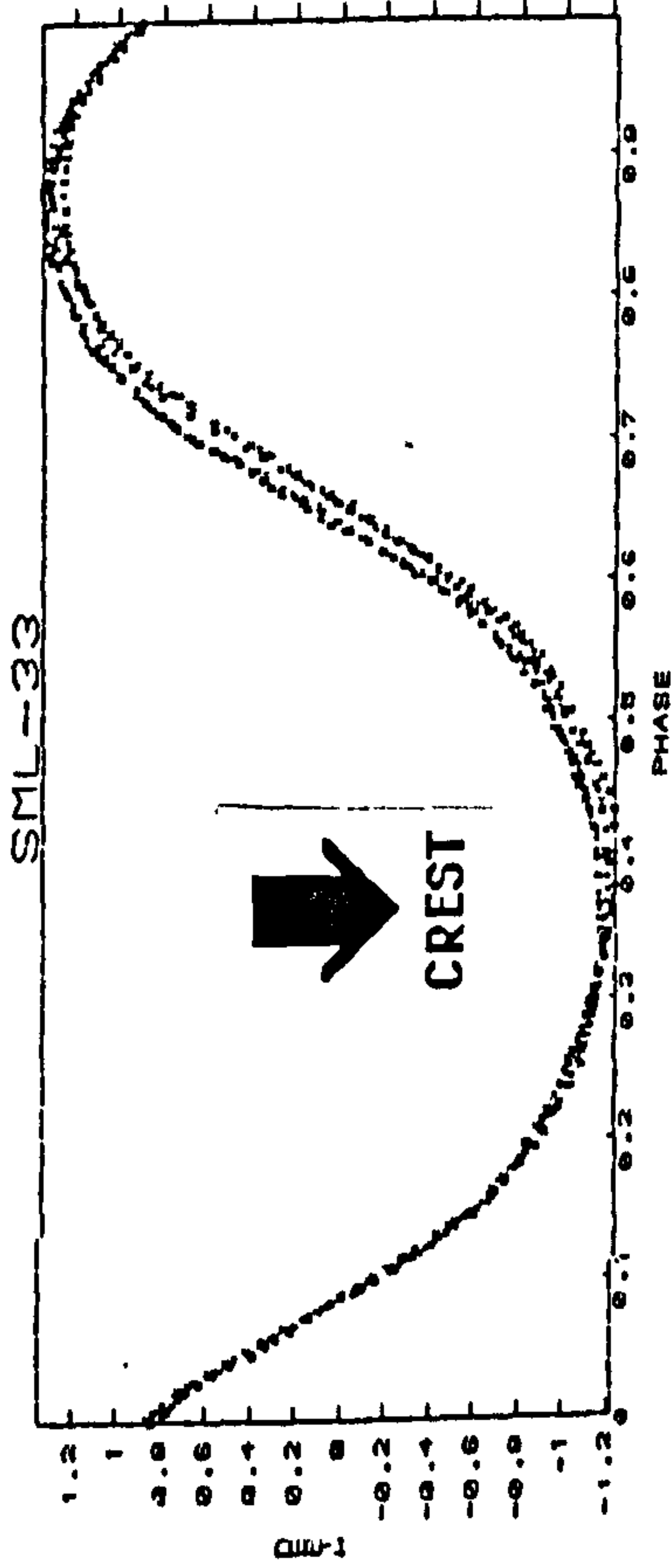
Study Code: SML-33

Instrument: Circular dividing eng.

Maker: Adam Higer

Date: 1887/8\*

Ser./Acq. No. .

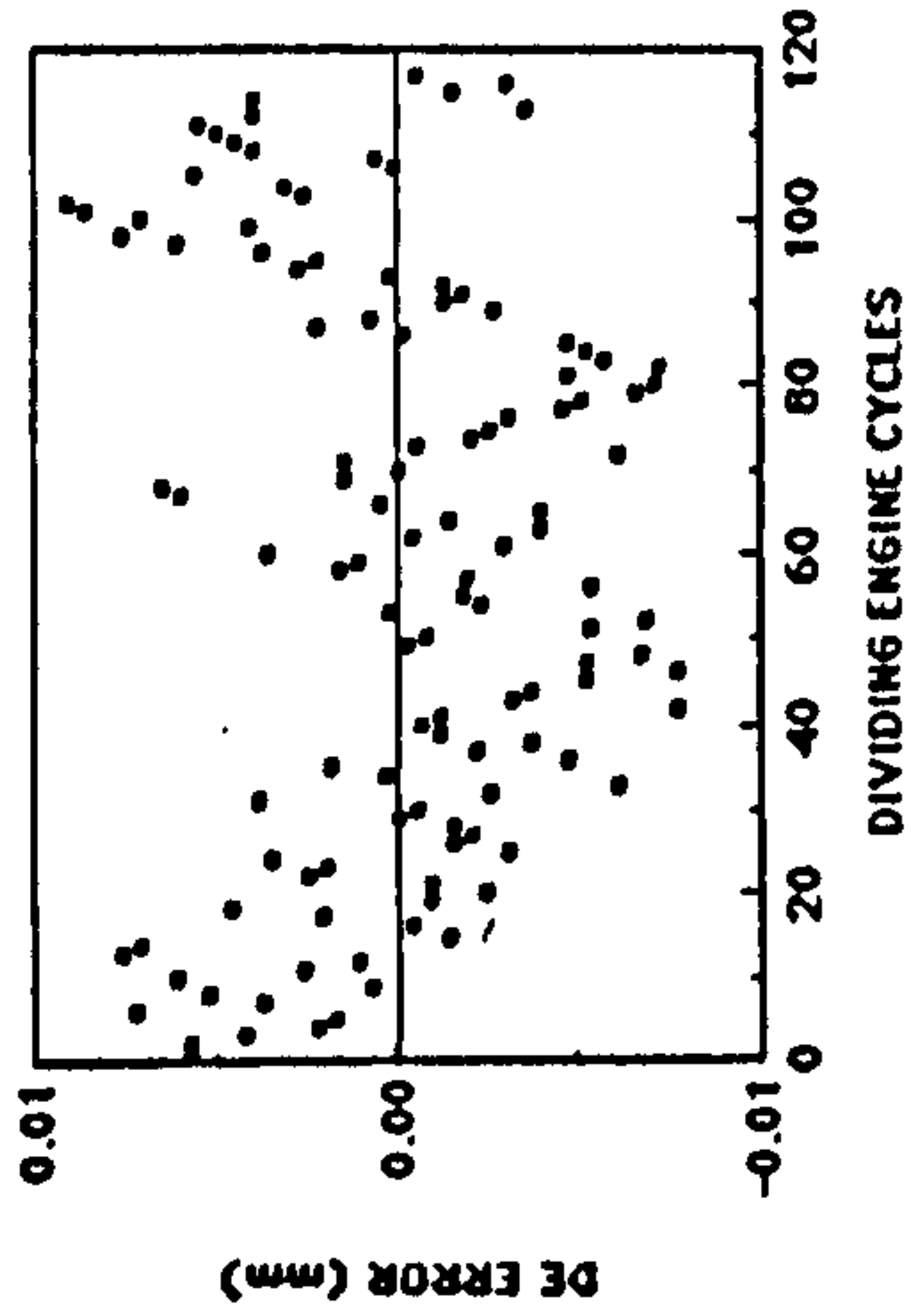


MU — [ Filar Scale Bench Div. Eng. Adjust. Leveling Focus Eye P. Tube Tool Gauge Binding Misc.

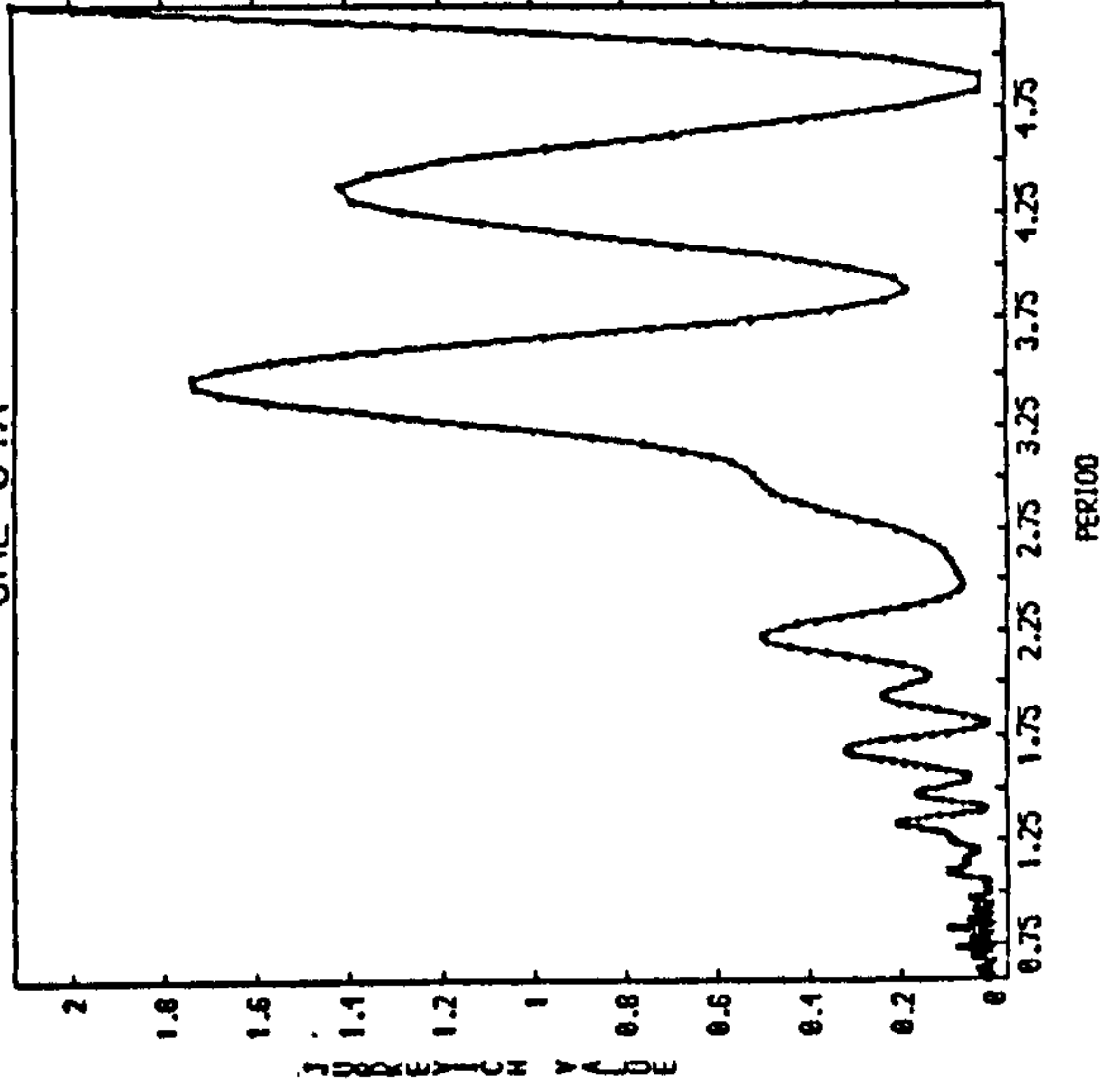
This engine is known as the Blythwood engine after Lord B. who funded and oversaw the project. Modifications were being made as late as 1912.



SML-34



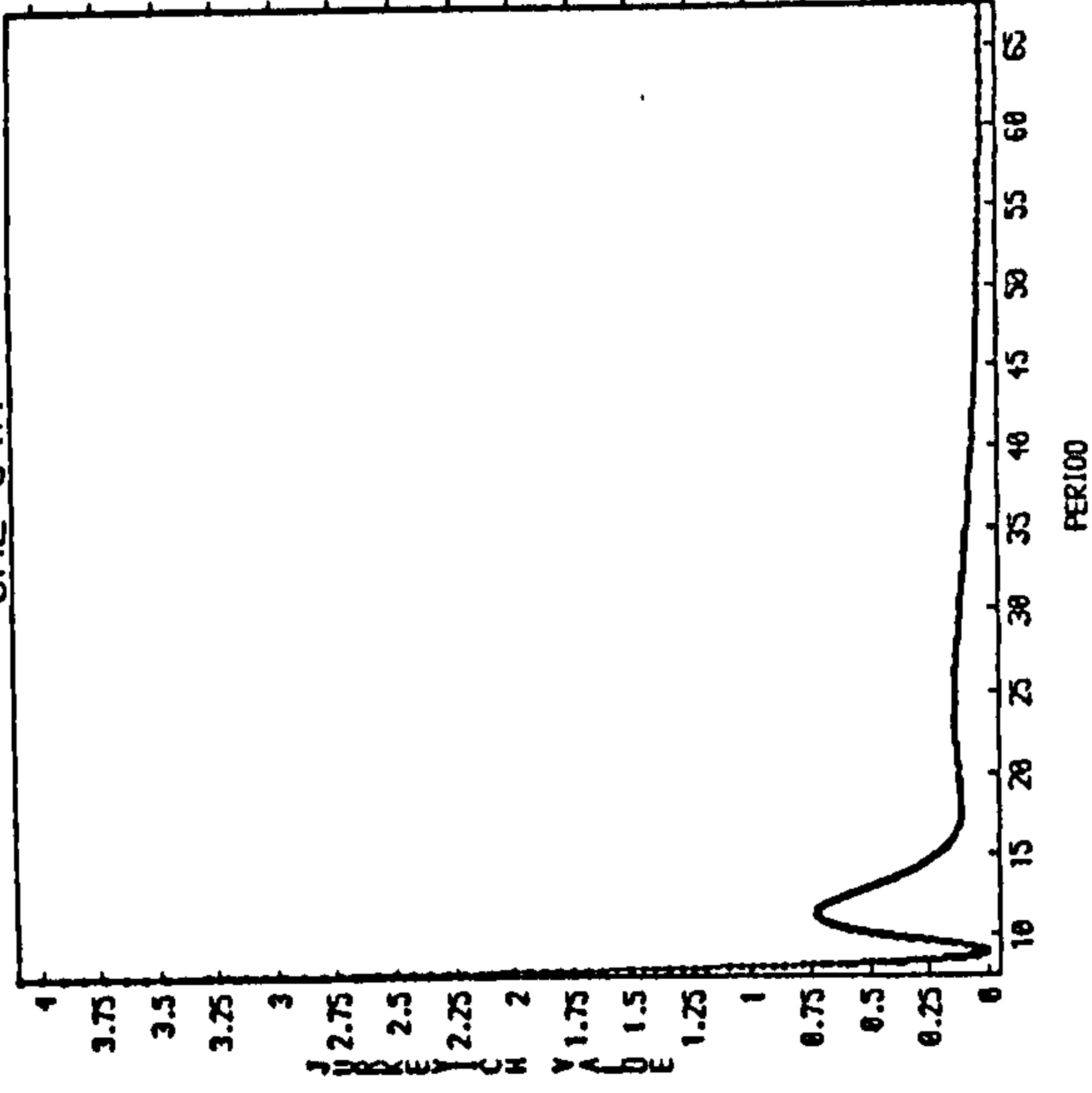
SML-34A



PERIOD

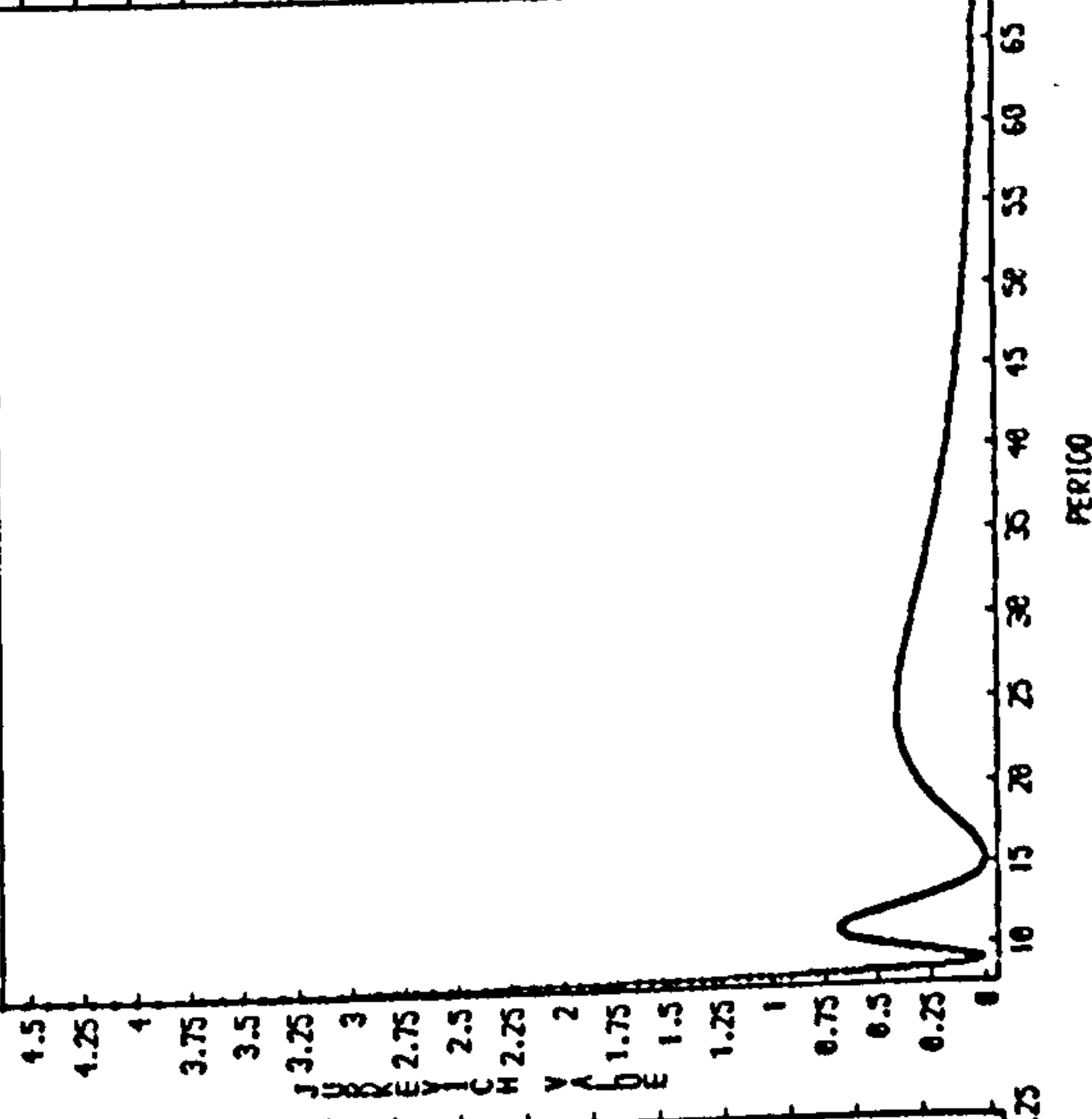
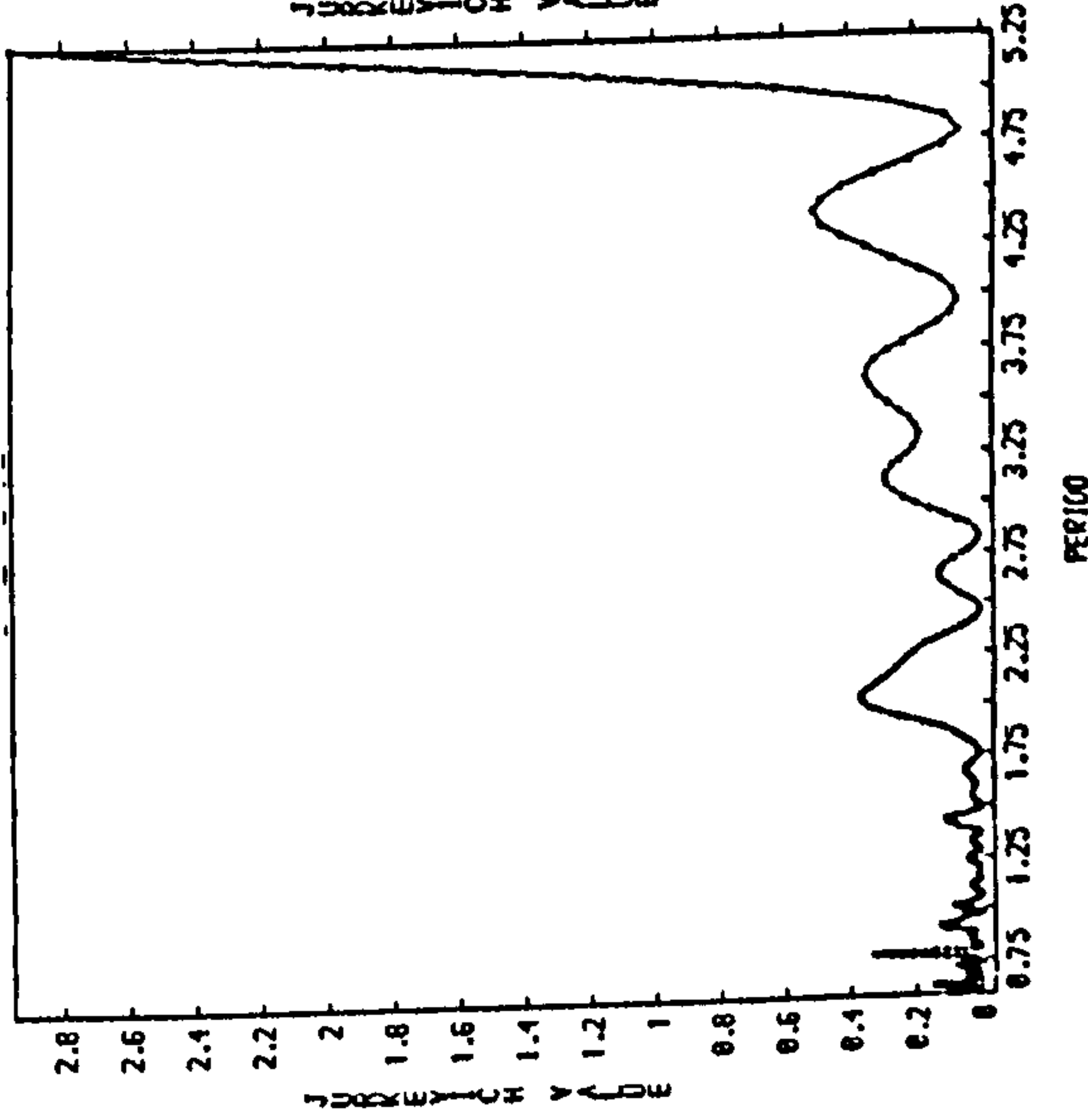
PERIOD

SML-34A

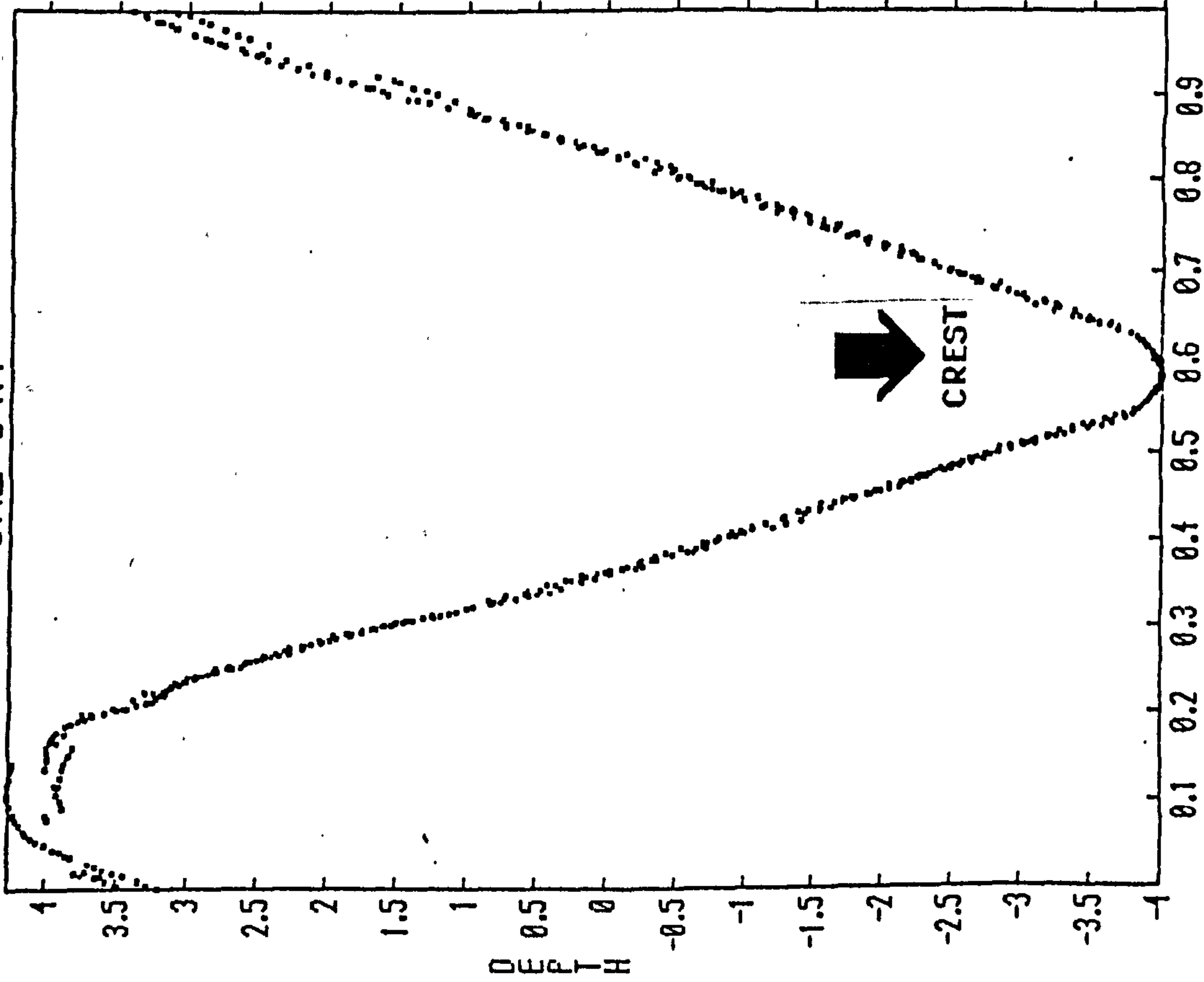


PERIOD

PERIOD



SML-34A



### Characteristics:

Screw ☒ Nut ☐

Leng: 2.875" /  $\approx 12^{\circ}$

Diameter: 0.3115"

Steel ☒ Brass ☐

Other:

### Instrument Identification:

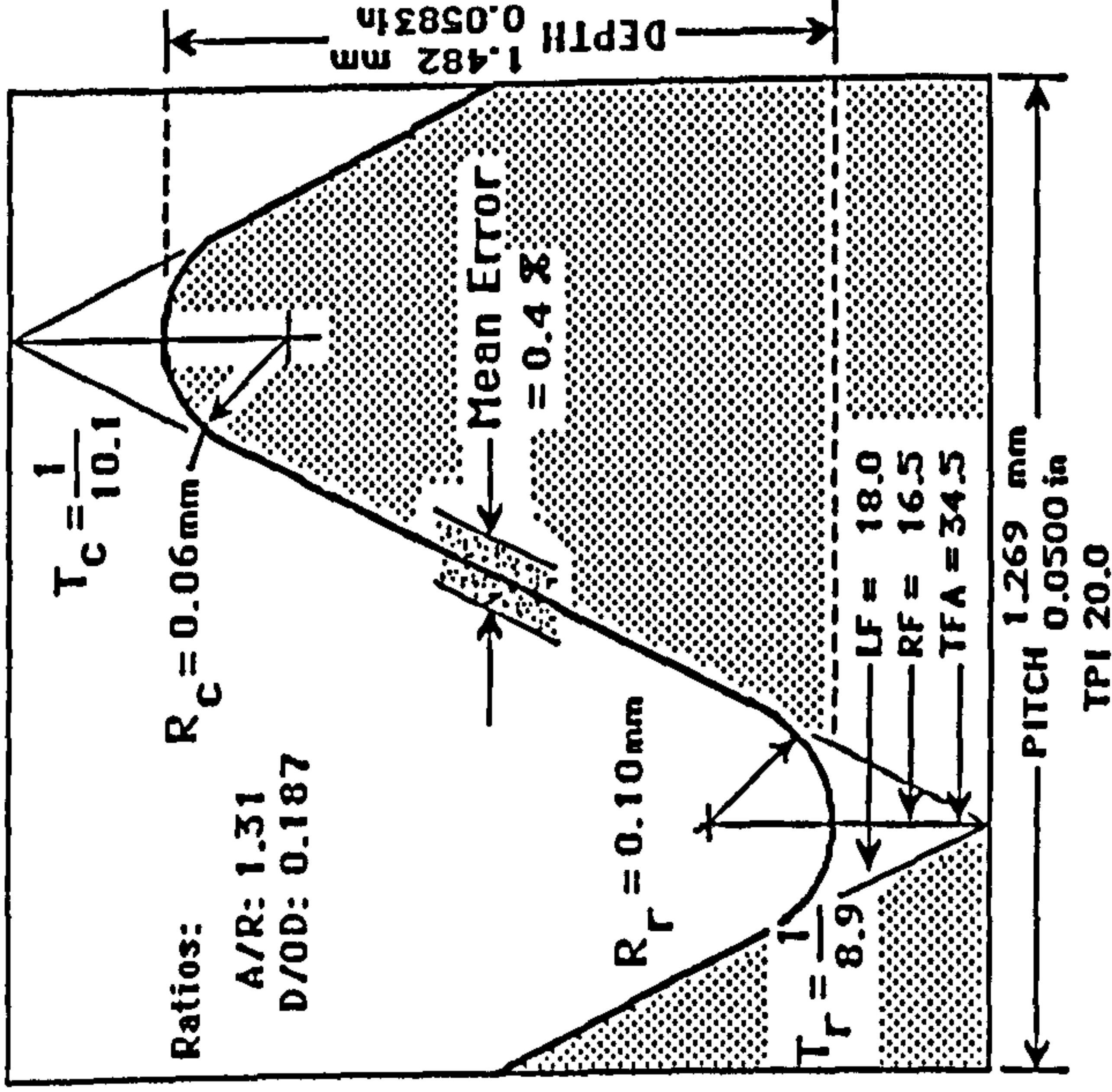
Study Code: SML-34a

Instrument: Ruling engine

Maker: John Barton

Date: ca.1820

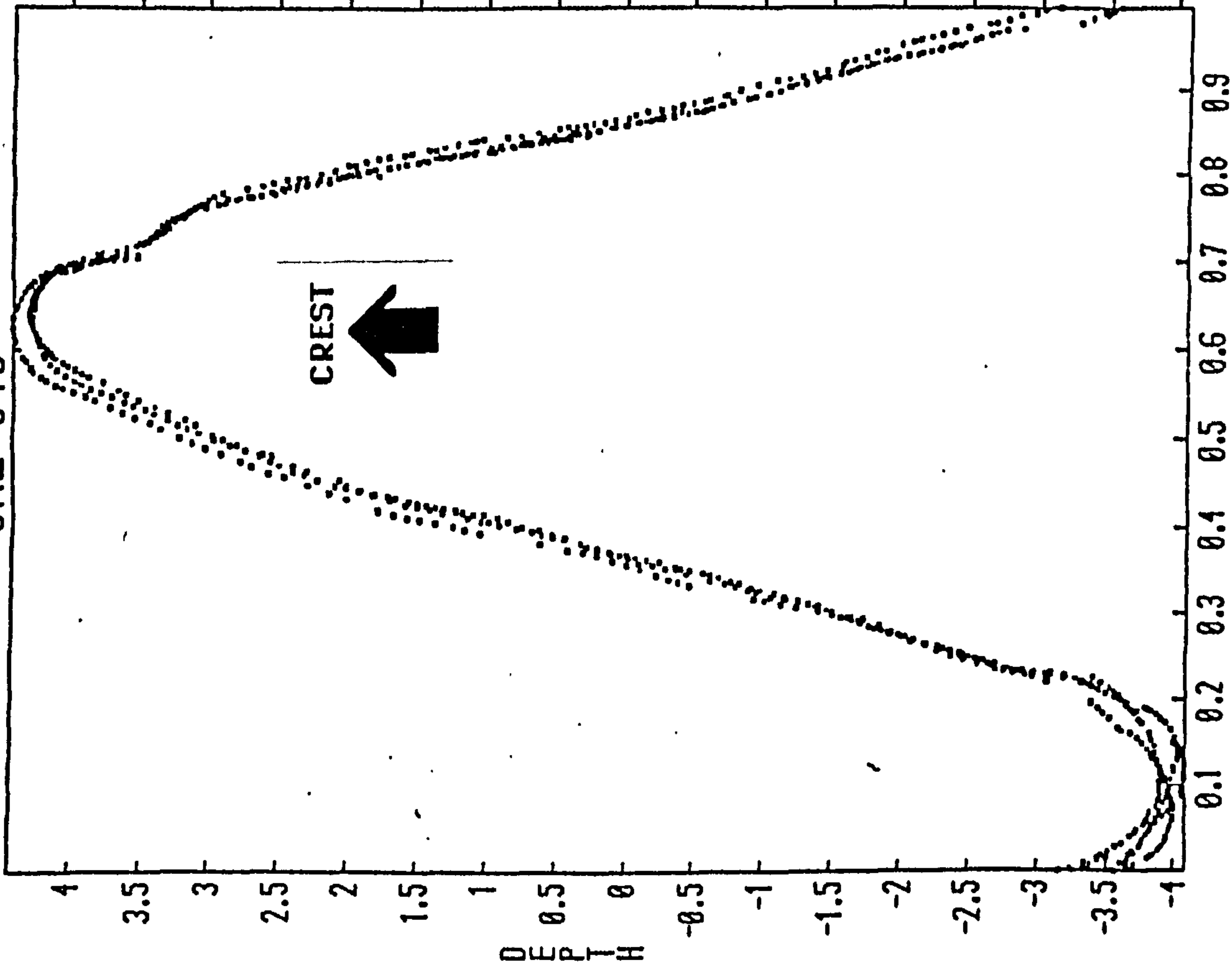
Ser./Acq. No. 1920-32



Mu	Filar
	Scale
	Bench
	Div. Eng.
	Adjust.
	Leveling
	Focus
	Eye P.
	Tube
	Tool
	Gauge
	Binding
	Misc.

Mu Drum: dia.: 6.5"  
 $\approx$  divisions: 100  
 resolution: adjustable  
 Accuracy limited by  
 wheel of 480 teeth

SML-34C

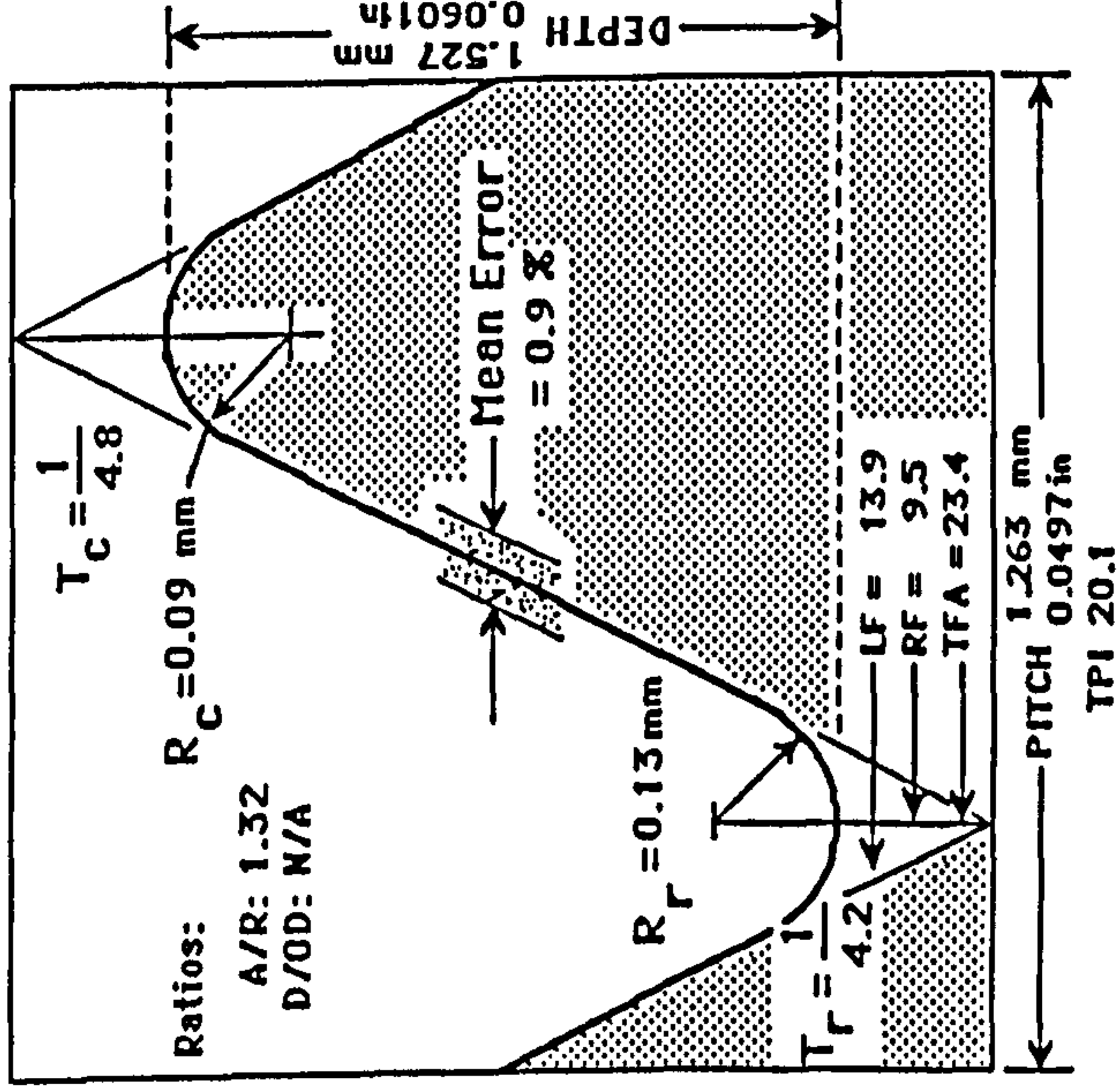


Characteristics:

Screw ☐ Nut ☒  
 Leng: / 12"  
 Diameter: (half screw)  
 Steel ☐ Brass ☒  
 Other:

Instrument Identification:

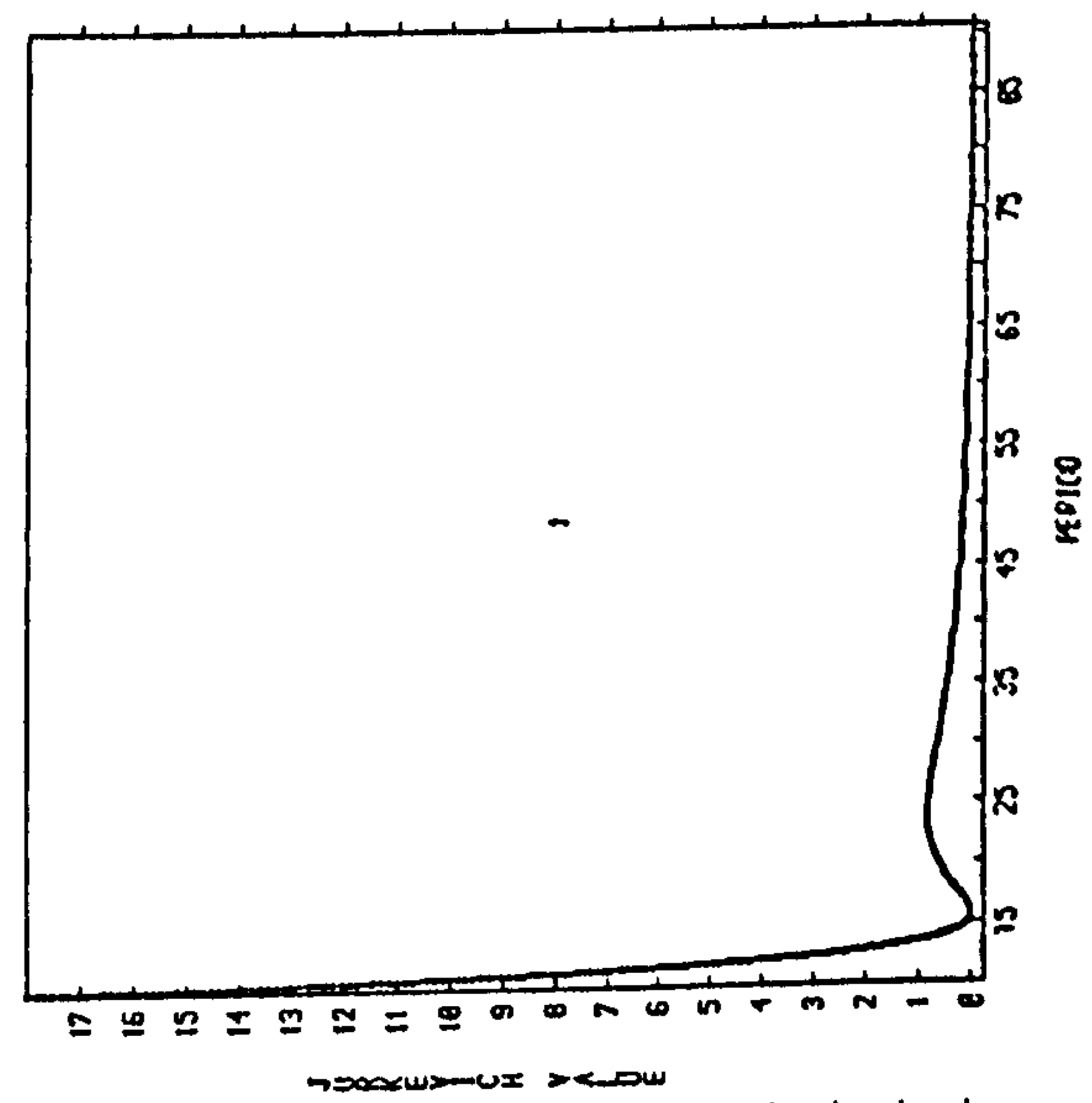
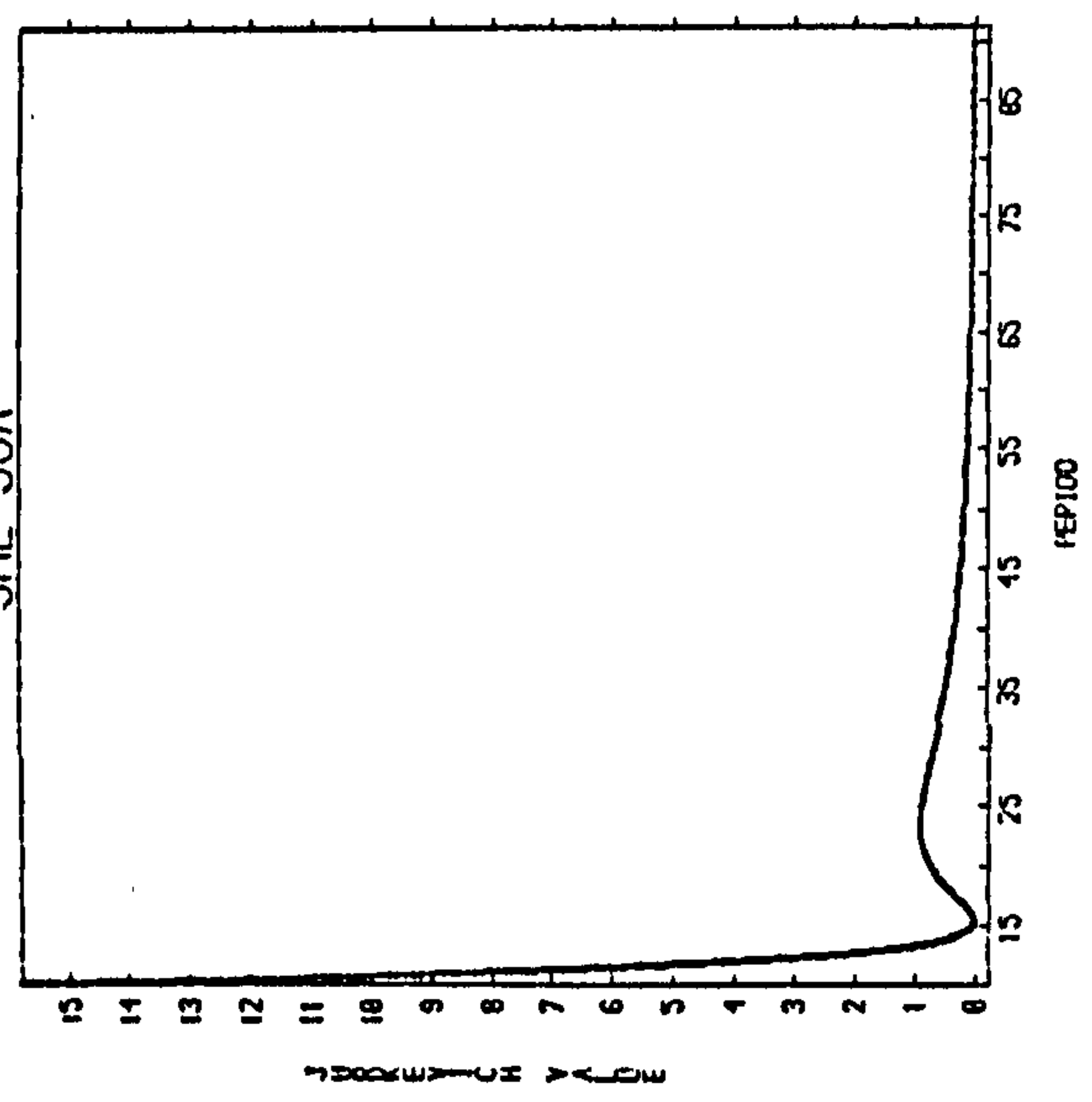
Study Code: SML-34c  
 Instrument: Ruling Engine  
 Maker: John Barton  
 Date: ca. 1820  
 Ser./Acq. No. 1926-32



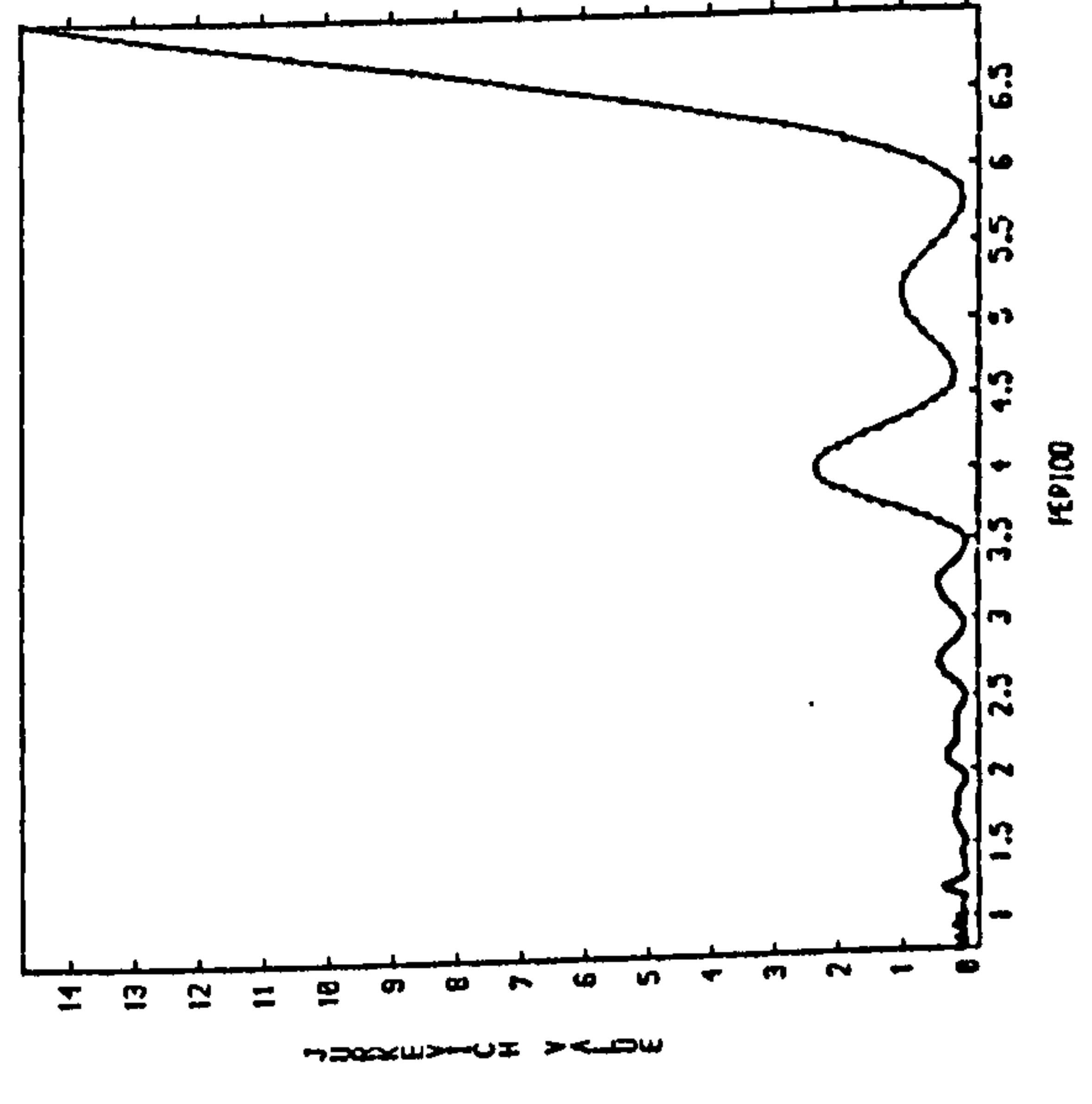
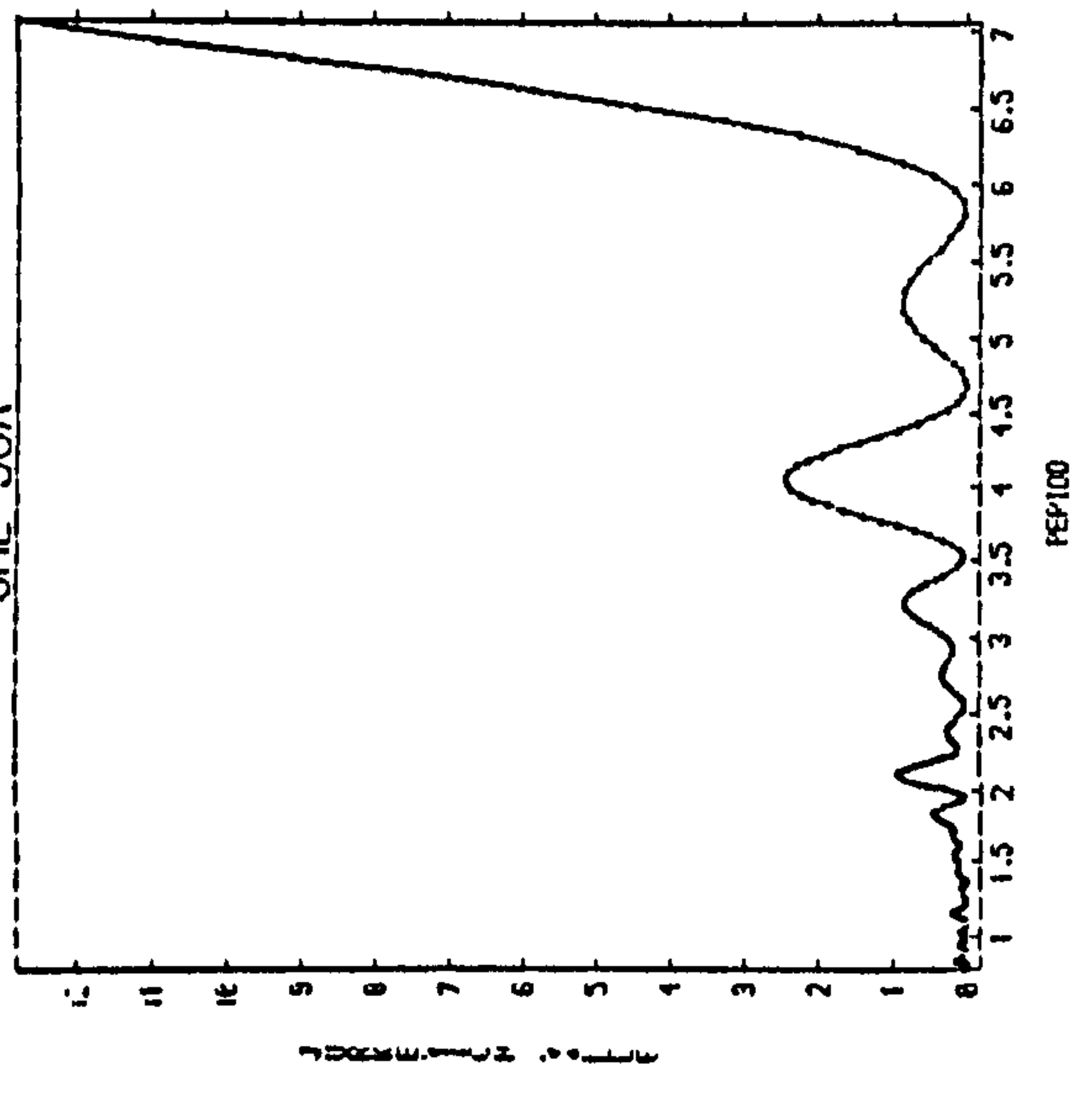
Mu — [ Filar Scale Bench Div. Eng. Adjust. Leveling Focus Eye P. Tube Tool Gauge Binding Misc. ]

(Nut for SML-34a)

SML-36A

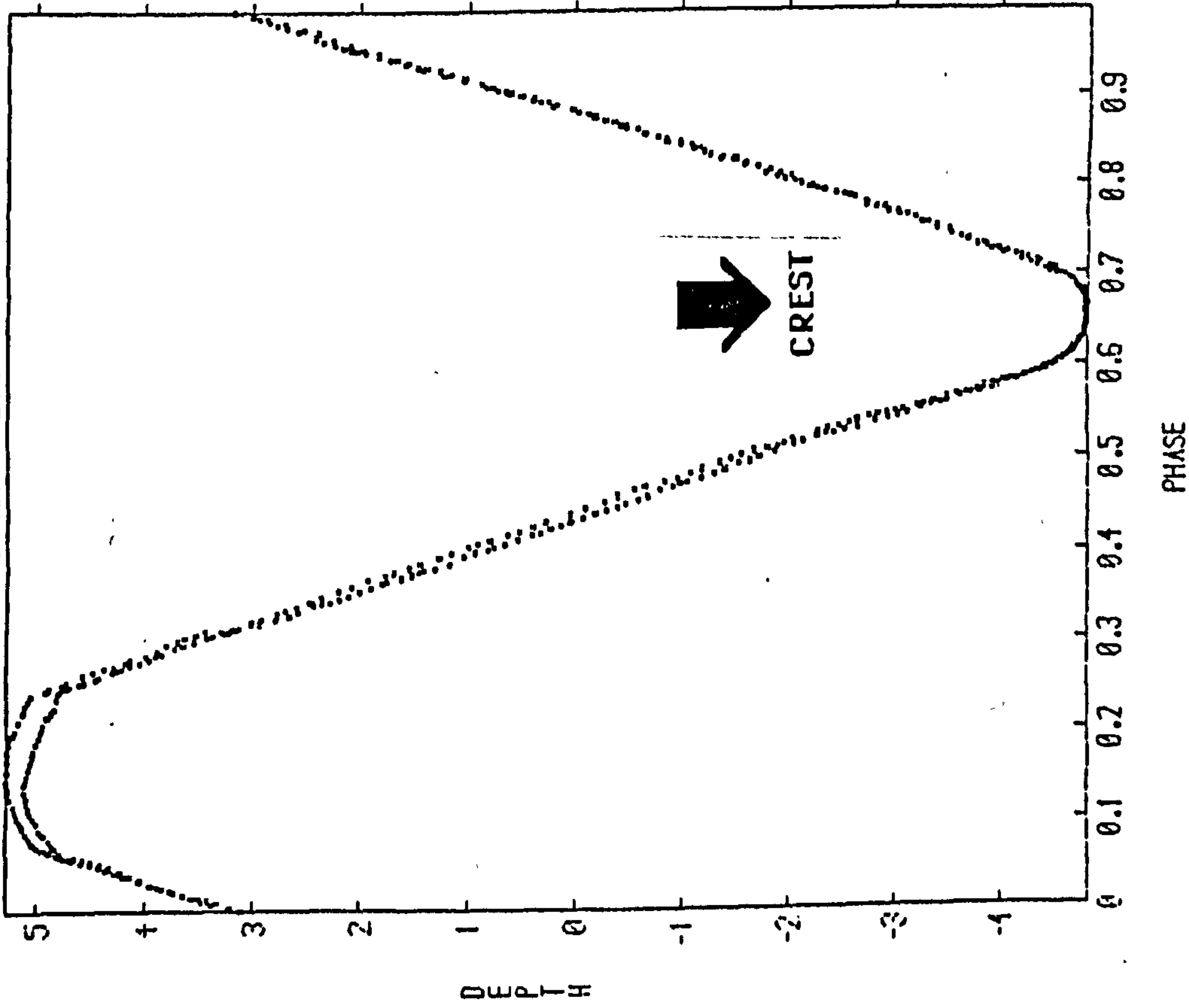


SML-36A





SML-36A



Characteristics:

Screw ☒ Nut ☐

Leng: 1.156"/23.125"D

Diameter: ~1.156"

Steel ☒ Brass ☐

Other:

Instrument Identification:

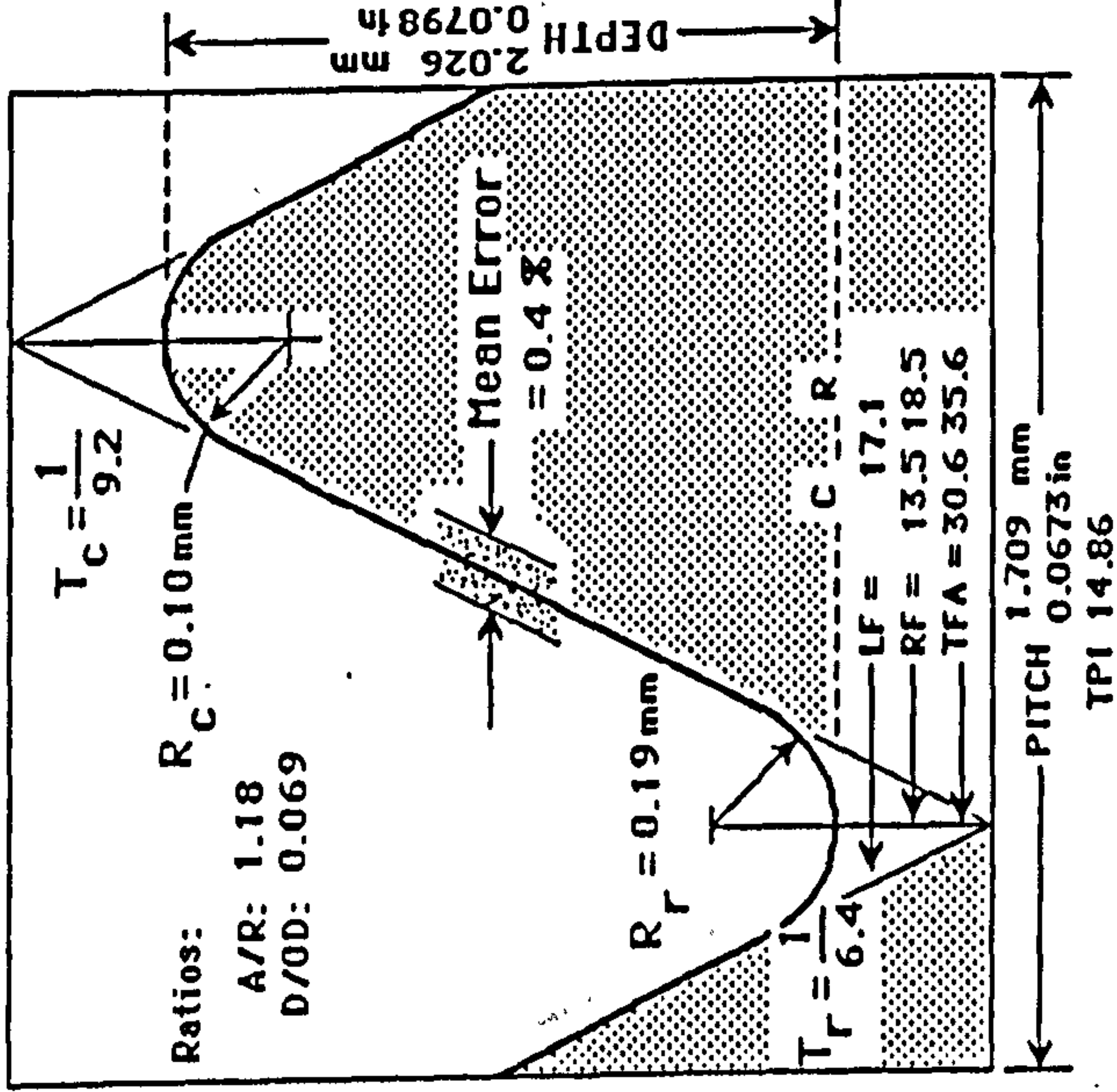
Study Code: SML-36a

Instrument: Circular Dividing Eng.

Maker: John Troughton

Date: 1778

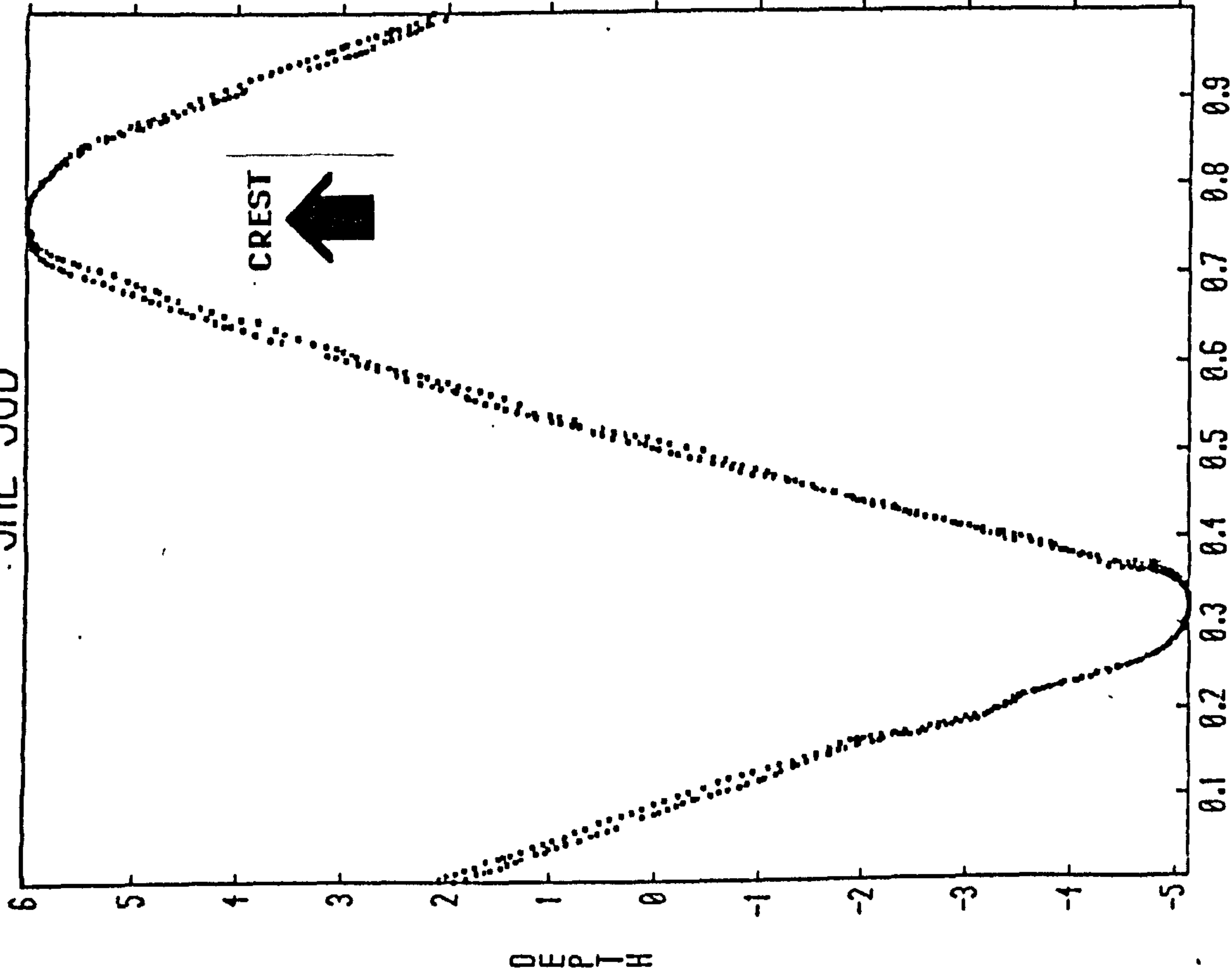
Ser./Acq. No.



Mu — [ Filar Scale Bench Div. Eng. Adjust. Leveling Focus Eye P. Tube Tool Gauge Binding Misc. ]

Mu Drum: dia.: 2.125"  
divisions: 20x6  
resolution: ~1/10  
(Profile 150°-152°)

SML-36B



Characteristics:

Screw ☐ Nut ☒

Leng: 1.156"/23.125"D

Diameter:  $\approx$ 1.156"

Steel ☐ Brass ☒

Other:

Instrument Identification:

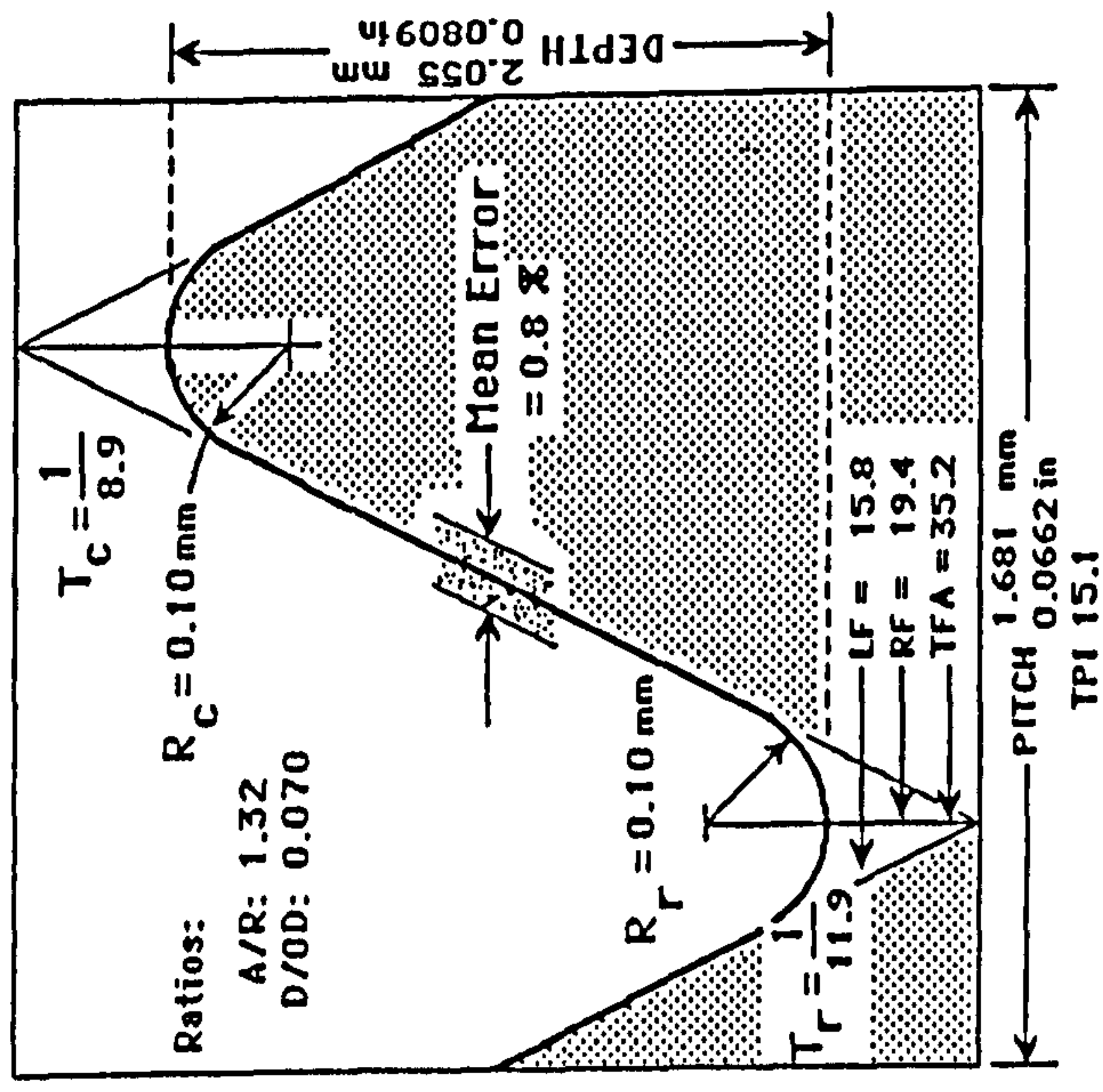
Study Code: SML-36b

Instrument: Circular Dividing Eng.

Maker: John Troughton

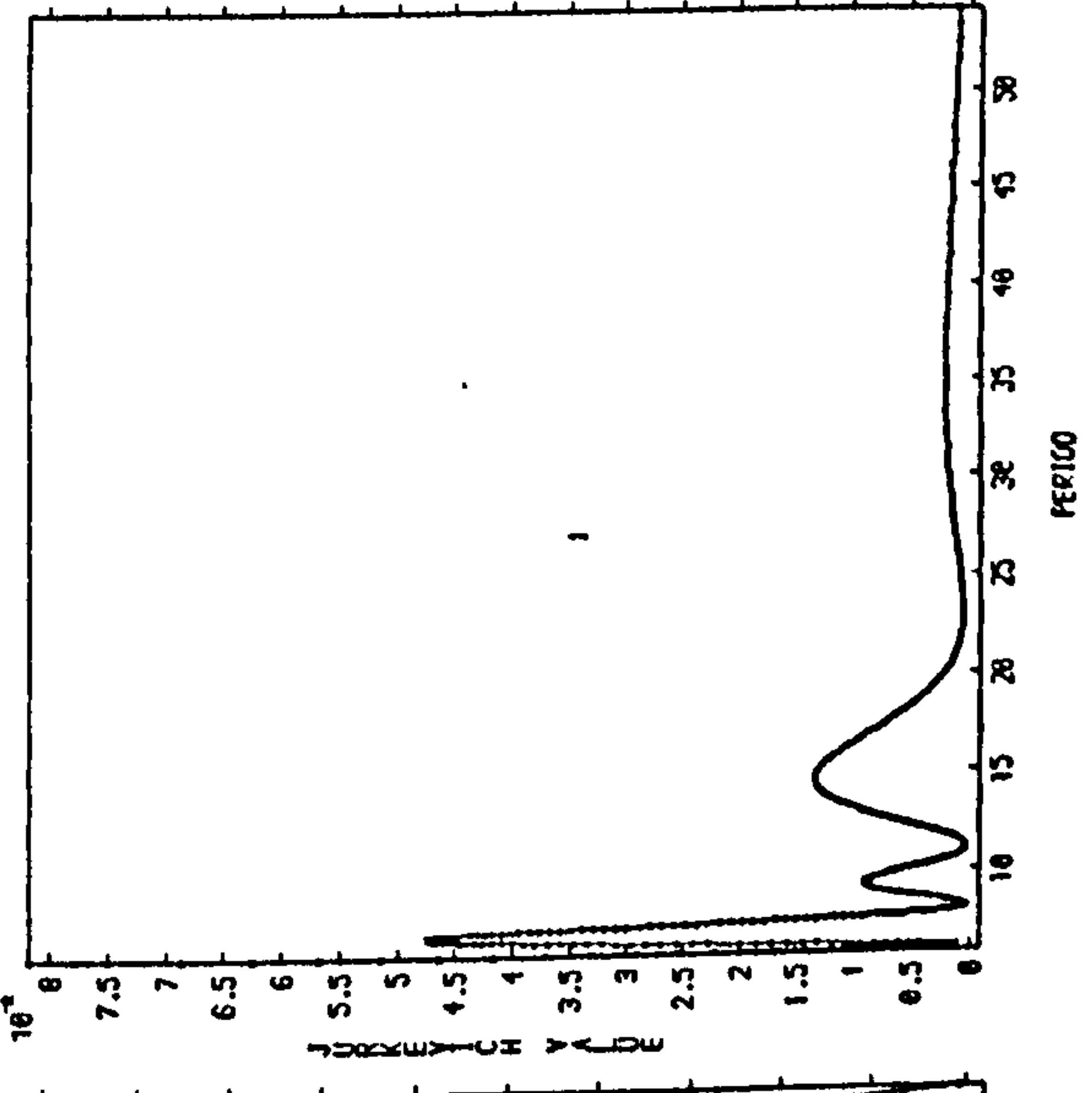
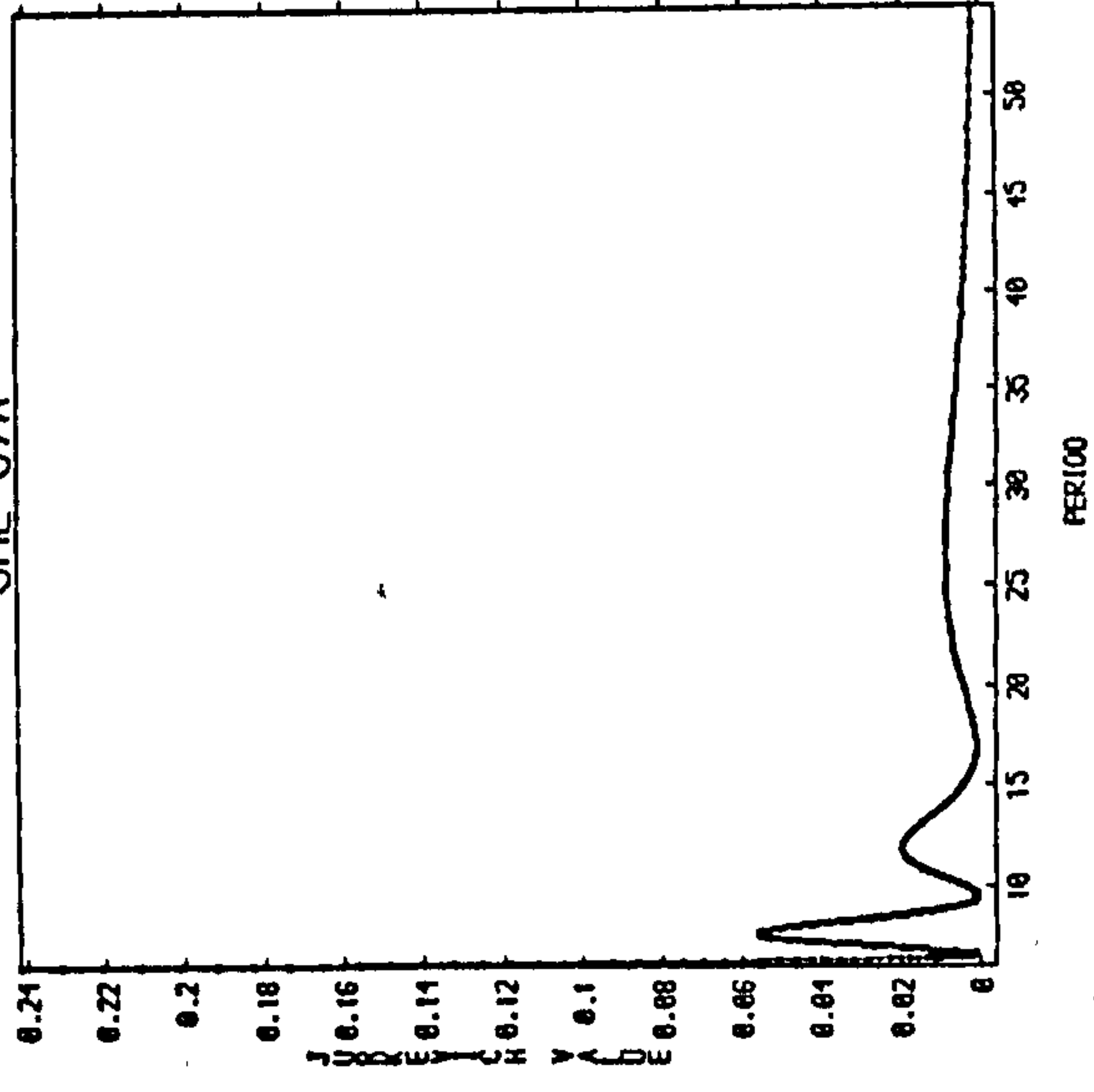
Date: 1778

Ser./Acq. No.

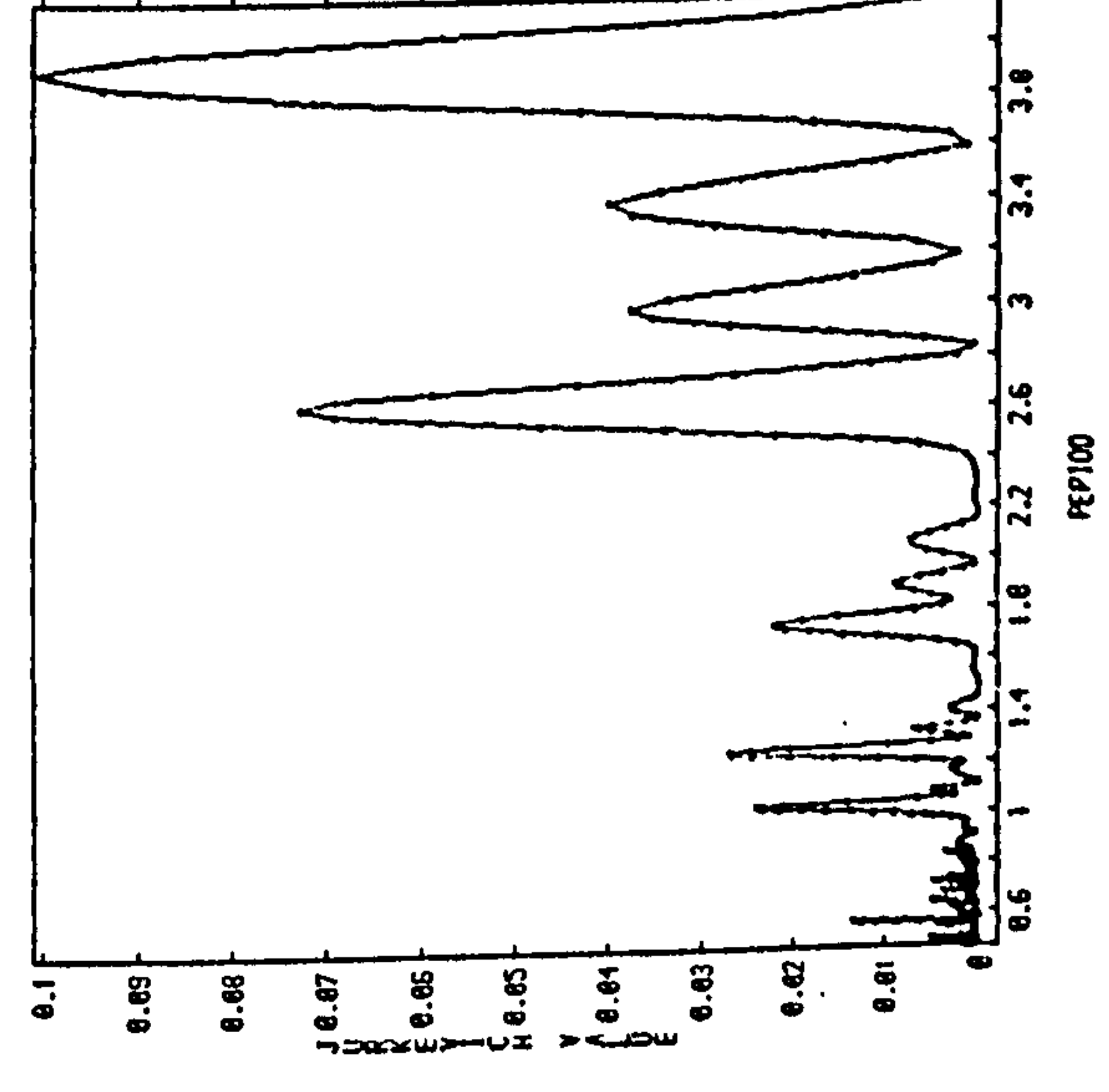
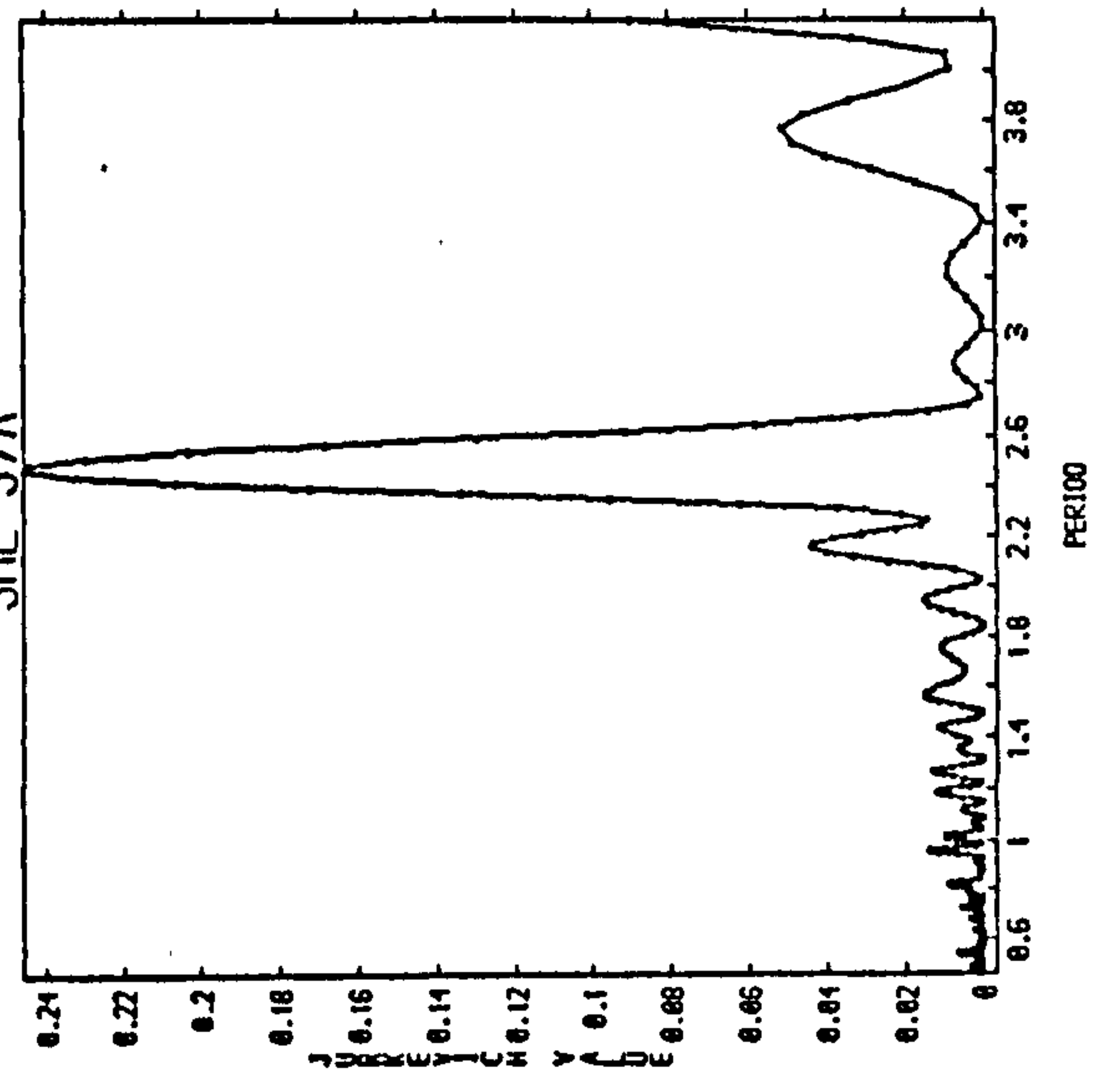


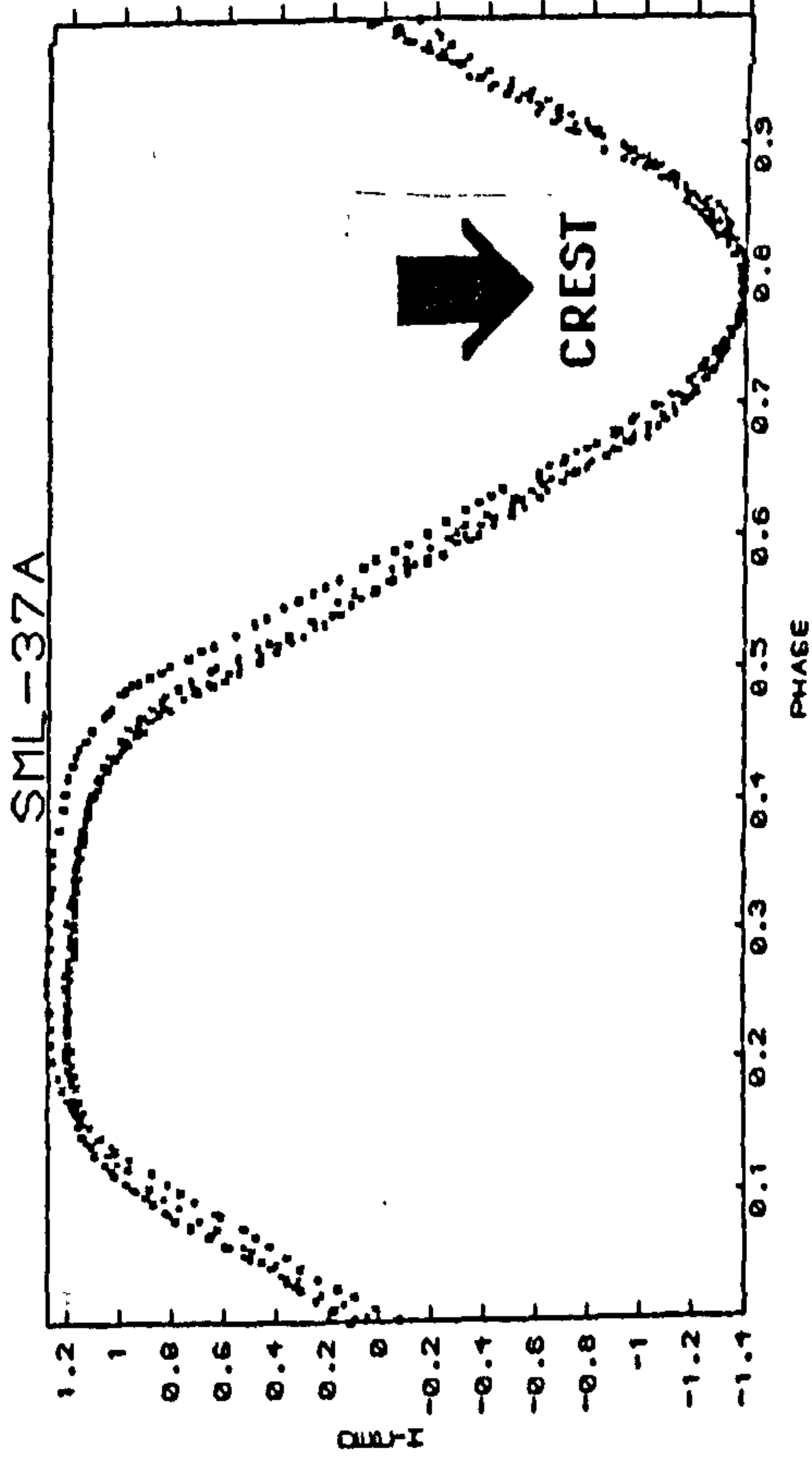
Mu	[	Filar	
		Scale	
[	]	Bench	
		Div. Eng.	
]	]	Adjust.	
		Leveling	
]	]	Focus	
		Eye P.	
]	]	Tube	
		Tool	
]	]	Gauge	
		Binding	
]	]	Misc.	

SML-37A



SML-37A





### Characteristics:

Screw ☒ Nut ☐

Leng: 1.125"/0.297"

Diameter: 1.0117-0058

Steel ☒ Brass ☐

Other:

### Instrument Identification:

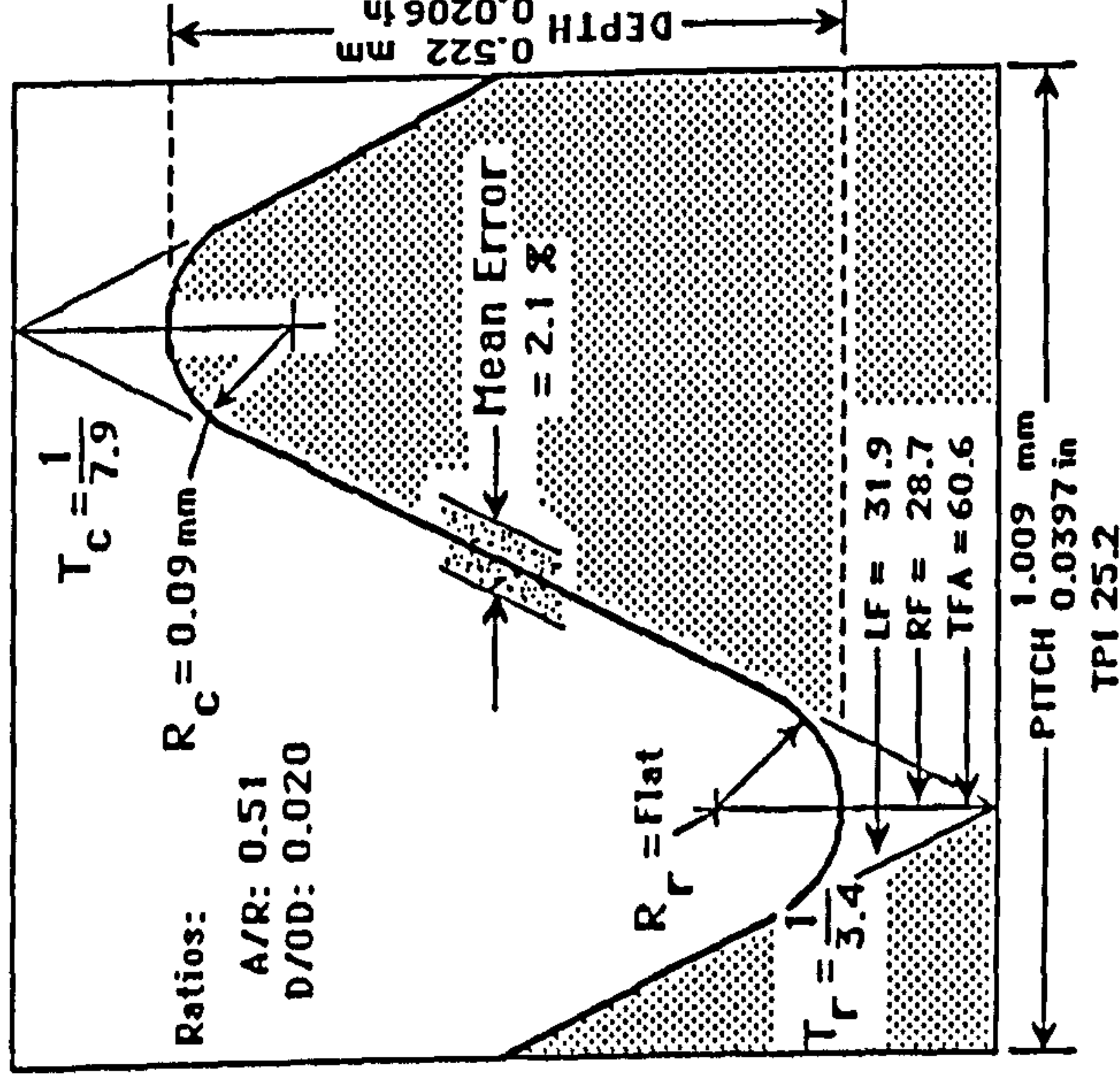
Study Code: SML-37a

Instrument: Circular dividing eng.

Maker: Frederick Cooke

Date: 1872

Ser./Acq. No. 1953-446



Mu	—	Filar
		Scale
—	—	Bench
		Div. Eng.
—	—	Adjust.
		Leveling
—	—	Focus
		Eye P.
—	—	Tube
		Tool
—	—	Gauge
		Binding
—	—	Misc.



Characteristics:

Screw ☐ Nut ☒

Leng: 1.125"/0.297"\*

Diameter: 1.0117-0058"

Steel ☐ Brass ☒

Other: possibly w/bronze

Instrument Identification:

Study Code: SML-37b

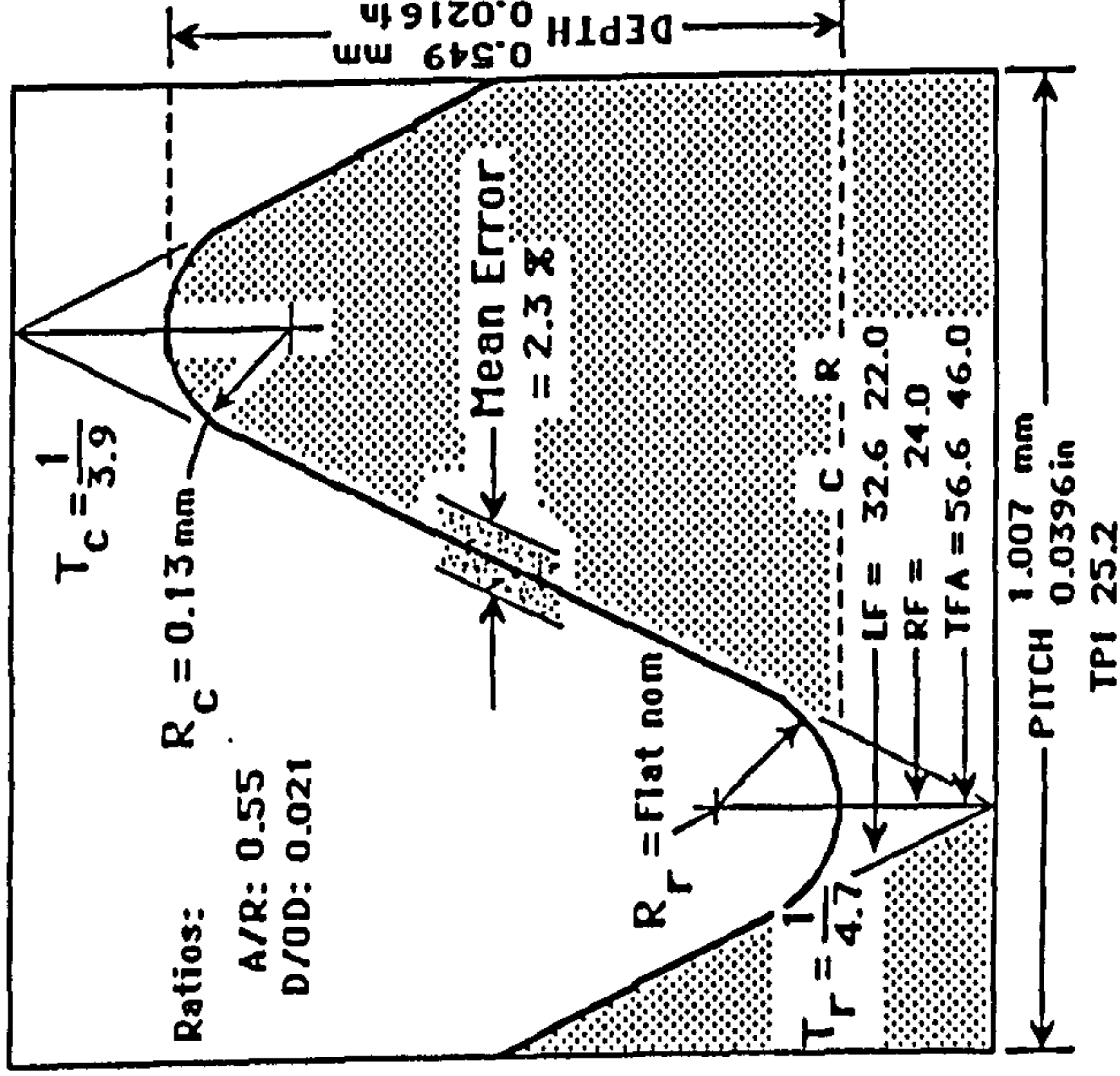
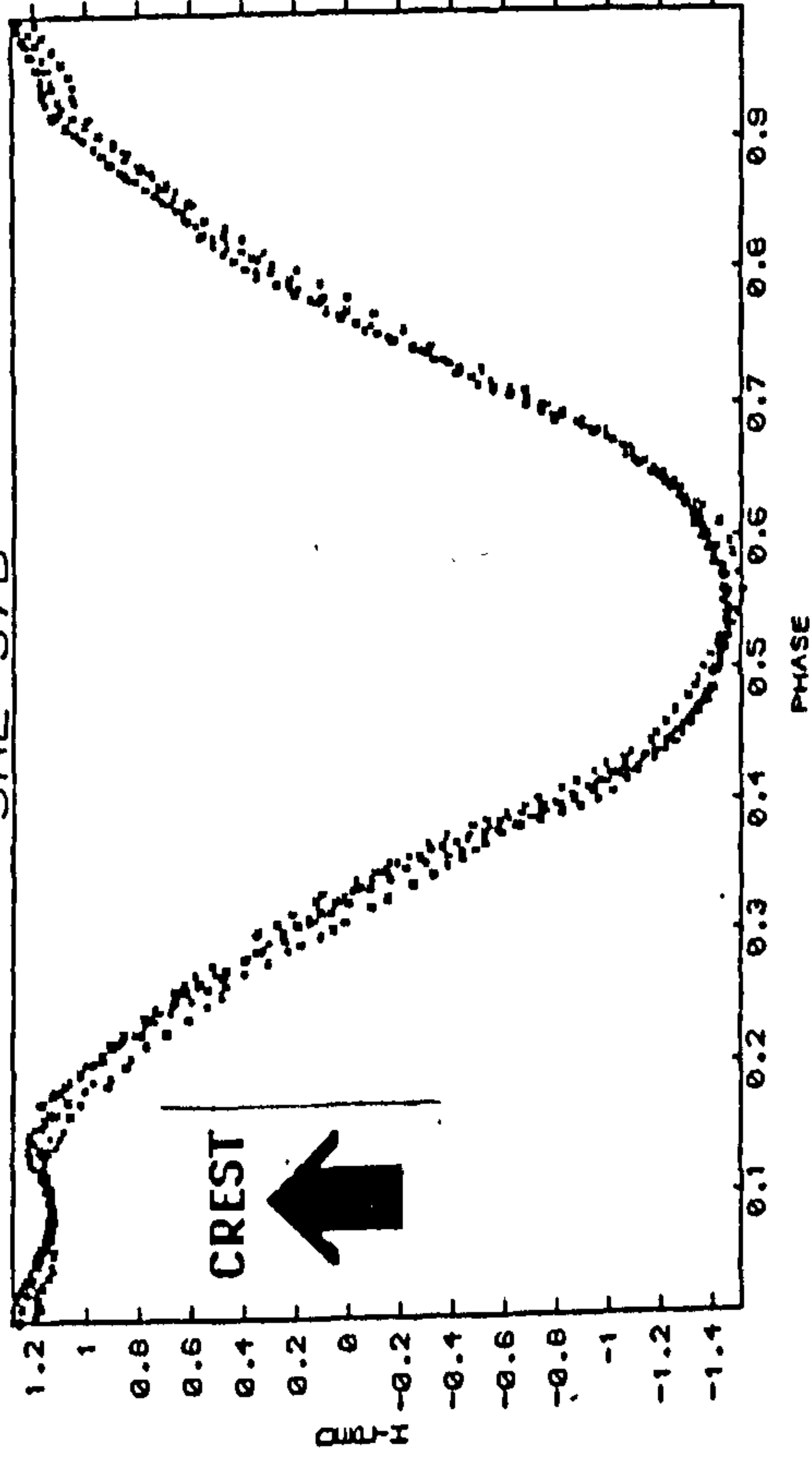
Instrument: Circular dividing eng.

Maker: Frederick Cooke

Date: 1872

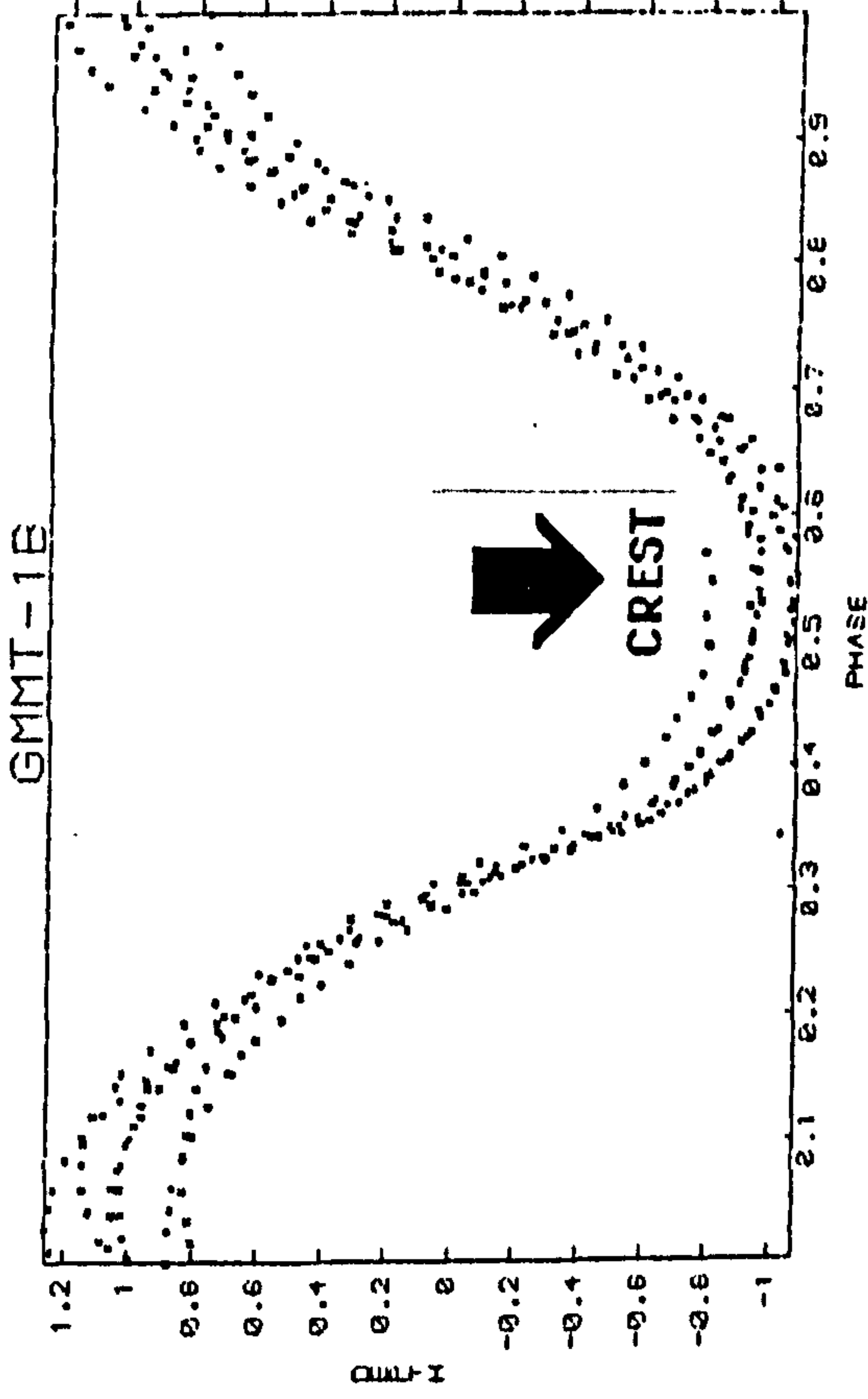
Ser./Acq. No. 1953-446

SML-37B



Mu	Filar
	Scale
	Bench
	Div. Eng.
	Adjust.
	Leveling
	Focus
	Eye P.
	Tube
	Tool
	Gauge
	Binding
	Misc.

Wheel has 14" radius and is 0.297" wide at the teeth



### Characteristics:

Screw ☒ Nut ☐

Leng: 0.375" / ~0.188"

Diameter: 0.1184"

Steel ☐ Brass ☒

Other:

### Instrument Identification:

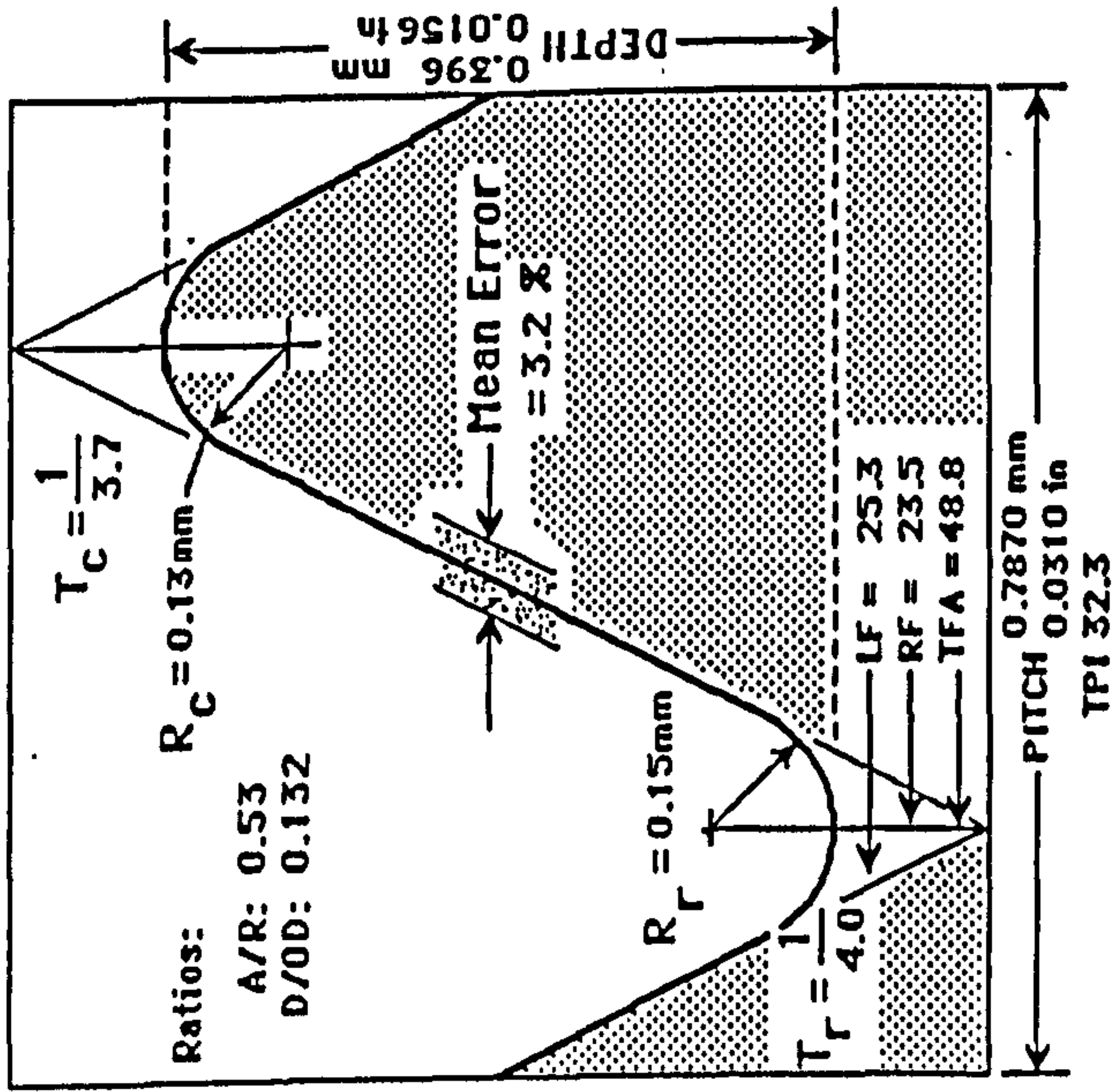
Study Code: GMT-1b

Instrument: Dumpy level

Maker: J.B. Dancer

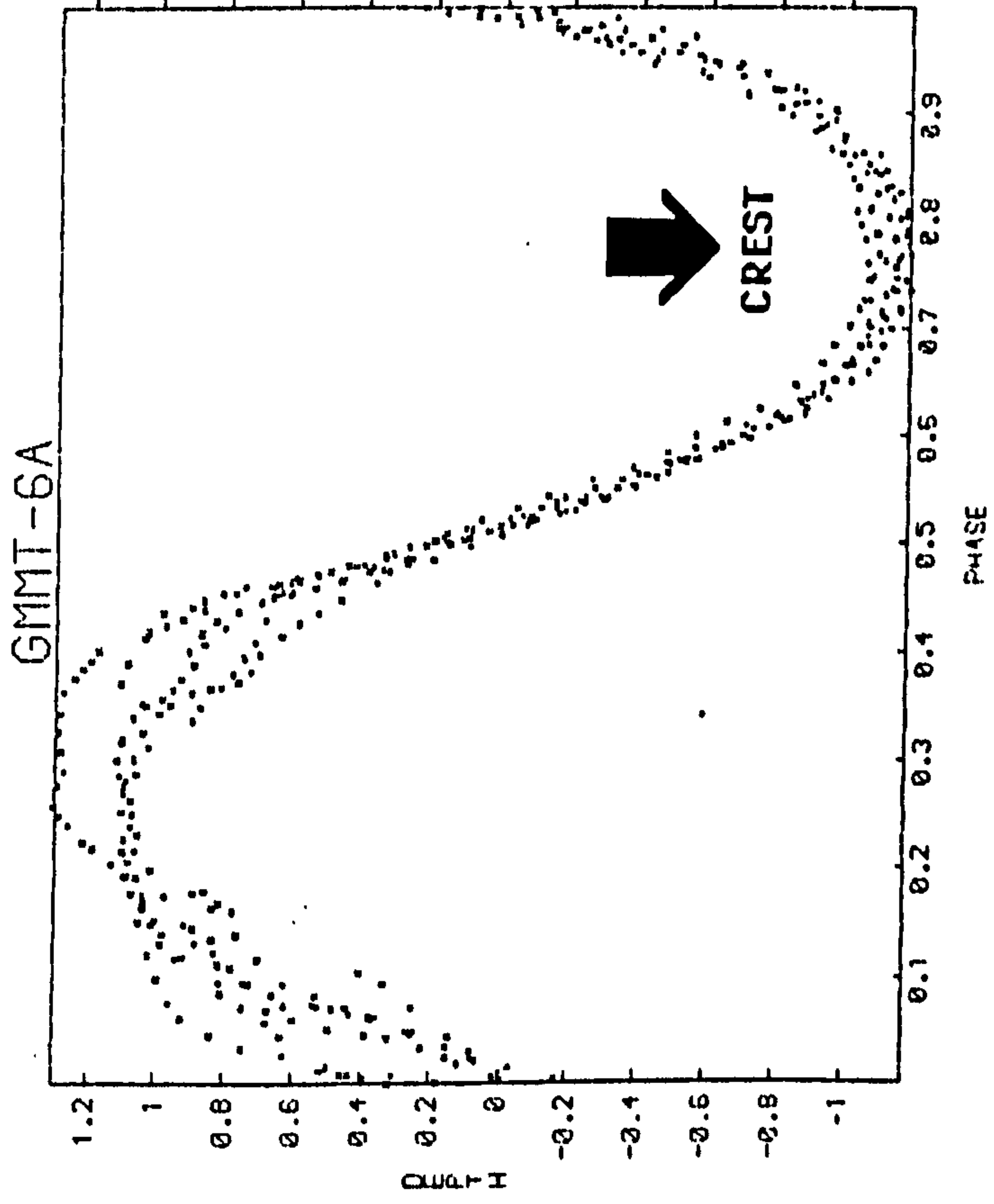
Date: ca. 1860's-70's

Ser./Acq. No. 1970.1



Mu	Filar
	Scale
	Bench
	Div. Eng.
	Adjust.
	Leveling
	Focus
	Eye P.
	Tube
	Tool
	Gauge
	Binding
	Misc.

(Eye piece fiducial adjust screw)



Characteristics:

Screw ☒ Nut ☐

Leng: 1.125"

Diameter: 0.2334"

Steel ☐ Brass ☒

Other:

Instrument Identification:

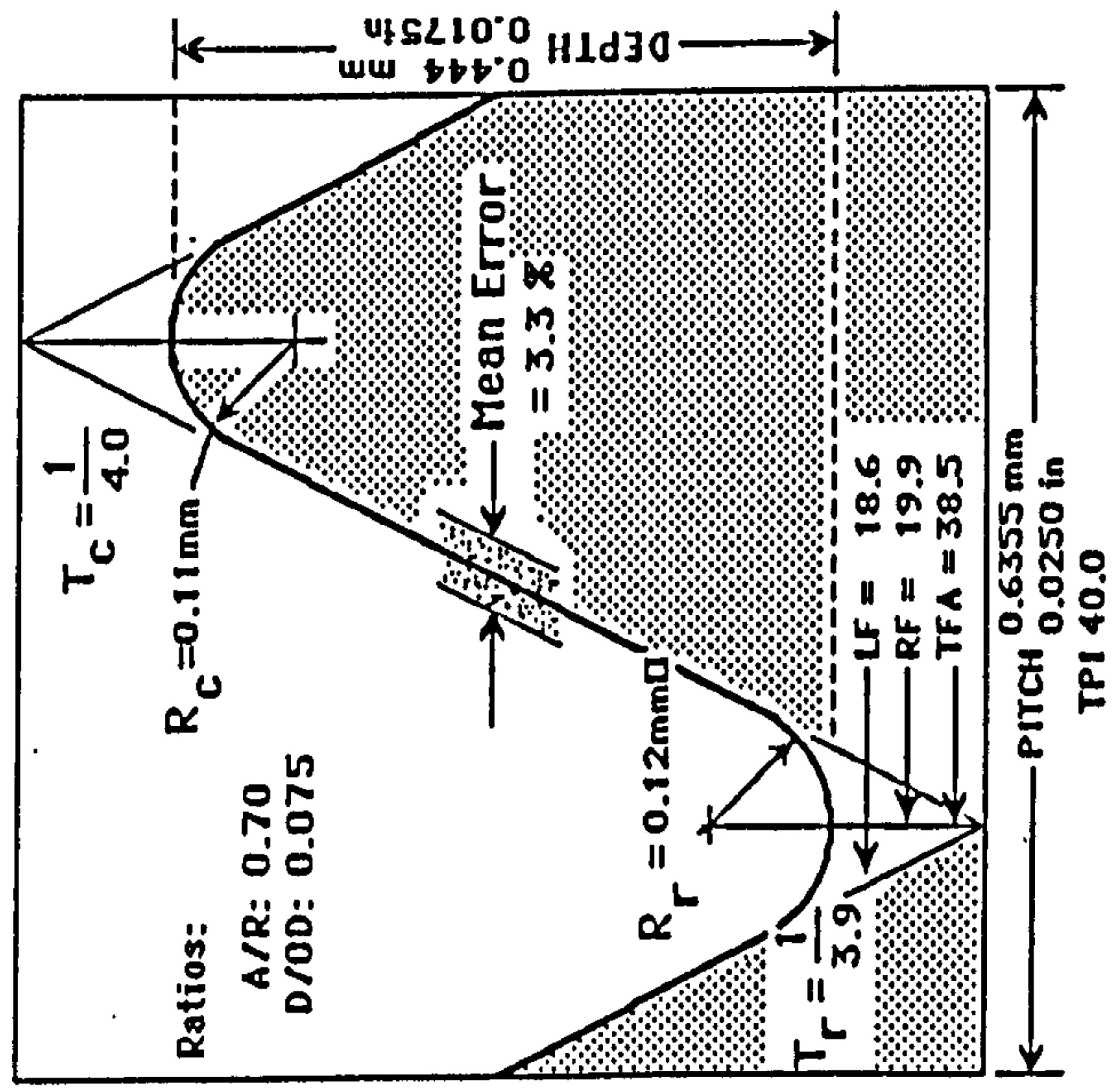
Study Code: GMT-6a

Instrument: Level

Maker: J. Casartelli

Date: 3rd q 19th c

Ser./Acq. No.



Mu

Filar

Scale

Bench

Div. Eng.

Adjust.

Leveling

Focus

Eye P.

Tube

Tool

Gauge

Binding

Misc.

(Azimuth adjust)



Characteristics:

Screw

Nut

Length: 1.156"

Diameter: 0.2333"

Steel

Brass

Other:

Instrument Identification:

Study Code: GMT-6b

Instrument: Level

Maker: J. Casartelli

Date: 3rd q 19th c

Ser./Acq. No.

GMT-6B

CREST

PHASE

COUNT

Ratio:  $T_c = \frac{1}{3.4}$

$R_r = 0.17\text{mm}$

$R_c = 0.14\text{mm}$

Mean Error = 3.5 %

DEPTH 0.371 mm

LF = 19.4

RF = 15.8

TFA = 36.2

PITCH 0.6321 mm

TPI 40.2

$T_r = \frac{1}{3.0}$

Ratio: A/R: 0.60 D/OD: 0.063

Mu

Filar

Scale

Bench

Div. Eng.

Adjust.

Leveling

Focus

Eye P.

Tube

Tool

Gauge

Binding

Misc.

(Altitude adjust)



Characteristics:

Screw

Nut

Leng:- 0.938in

Diameter: 0.1444"

Steel

Brass

Other:

Instrument Identification:

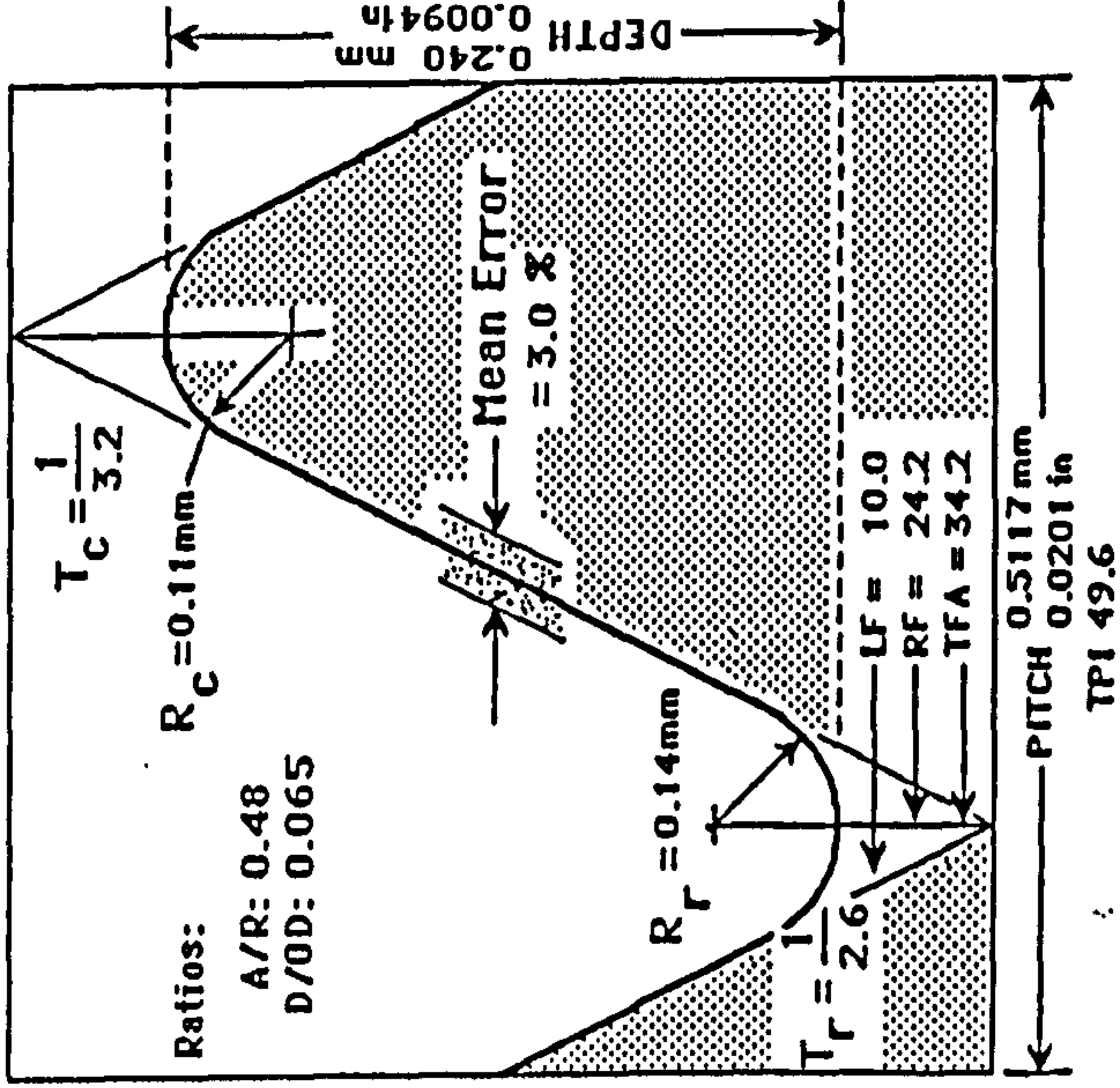
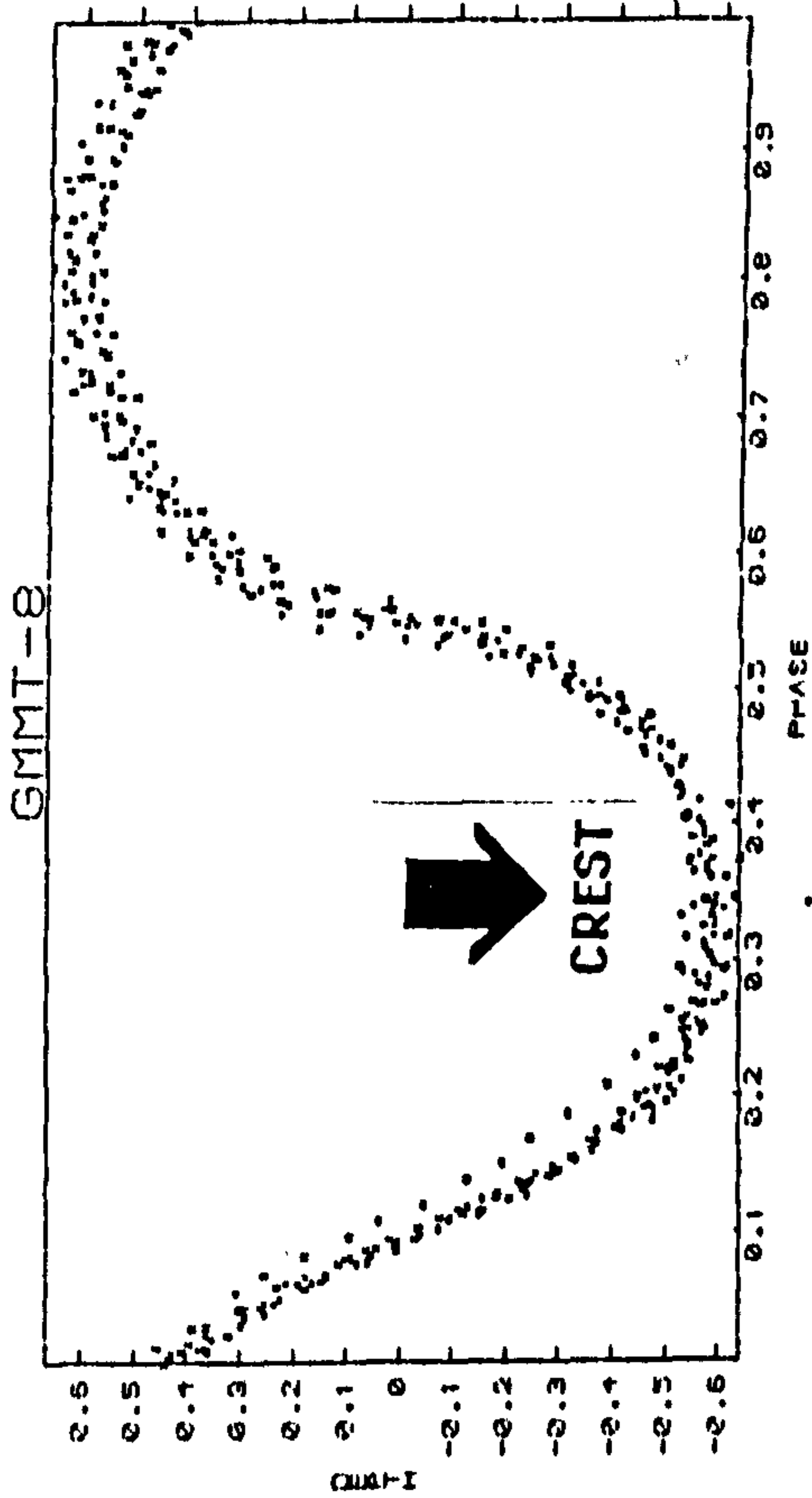
Study Code: GMT-8

Instrument: Theodolite--  
Everest pattern

Maker: G & M Simons, London

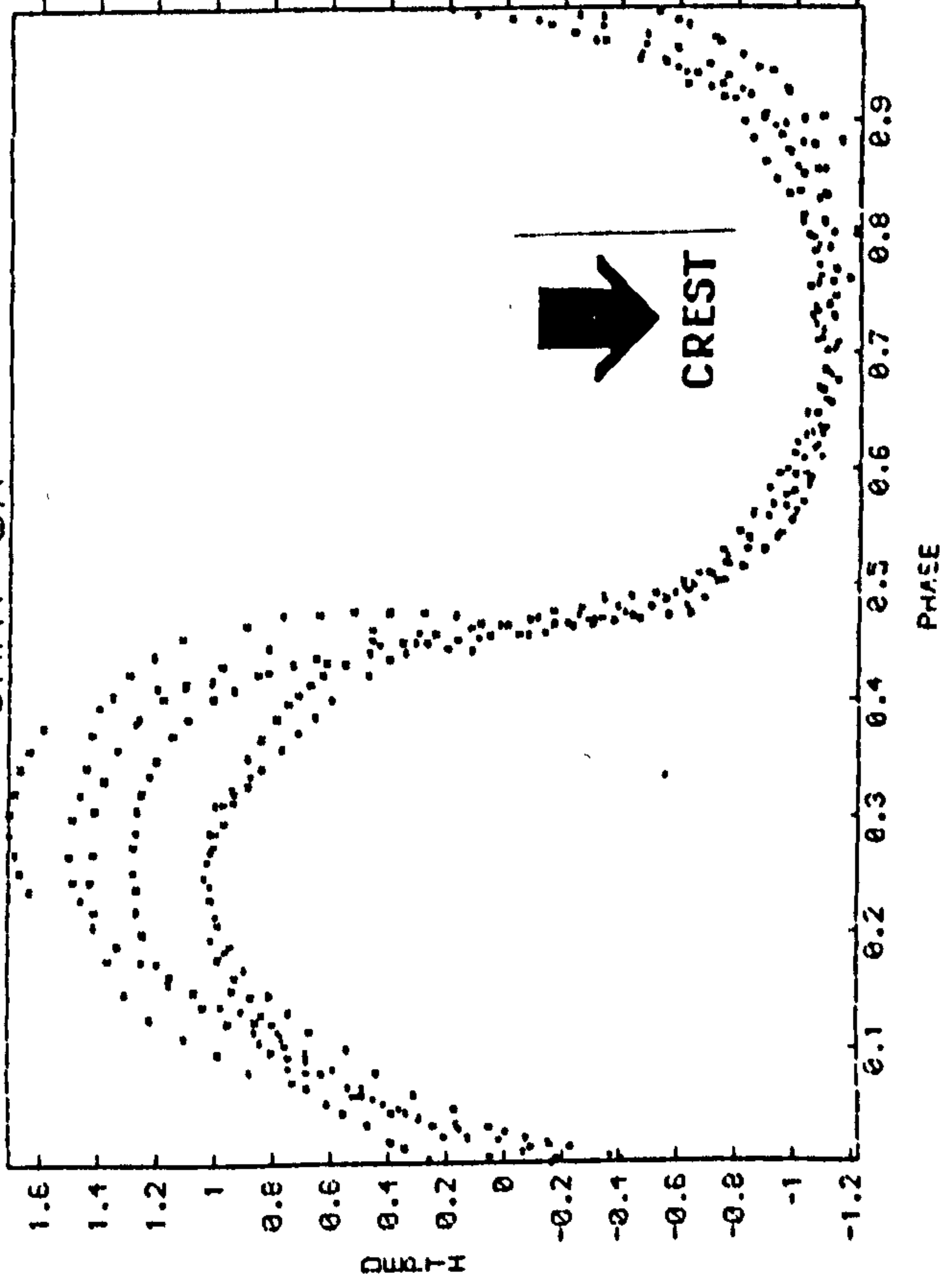
Date: 1896(?)

Ser./Acq. No. 1972.5



	Filar
	Scale
	Bench
	Div. Eng.
	Adjust.
	Leveling
	Focus
	Eye P.
	Tube
	Tool
	Gauge
	Binding
	Misc.
	(Vernier adjust)

# GMMT-9A

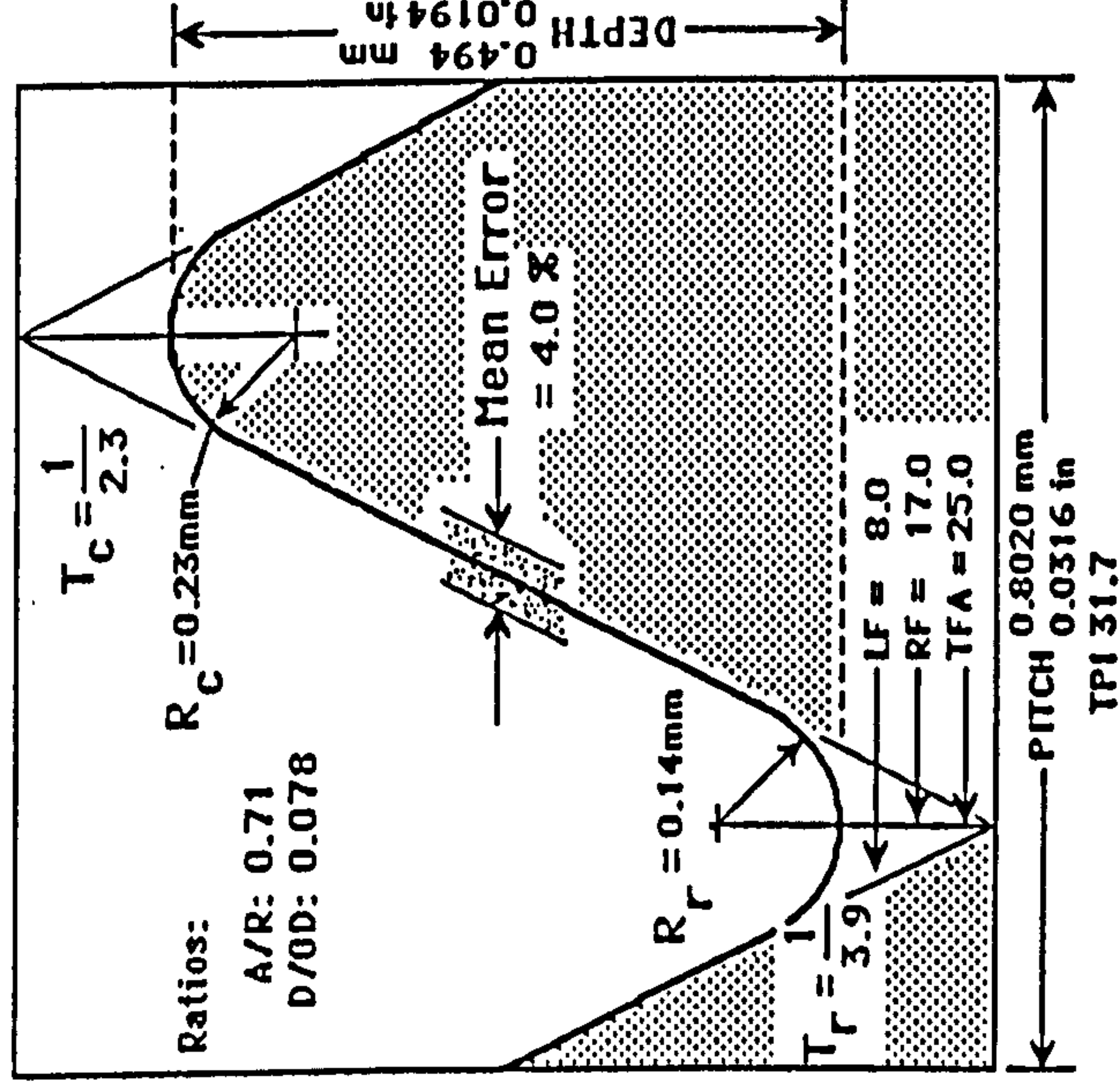


## Characteristics:

Screw ☒ Nut ☐  
 Leng: 1.375"  
 Diameter: 0.2482"  
 Steel ☐ Brass ☒  
 Other:

## Instrument Identification:

Study Code: GMMT-9a  
 Instrument: Y-level  
 Maker: W & S Jones  
 Date: ca.1840  
 Ser./Acq. No. 1968.15



Mu — [ Filar Scale Bench Div. Eng. Adjust. Leveling Focus Eye P. Tube Tool Gauge Binding Misc. ]

(Azimuth adj.)

Characteristics:

Screw

Nut

Leng: 3.125" / 1.0"

Diameter: 0.4492"

Steel

Brass

Other:

Instrument Identification:

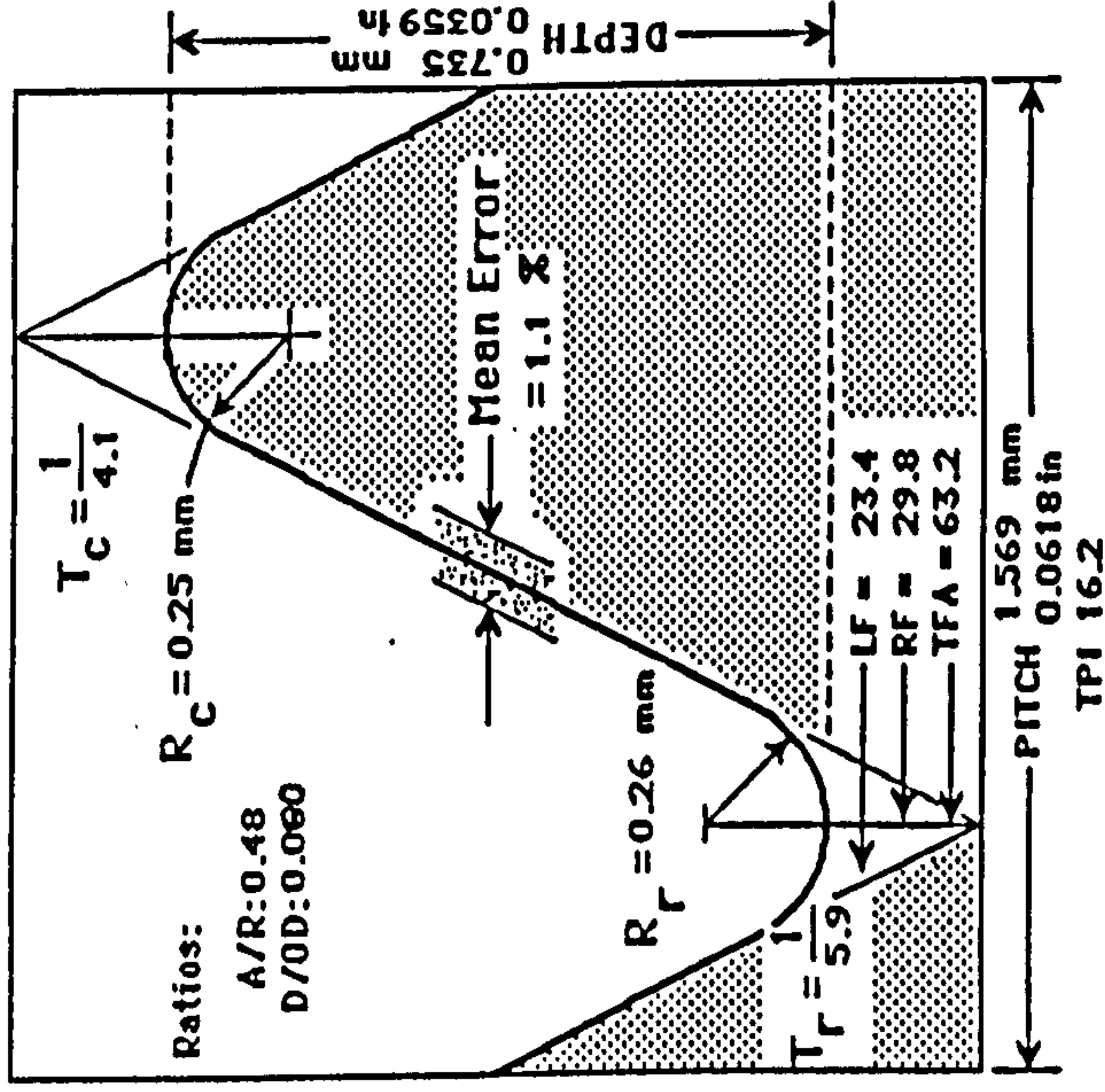
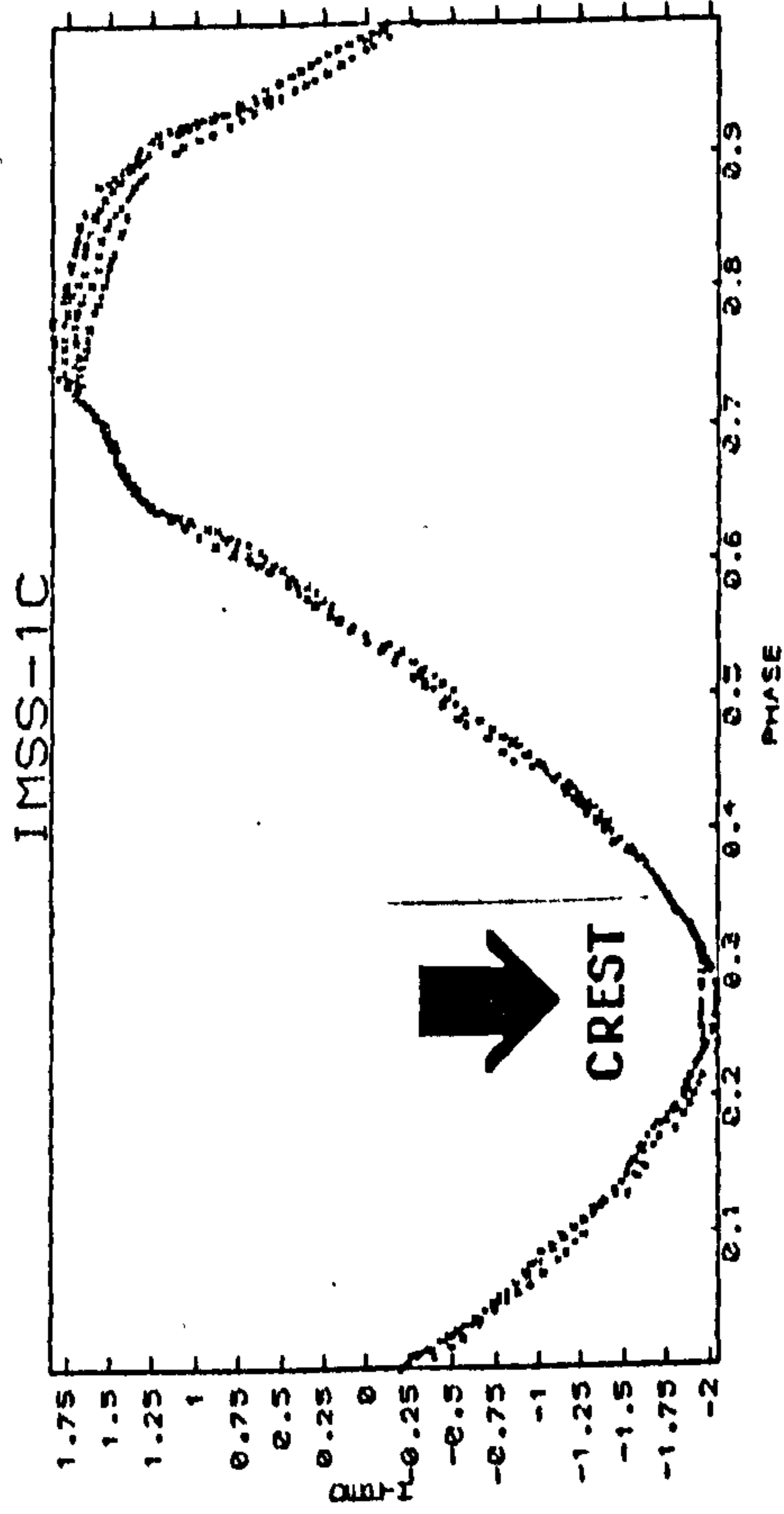
Study Code: IMSS-1C

Instrument: Circular Div. Engine

Maker: Duc de Chaulnes

Date: 1762

Ser./Acq. No.



MU

Filar

Scale

Bench

Div. Eng.

Adjust.

Leveling

Focus

Eye P.

Tube

Tool

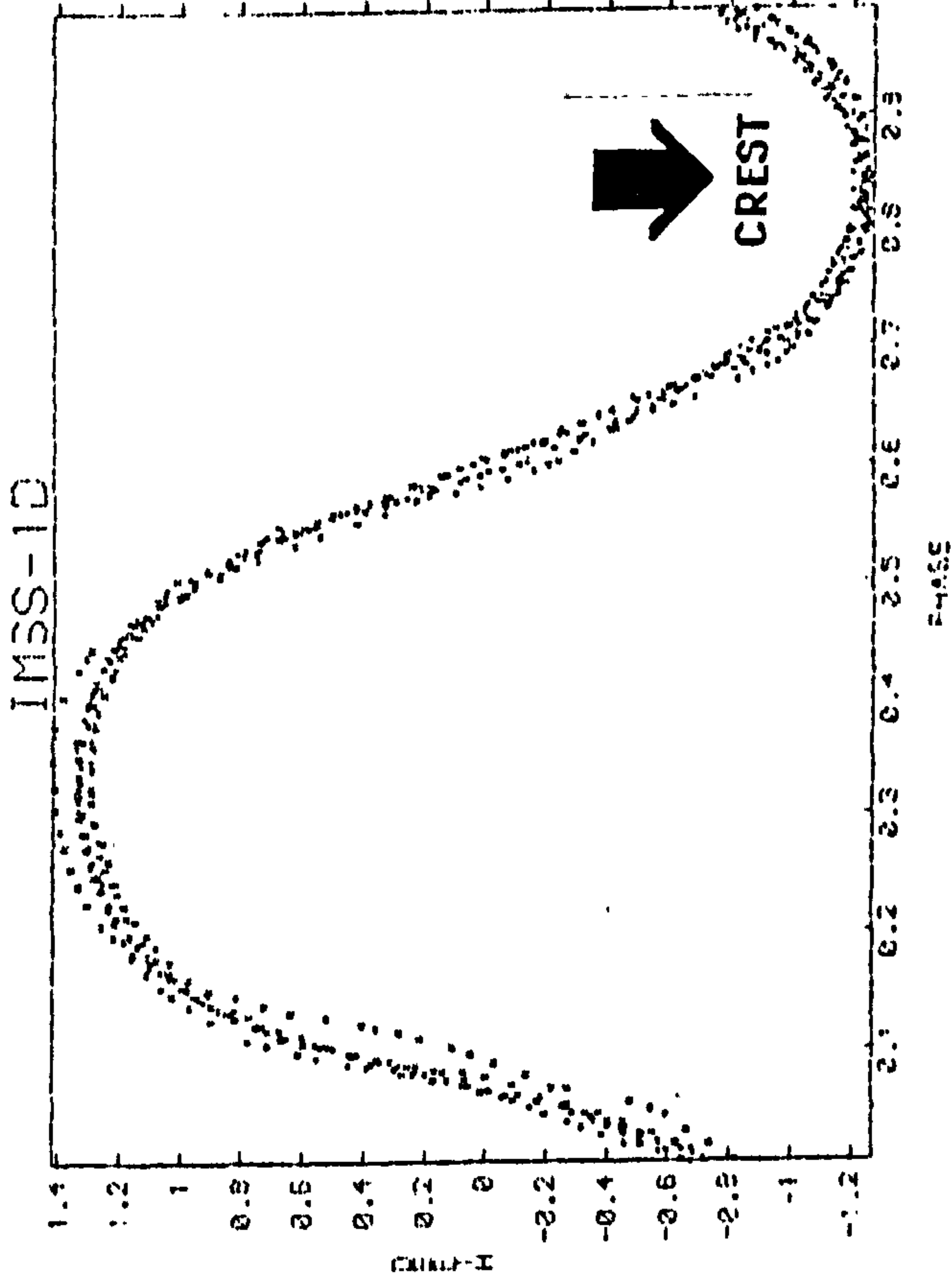
Gauge

Binding

Misc.

For backlash adjustment





**Characteristics:**

Screw ☒ Nut ☐

Leng: 1.625" / ~0.45"

Diameter: 0.2180"

Steel ☒ Brass ☐

Other:

**Instrument Identification:**

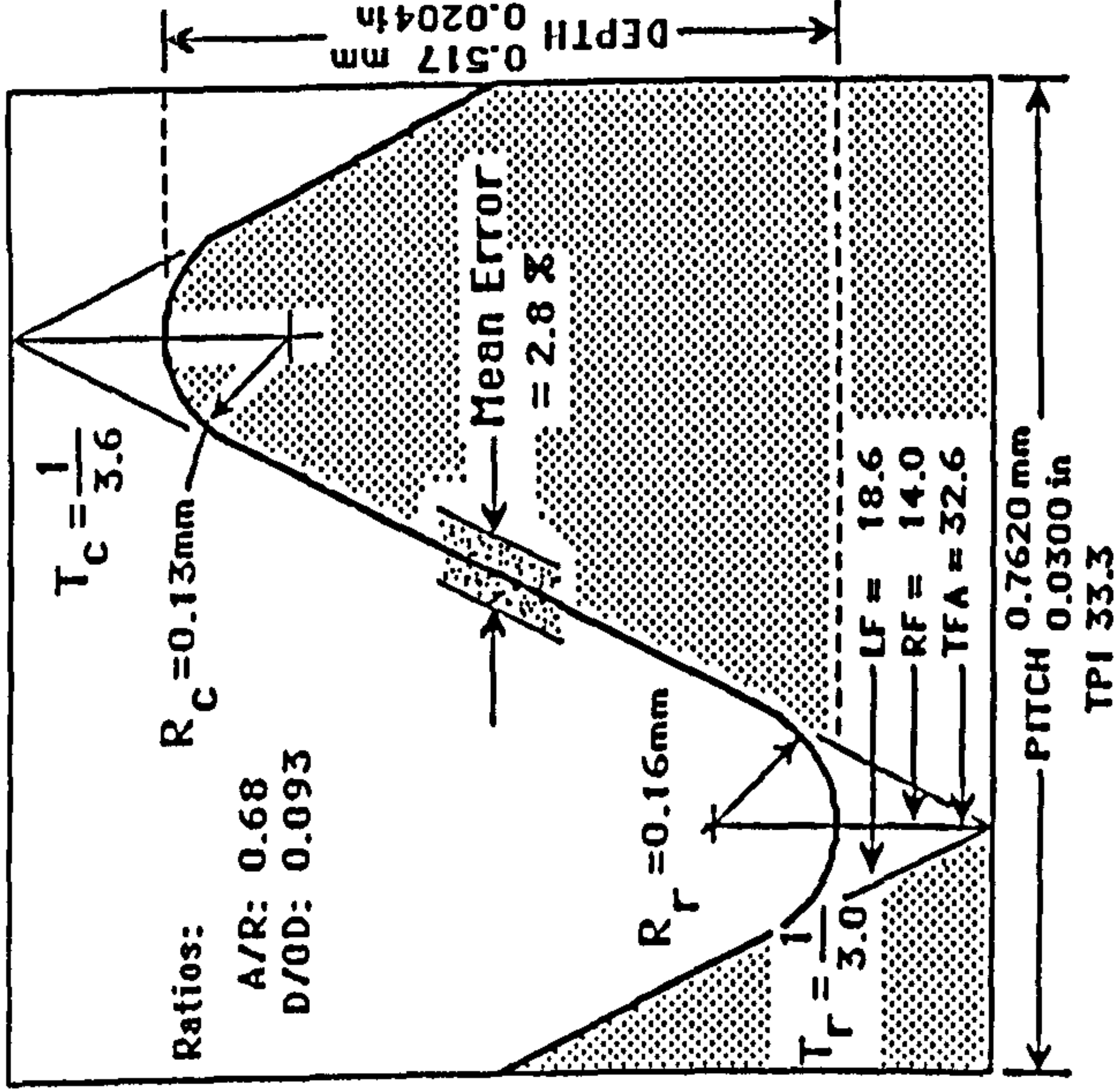
Study Code: IMSS-1d

Instrument: Circular Dividing Eng.

Maker: Chaulnes

Date: 1762

Ser./Acq. No.



Mu

Filar

Scale

Bench

Div. Eng.

Adjust.

Leveling

Focus

Eye P.

Tube

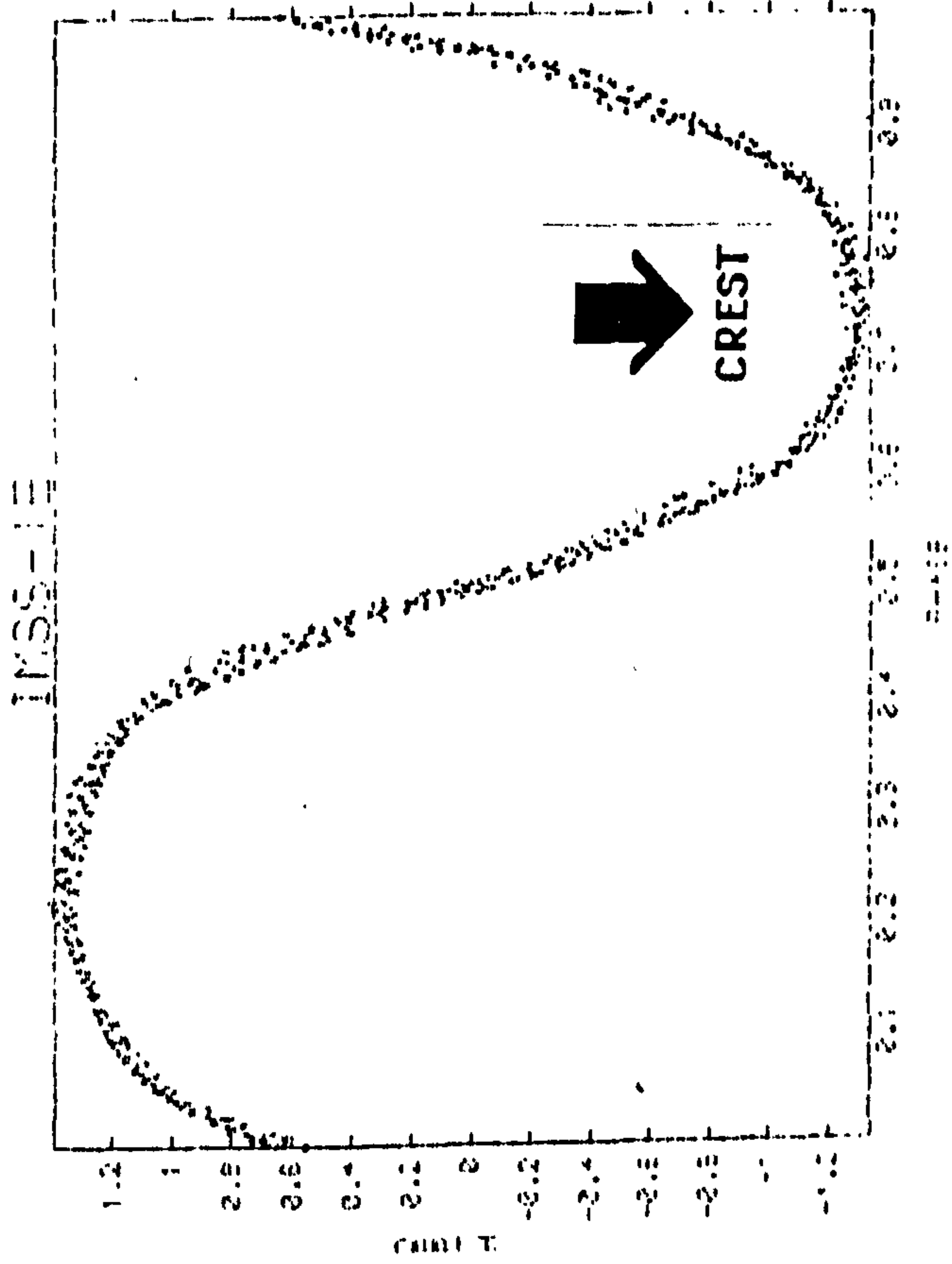
Tool

Gauge

Binding

Misc.





**Characteristics:**

Screw ☒ Nut ☐

Leng: 1.625" /  $\approx 1.5"$

Diameter: 0.2098"

Steel ☒ Brass ☐

Other: ☐

**Instrument Identification:**

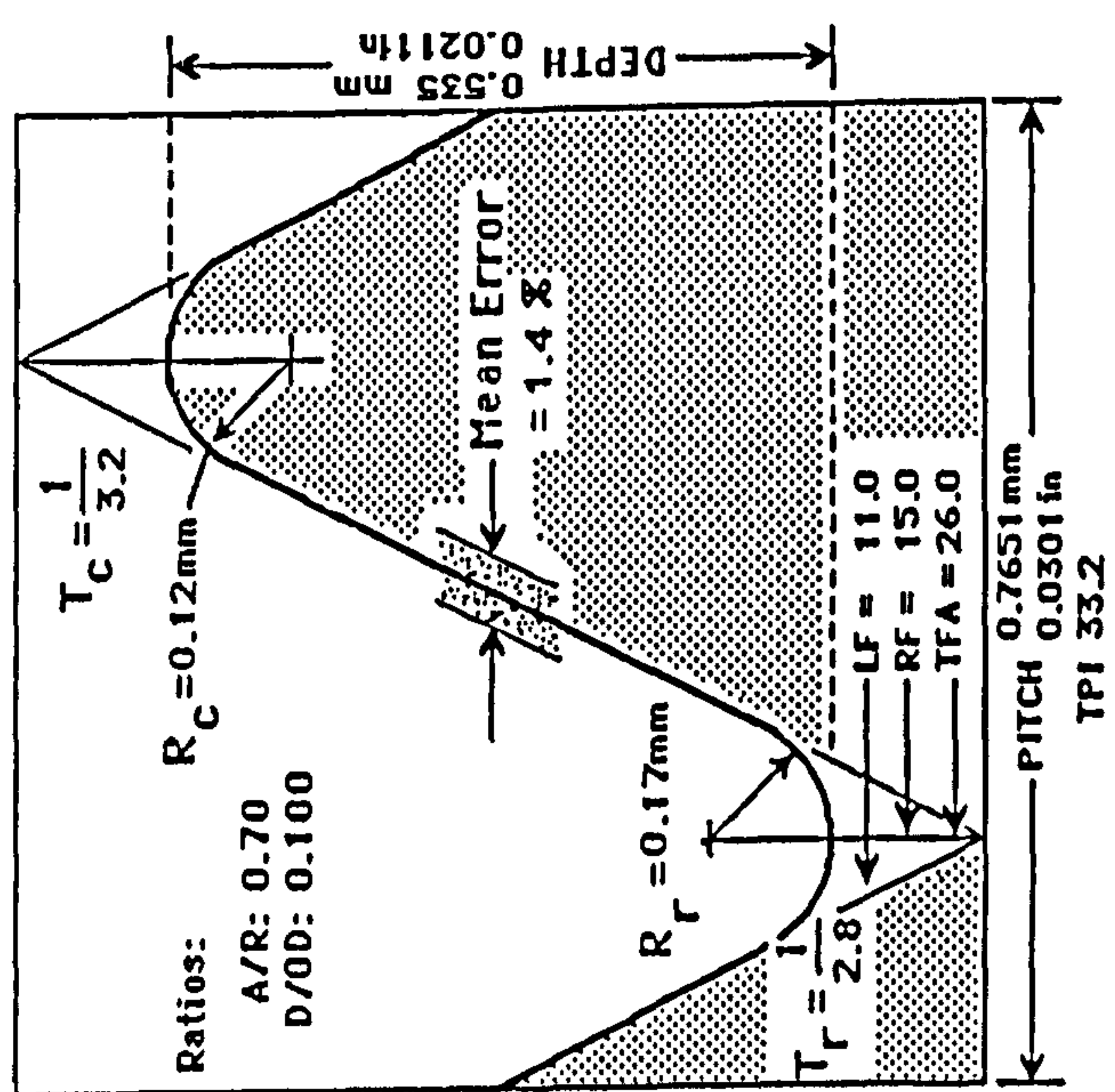
Study Code: IMSS-1e

Instrument: Circular Dividing Eng.

Maker: Chalunes

Date: 1762

Ser./Acq. No.



Mu	Filar	
	Scale	
[	Bench	
	Div. Eng.	
]	Adjust.	
	Leveling	
	Focus	
	Eye P.	
	Tube	
	Tool	
	Gauge	
	Binding	
	Misc.	

Characteristics:

Screw

Nut

Leng: #0.625"

Diameter: 0.219"

Steel

Brass

Other:

Instrument Identification:

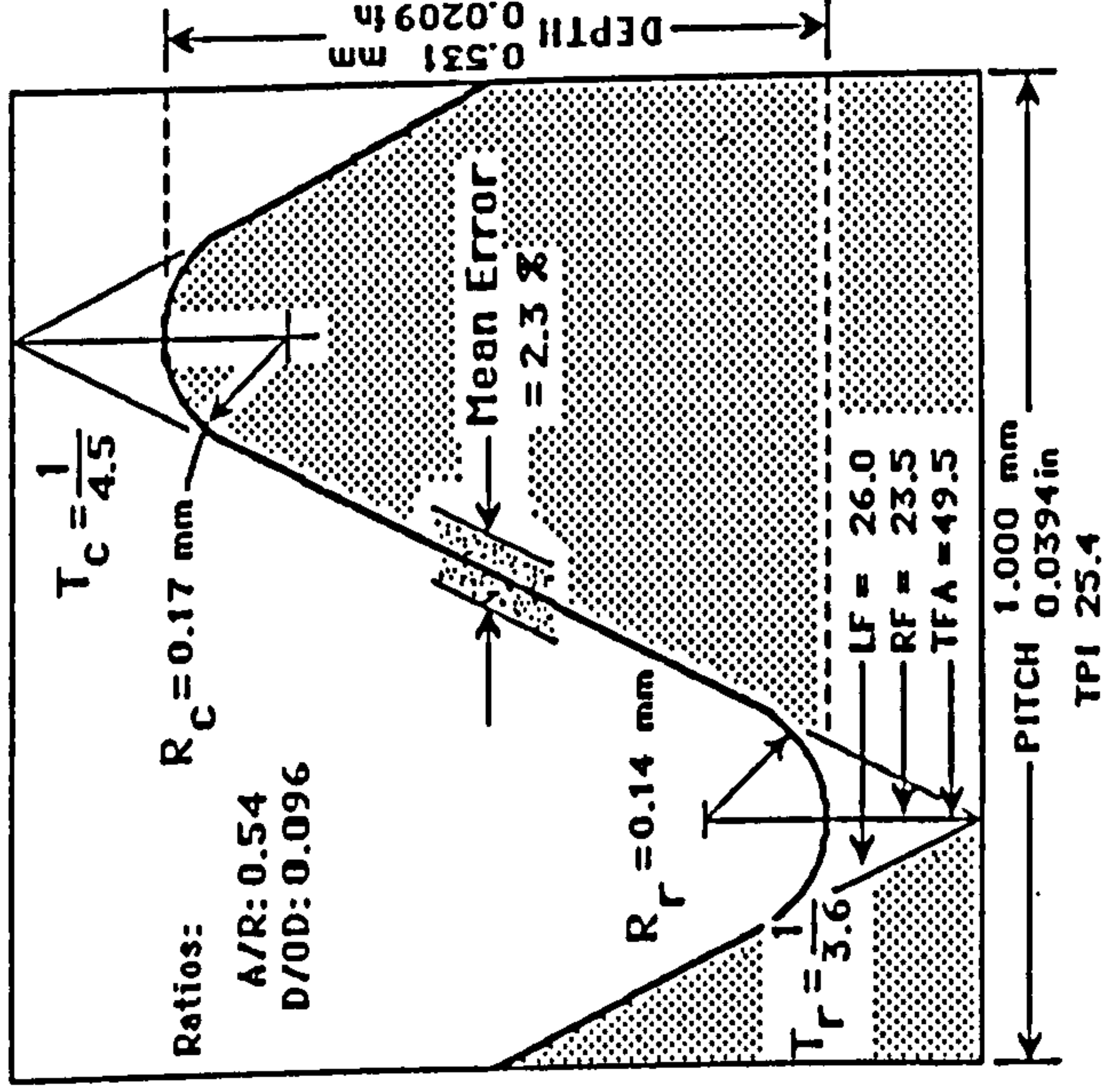
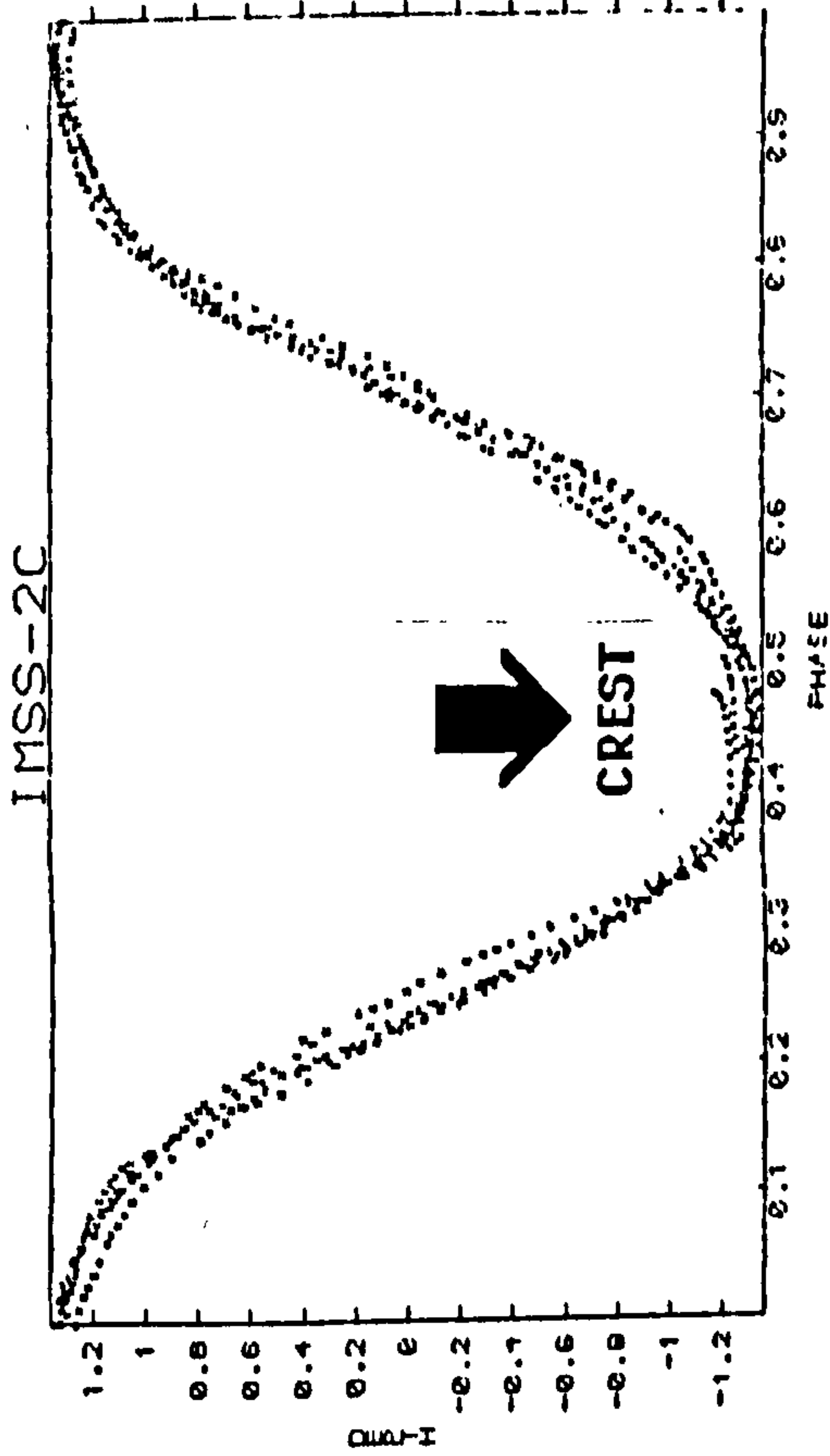
Study Code: IMSS-2c

Instrument: Linear Dividing Eng.

Maker: Chaulnes

Date: ca.1762

Ser./Acq. No.



Mu

Filar

Scale

Bench

Div. Eng.

Adjust.

Leveling

Focus

Eye P.

Tube

Tool

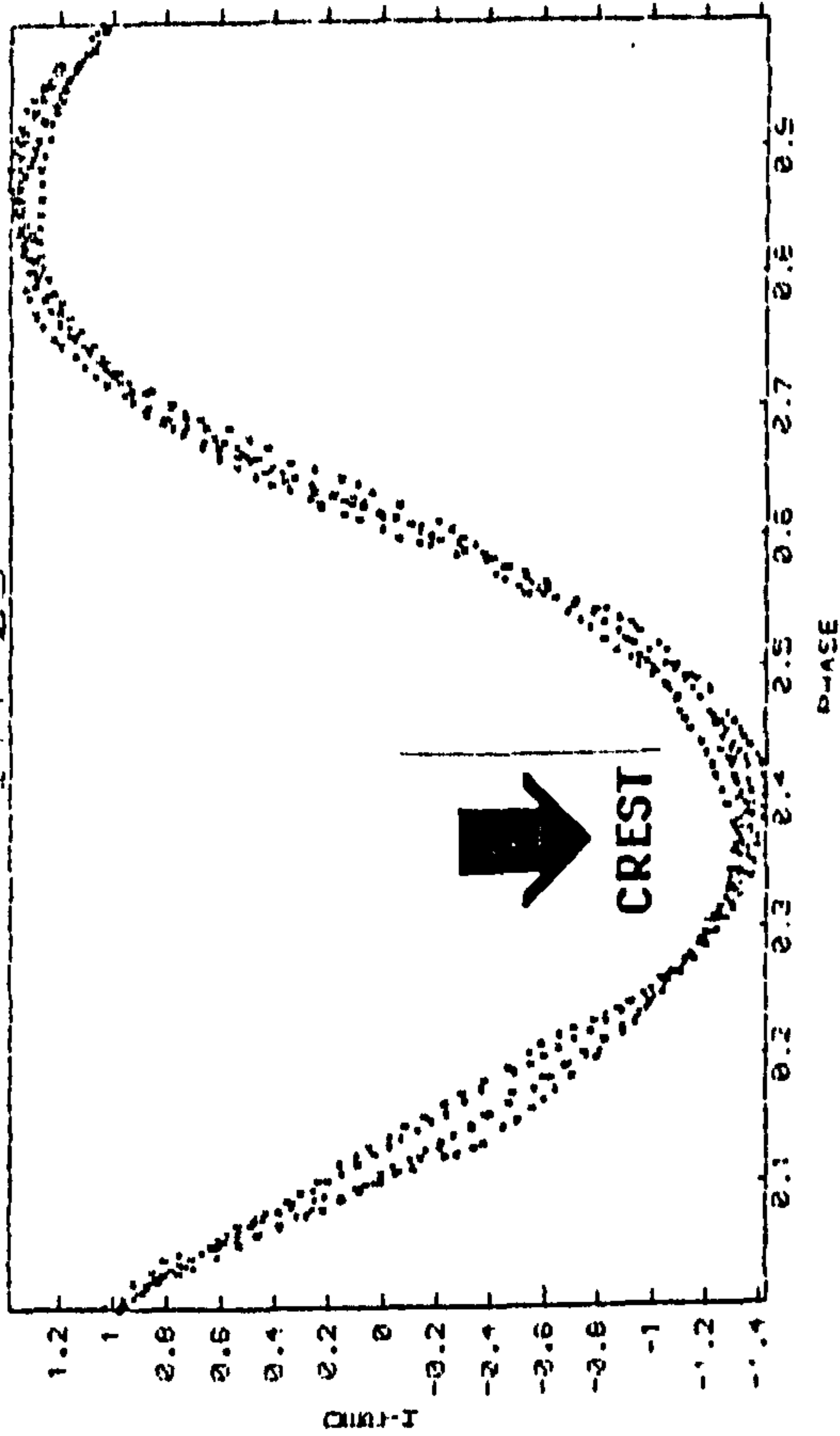
Gauge

Binding

Misc.

Screw for adjusting worm against the rack

ITT-2B



Characteristics:

Screw ☒ Nut ☐

Leng: 2.375" / 0.433"

Diameter: 0.2646"

Steel ☒ Brass ☐

Other:

Instrument Identification:

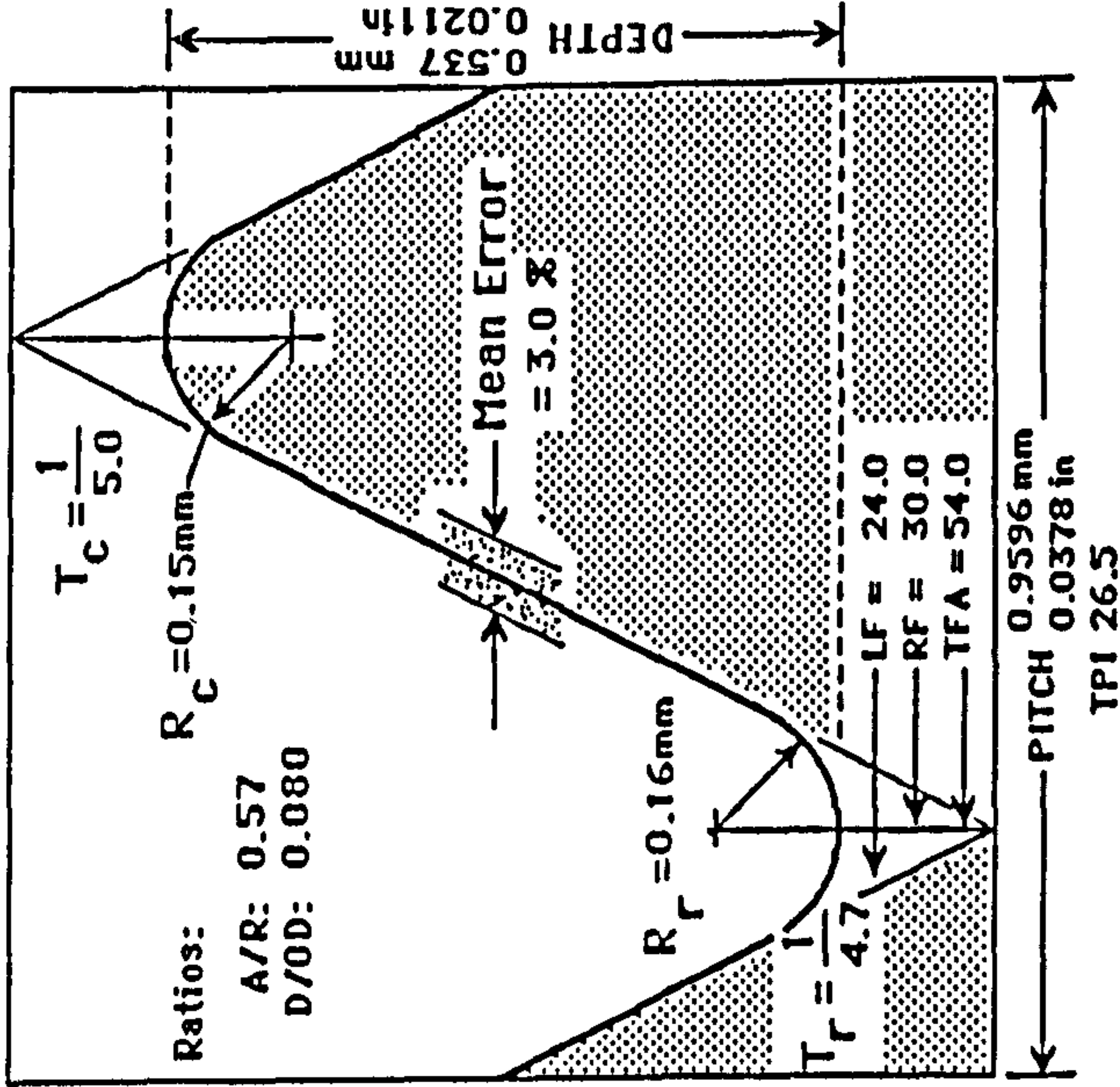
Study Code: ITT-2b

Instrument: Linear Dividing Eng.

Maker: Perreux

Date: 1855

Ser./Acq. No. A 77



Mu	Filar	
	Scale	
Bench	Div. Eng.	
	Adjust.	
Leveling	Focus	
	Eye P.	
Tube	Tool	
	Gauge	
Binding	Misc.	



Characteristics:

Screw

Nut

Leng: 1.654" / 0.295"

Diameter: 0.1497"

Steel

Brass

Other:

Instrument Identification:

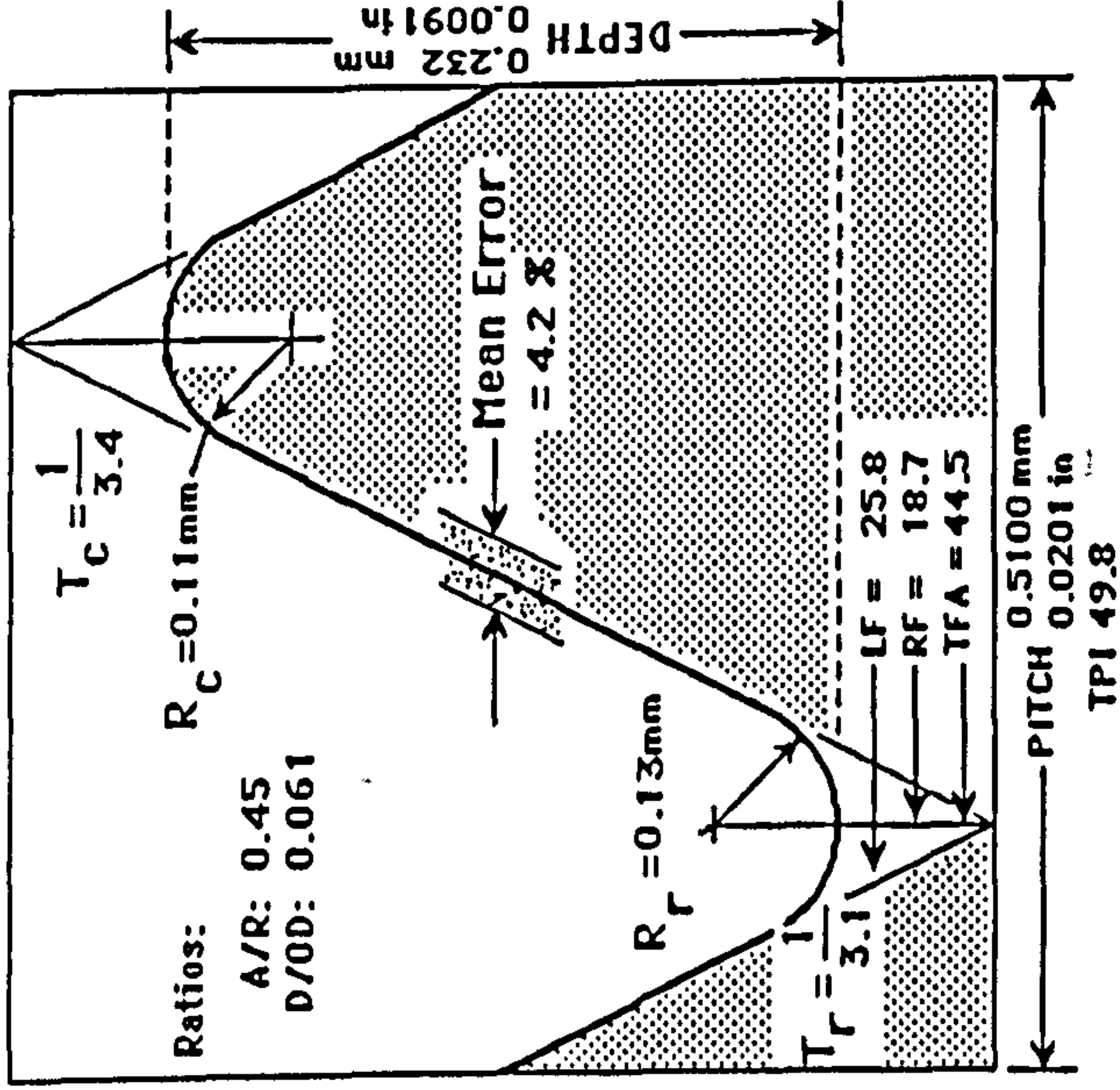
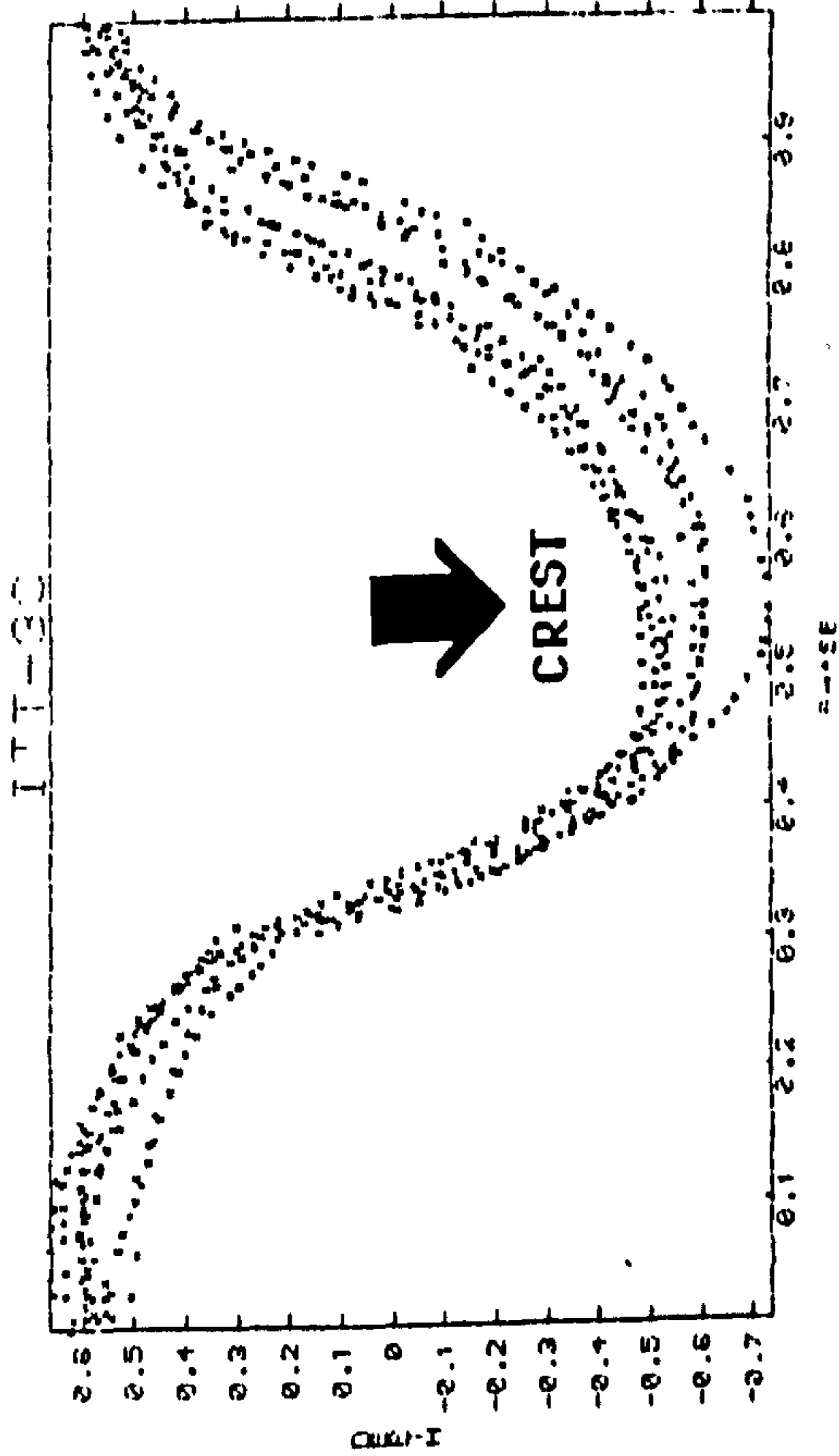
Study Code: ITT-3c

Instrument: Circle--Polarization and spectroscopy

Maker: Duboscq

Date: 1855-78

Ser./Acq. No. B 48



Mu	Filar
	Scale
	Bench
	Div. Eng.
	Adjust.
	Leveling
	Focus
	Eye P.
	Tube
	Tool
	Gauge
	Binding
	Misc.



Characteristics:

Screw

Nut

Leng: 3.00cm / 1.30cm

Diameter: 0.60cm

Steel

Brass

Other:

Instrument Identification:

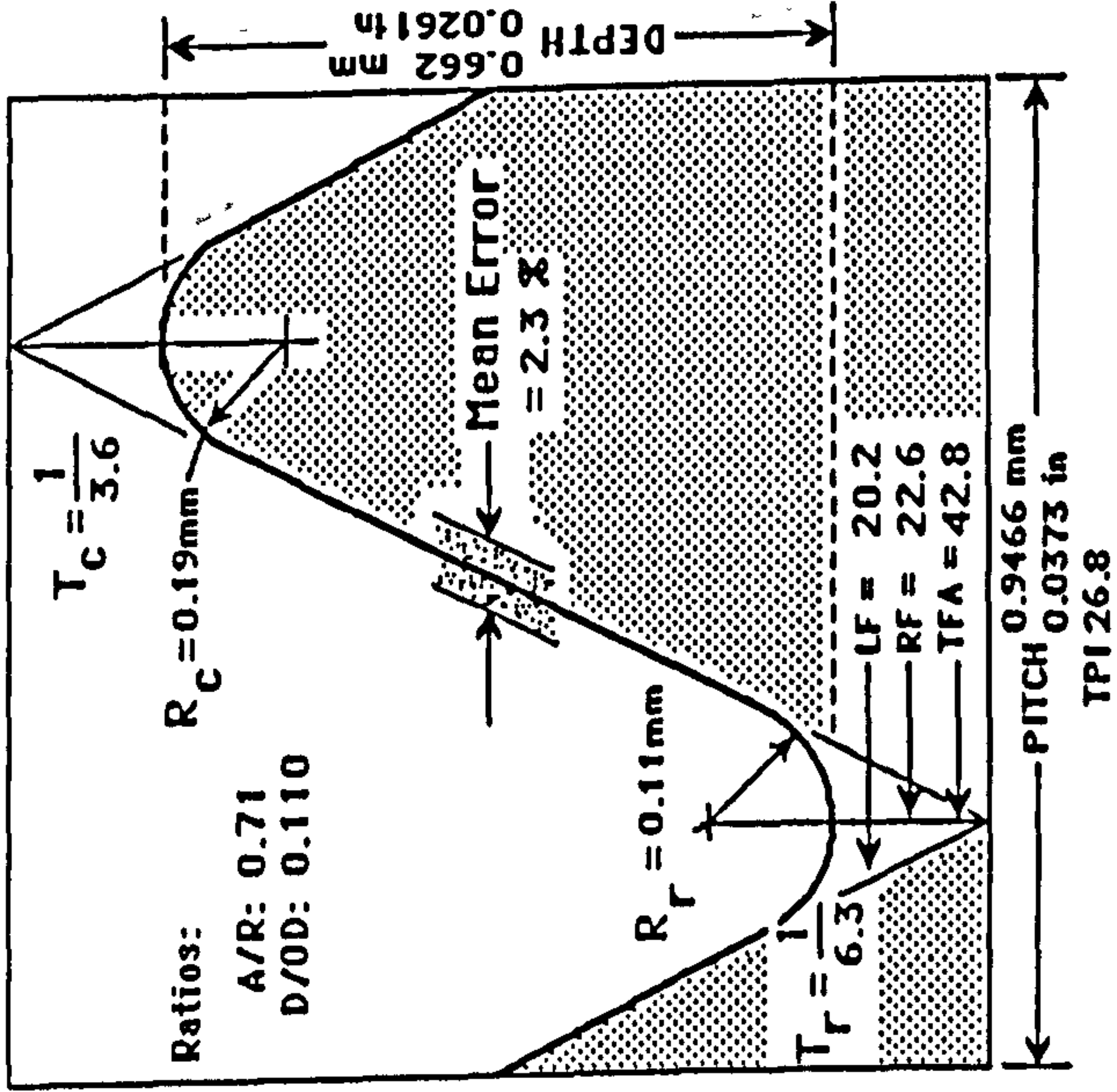
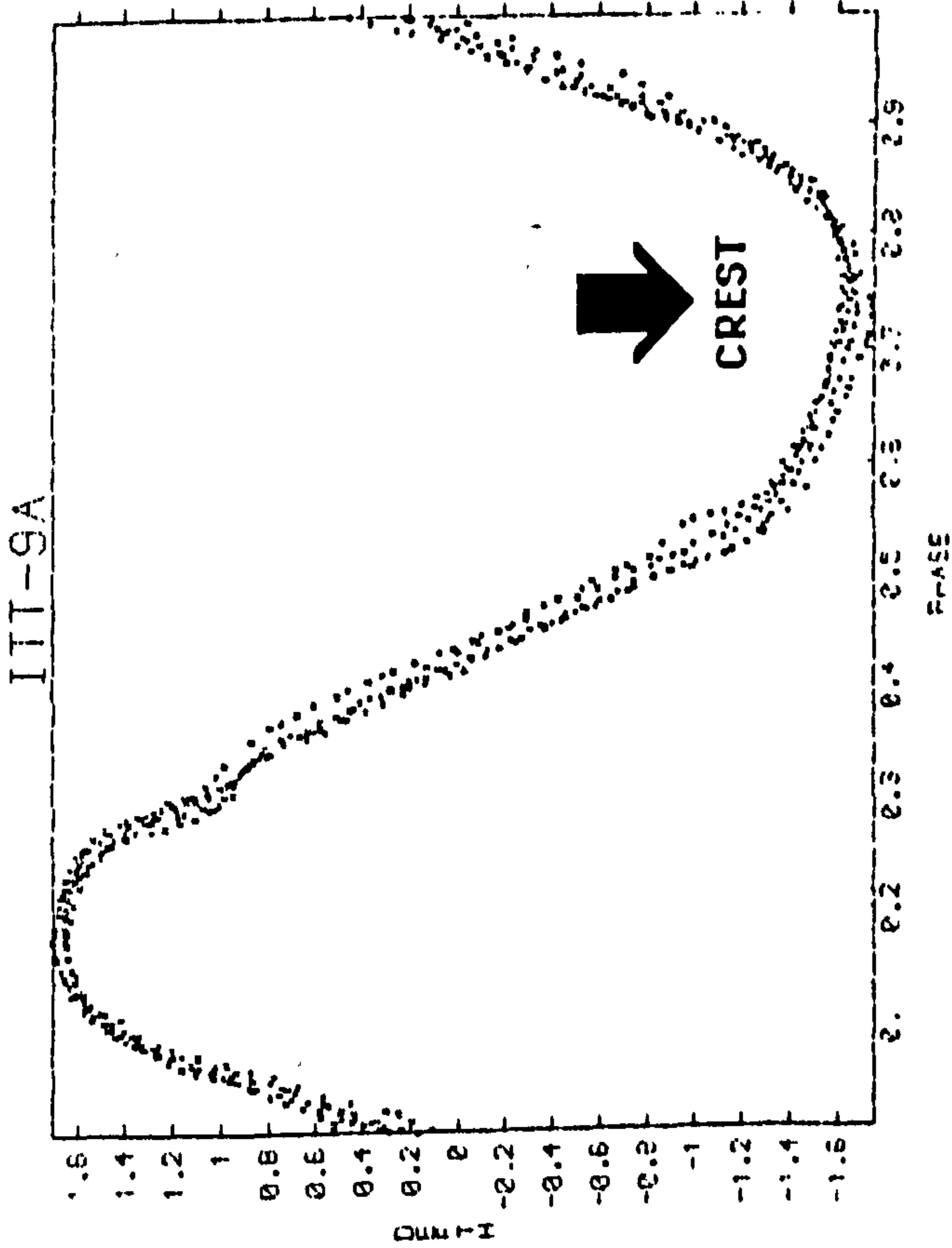
Study Code: ITT-9a

Instrument: Manometer

Maker: F. Miller, Insbruck

Date: 1855-78

Ser./Acq. No.



Mu	Filar
	Scale
	Bench
	Div. Eng.
	Adjust.
	Leveling
	Focus
	Eye P.
	Tube
	Tool
	Gauge
	Binding
	Misc.

(Note flattened crest on this and ITT-9b)

Characteristics:

Screw

Nut

Leng: 3.50cm / 1.30cm

Diameter: 0.70cm

Steel

Brass

Other:

Instrument Identification:

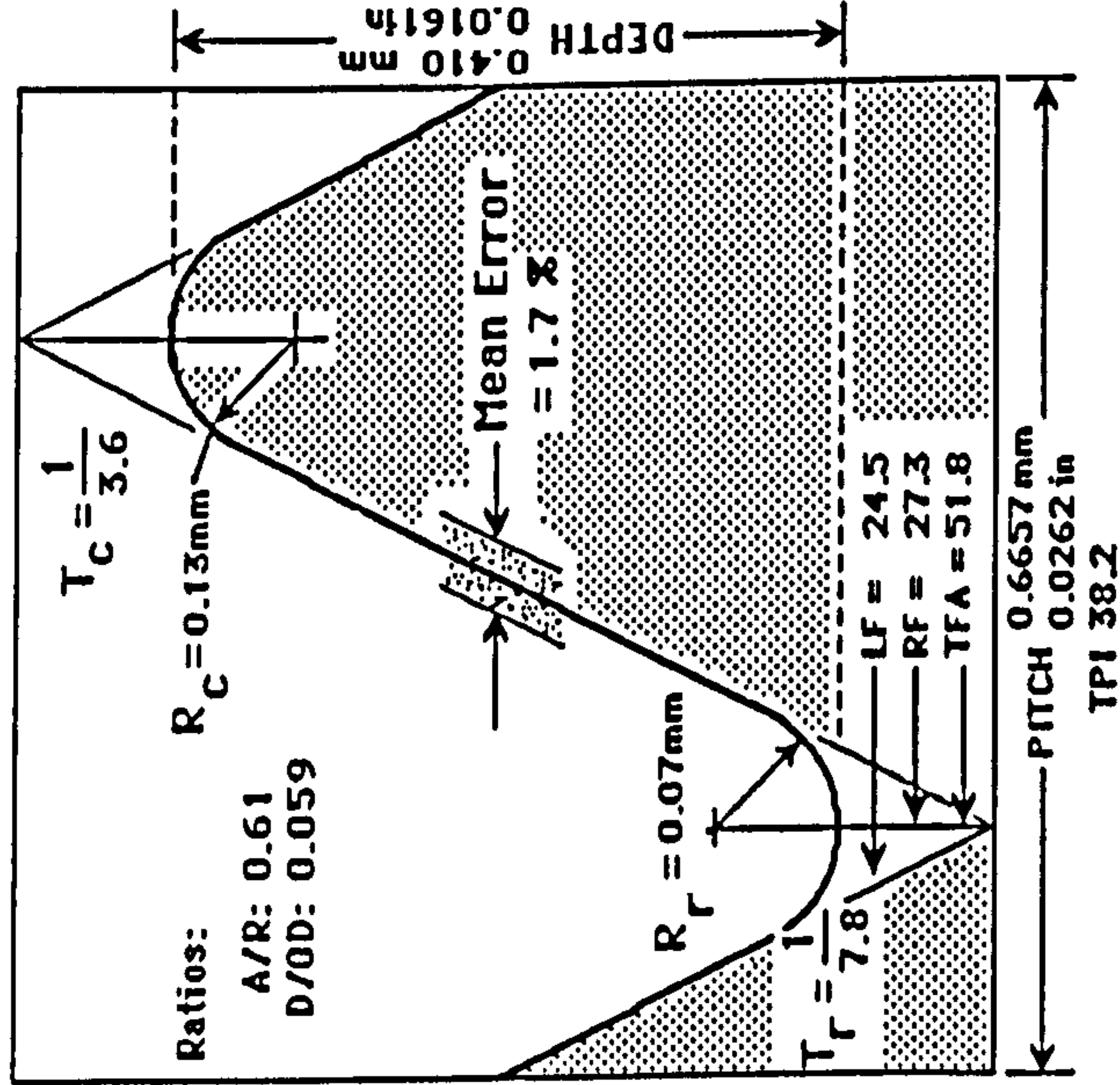
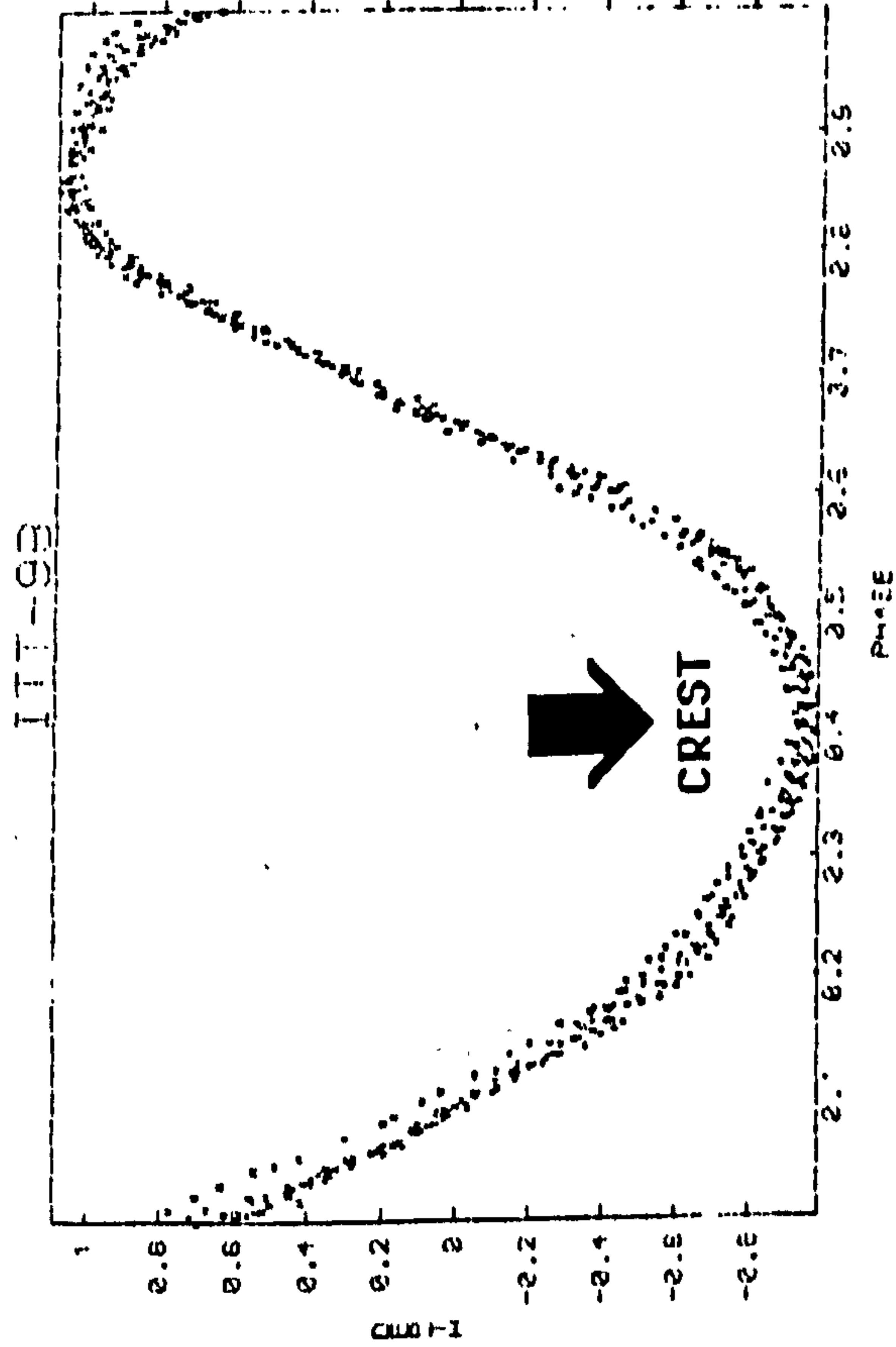
Study Code: ITT-9b

Instrument: Manometer

Maker: F. Miller, Insbruck

Date: 1855-78

Ser./Acq. No.



Mu	Filar
	Scale
	Bench
	Div. Eng.
	Adjust.
	Leveling
	Focus
	Eye P.
	Tube
	Tool
	Gauge
	Binding
	Misc.

(Vernier adjust)

(Note flattening on the crest and compare with ITT-9a)

Characteristics:

Screw

Nut

Leng: 4.60cm / 0.75cm

Diameter: 0.50cm

Steel

Brass

Other:

Instrument Identification:

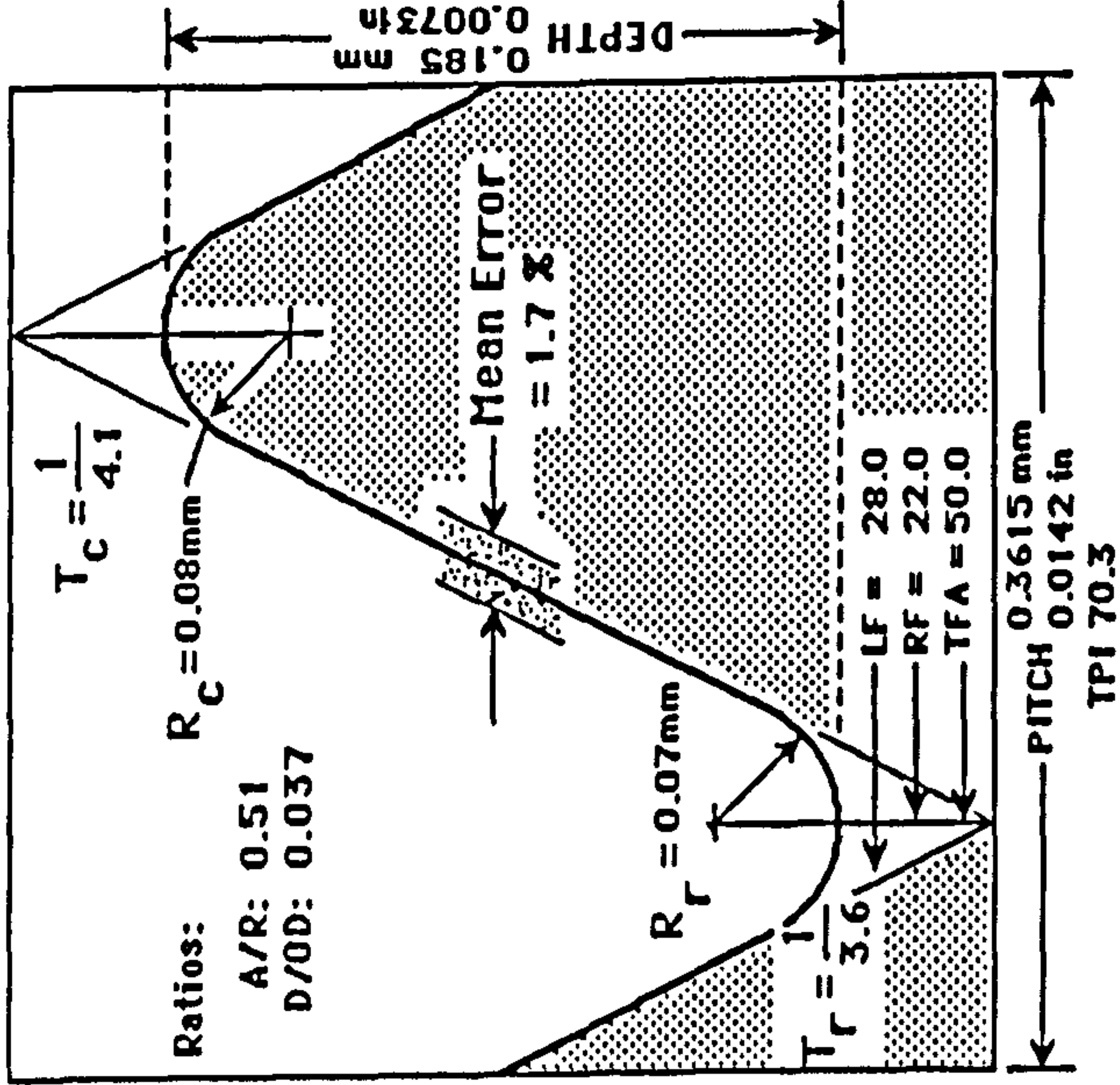
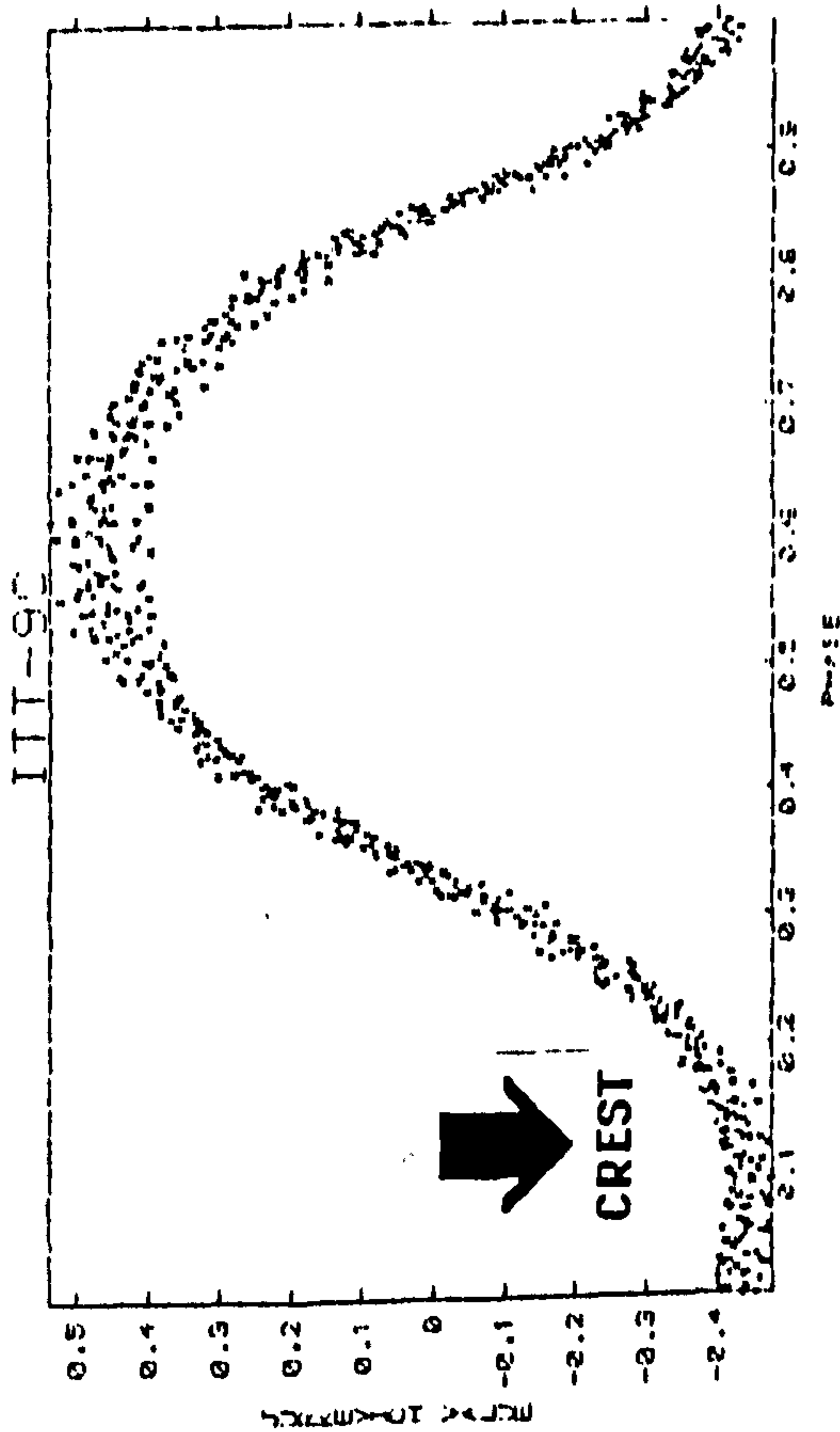
Study Code: ITT-9c

Instrument: Monometer

Maker: F. Miller, Insbruck

Date: 1855-78

Ser./Acq. No.



Mu

Filar

Scale

Bench

Div. Eng.

Adjust.

Leveling

Focus

Eye P.

Tube

Tool

Gauge

Binding

Misc.



Characteristics:

Screw

Nut

Leng: 3.00cm / 1.30cm

Diameter: ≈0.60cm

Steel

Brass

Other:

Instrument Identification:

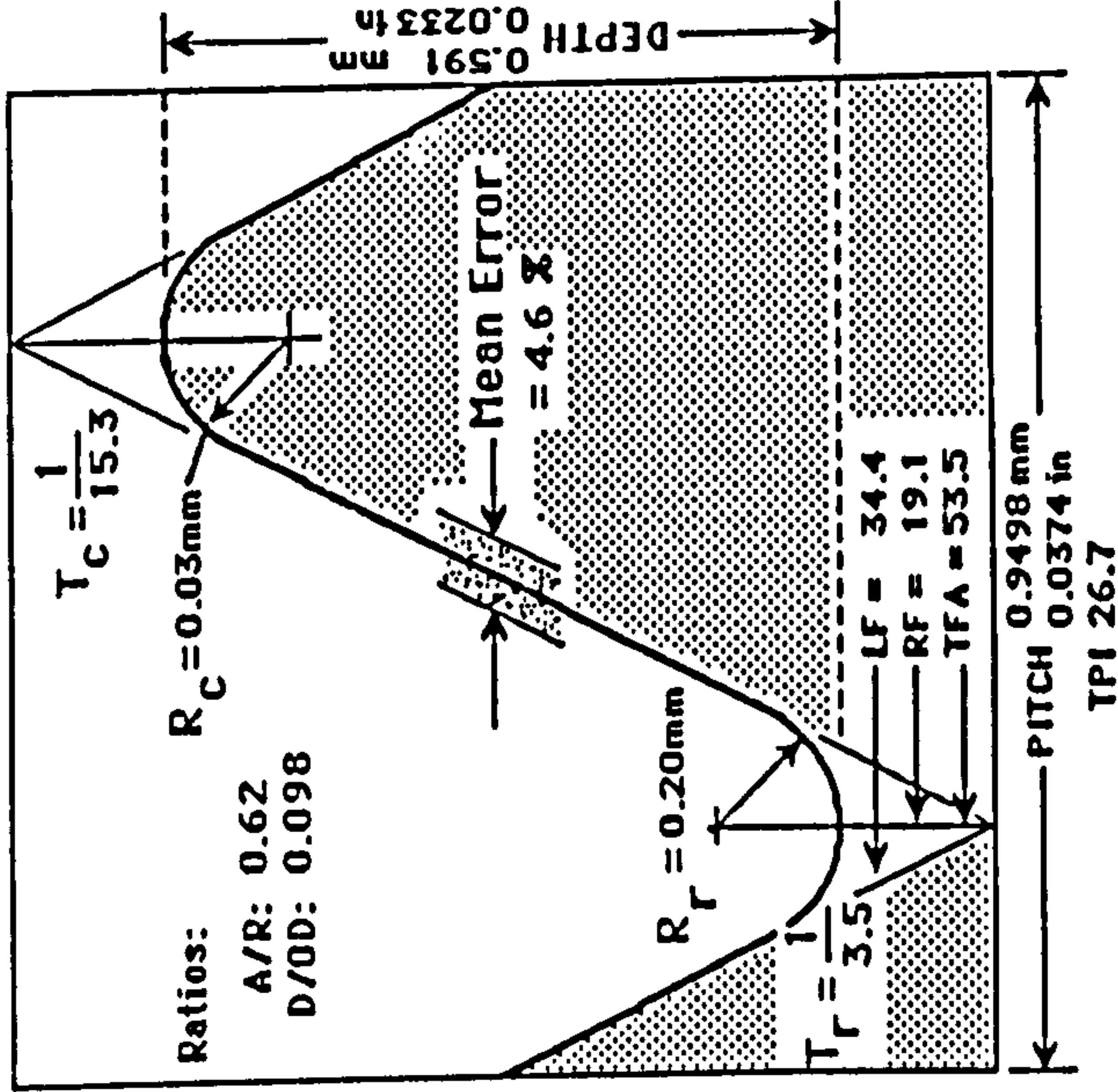
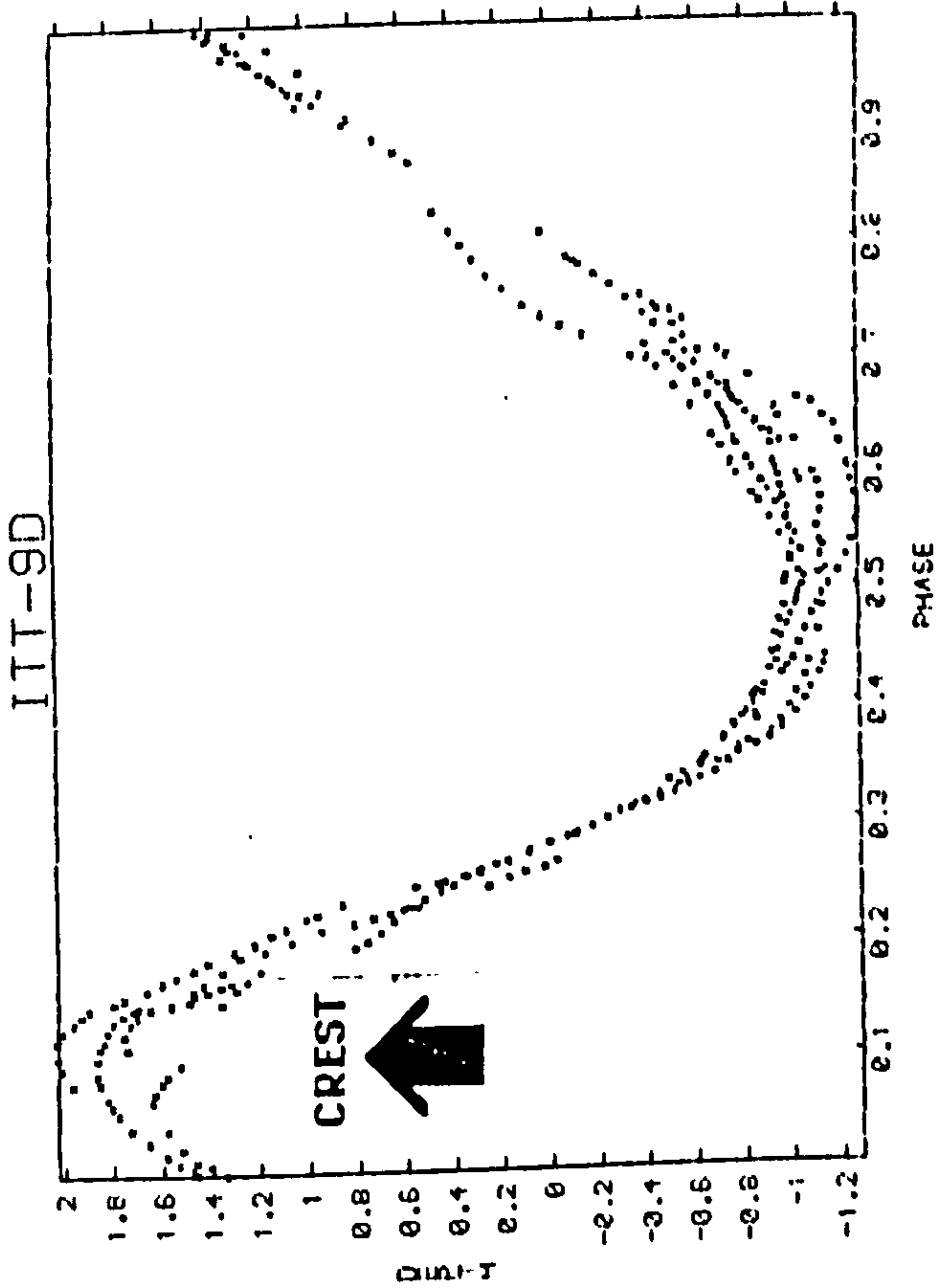
Study Code: ITT-9d

Instrument: Manometer

Maker: F. Miller, Insbruck

Date: 1855-78

Ser./Acq. No.



MU

Filar

Scale

Bench

Div. Eng.

Adjust.

Leveling

Focus

Eye P.

Tube

Tool

Gauge

Binding

Misc.



Characteristics:

Screw

Nut

Leng: 0.813"

Diameter: 0.125"

Steel

Brass

Other:

Instrument Identification:

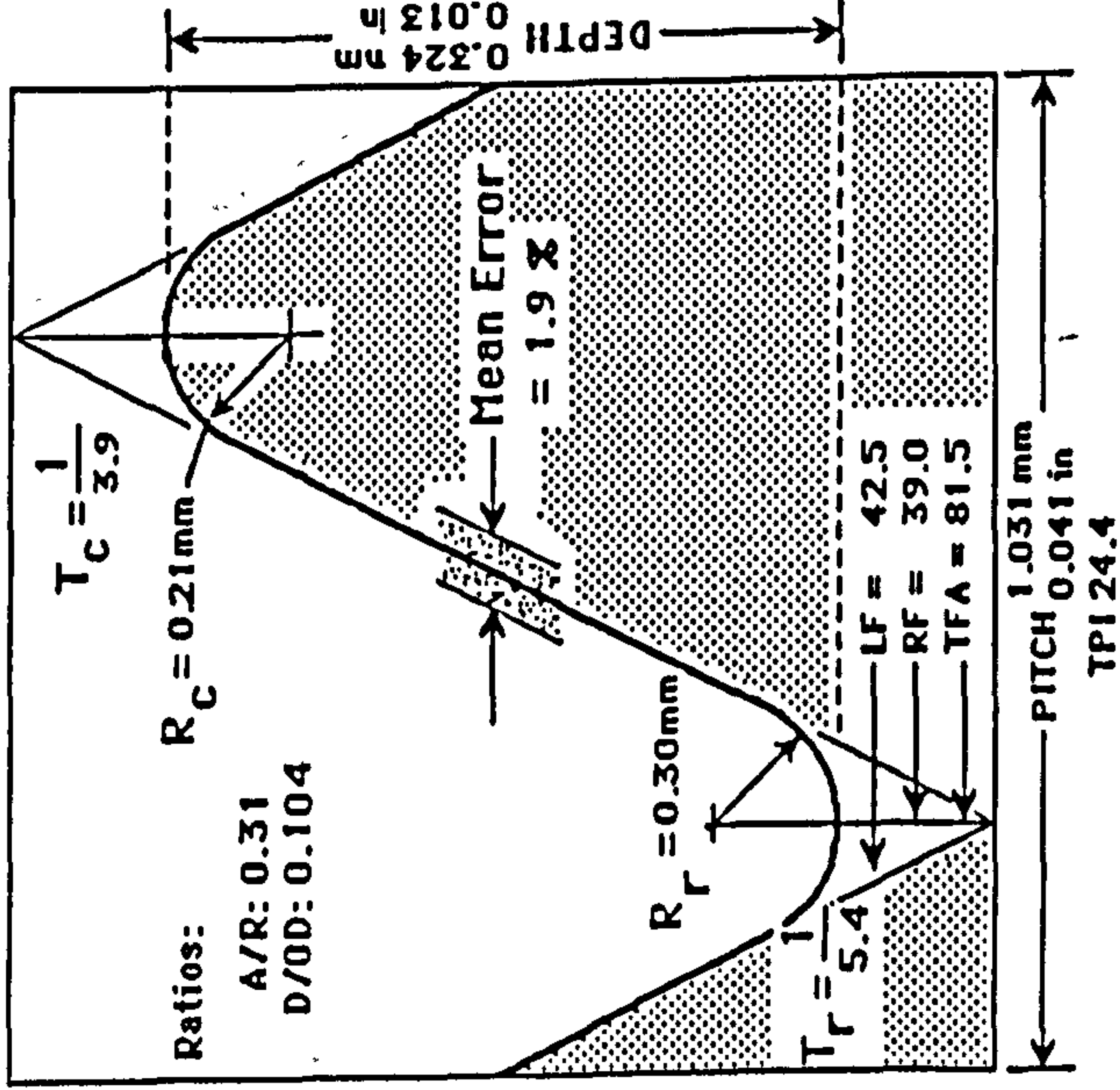
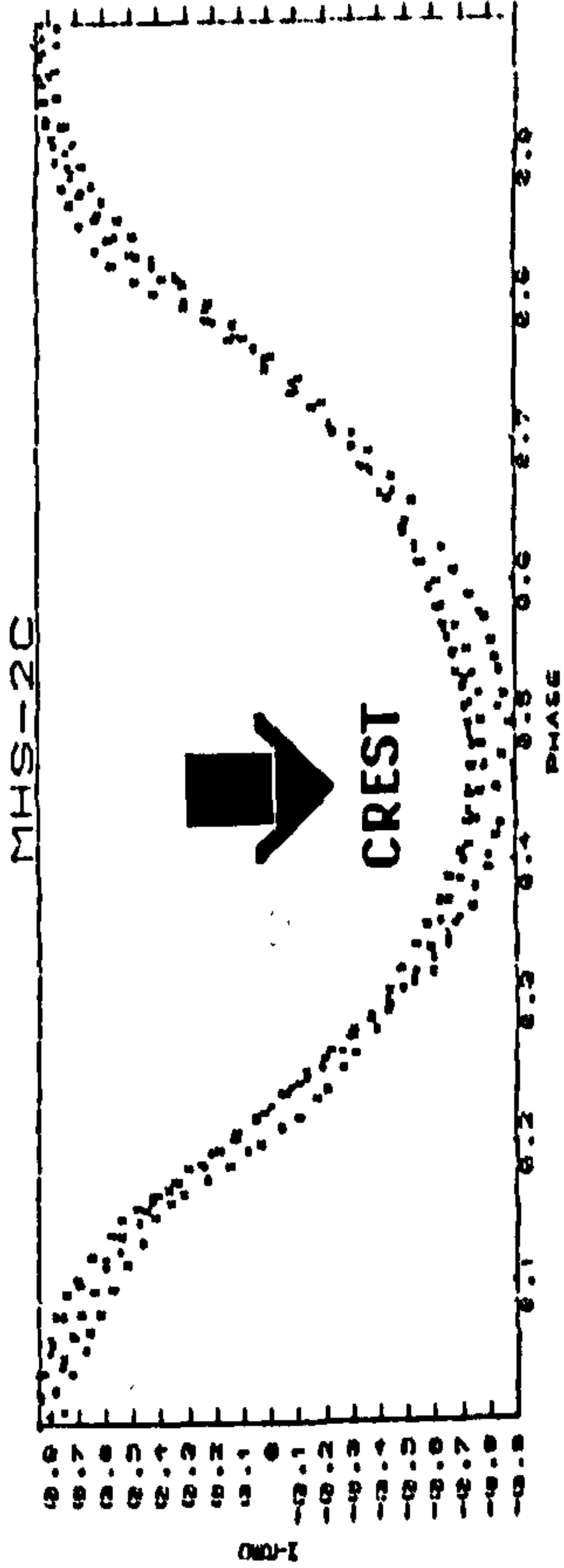
Study Code: MHS-2C

Instrument: Micrometer-Bifilar

Maker: Thomas Jones

Date: ca.1820

Ser./Acq. No. 79-23



Mu

Filar

Scale

Bench

Div. Eng.

Adjust.

Leveling

Focus

Eye P.

Tube

Tool

Gauge

Binding

Multiple Thread screw  
for rotation of mu head

Characteristics:

Screw

Nut

Leng: 2.50"

Diameter: 0.1708"

Steel

Brass

Other:

Instrument Identification:

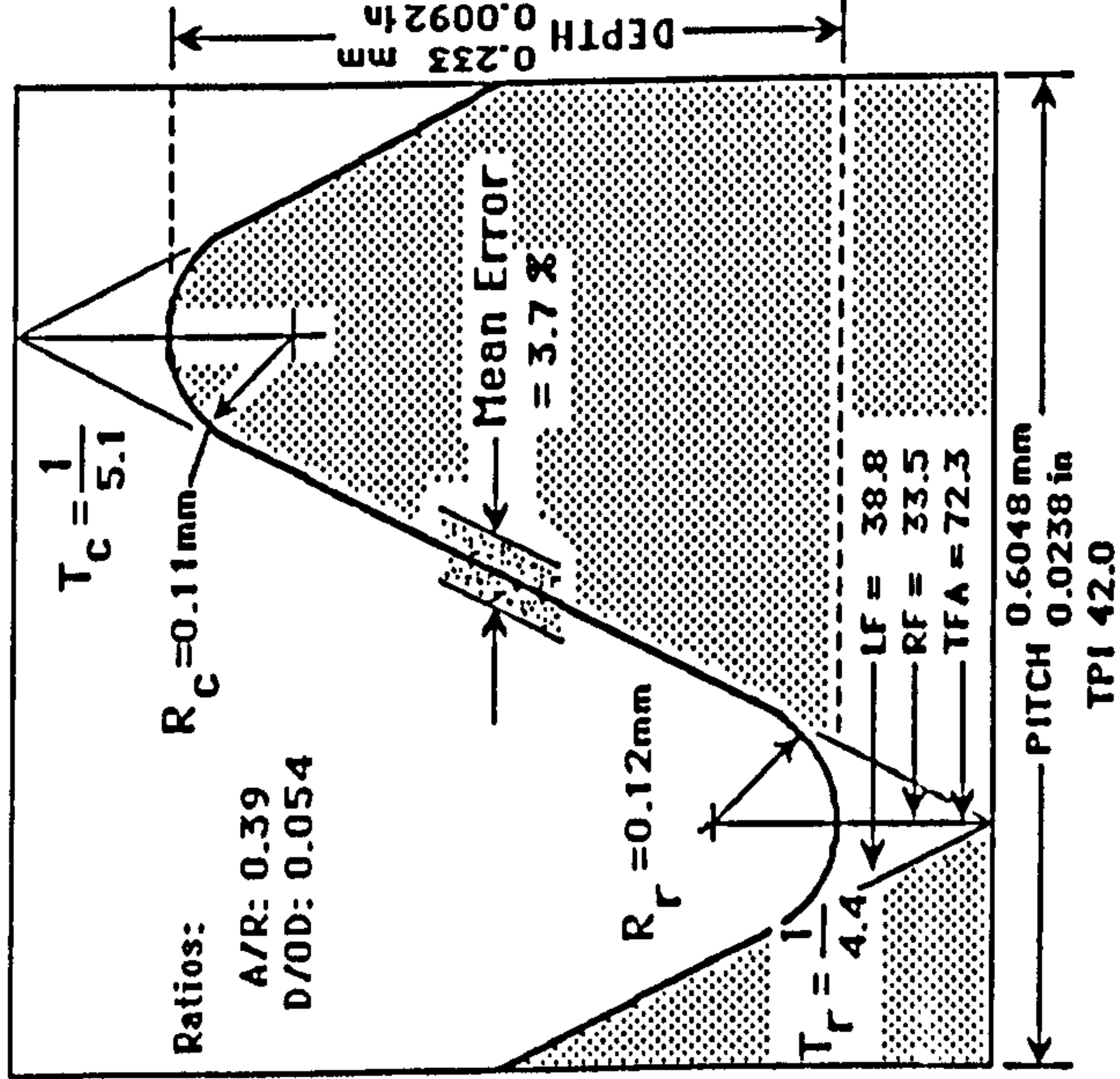
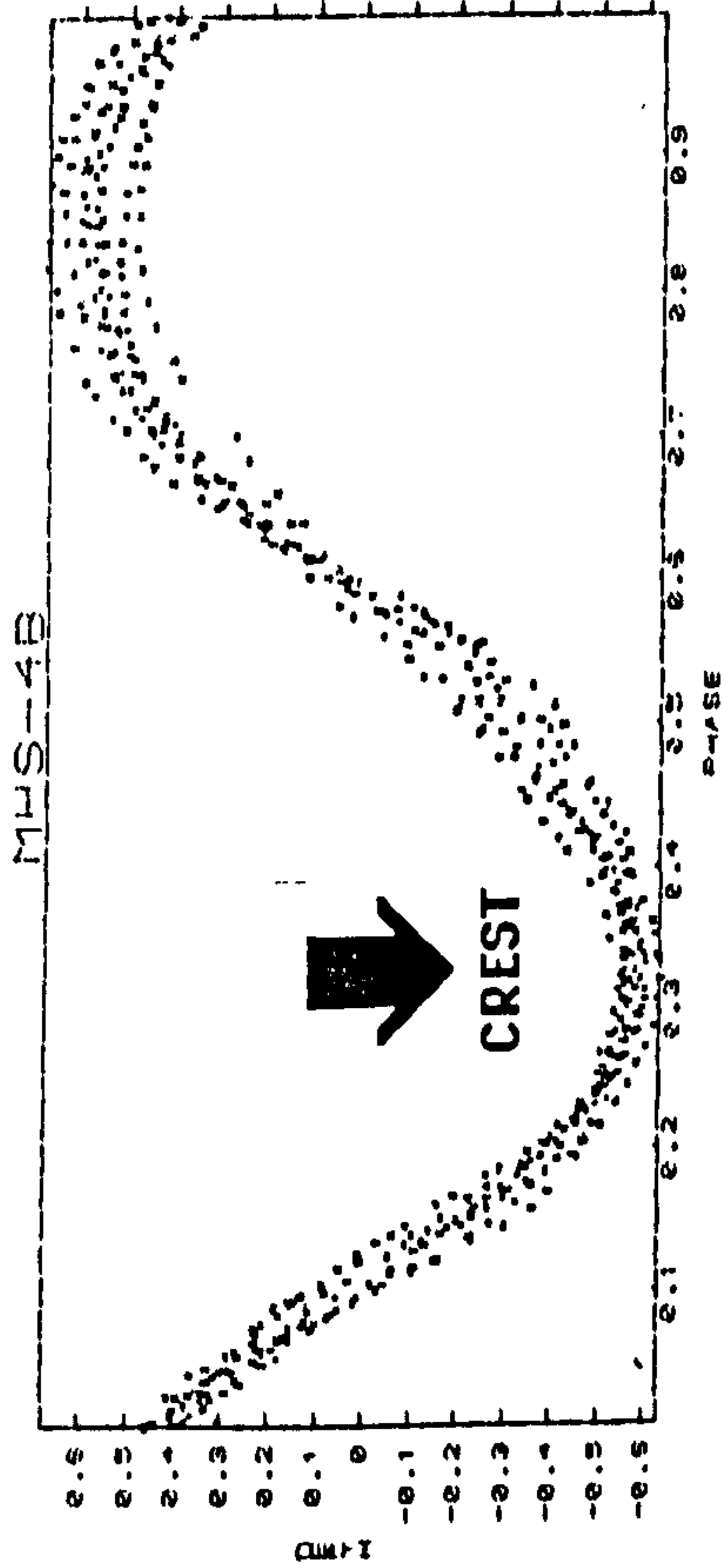
Study Code: MHS-4b

Instrument: Portable quadrant

Maker: John Bird

Date: 1770

Ser./Acq. No.



Mu	Filar
	Scale
	Bench
	Div. Eng.
	Adjust.
	Leveling
	Focus
	Eye P.
	Tube
	Tool
	Gauge
	Binding
	Misc.

(Azimuth adjust)

Characteristics:

Screw

Nut

Leng: 2.625"

Diameter: 0.125"

Steel

Brass

Other: Silver

Instrument Identification:

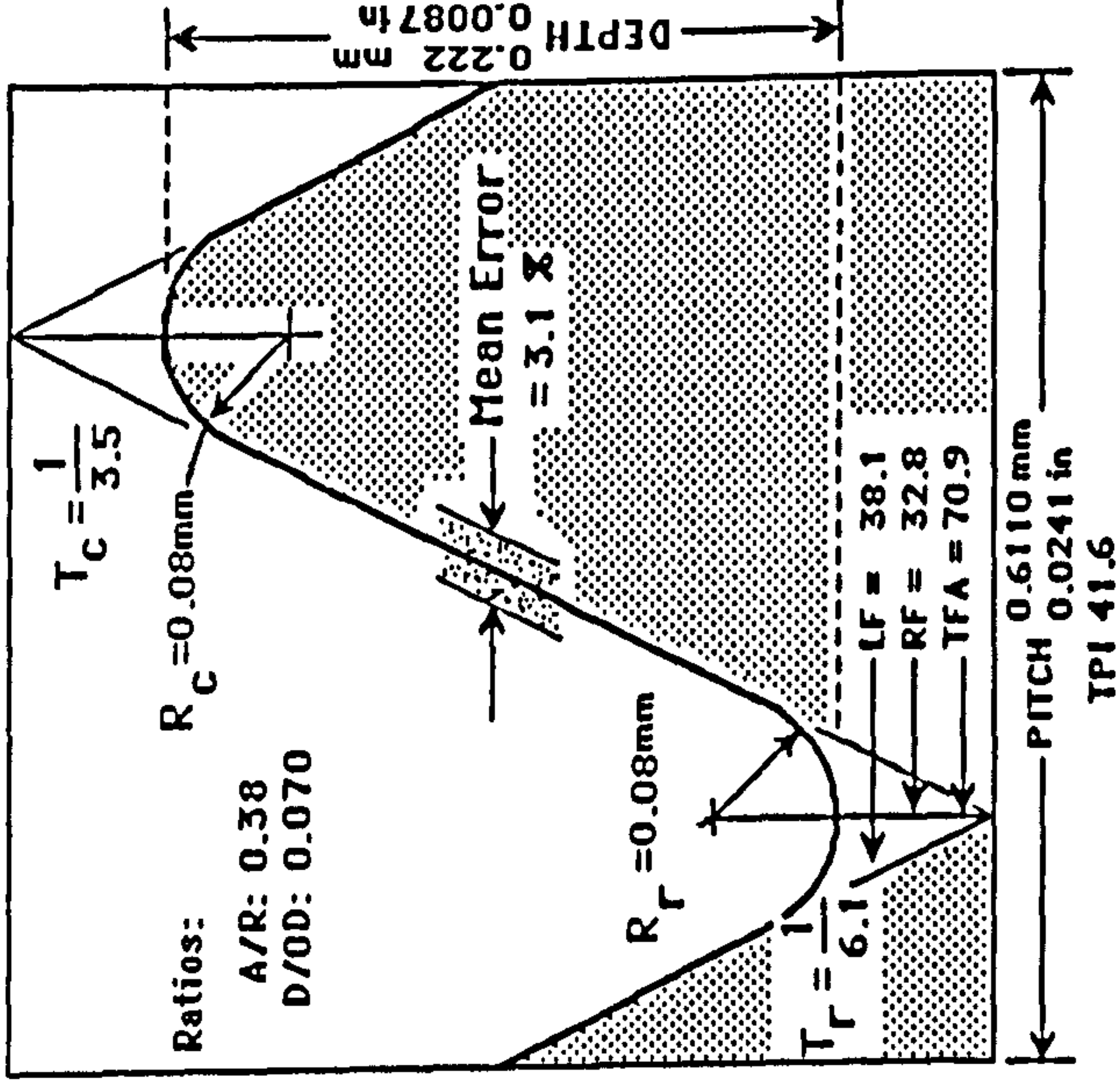
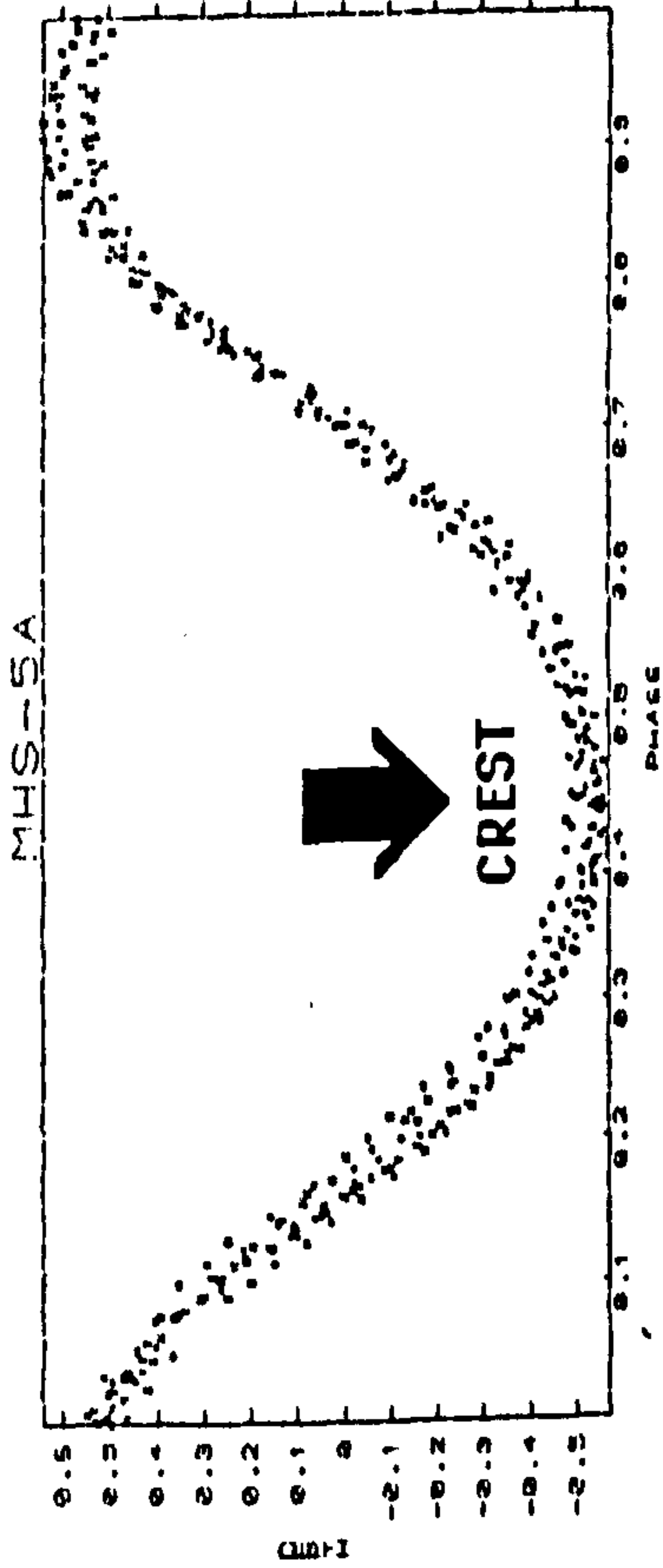
Study Code: MHS-5a

Instrument: Gunner's level

Maker: N/S (German)

Date: 1736

Ser./Acq. No.



MU

Filar

Scale

Bench

Div. Eng.

Adjust.

Leveling

Focus

Eye P.

Tube

Tool

Gauge

Binding

Misc.

(Vertical adjust)



Characteristics:

Screw

Nut

Leng: 0.875"

Diameter: ≈0.125"

Steel

Brass

Other: Silver

Instrument Identification:

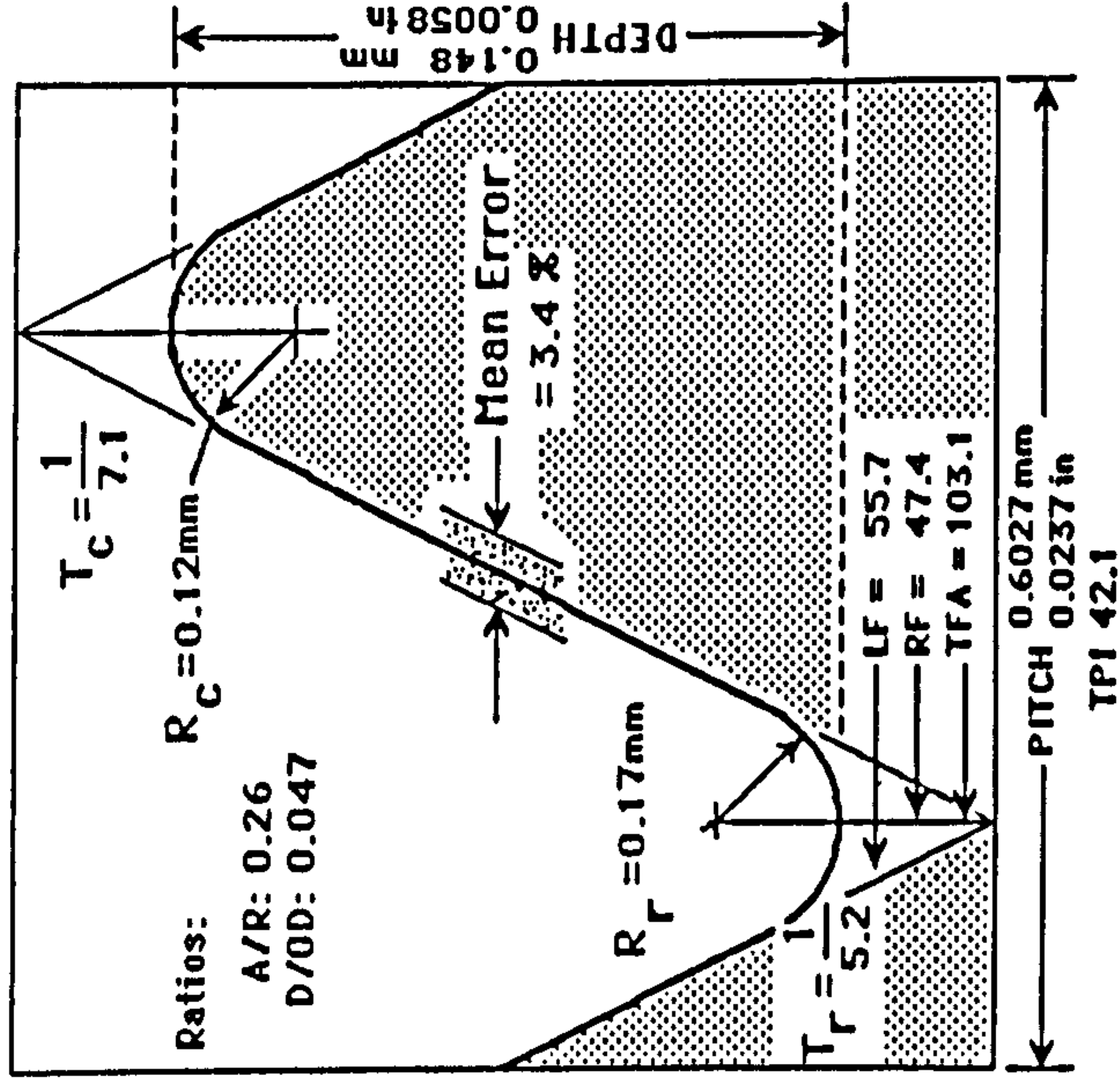
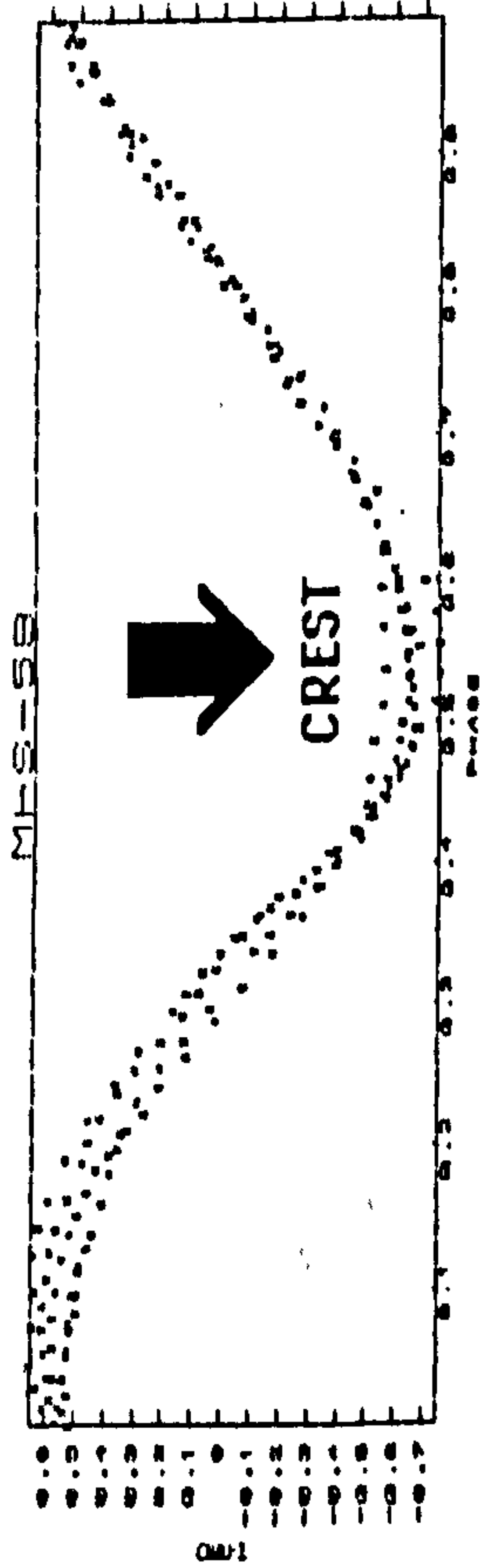
Study Code: MHS-5b

Instrument: Gunner's level

Maker: N/S (German)

Date: 1736

Ser./Acq. No.



Mu	Filar	
	Scale	
	Bench	
	Div. Eng.	
	Adjust.	
	Leveling	
	Focus	
	Eye P.	
	Tube	
	Tool	
	Gauge	
	Binding	
	Misc.	

(Horizontal adjust)



Characteristics:

Screw

☒

Nut

☐

Leng: 1.625" / 0.156"

Diameter: 0.0746

Steel

☐

Brass

☐

Other: Iron

Instrument Identification:

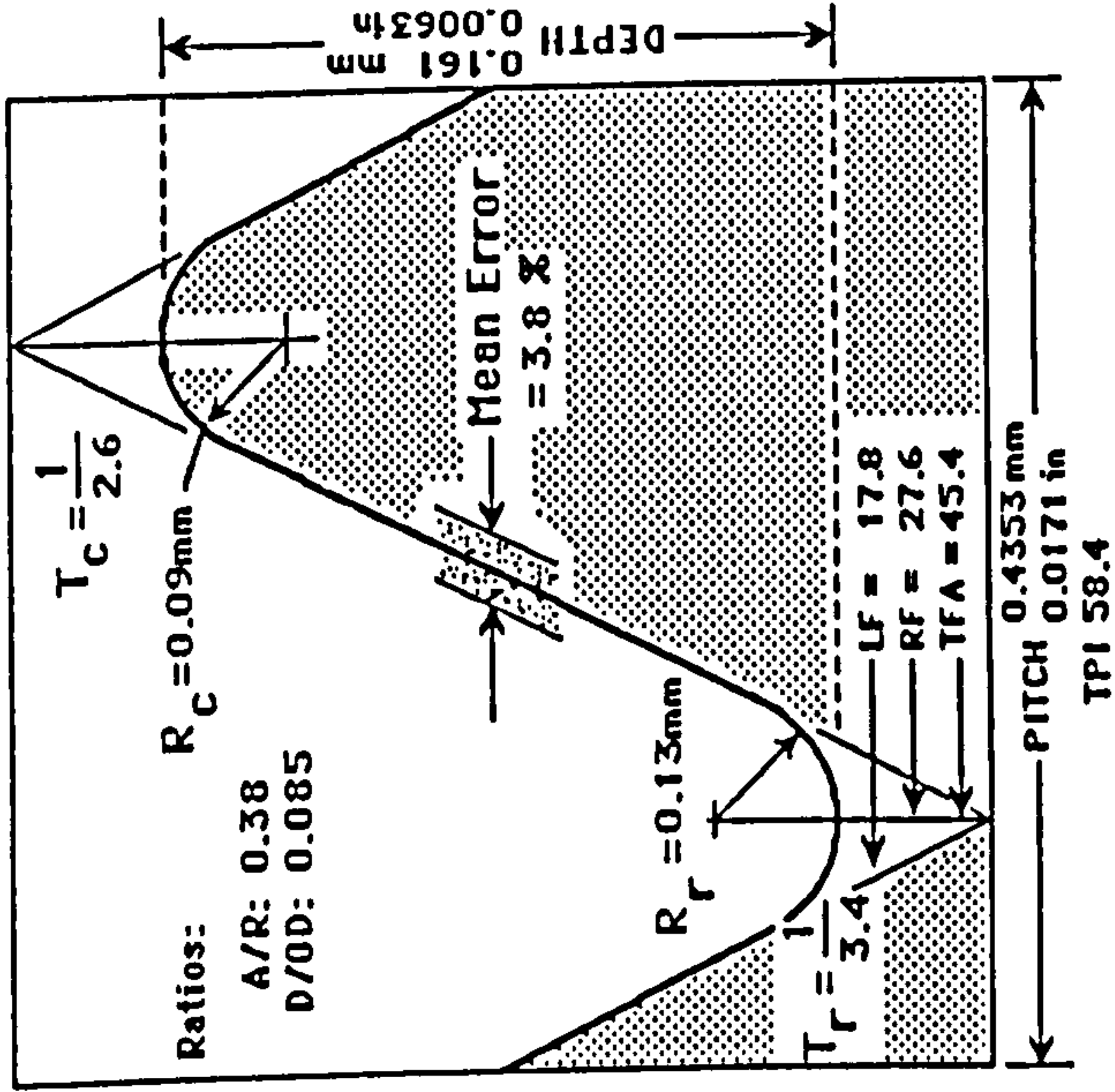
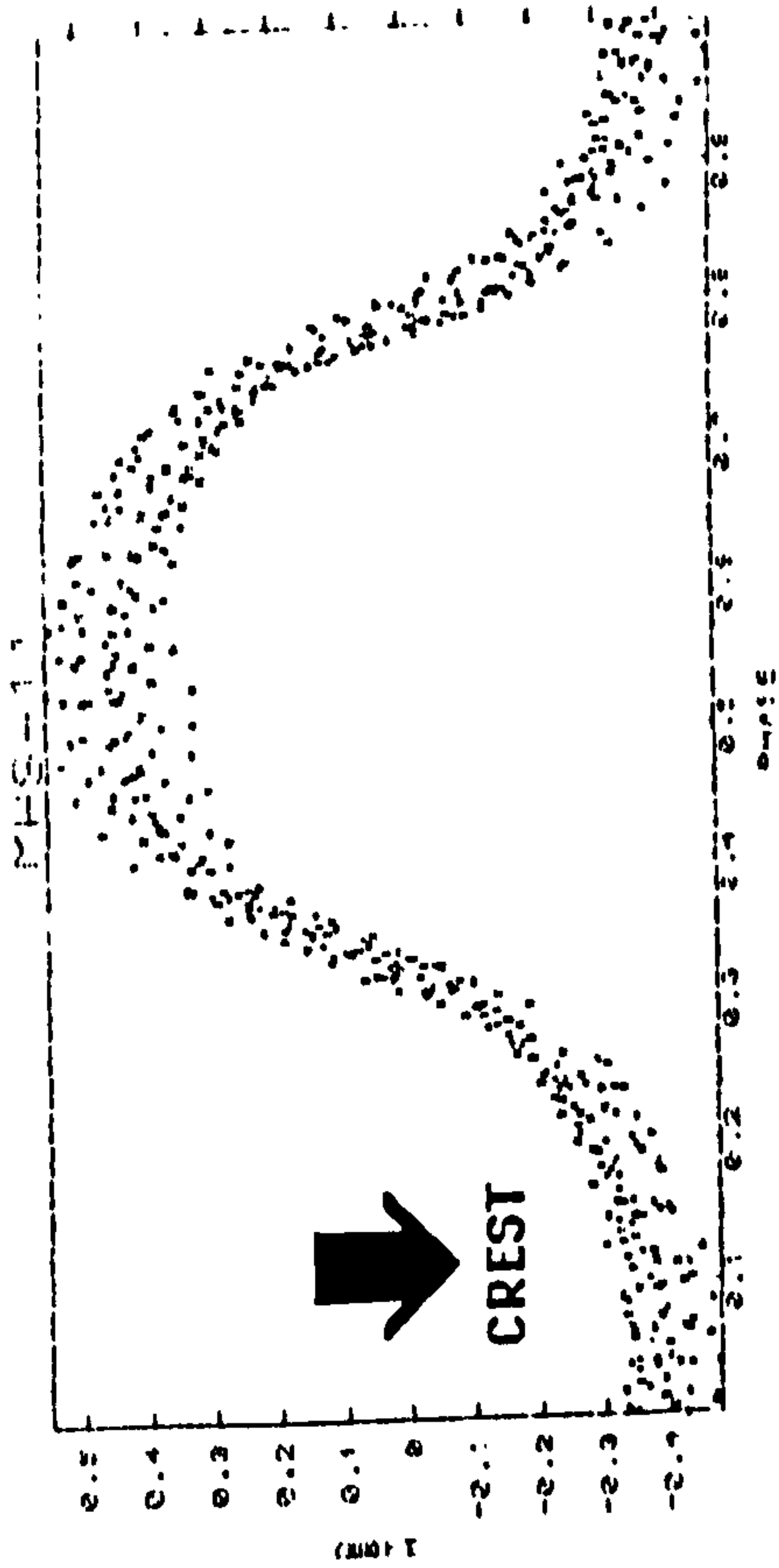
Study Code: MHS-11

Instrument: Ellipsograph

Maker: Gourdin, Paris

Date: ca.1790

Ser./Acq. No.



Mu	[	Filar
		Scale
		Bench
		Div. Eng.
		Adjust.
		Leveling
		Focus
		Eye P.
		Tube
		Tool
		Gauge
		Binding
		Misc.

Characteristics:

Screw

Nut

Leng: 1.188" / 0.344"

Diameter: ≈0.156"

Steel

Brass

Other: Iron

Instrument Identification:

Study Code: MHS-12

Instrument: Gunner's level

Maker: "I.D.F." (F=fecit)

Date: 1621

Ser./Acq. No.

Mu

Filar

Scale

Bench

Div. Eng.

Adjust.

Leveling

Focus

Eye P.

Tube

Tool

Gauge

Binding

Misc.

(\* some flattening--wear?)

Characteristics:

Screw

Nut

Leng: 0.438" / 0.438"

Diameter: 0.1312"

Steel

Brass

Other:

Instrument Identification:

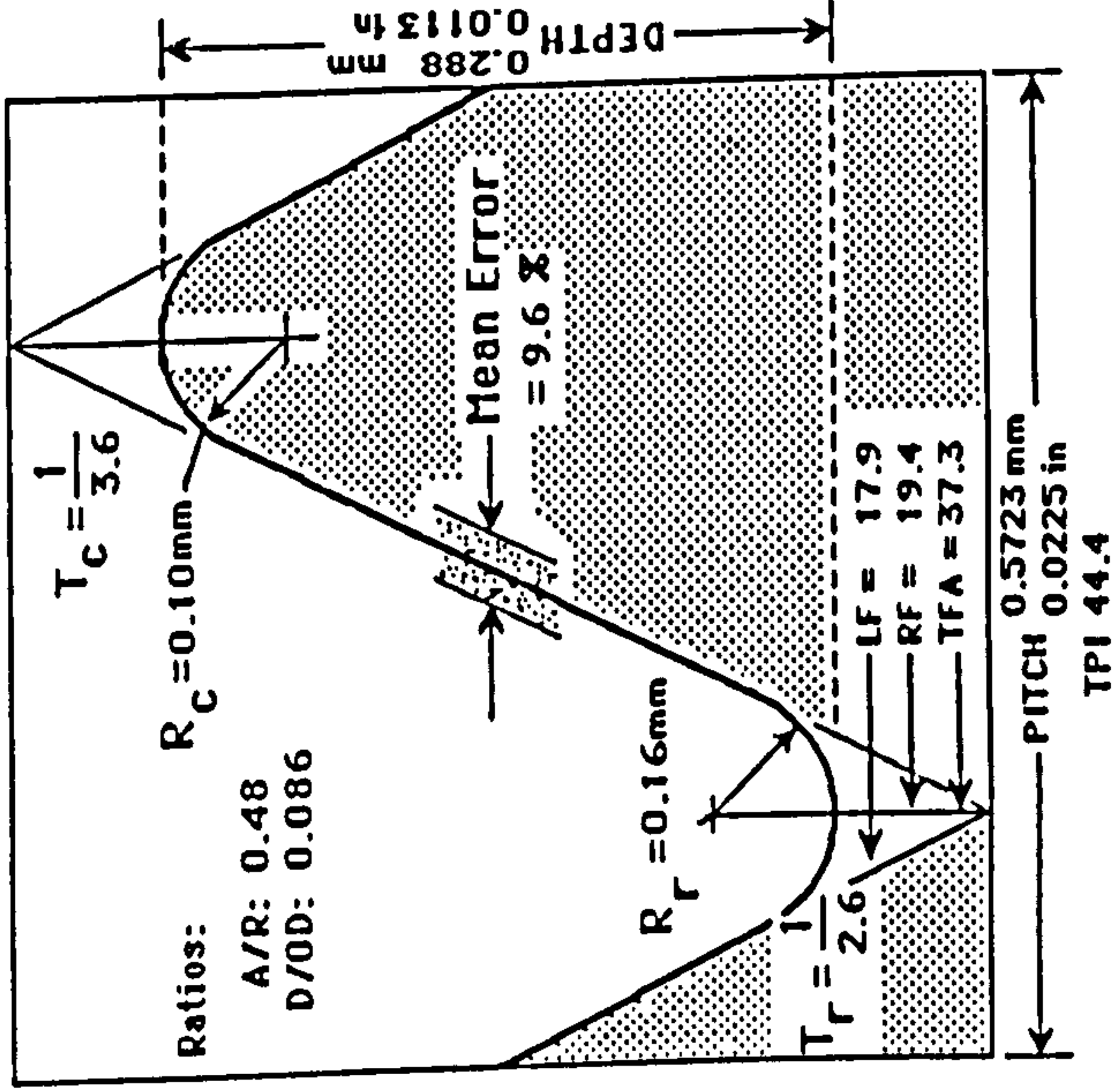
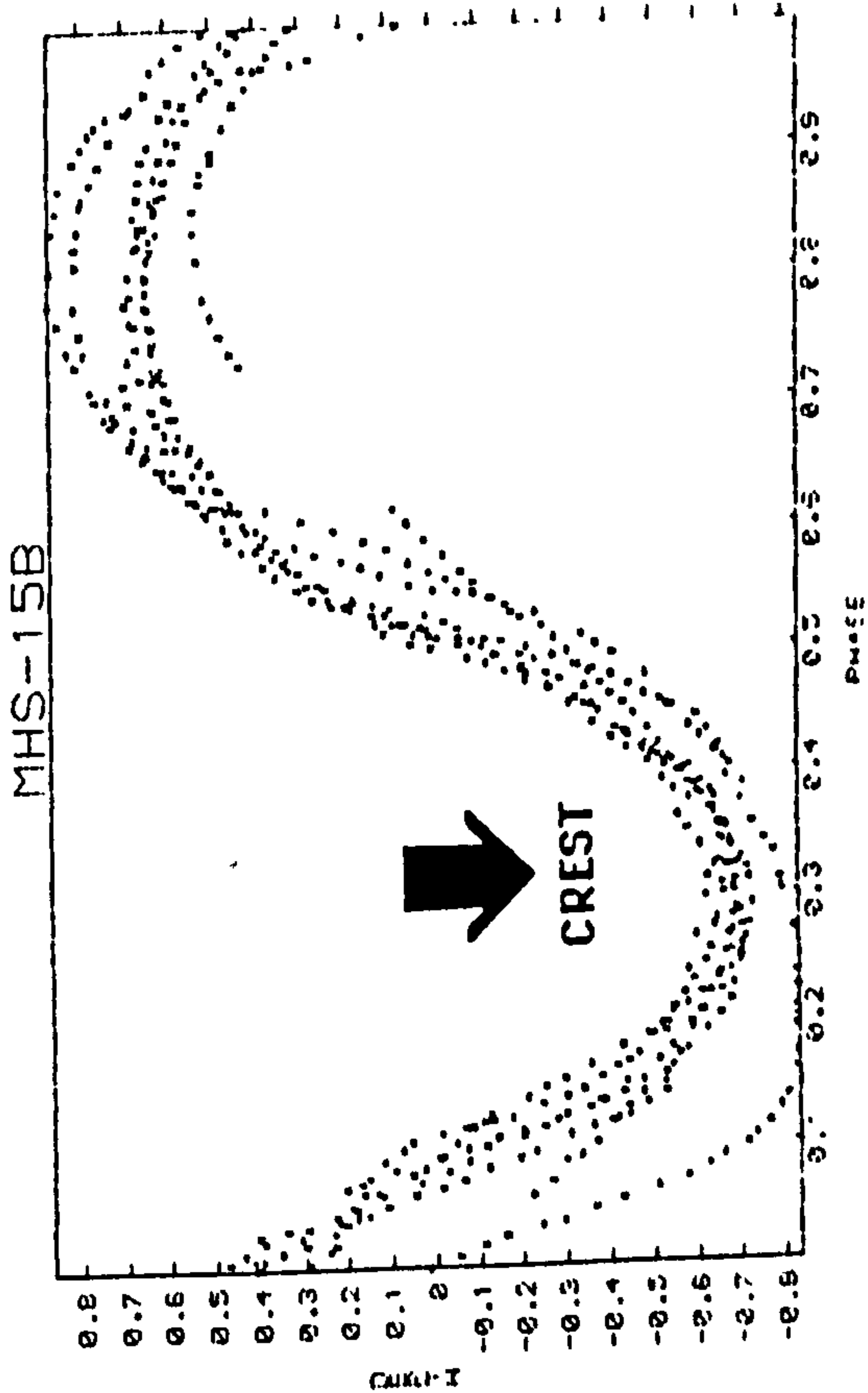
Study Code: MHS-15b

Instrument: Reflecting circle--  
de Borda type

Maker: Etienne Lenoir

Date: ca.1790

Ser./Acq. No. RAS #19



Mu

Filar

Scale

Bench

Div. Eng.

Adjust.

Leveling

Focus

Eye P.

Tube

Tool

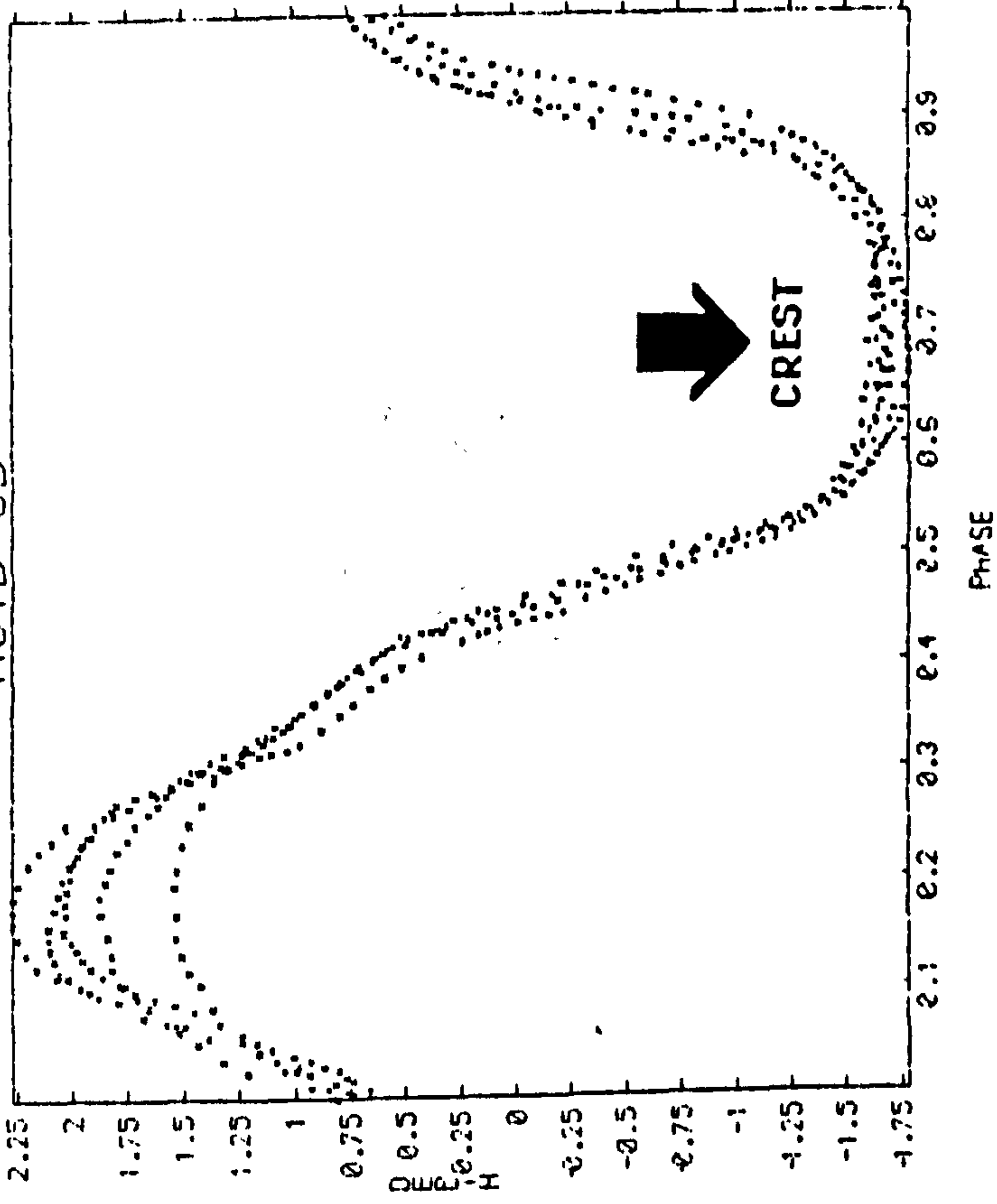
Gauge

Binding

Misc.

(On mirror side)

MSTB-8B



Characteristics:

Screw ☒ Nut ☐

Leng: 1.25"

Diameter: 0.2840"

Steel ☒ Brass ☐

Other:

Instrument Identification:

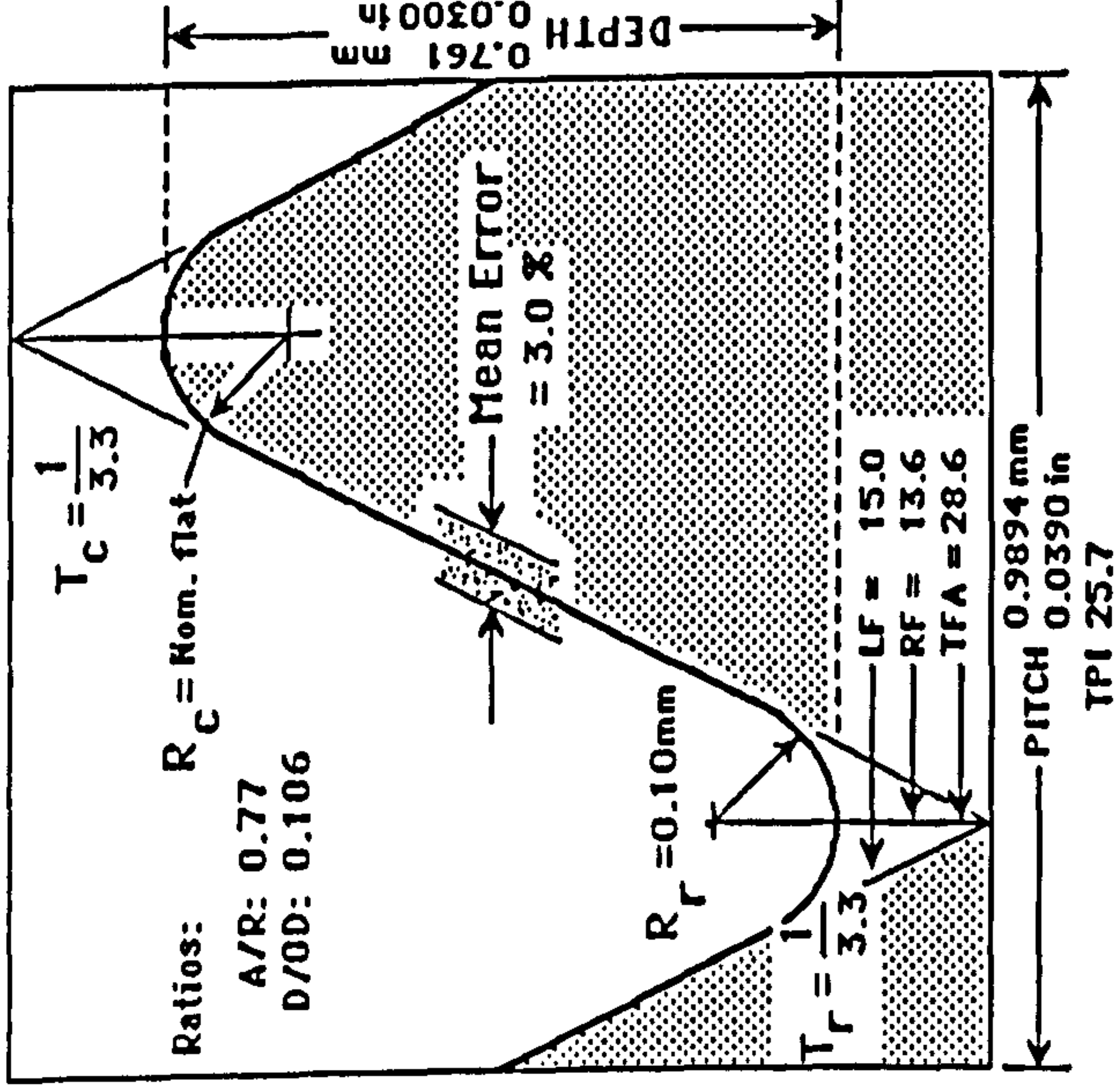
Study Code: MSTB-8b

Instrument: Micrometer

Maker: Holtzapffel & Co.

Date: ca.1870's?

Ser./Acq. No.



Mu	[	Filar
		Scale
[	]	Bench
		Div. Eng.
[	]	Adjust.
		Leveling
[	]	Focus
		Eye P.
[	]	Tube
		Tool
[	]	Gauge
		Binding
[	]	Misc.

(Internal tube Mu)

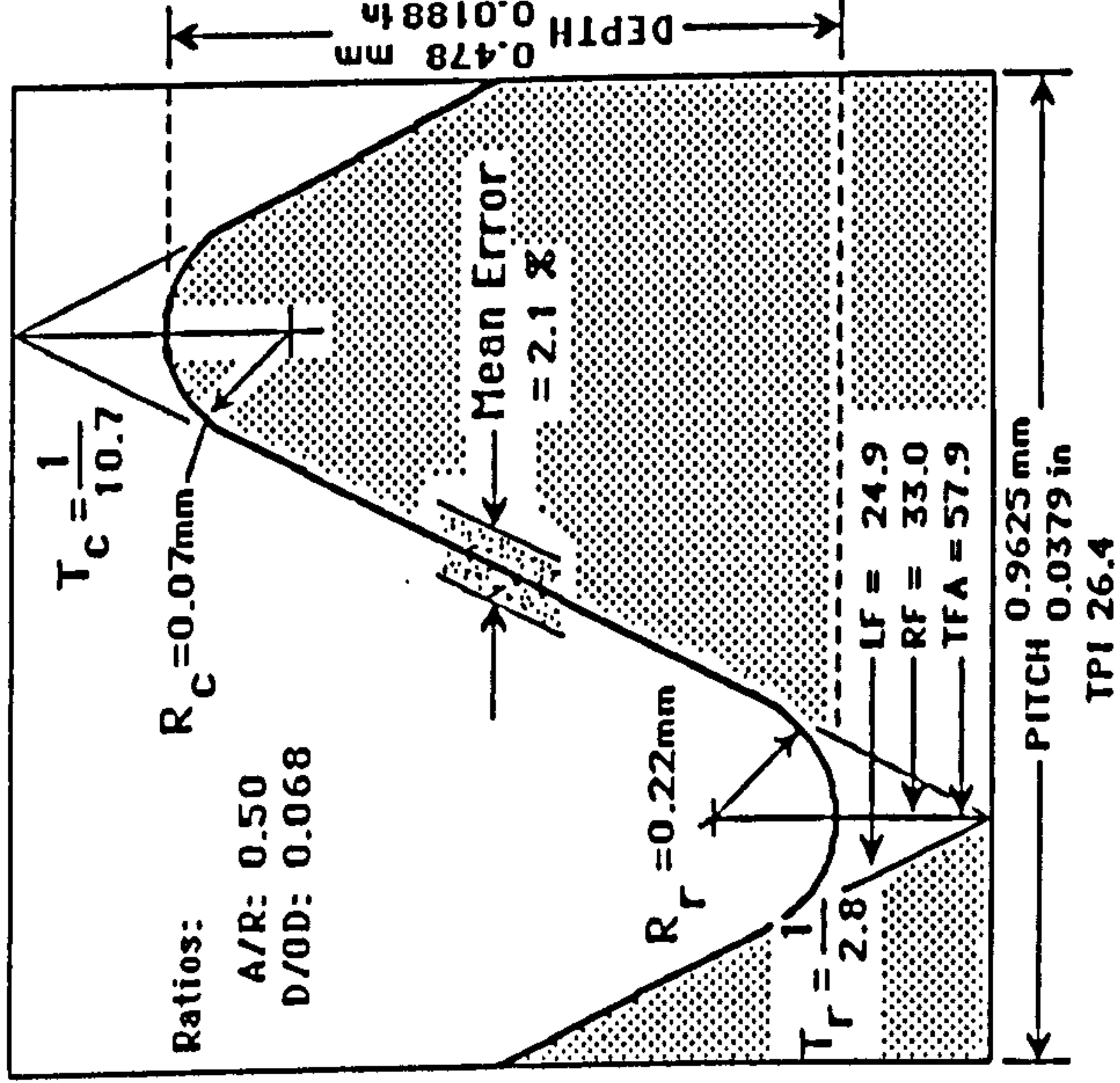
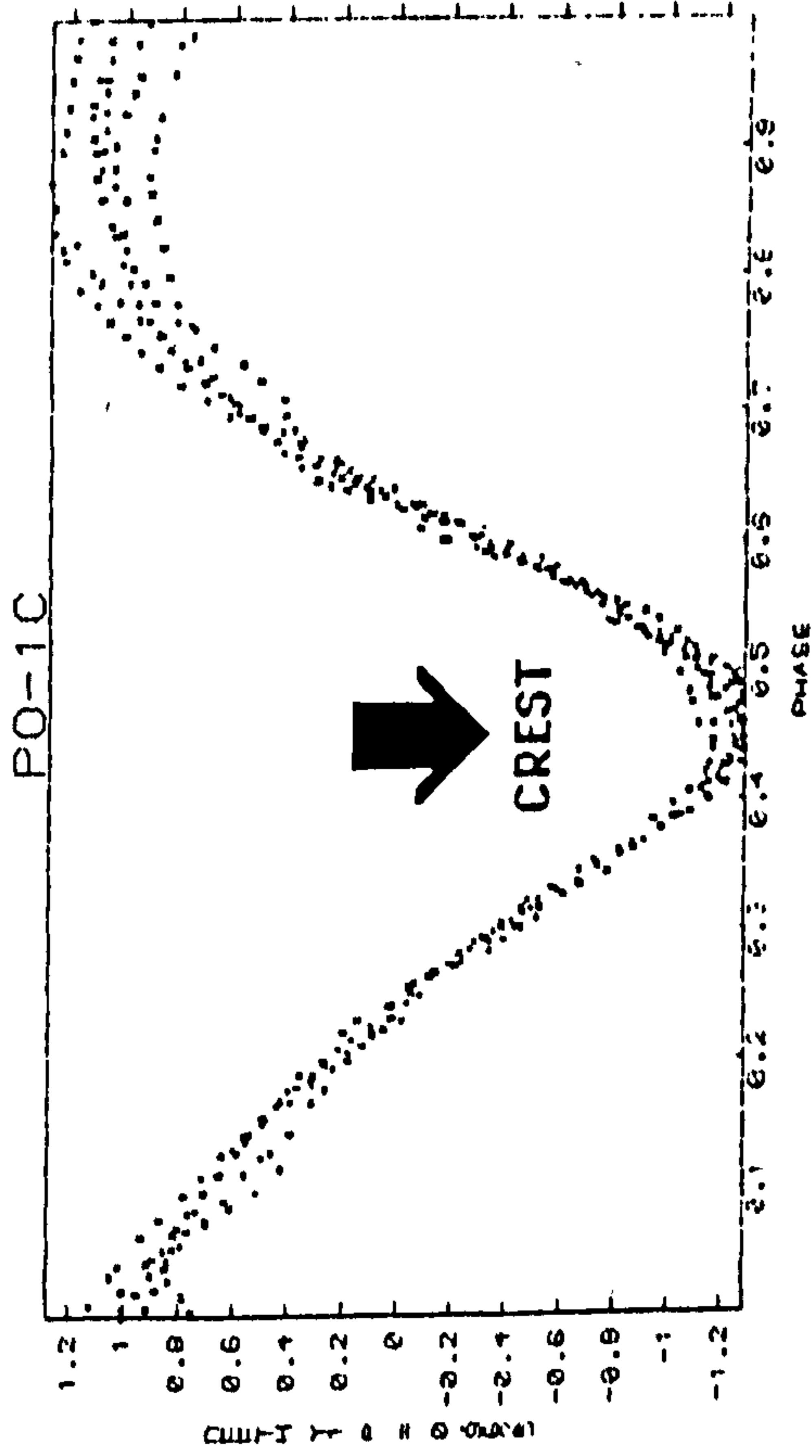


Characteristics:

Screw	<input checked="" type="checkbox"/>	Nut	<input type="checkbox"/>
Leng:	1.50"	Diameter:	0.2780
Steel	<input checked="" type="checkbox"/>	Brass	<input type="checkbox"/>
Other:	Iron		

Instrument Identification:

Study Code:	P0-1c
Instrument:	Astronomical sextant
Maker:	Claude Langlois
Date:	1738
Ser./Acq. No.	1A1811



Mu	Filar	
	Scale	
	Bench	
	Div. Eng.	
	Adjust.	
	Leveling	
	Focus	
	Eye P.	
	Tube	
	Tool	
	Gauge	
	Binding	
	Misc.	

(Tangent arm)

Characteristics:

Screw

Nut

Leng: 1.938" / 0.250"

Diameter: 0.2179"

Steel

Brass

Other:

Instrument Identification:

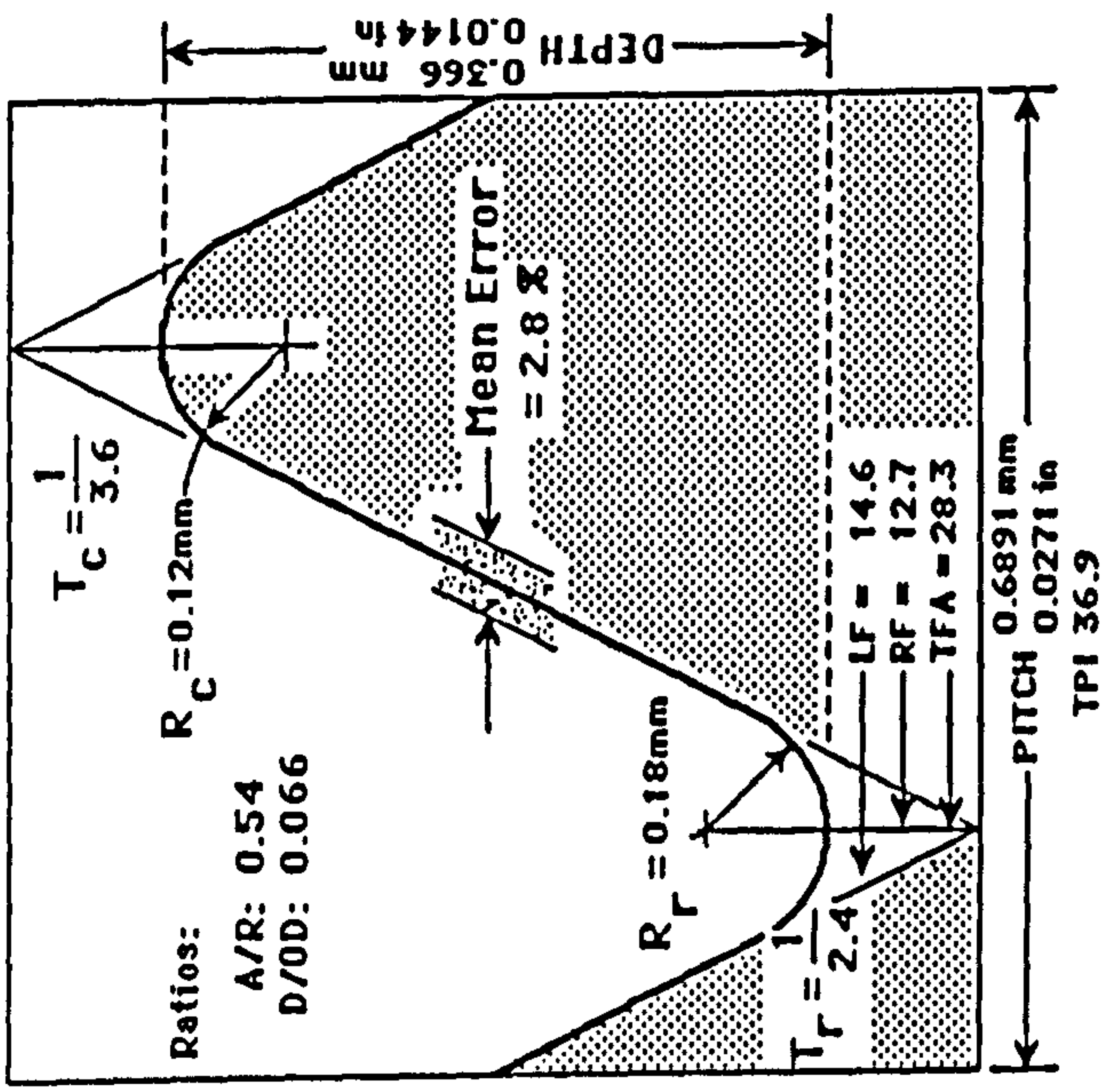
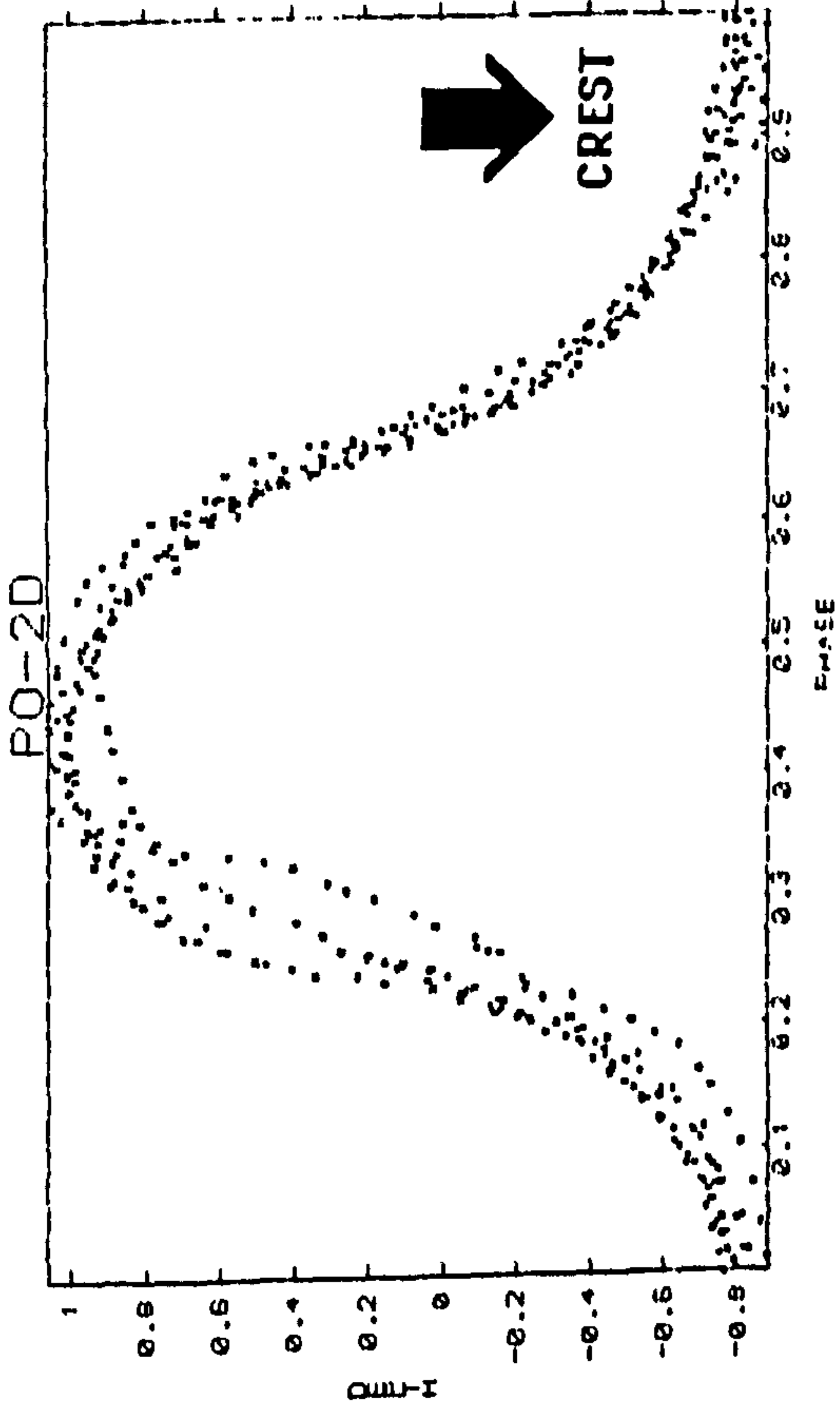
Study Code: P0-2d

Instrument: Gregorian

Maker: James Short

Date: ca.1753/4

Ser./Acq. No. 237 = 9.6  
964



Mu

Filar

Scale

Bench

Div. Eng.

Adjust.

Leveling

Focus

Eye P.

Tube

Tool

Gauge

Binding

Misc.

(Azimuth adjust)  
NB: shadowgraph  
made from mould

Characteristics:

Screw ☒ Nut ☐

Leng: 2.125" / 0.438"

Diameter: 0.2052"

Steel ☒ Brass ☐

Other:

Instrument Identification:

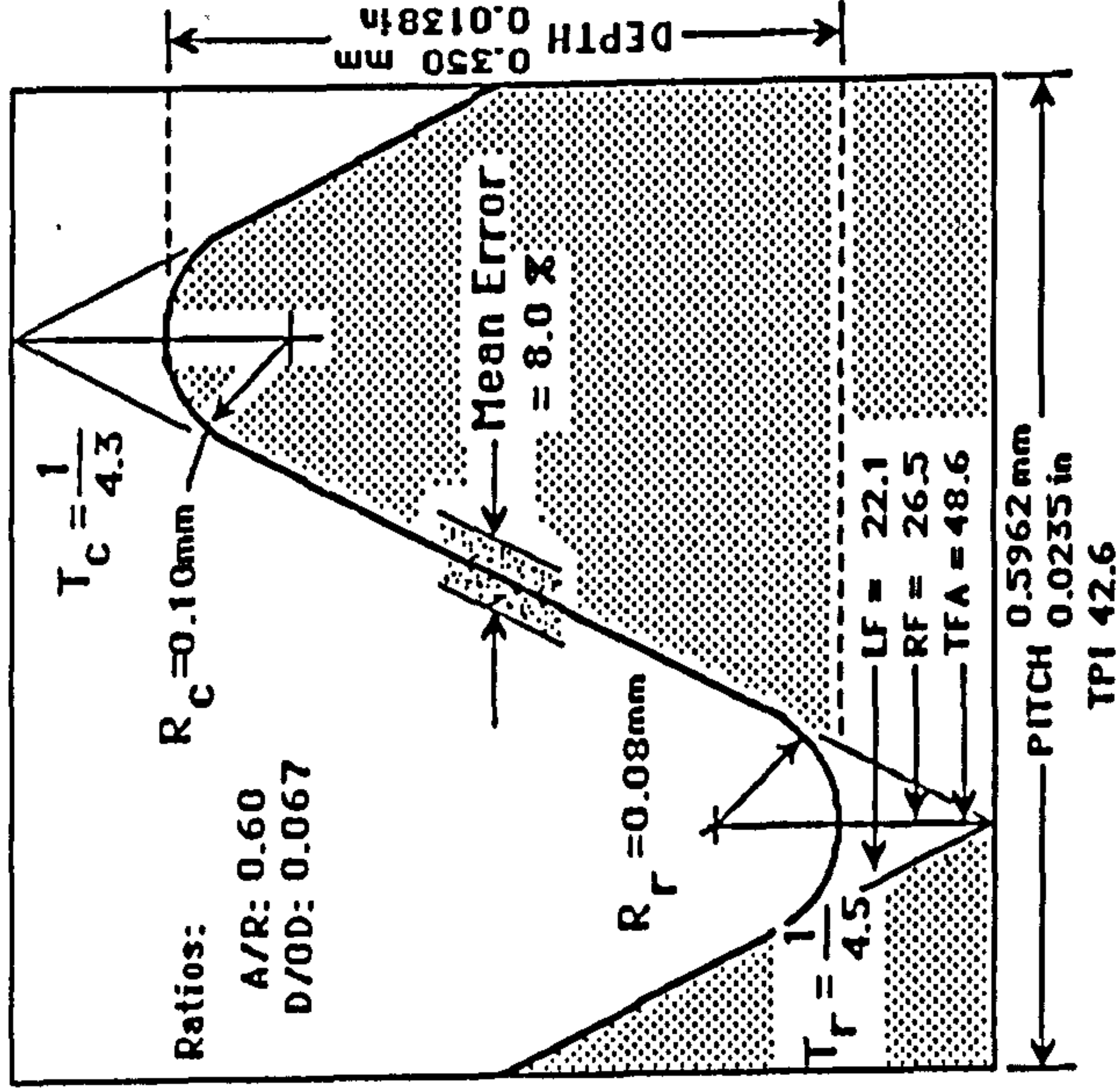
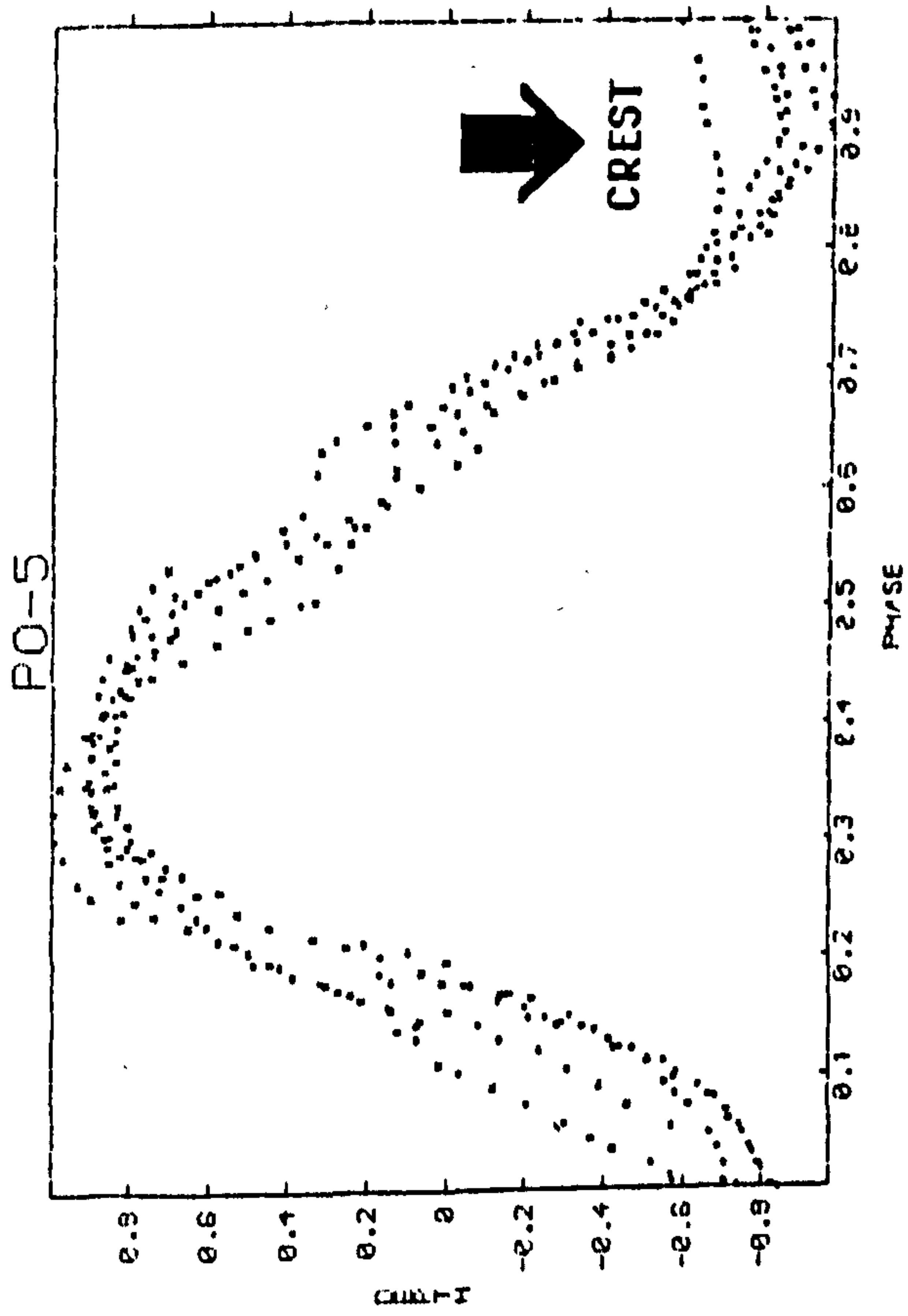
Study Code: P0-5

Instrument: Reflecting telescope

Maker: Foucault/Secretan

Date: 1860

Ser./Acq. No.



Mu

Filar

Scale

Bench

Div. Eng. Adjust.

Leveling

Focus

Eye P.

Tube

Tool

Gauge

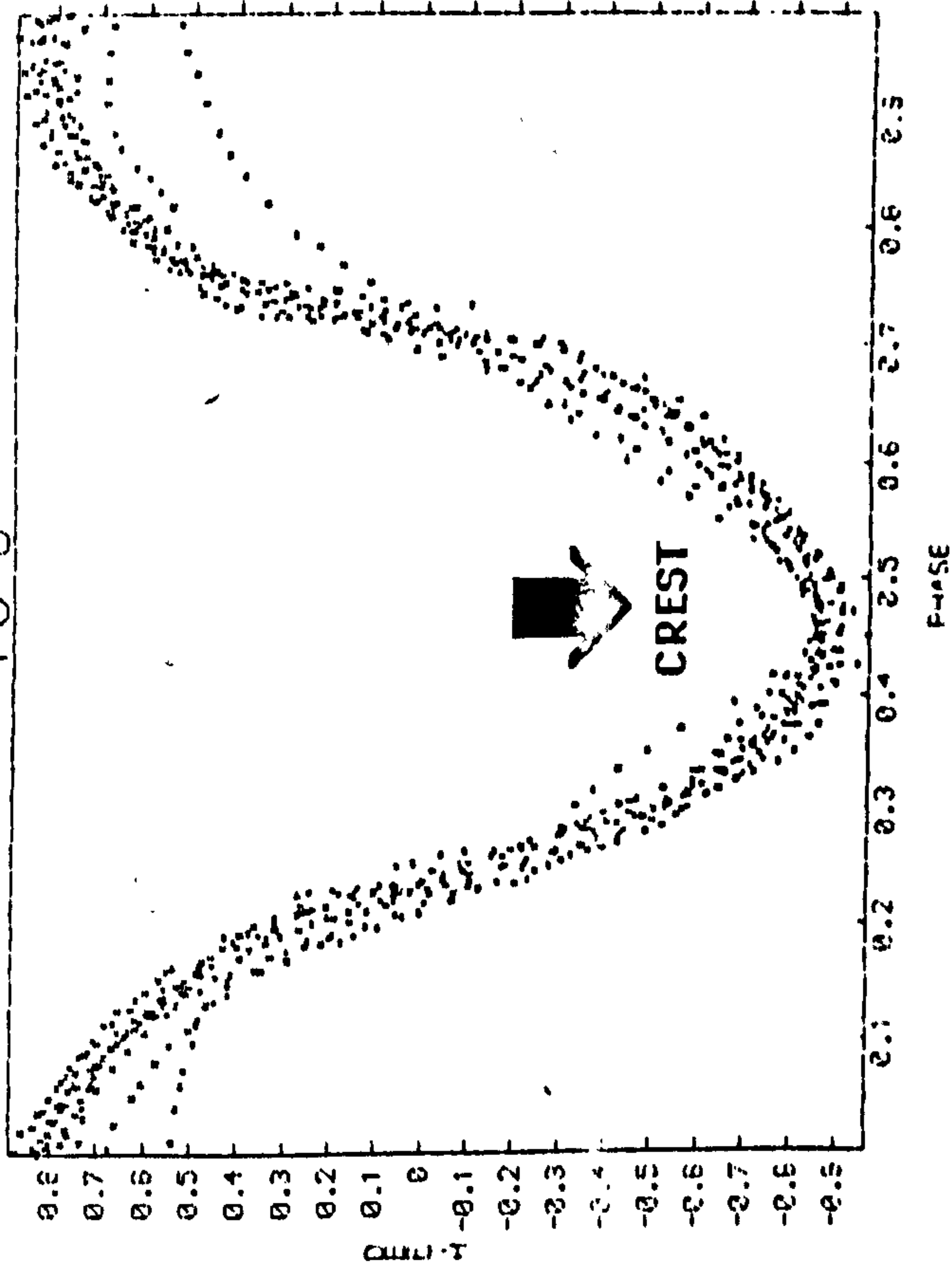
Binding

Misc.

(Altitude adjust. The telescope mounting was made by Secretan for Foucault's first silver on glass reflector) (shadowgraph made from the mould)



PO-6



Characteristics:

Screw ☒ Nut ☐

Length: 0.875" / 0.156"

Diameter: 0.1304"

Steel ☒ Brass ☐

Other:

Instrument Identification:

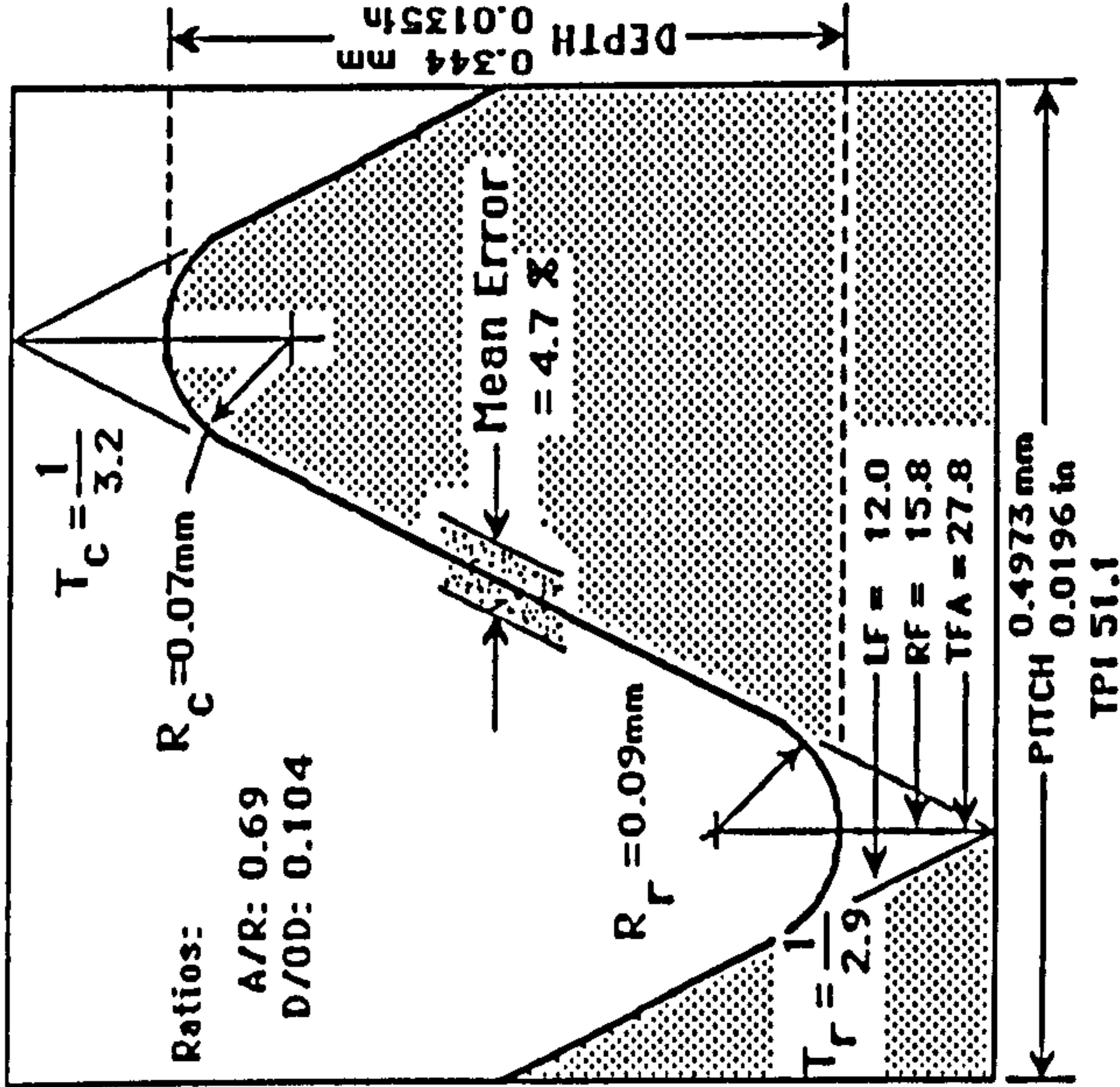
Study Code: PO-6

Instrument: Repetition circle

Maker: Fortin

Date: 1831

Ser./Acq. No.



Mu	[	Filar	
		Scale	
	]	Bench	
		Div. Eng.	
		Adjust.	
		Leveling	
		Focus	
		Eye P.	
		Tube	
		Tool	
		Gauge	
		Binding	
		Misc.	

(Altitude adjust)



Characteristics:

Screw

Nut

Leng: 1.375" / 0.25"

Diameter: 0.3093"

Steel

Brass

Other: Iron

Instrument Identification:

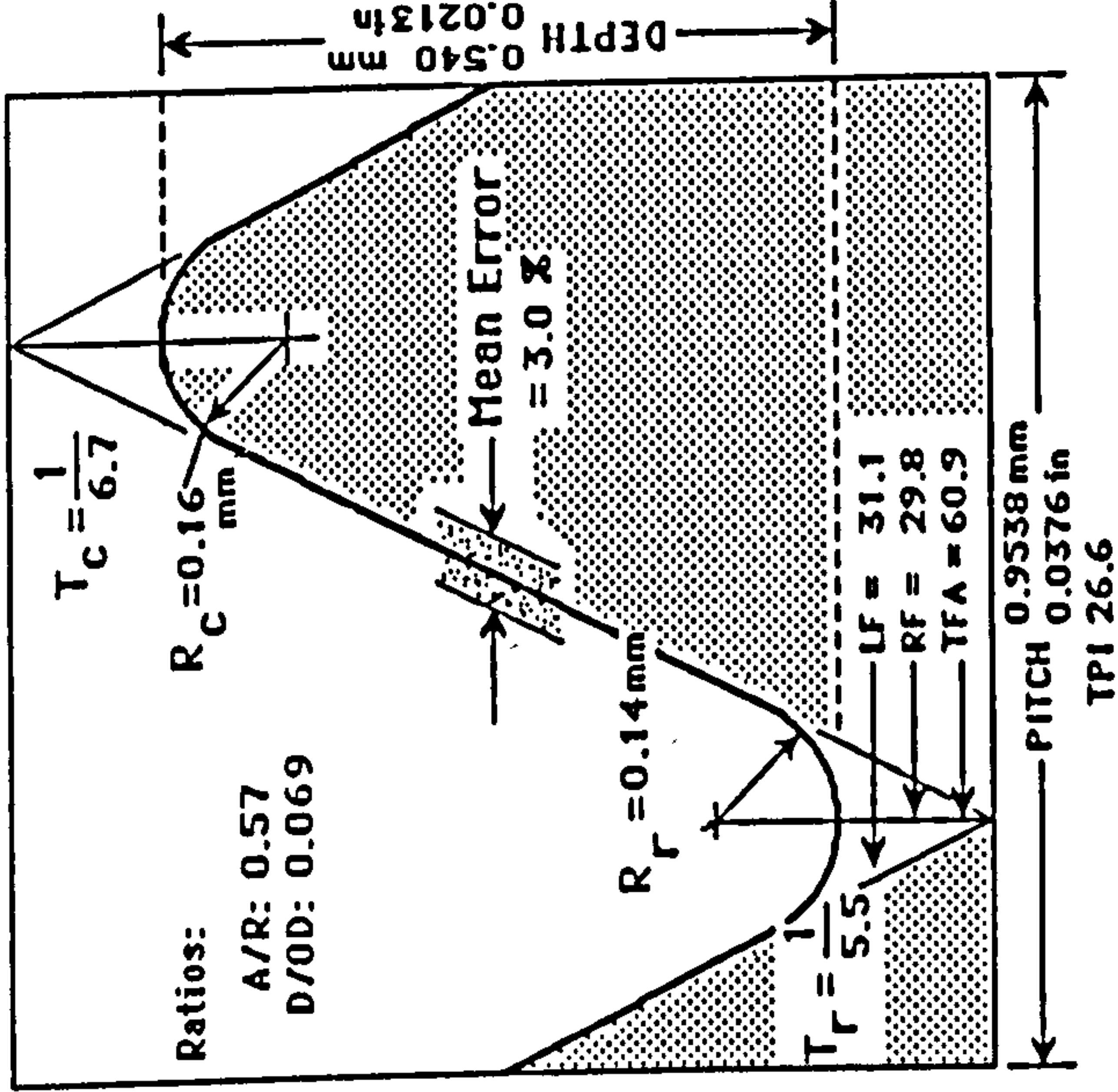
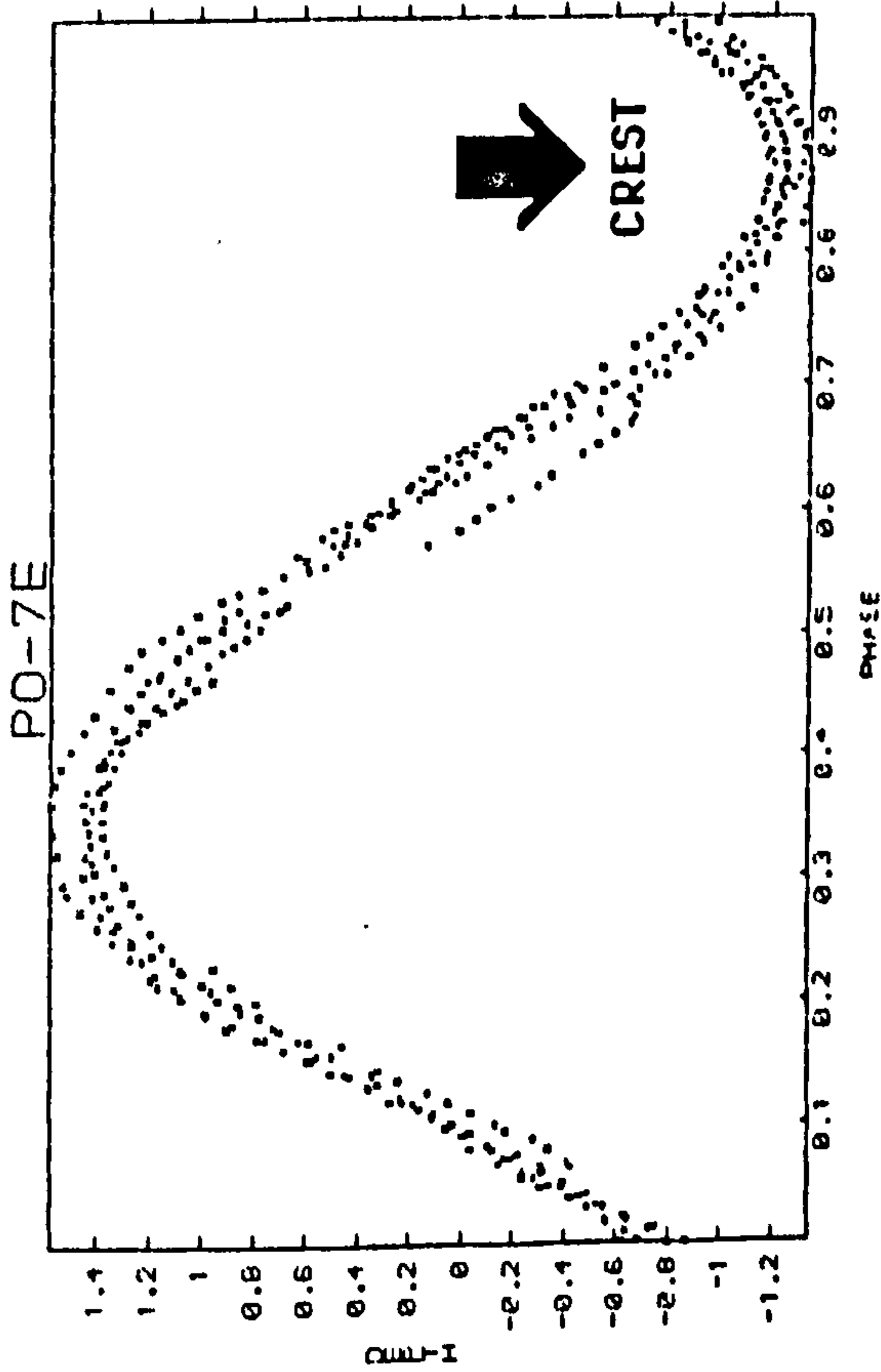
Study Code: PO-7e

Instrument: Astronomical sextant

Maker: Claude Langlois

Date: 1746

Ser./Acq. No.



Mu	Filar
	Scale
	Bench
	Div. Eng.
	Adjust.
	Leveling
	Focus
	Eye P.
	Tube
	Tool
	Gauge
	Binding
	Misc.

(Altitude adjust on the tangent arm)

Characteristics:

Screw

Nut

Leng: 1.094" / 0.313"

Diameter: 0.1432"

Steel

Brass

Other:

Instrument Identification:

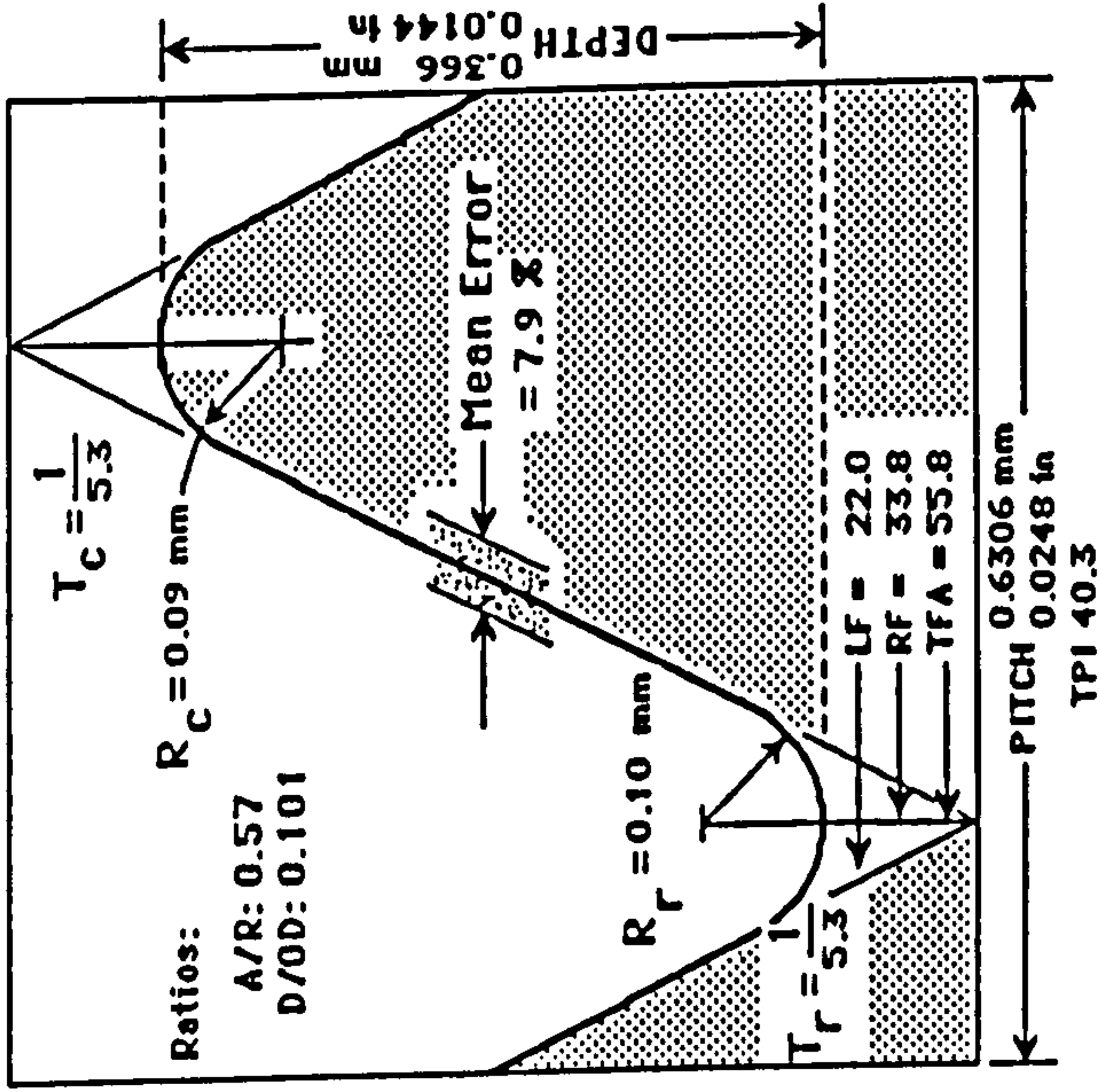
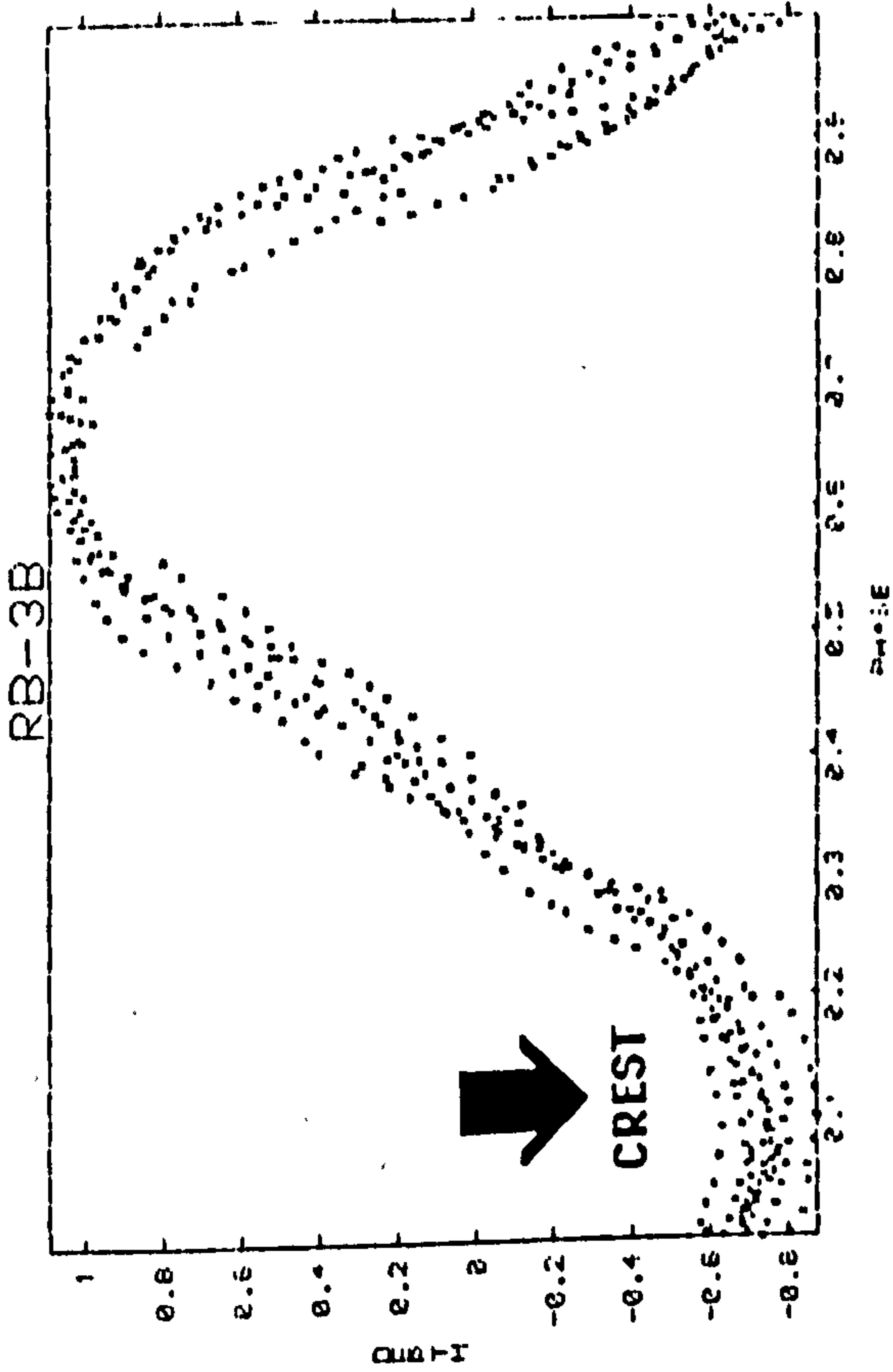
Study Code: RB-3b

Instrument: Octant

Maker: Spencer, Browning & Rust

Date: ca.1840

Ser./Acq. No.



Mu

Filar

Scale

Bench

Div. Eng.

Adjust.

Leveling

Focus

Eye P.

Tube

Tool

Gauge

Binding

Misc.

Index adjusting screw

Characteristics:

Screw

Nut

Leng: 0.313" / 0.219"

Diameter: 0.188"

Steel

Brass

Other:

Instrument Identification:

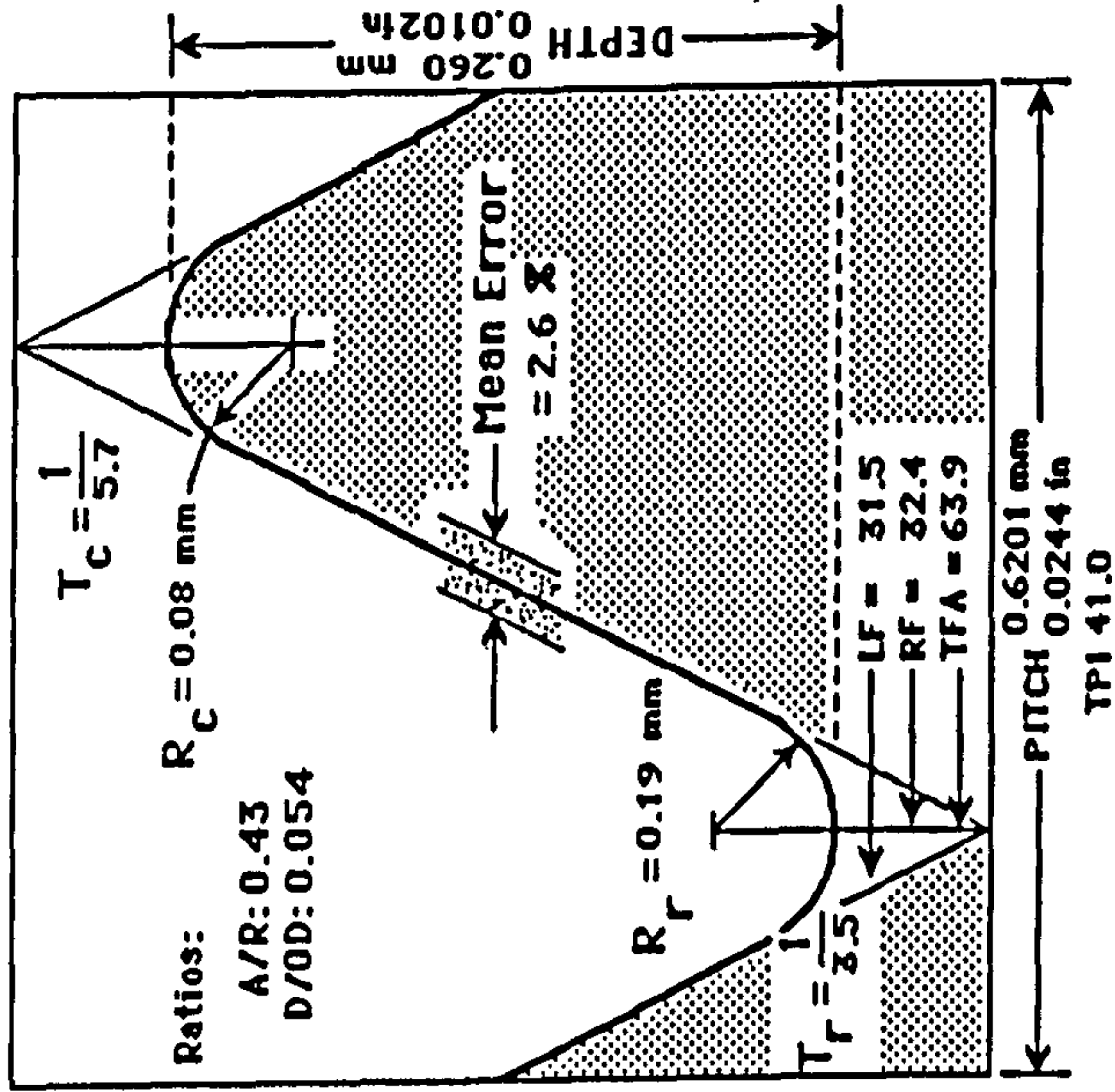
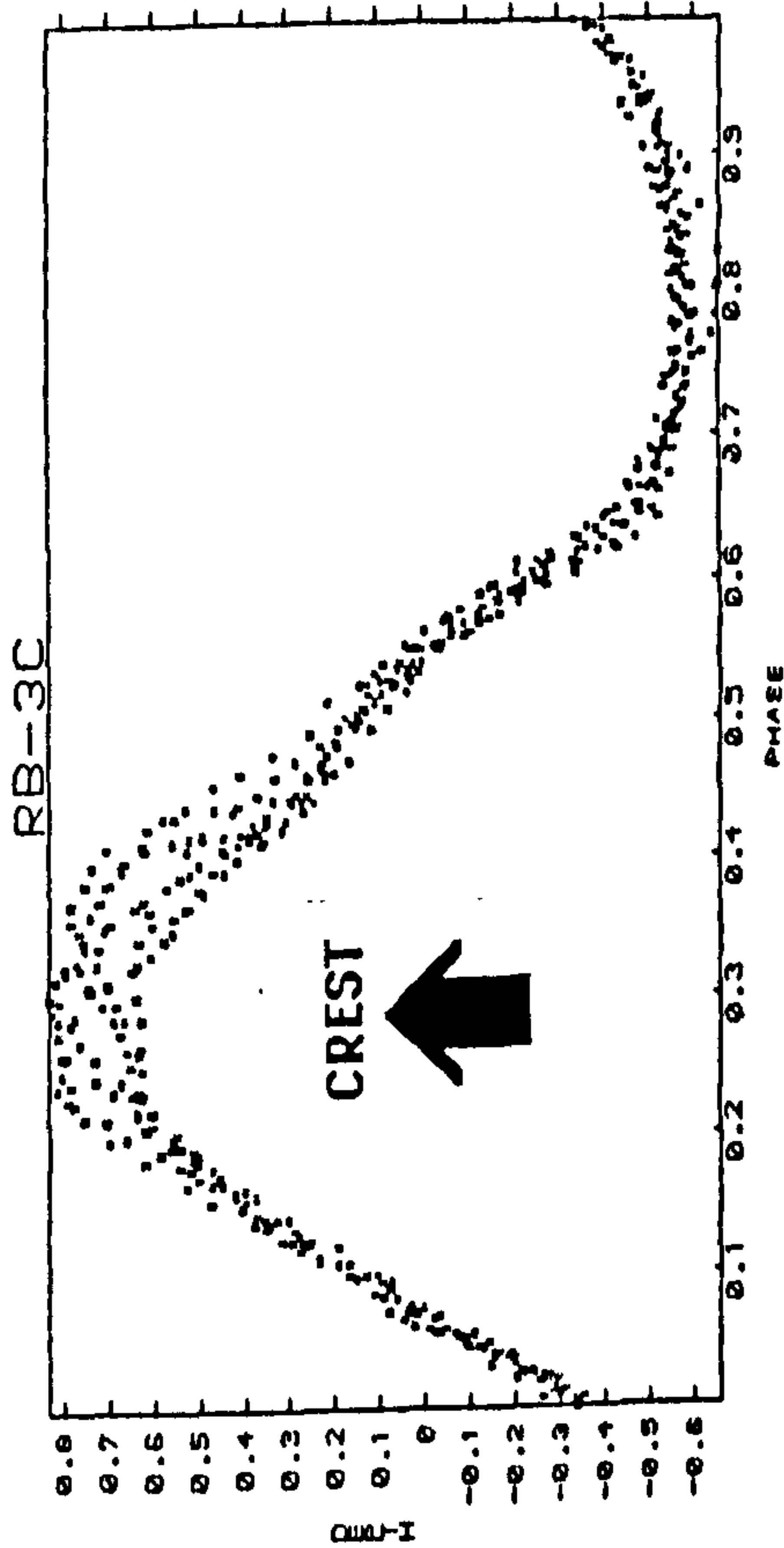
Study Code: RB-3c

Instrument: Octant

Maker: Spencer, Browning & Rust

Date: ca.1840

Ser./Acq. No.



Mu

Filar

Scale

Bench

Div. Eng.

Adjust.

Leveling

Focus

Eye P.

Tube

Tool

Gauge

Binding

Misc.

Clamp screw nut on

Index arm

Characteristics:

Screw

Nut

Leng: 1.531" / 0.189"

Diameter: 0.1175"

Steel

Brass

Other: Nickel/steel

Instrument Identification:

Study Code: RB-14

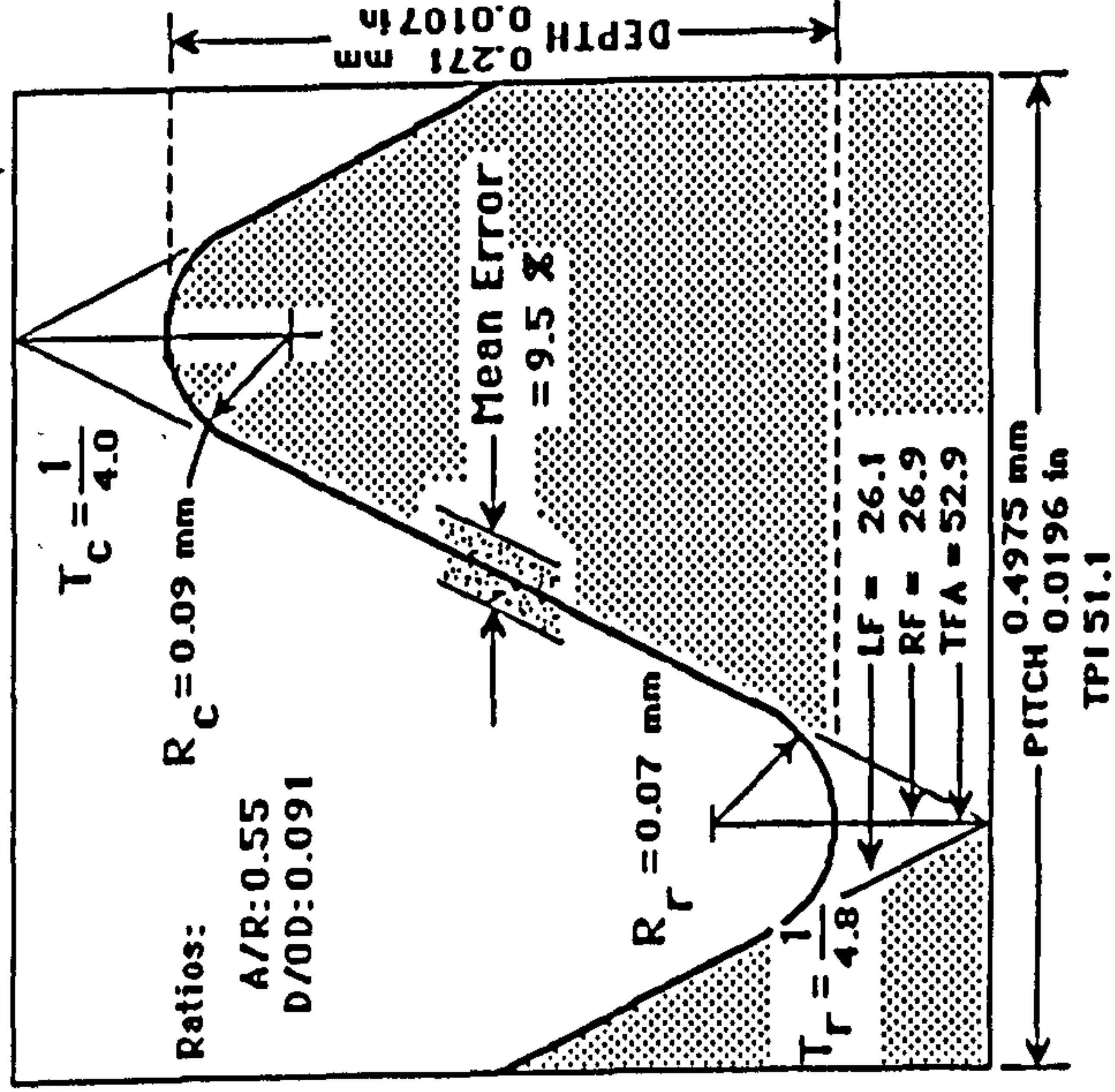
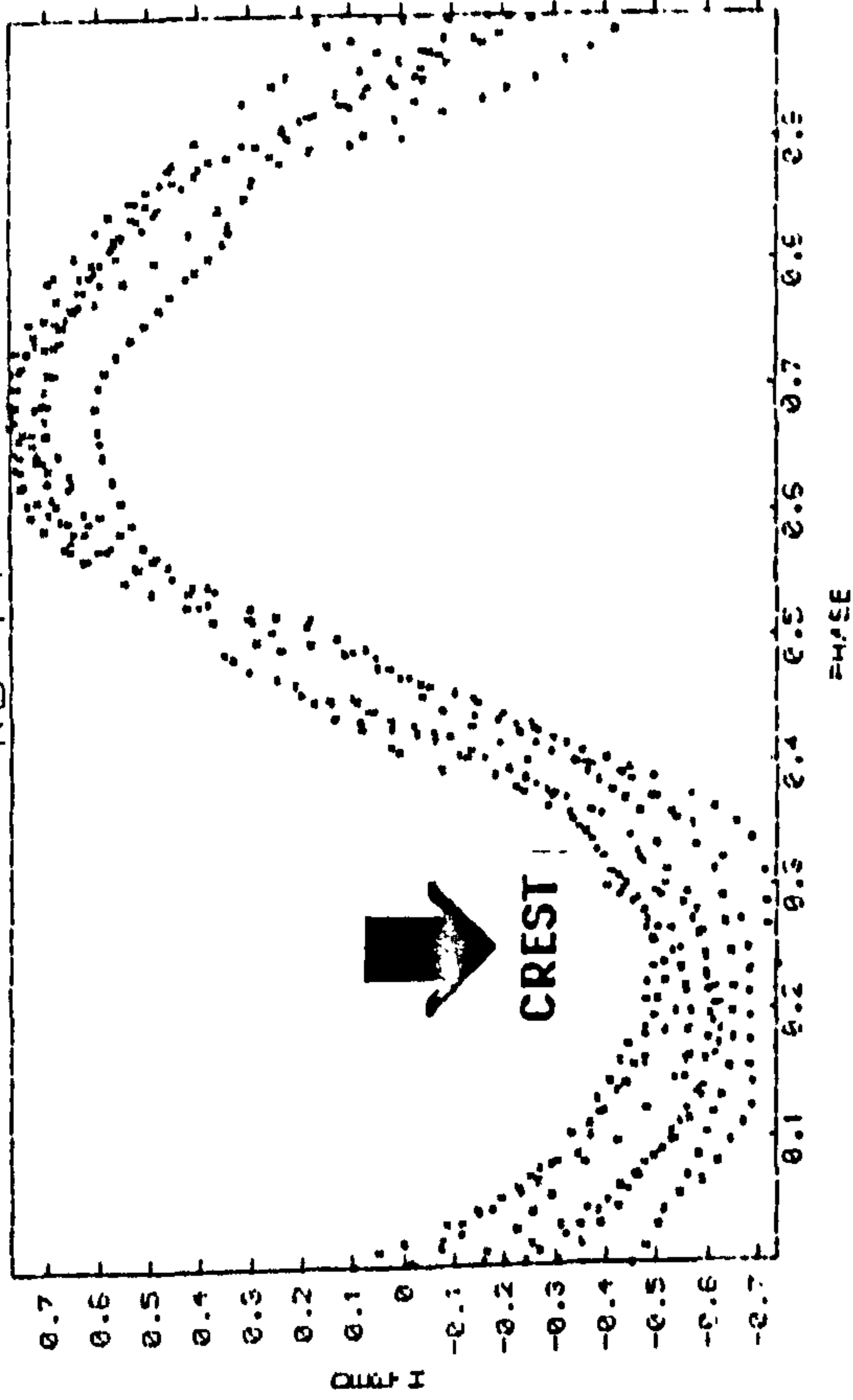
Instrument: Proportional Dividers

Maker: Eugene Dietzen & Co.

Date: 1912

Ser./Acq. No.

RB-14



Mu

Filar

Scale

Bench

Div. Eng.

Adjust.

Leveling

Focus

Eye P.

Tube

Tool

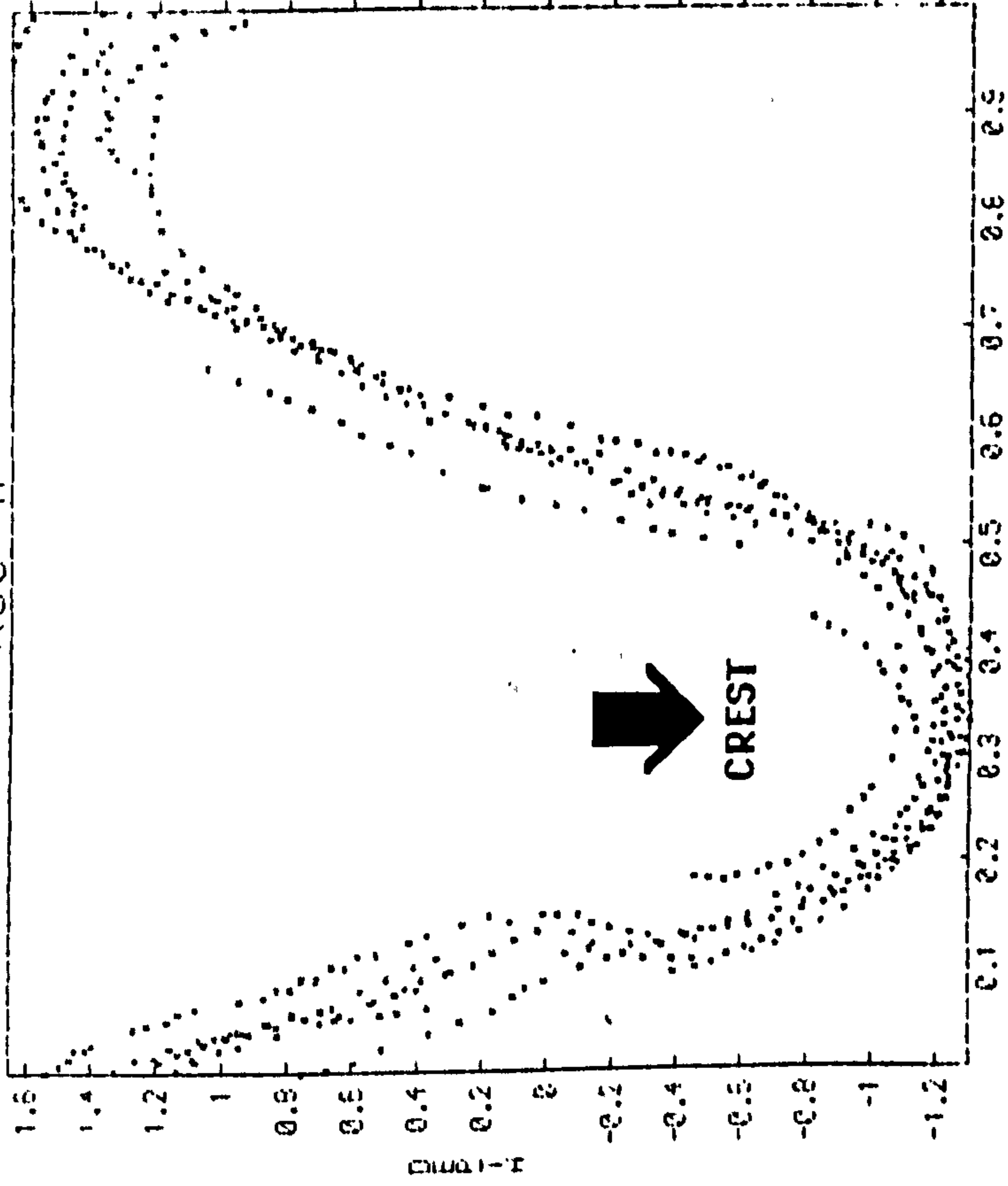
Gauge

Binding

Misc.



ROG-4F



Characteristics:

Screw ☒ Nut ☐

Leng: 0.625"

Diameter: 0.1922"

Steel ☐ Brass ☒

Other:

Instrument Identification:

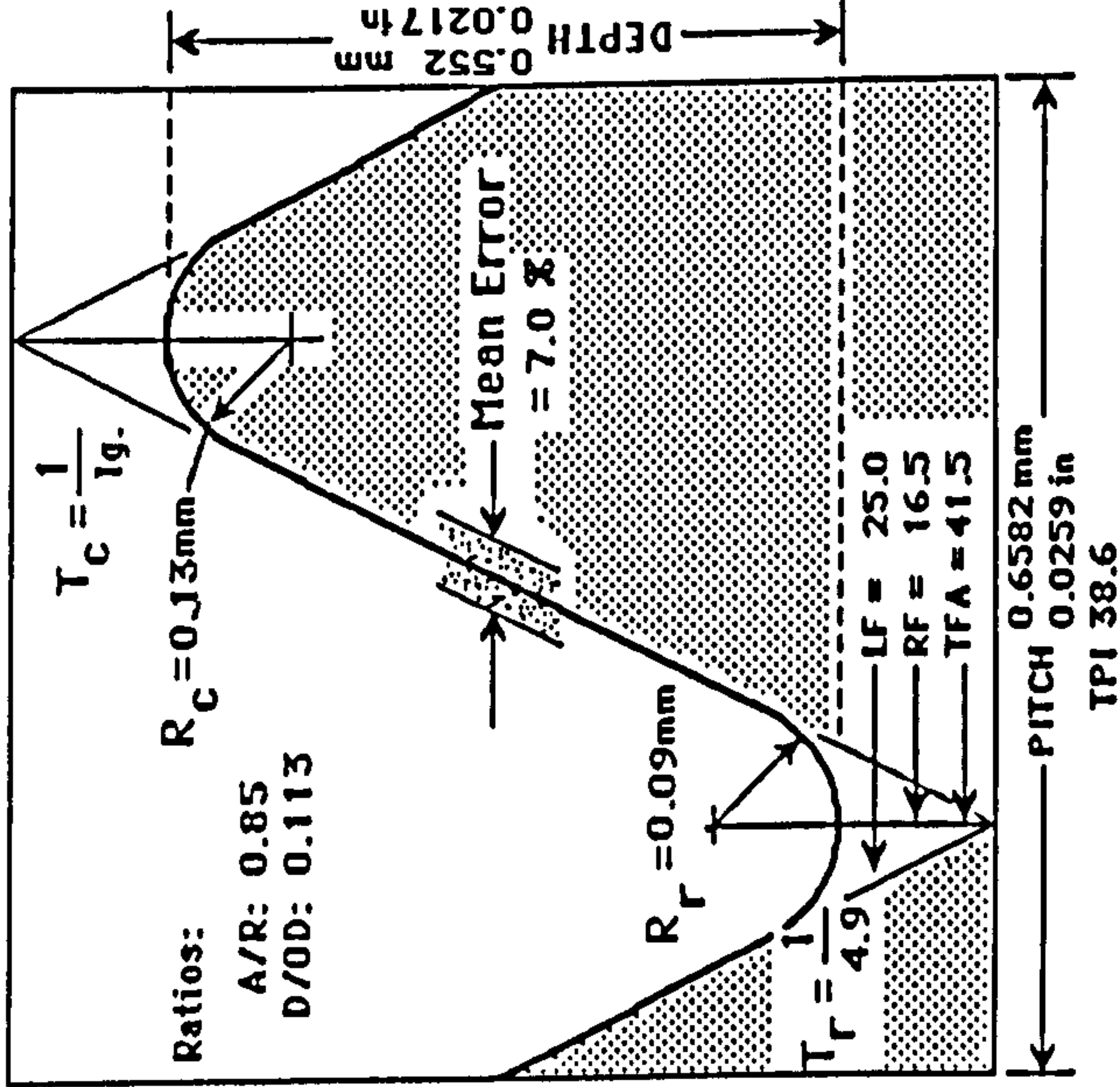
Study Code: ROG-4f

Instrument: Micrometer

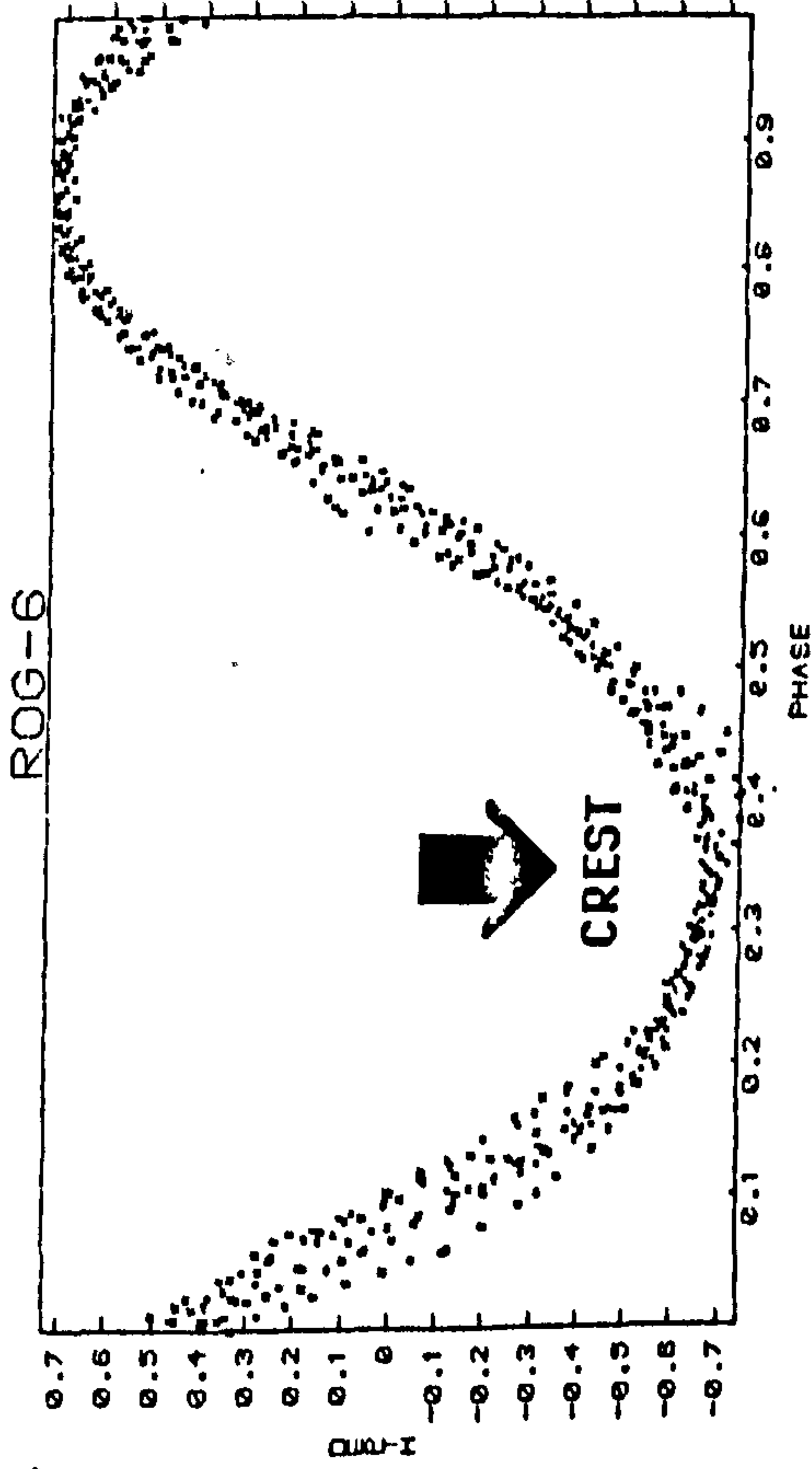
Maker: Troughton & Simms

Date: ca.1840

Ser./Acq. No. 0L-18



Mu	[	Filar
		Scale
[	]	Bench
		Div. Eng.
[	]	Adjust.
		Leveling
[	]	Focus
		Eye P.
[	]	Tube
		Tool
[	]	Gauge
		Binding
[	]	Misc.



**Characteristics:**

Screw ☒ Nut ☐

Leng: 0.813 / ~0.5"

Diameter: 0.2768"

Steel ☒ Brass ☐

Other: ☐

**Instrument Identification:**

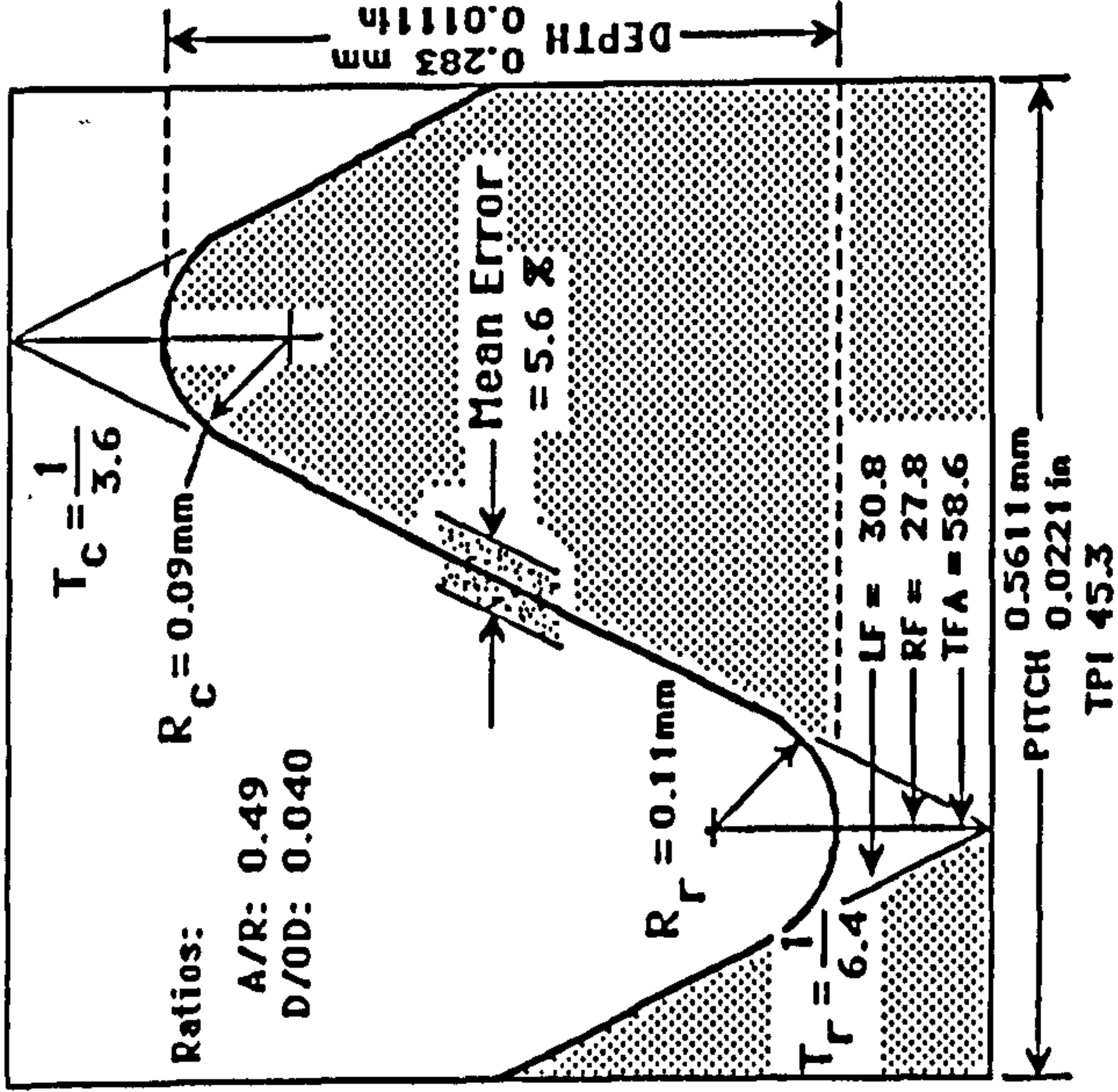
Study Code: ROG-6

Instrument: Gregorian mounting

Maker: Haupois

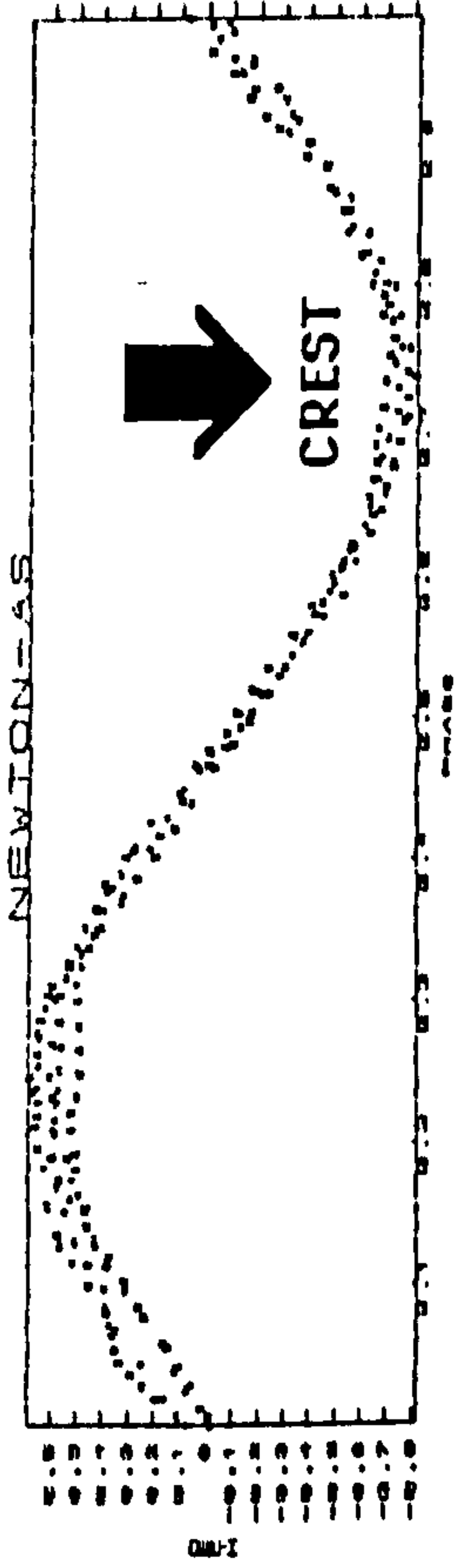
Date: 1787

Ser./Acq. No. 00/R6



Mu — [ Filar Scale Bench Div. Eng. Adjust. Leveling Focus Eye P. Tube Tool Gauge Binding Misc. (Foot) ]

NB: This is the mounting for a Dollond Gregorian



Characteristics:

Screw ☒ Nut ☐

Leng: 1.188"

Diameter:  $\approx 0.188$ "

Steel ☒ Brass ☐

Other: Iron

Instrument Identification:

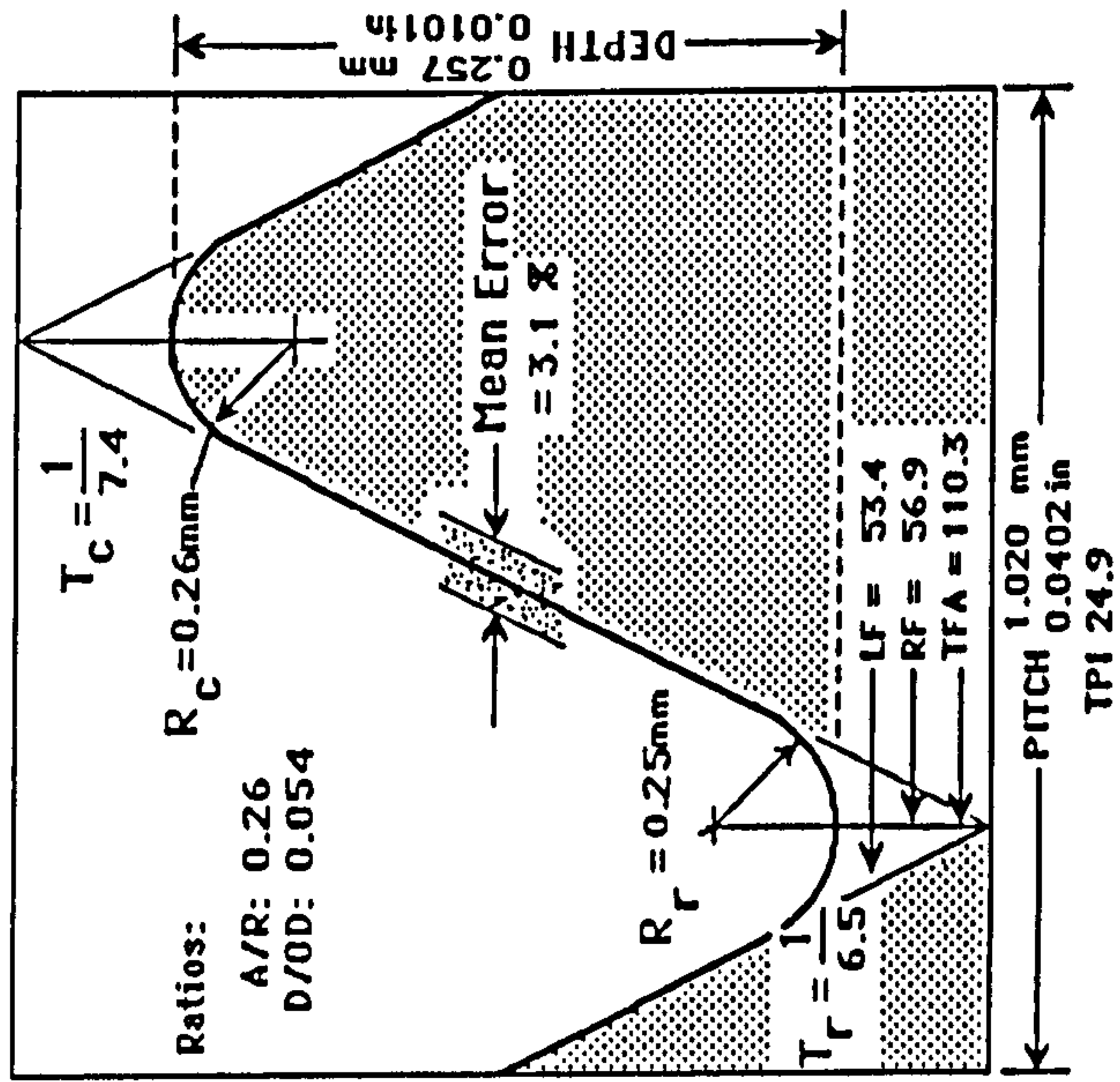
Study Code: RS-1b

Instrument: Reflecting telescope

Maker: Newton / Heath & Wing

Date: 1670 / ca.1760

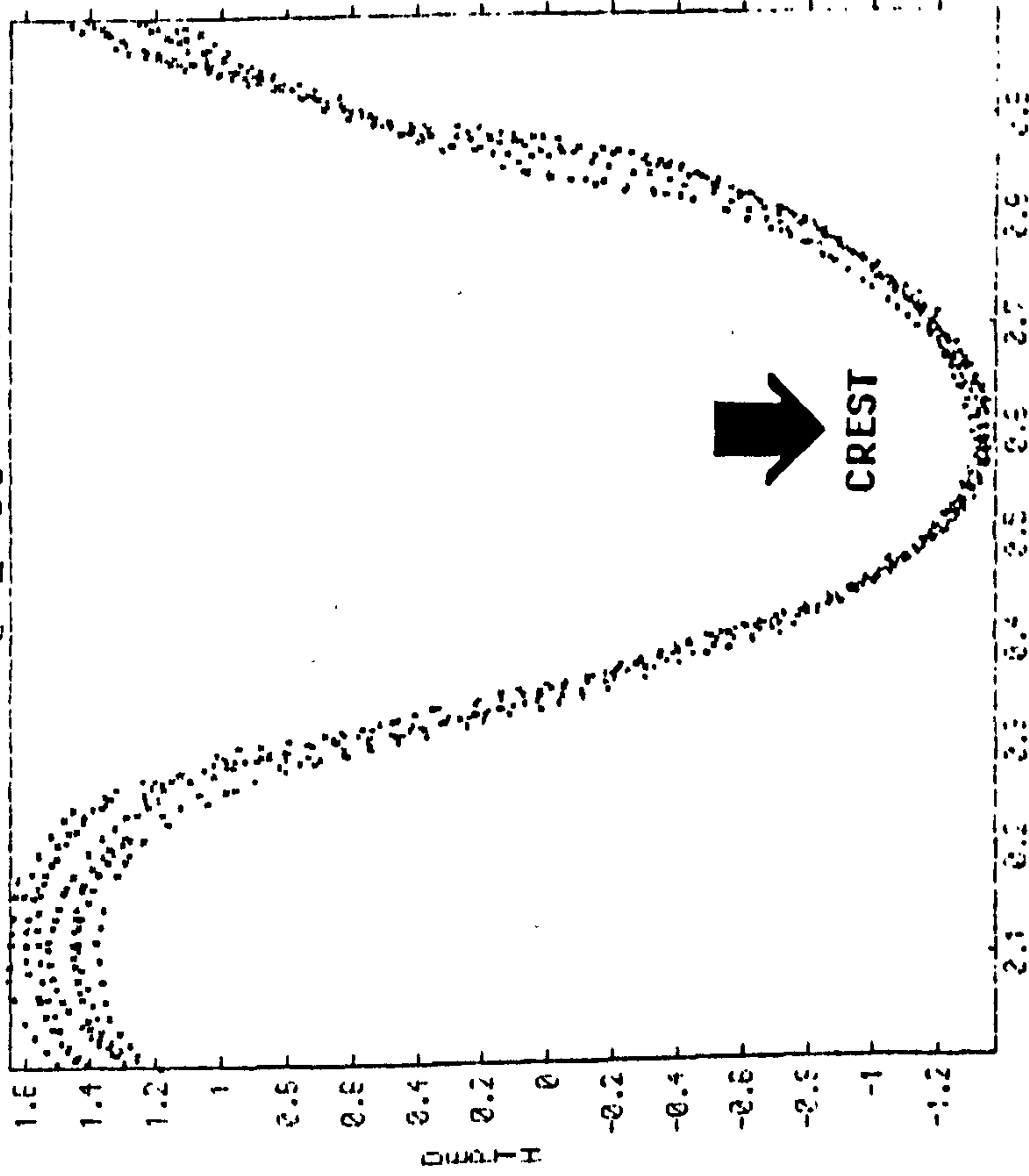
Ser./Acq. No.



	Filar
	Scale
	Bench
	Div. Eng.
	Adjust.
	Leveling
	Focus
	Eye P.
	Tube
	Tool
	Gauge
	Binding
	Misc.

(appears to be original)

SML-6C



Characteristics:

Screw ☒ Nut ☐

Leng: 3.25" / 0.875"

Diameter: 0.2860"

Steel ☒ Brass ☐

Other:

Instrument Identification:

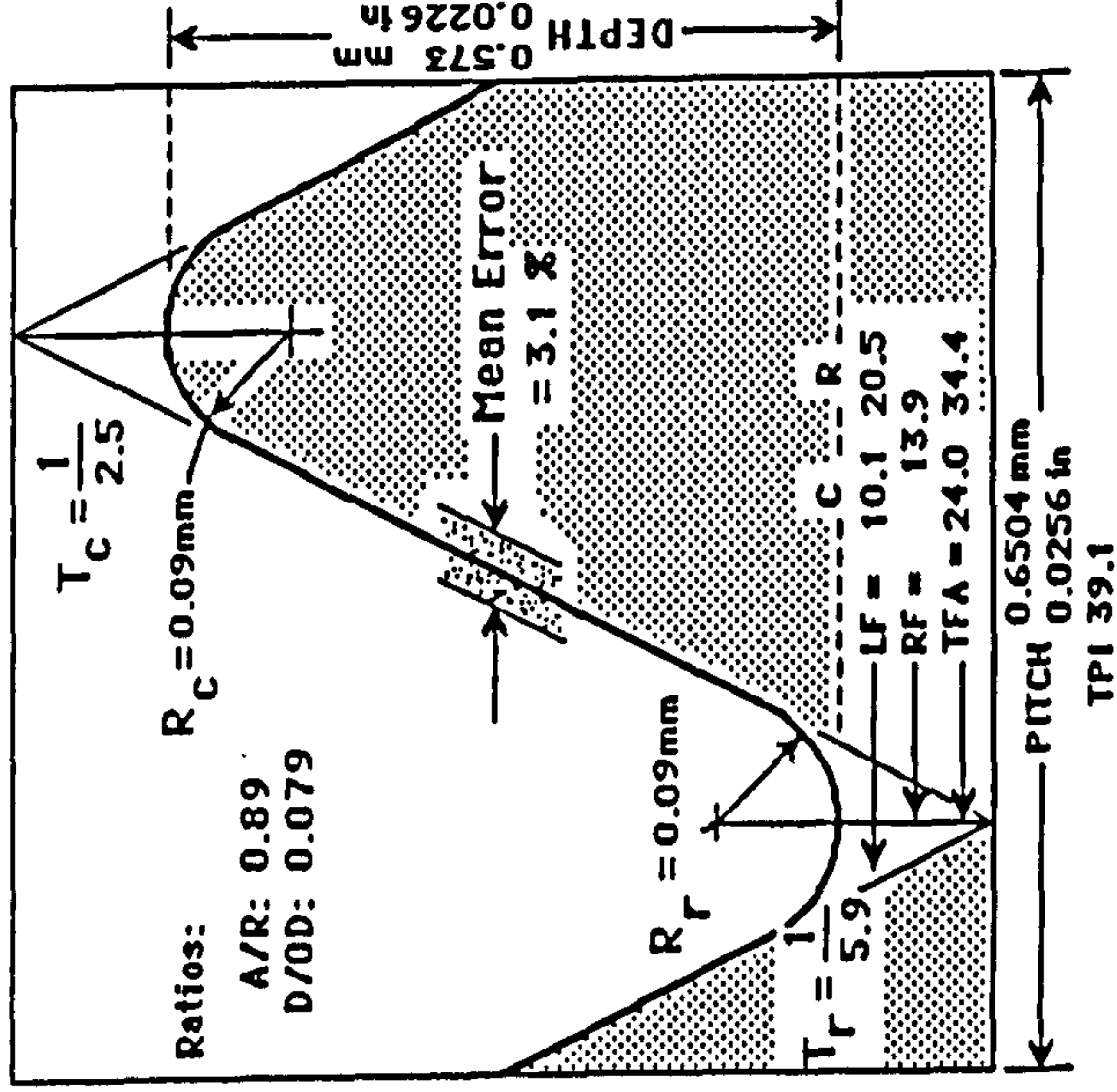
Study Code: SML-6c

Instrument: Shuckburg equatorial

Maker: Ramsden

Date: 1791

Ser./Acq. No. 1929-979



Mu	[	Filar	
		Scale	
[	]	Bench	
		Div. Eng.	
		Adjust.	
		Leveling	
		Focus	
		Eye P.	
		Tube	
		Tool	
		Gauge	
		Binding	
		Misc.	



Characteristics:

Screw

Nut

Leng: 1.93" / 0.26"

Diameter: 0.172"

Steel

Brass

Other:

Instrument Identification:

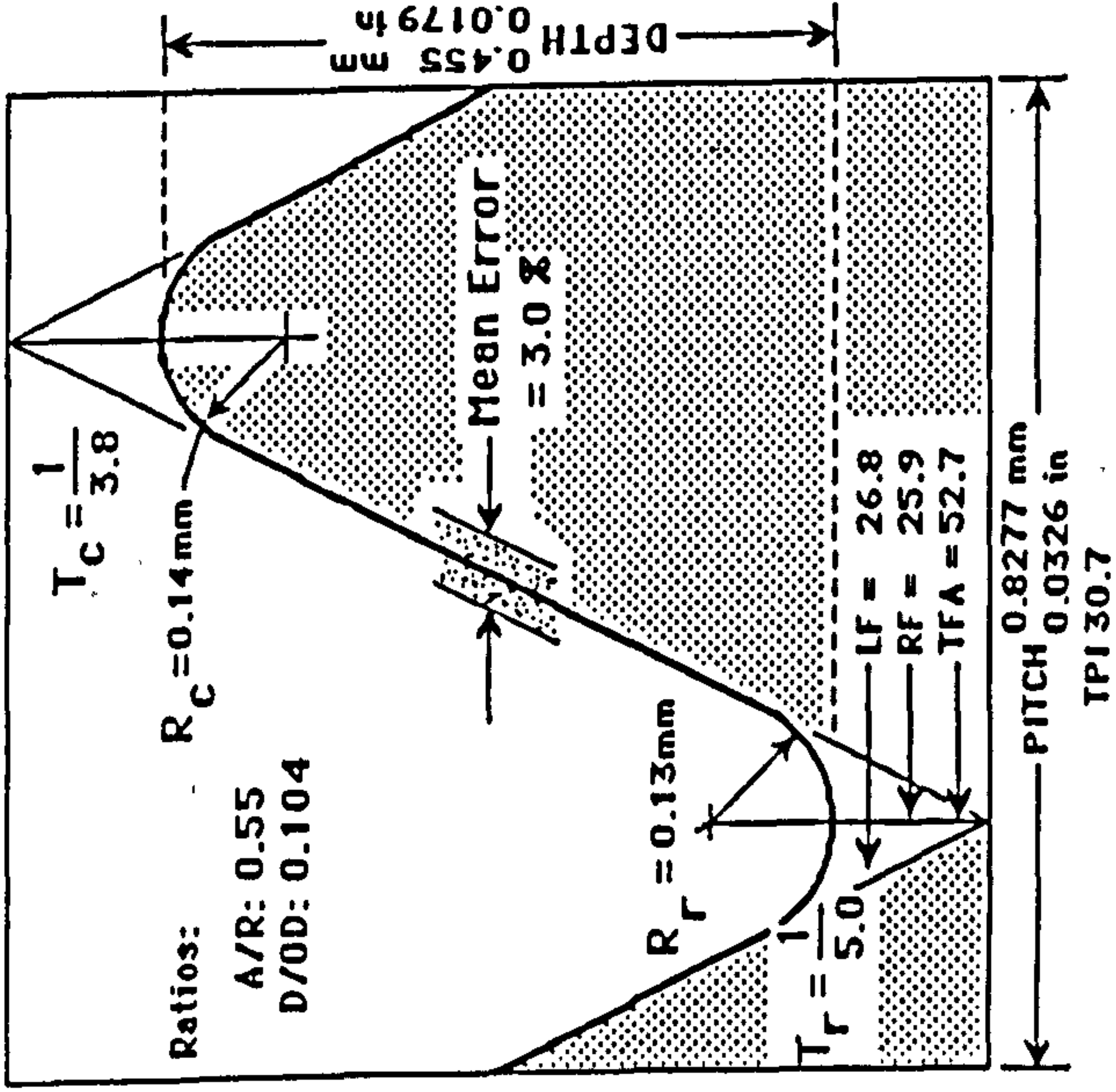
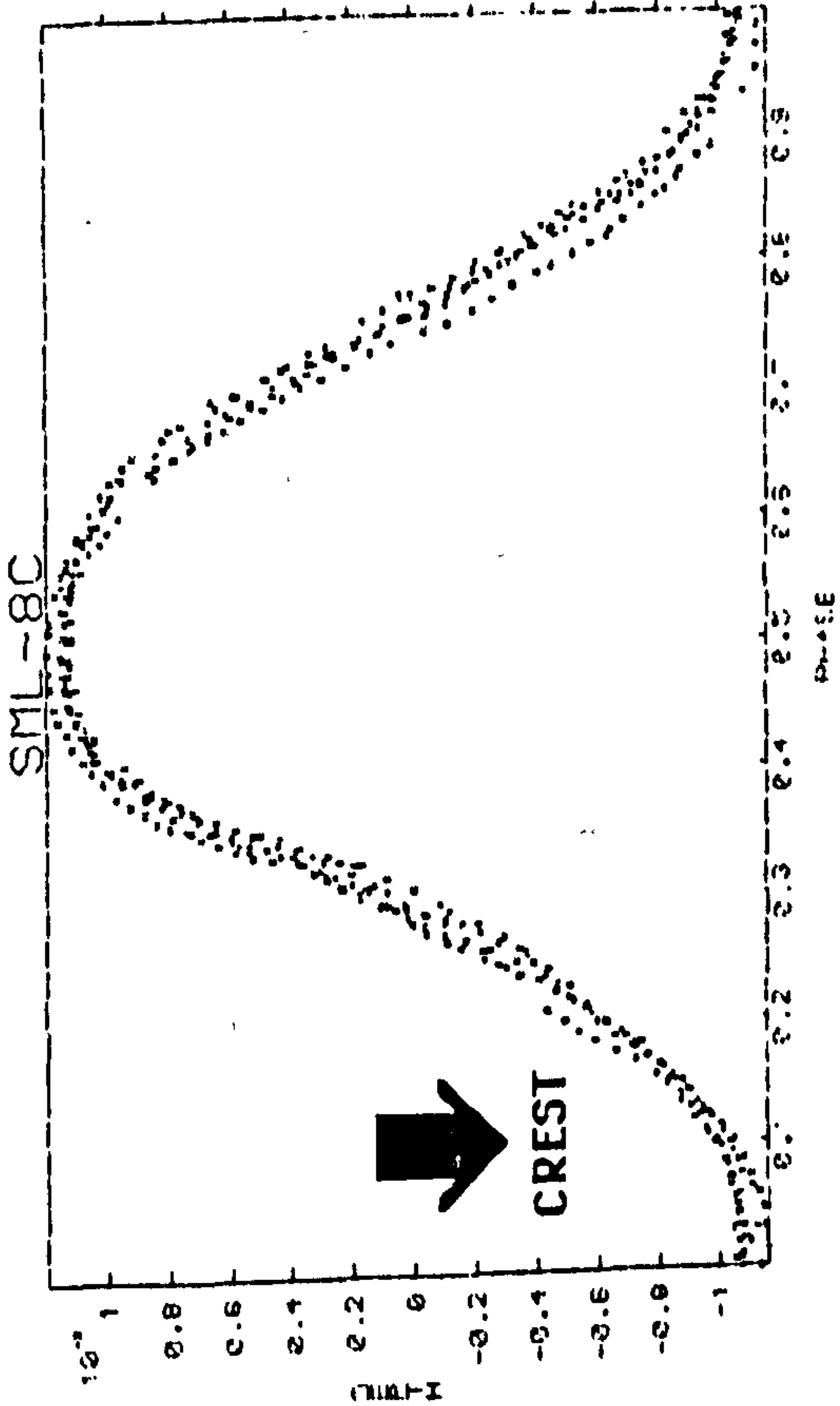
Study Code: SML-8c

Instrument: Portable equatorial

Maker: John Smeaton

Date: 1770

Ser./Acq. No. 1931-347



Mu

Filar

Scale

Bench

Div. Eng.

Adjust.

Leveling

Focus

Eye P.

Tube

Tool

Gauge

Binding

Misc.

(Vernier)

Characteristics:

Screw

Nut

Leng: 1.125"

Diameter: 0.1568"

Steel

Brass

Other:

Instrument Identification:

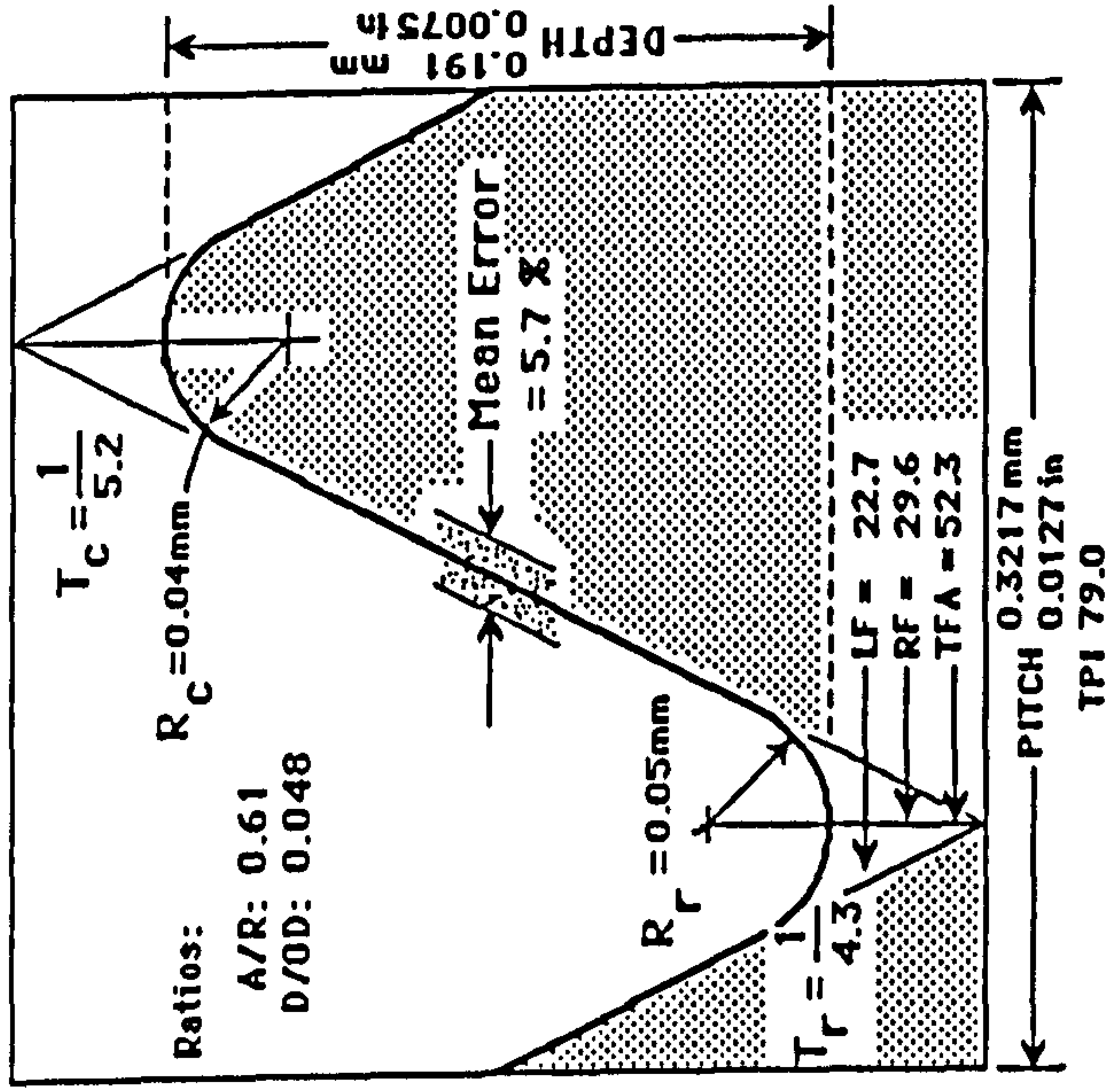
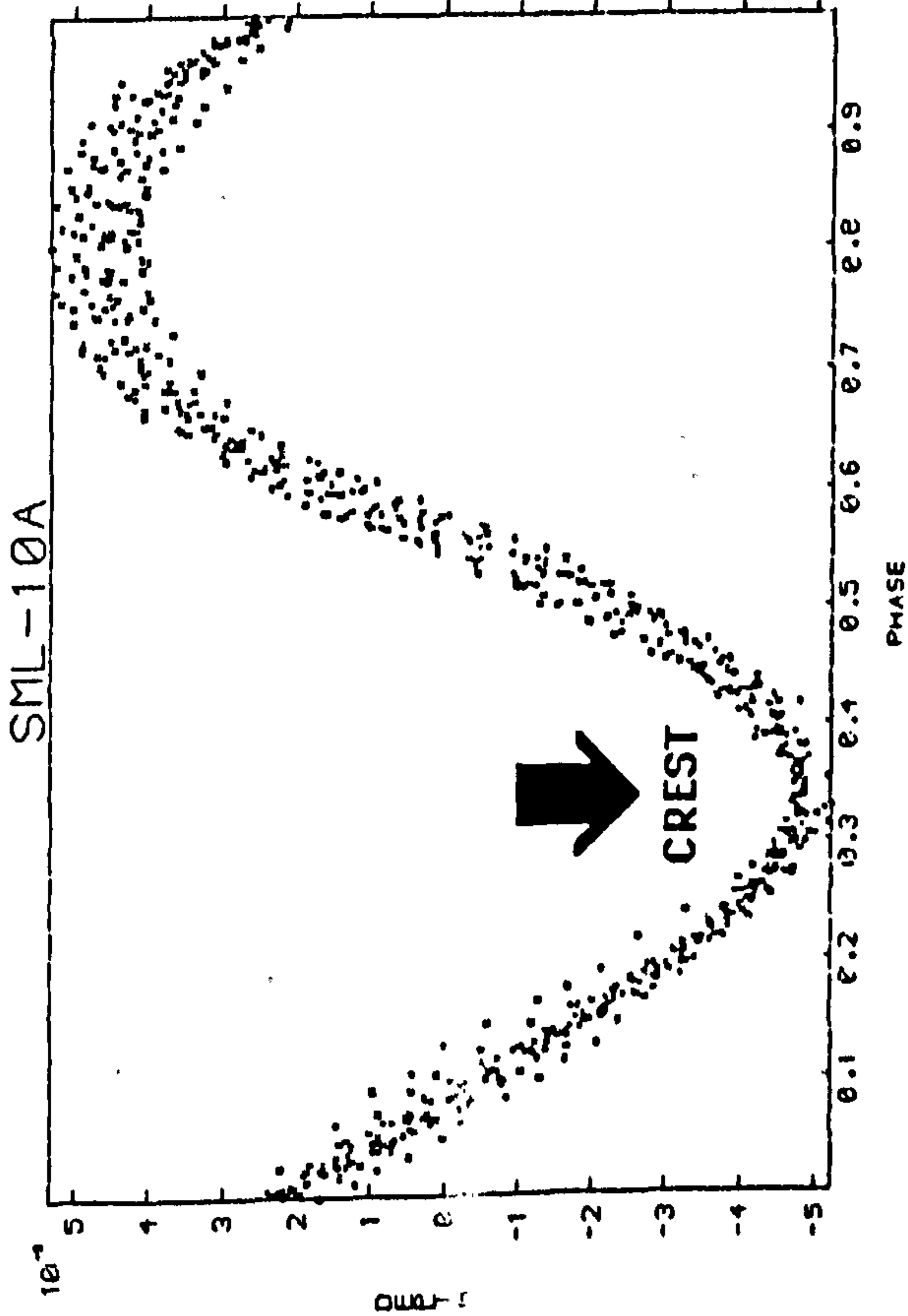
Study Code: SML-10a

Instrument: Geodetic theodolite

Maker: Ertel & Sohn

Date: ca.1840

Ser./Acq. No. 1950-246



Mu	Filar	
	Scale	
	Bench	
	Div. Eng.	
	Adjust.	
	Leveling	
	Focus	
	Eye P.	
	Tube	
	Tool	
	Gauge	
	Binding	
	Misc.	
	(Vernier—right)	

Characteristics:

Screw

Nut

Leng: 1.125"

Diameter: 0.1586"

Steel

Brass

Other:

Instrument Identification:

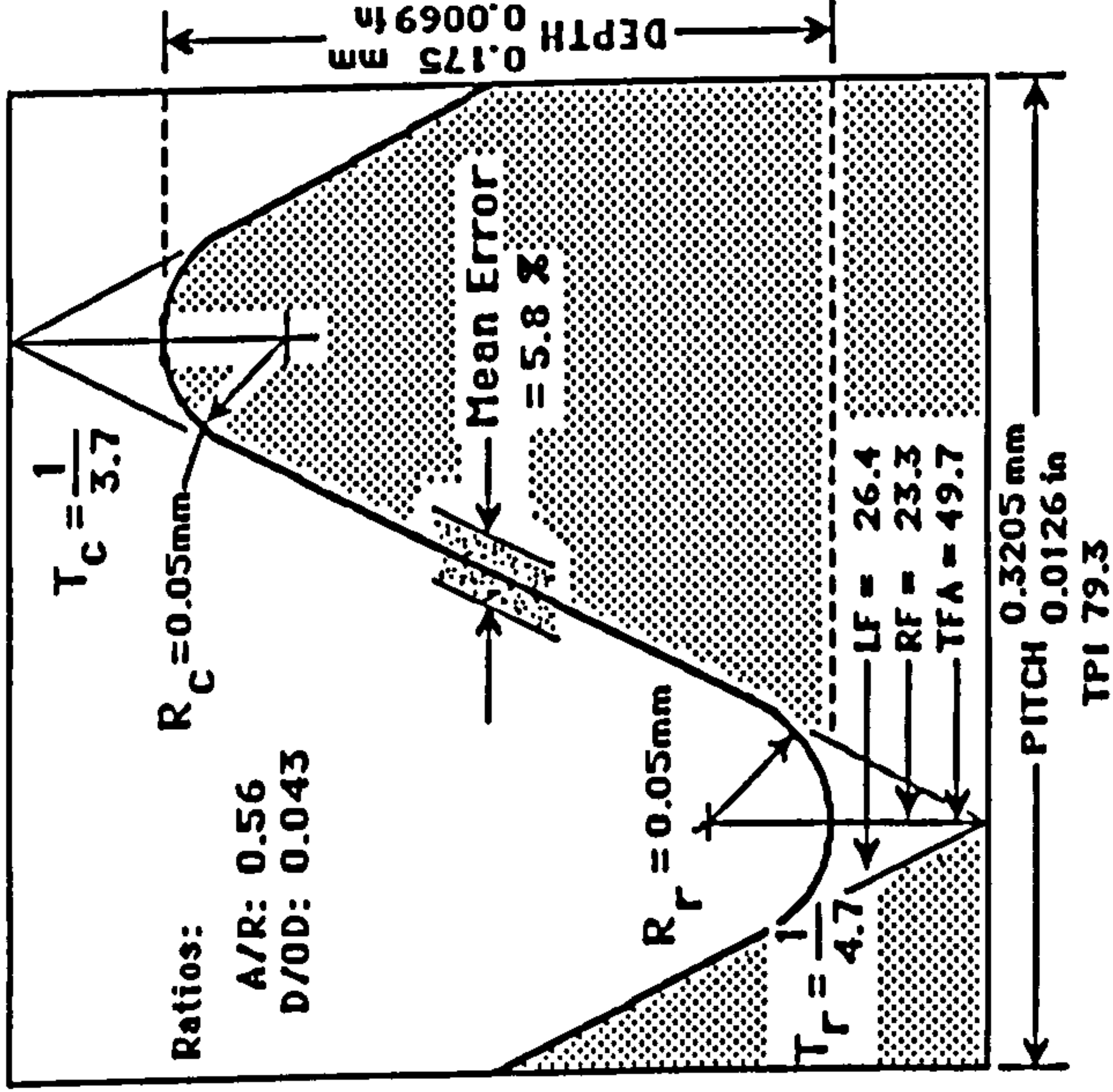
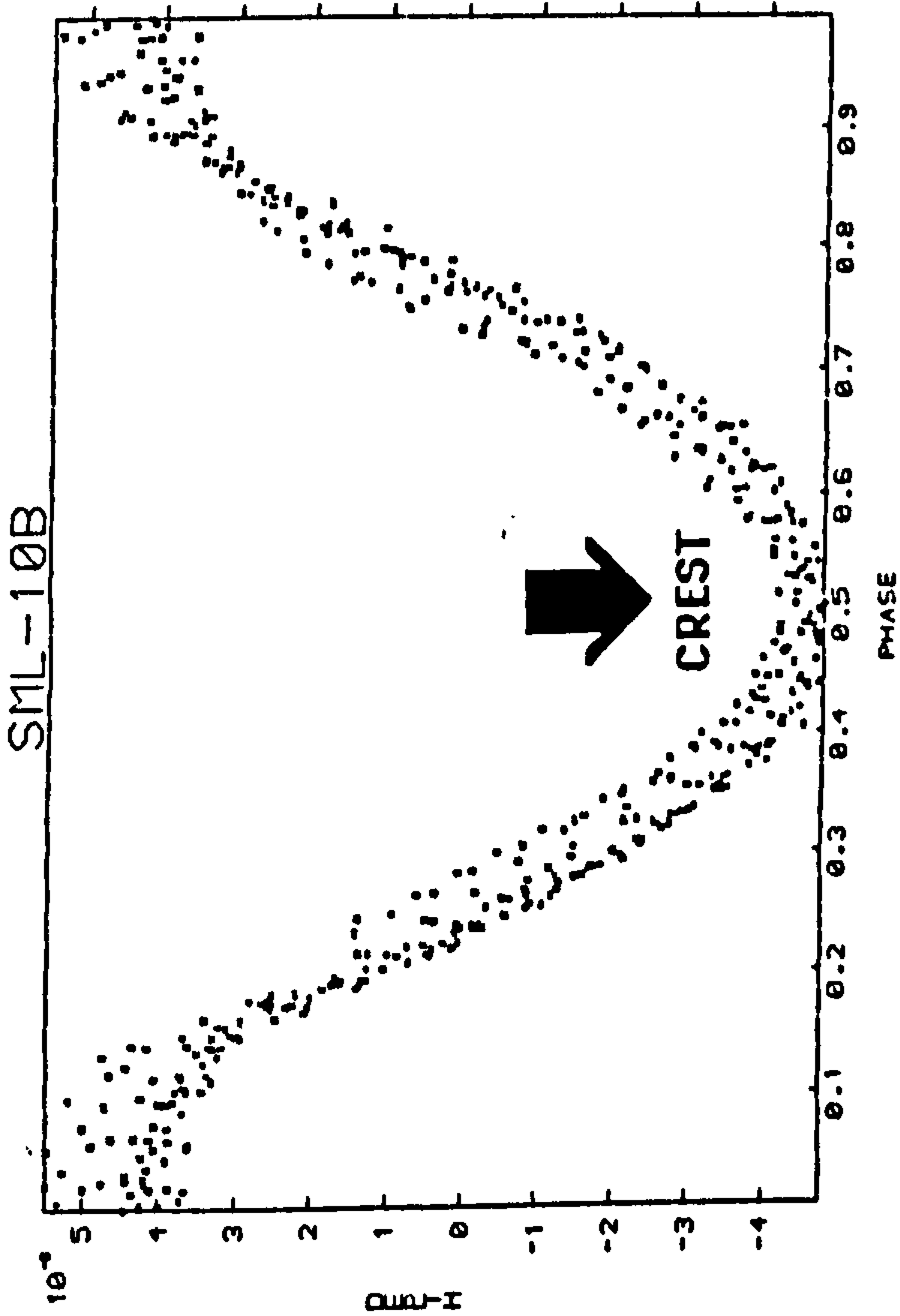
Study Code: SML-10b

Instrument: Geodetic theodolite

Maker: Ertel & Sohn

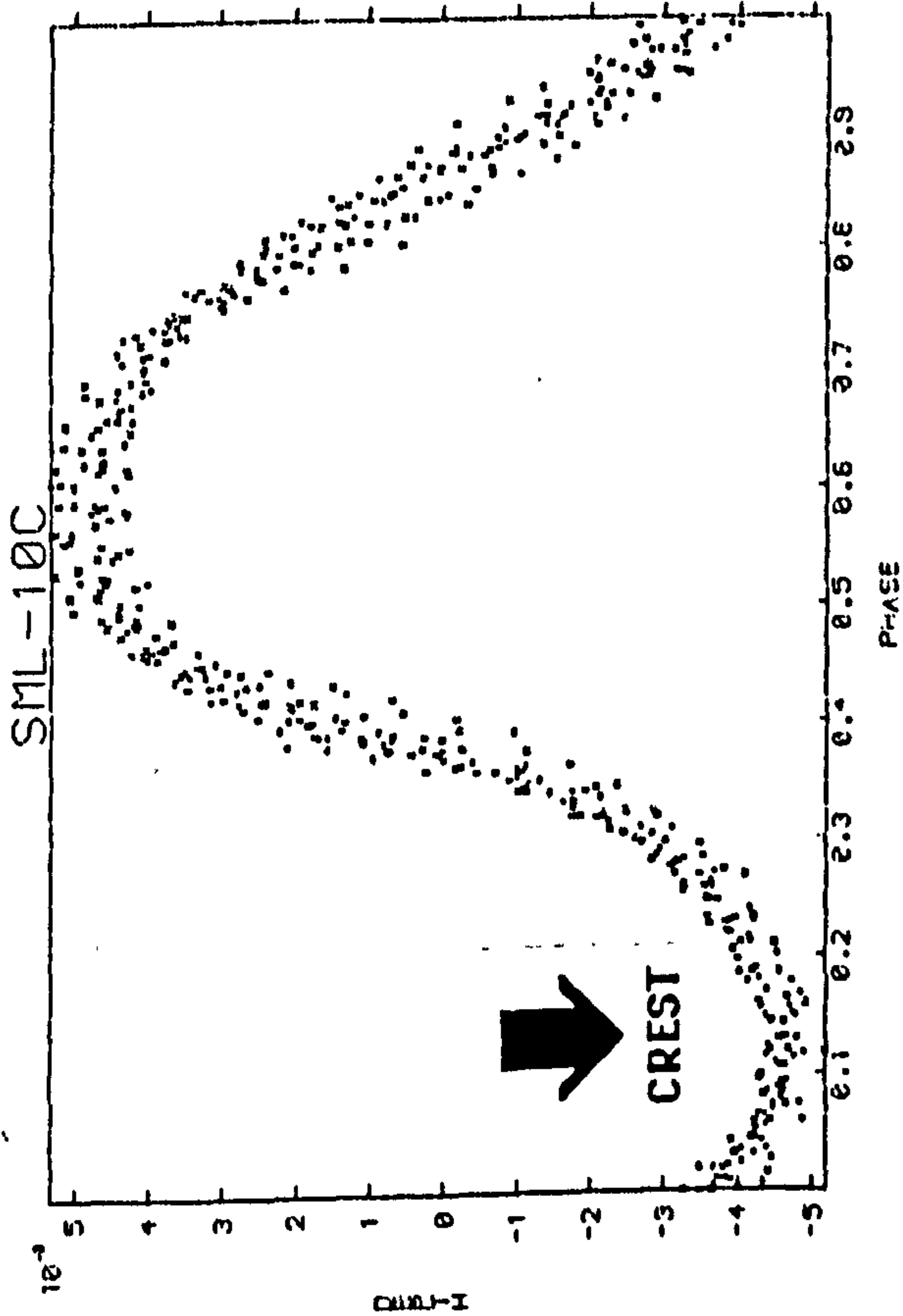
Date: ca.1840

Ser./Acq. No. 1950-246



Mu	Filar	
		Scale
Bench	Div. Eng.	
		Adjust.
	Leveling	
	Focus	
	Eye P.	
	Tube	
	Tool	
	Gauge	
	Binding	
	Misc.	
		(Vernier—left)





Characteristics:

Screw ☒ Nut ☐

Leng: 1.125"

Diameter: 0.1659"

Steel ☐ Brass ☒

Other:

Instrument Identification:

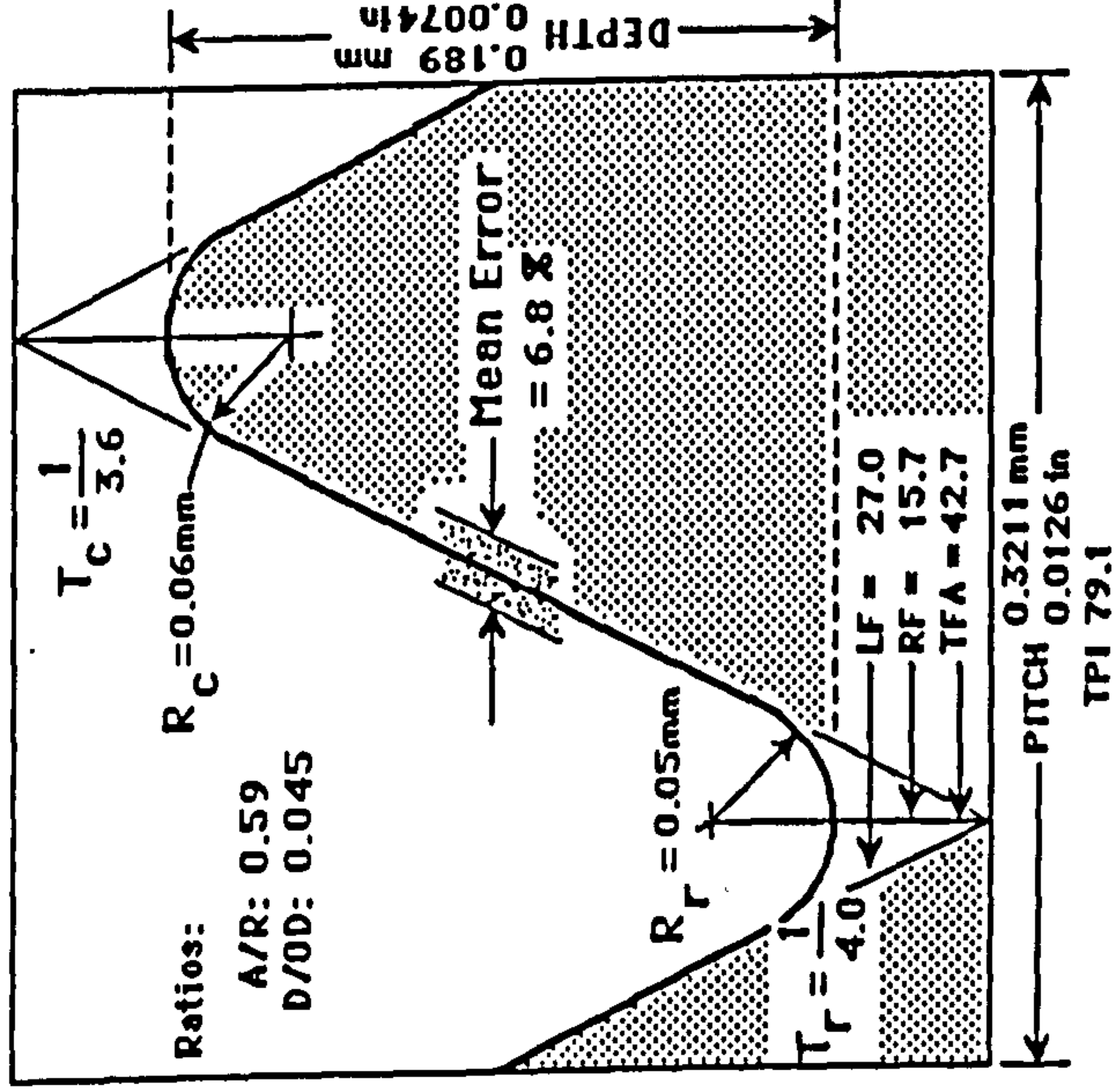
Study Code: SML-10c

Instrument: Geodetic theodolite

Maker: Ertel & Sohn

Date: ca.1840

Ser./Acq. No. 1950-246



Mu — [ Filar Scale Bench Div. Eng. Adjust. Leveling Focus Eye P. Tube Tool Gauge Binding Misc.

(Vernier—back upper)



Characteristics:

Screw

Nut

Leng: 1.125"

Diameter: 0.1582"

Steel

Brass

Other:

Instrument Identification:

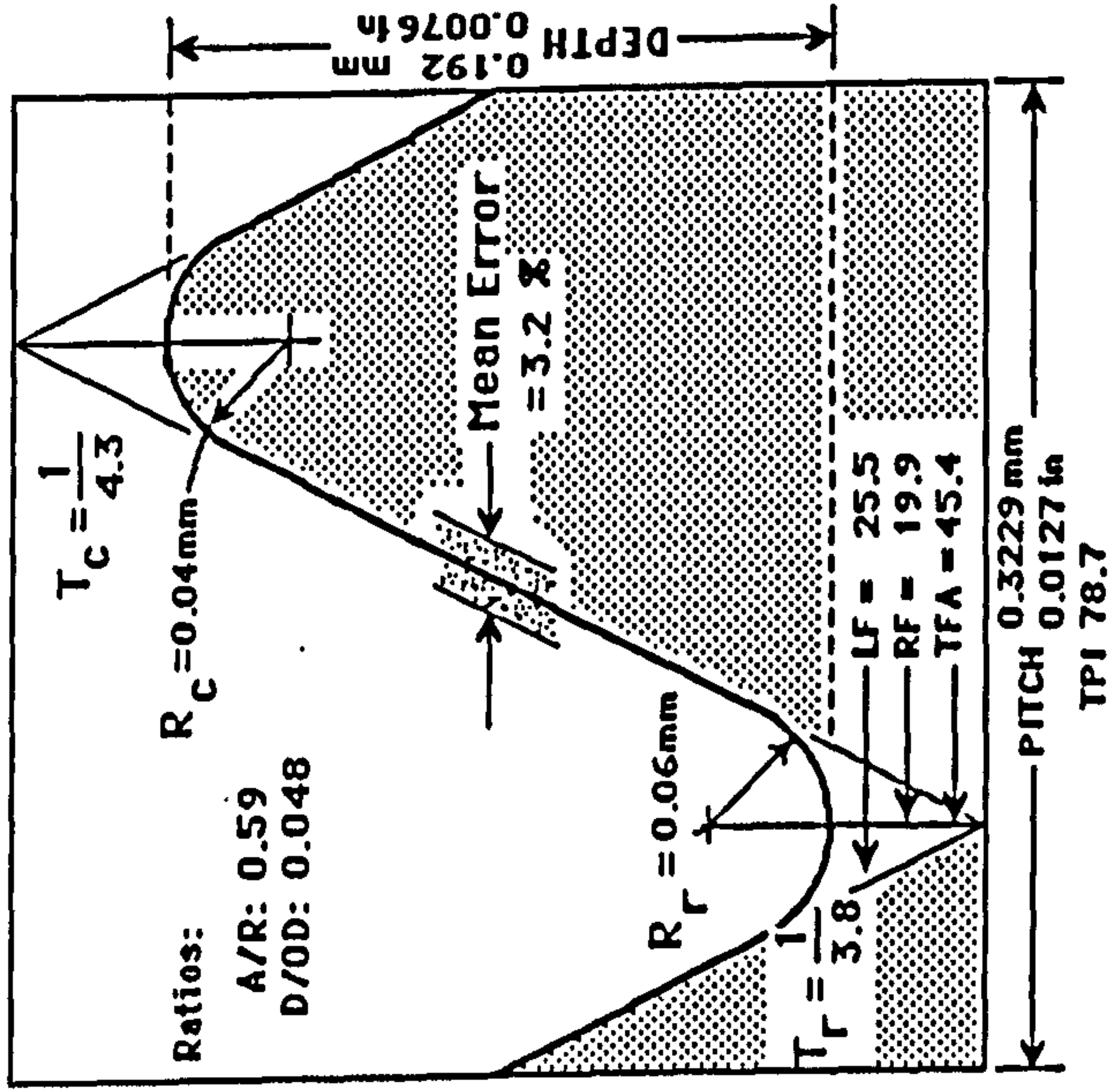
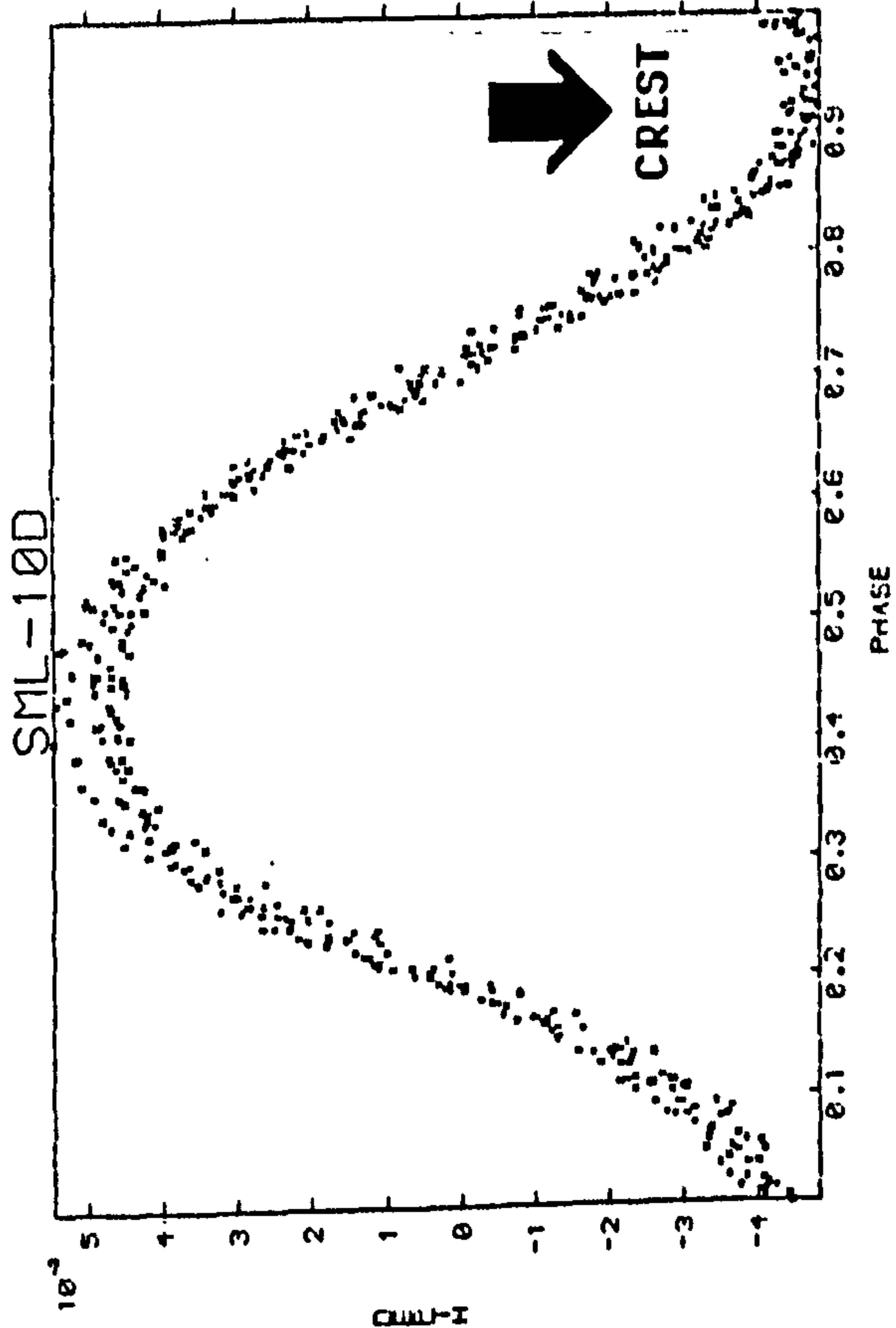
Study Code: SML-10d

Instrument: Geodetic theodolite

Maker: Ertel & Sohn

Date: ca.1840

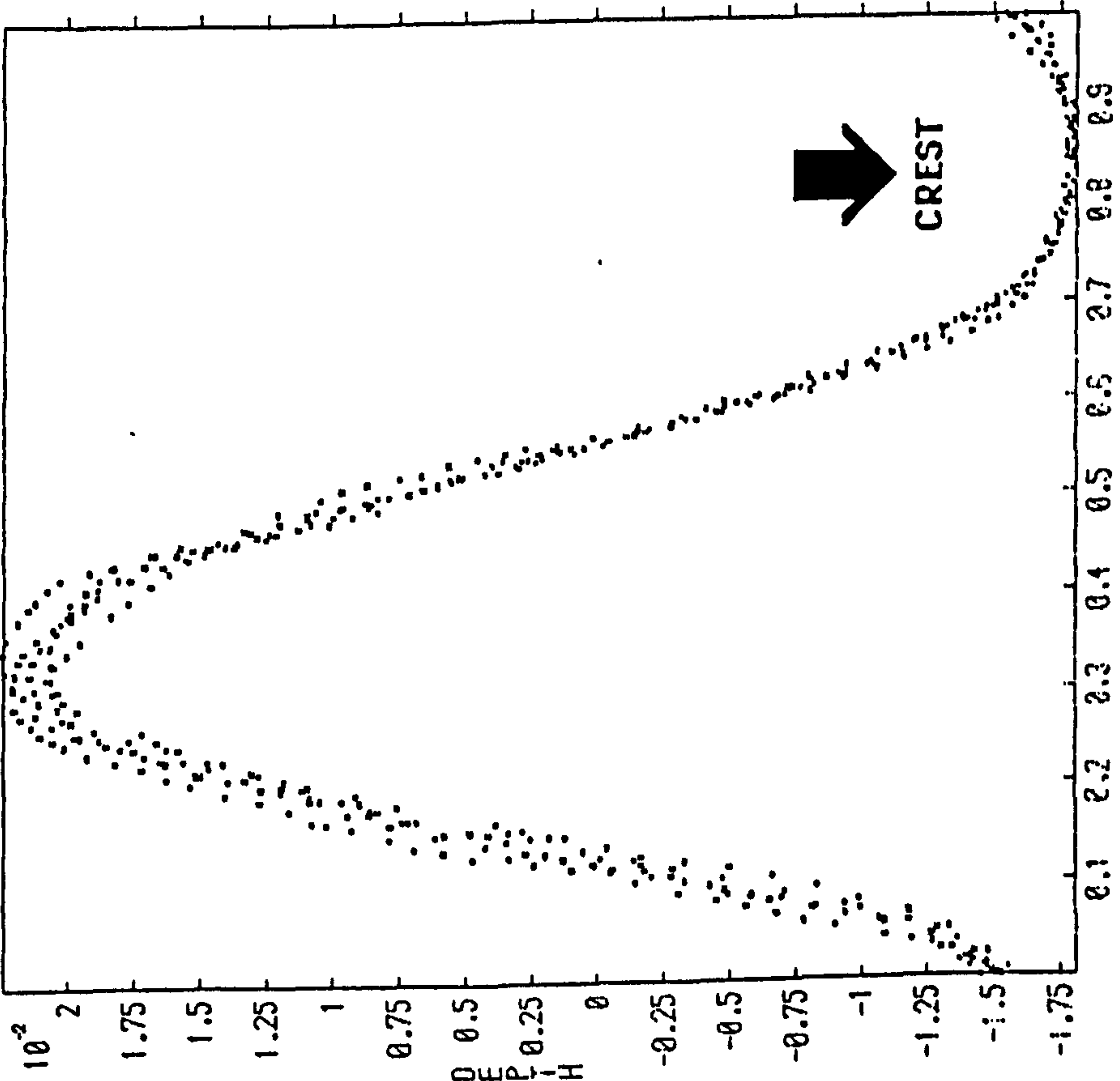
Ser./Acq. No. 1950-246



MU	Filar	
		Scale
MU	Bench	
		Div. Eng. Adjust.
		Leveling
		Focus
		Eye P. Tube
		Tool
		Gauge
		Binding
		Misc.

(Vernier—back lower)

SML-11A



**Characteristics:**

Screw ☒ Nut ☐

Leng: 1.00"

Diameter: 0.2122"

Steel ☐ Brass ☒

Other:

**Instrument Identification:**

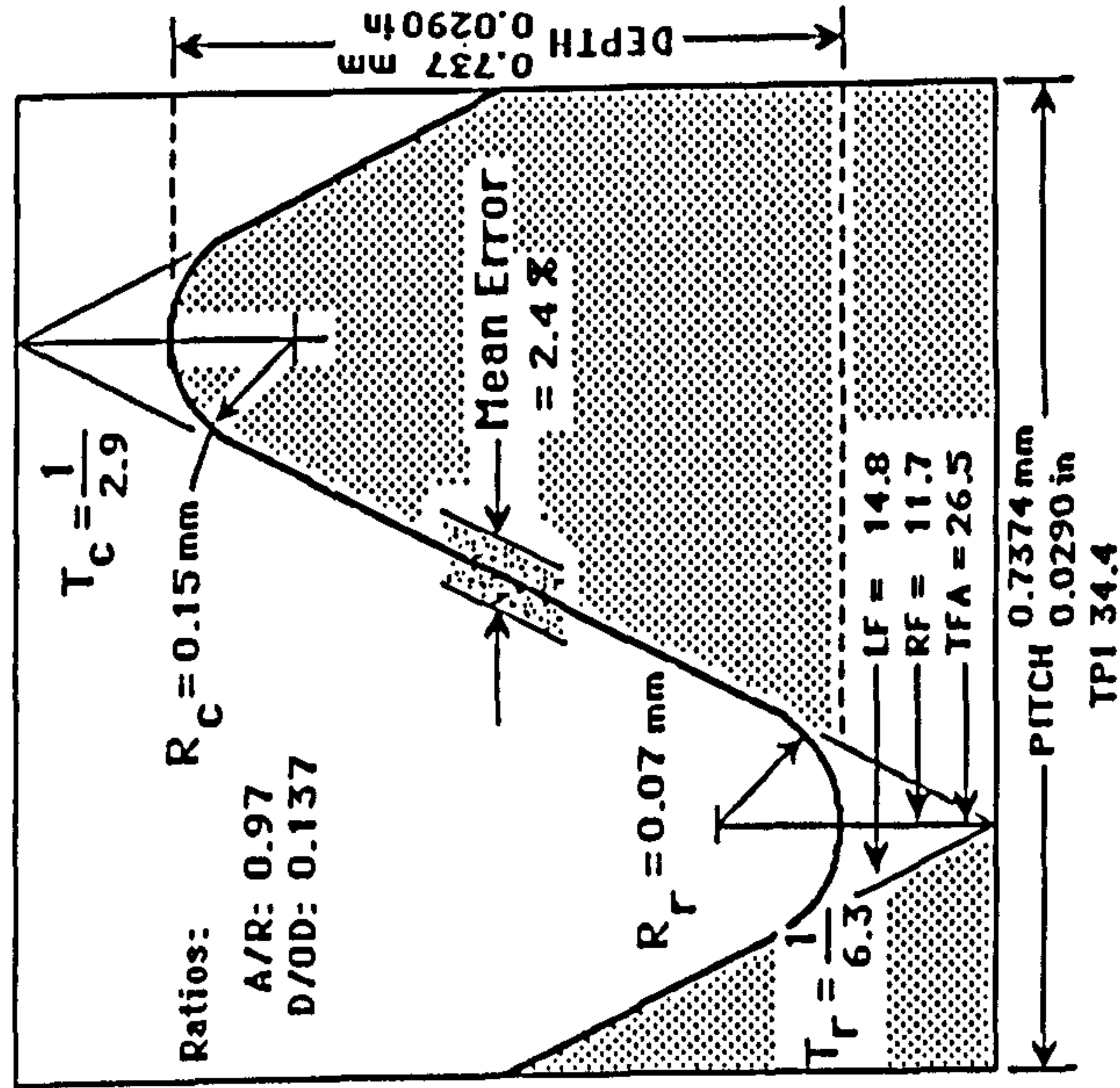
Study Code: SML-11a

Instrument: Alazimuth theodolite

Maker: Thomas Jones

Date: 2nd q 19th c

Ser./Acq. No. 1948-128



Fi	Filar
Sc	Scale
Bn	Bench
Div. Eng.	Div. Eng.
Adj.	Adjust.
Leveling	Leveling
Focus	Focus
Eye P.	Eye P.
Tube	Tube
Tool	Tool
Gauge	Gauge
Binding	Binding
Misc.	Misc.

(On the left side)

Characteristics:

Screw

Nut

Leng: 1.00"

Diameter: 0.2118"

Steel

Brass

Other:

Instrument Identification:

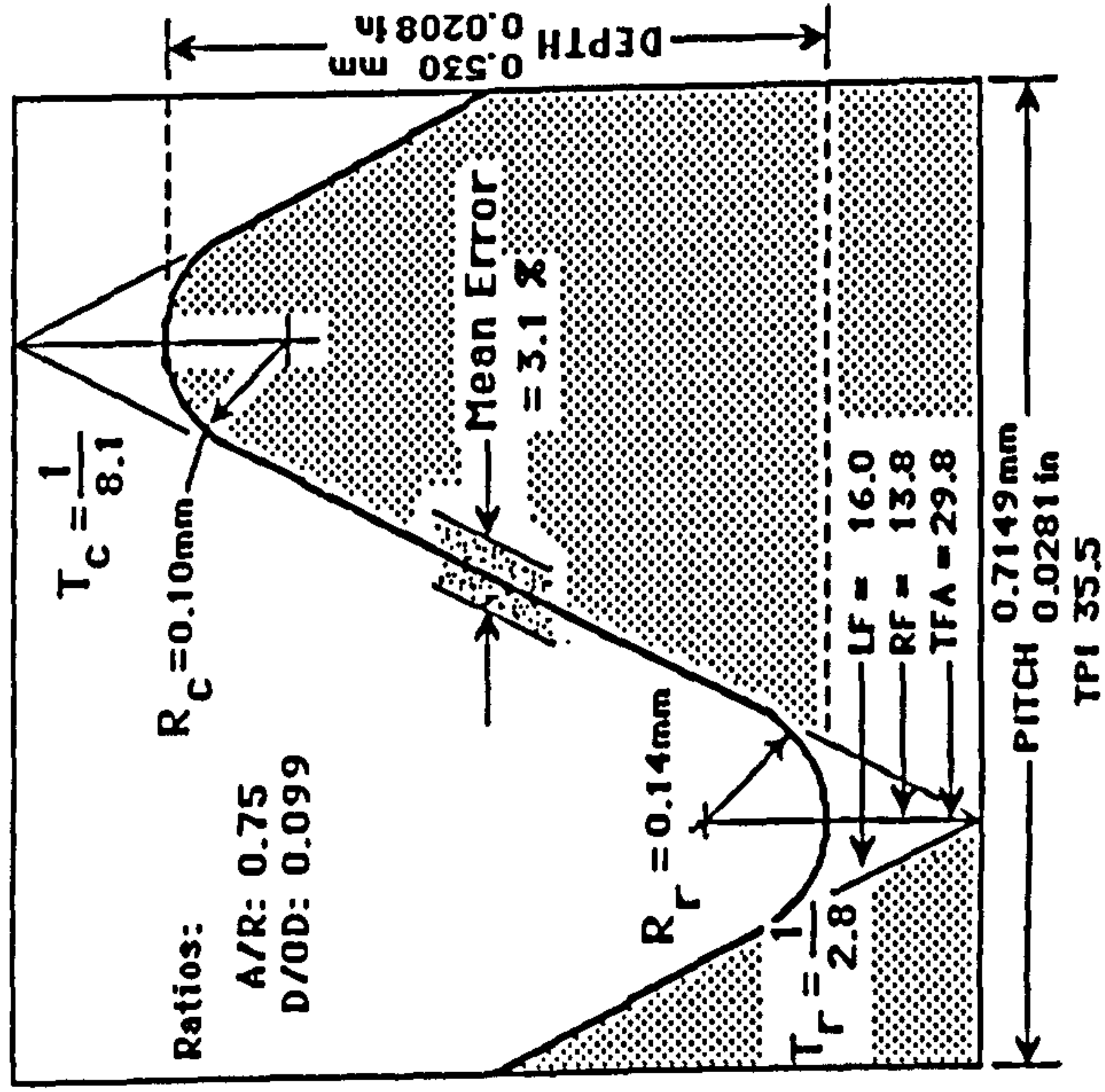
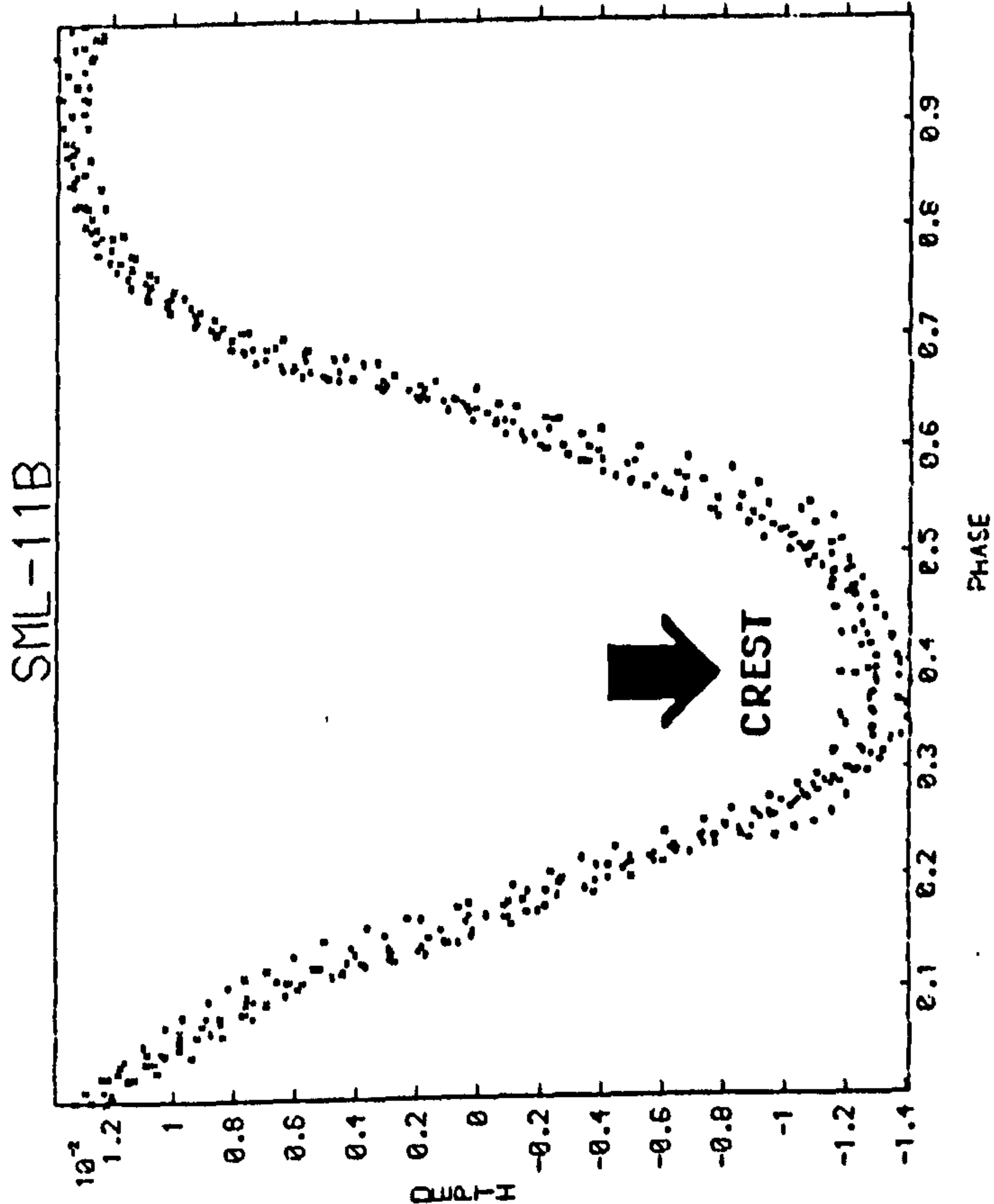
Study Code: SML-11b

Instrument: Altazimuth theodolite

Maker: Thomas Jones

Date: ca.1830

Ser./Acq. No. 1948-128



Mu	Filar	
	Scale	
	Bench	
	Div. Eng.	
	Adjust.	
	Leveling	
	Focus	
	Eye P.	
	Tube	
	Tool	
	Gauge	
	Binding	
	Misc.	



Characteristics:

Screw ☒ Nut ☐

Leng: 0.813"

Diameter: 0.2292"

Steel ☐ Brass ☒

Other:

Instrument Identification:

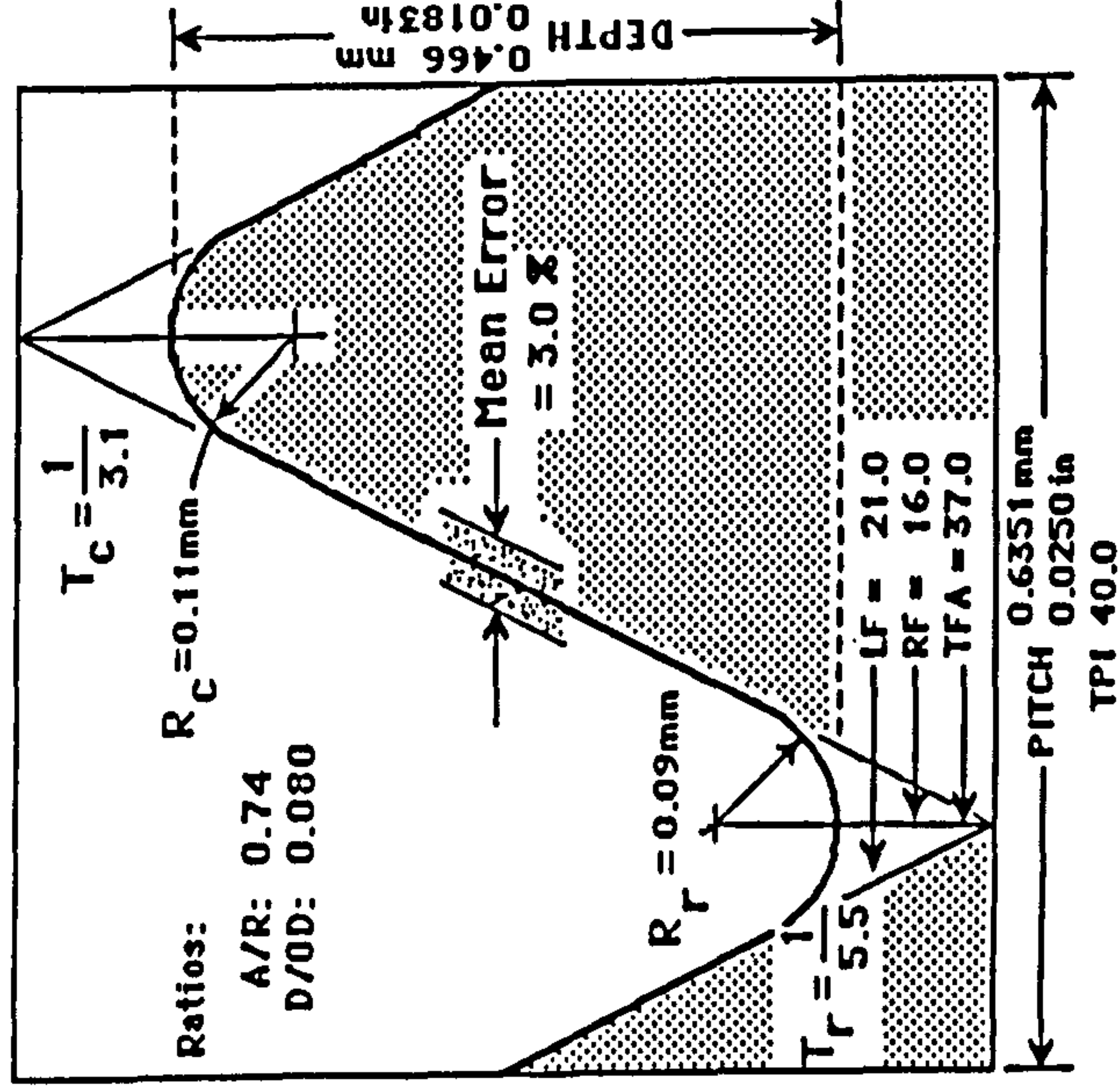
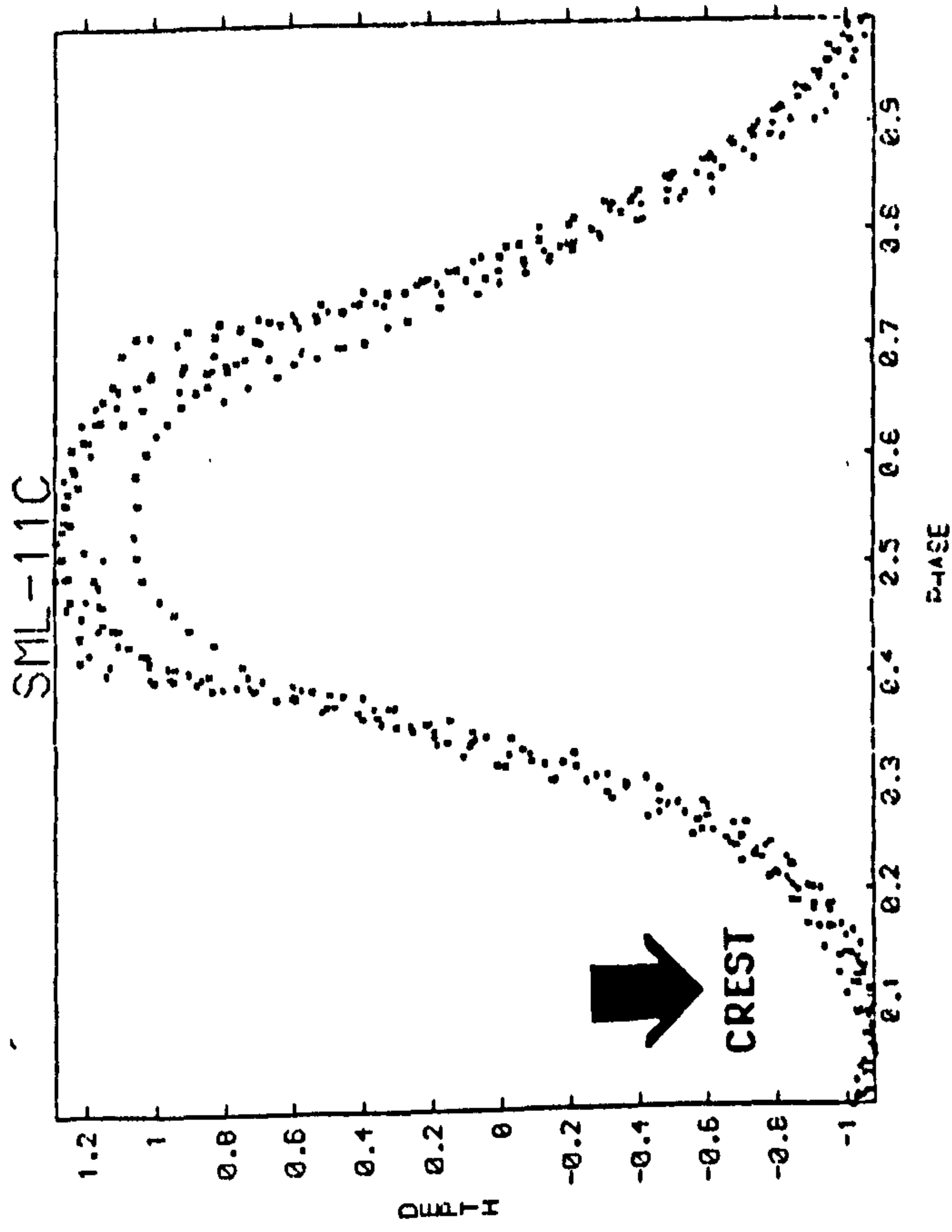
Study Code: SML-11C

Instrument: Altazimuth theodolite

Maker: Thomas Jones

Date: ca.1830

Ser./Acq. No. 1948-128



Mu	[	Filar	
		Scale	
[	]	Bench	
		Div. Eng.	
		Adjust.	
		Leveling	
		Focus	
		Eye P.	
		Tube	
		Tool	
		Gauge	
		Binding	
		Misc.	
		(On base)	



Characteristics:

Screw

Nut

Leng: 1.125"

Diameter: 0.1804"

Steel

Brass

Other:

Instrument Identification:

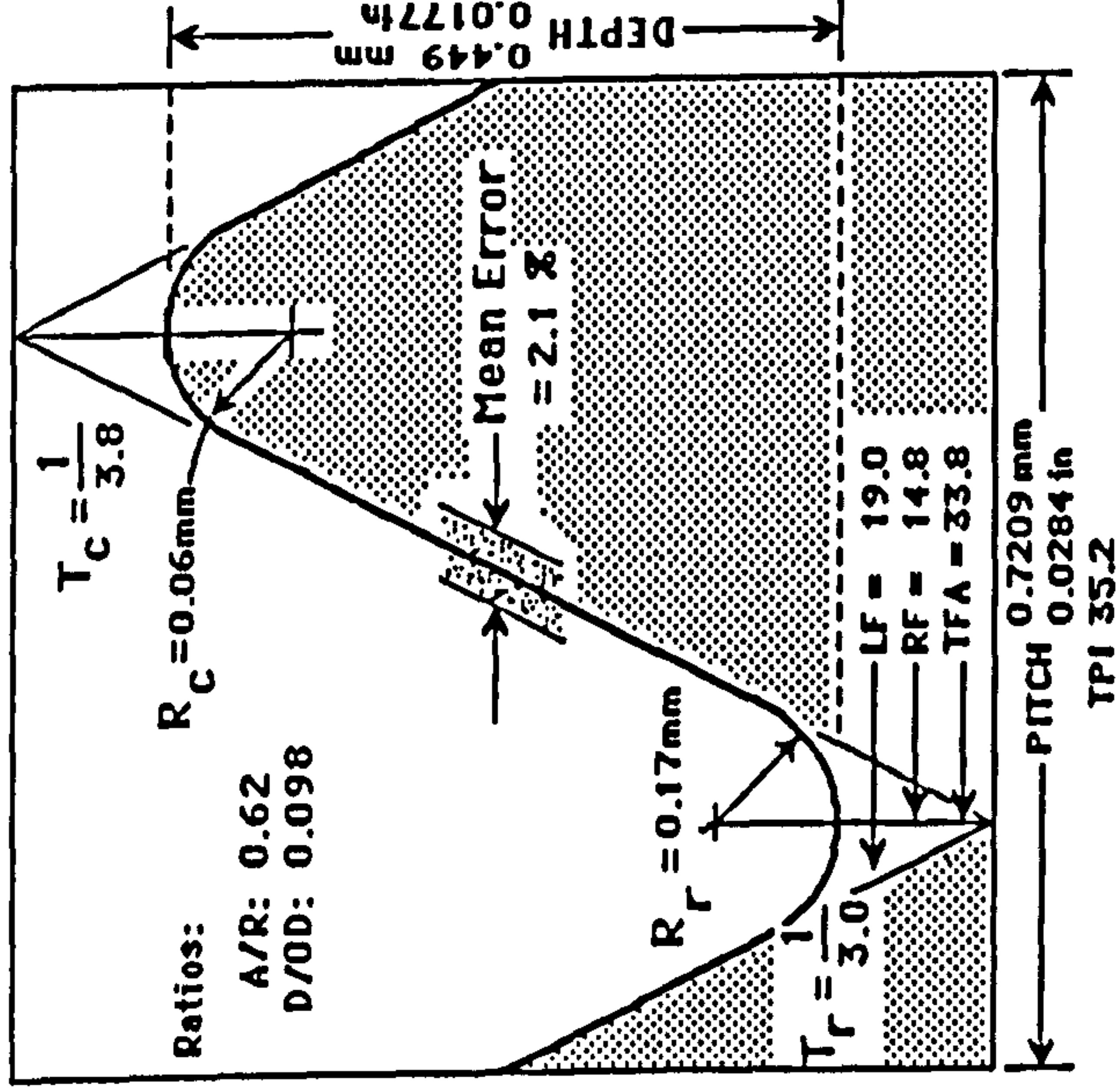
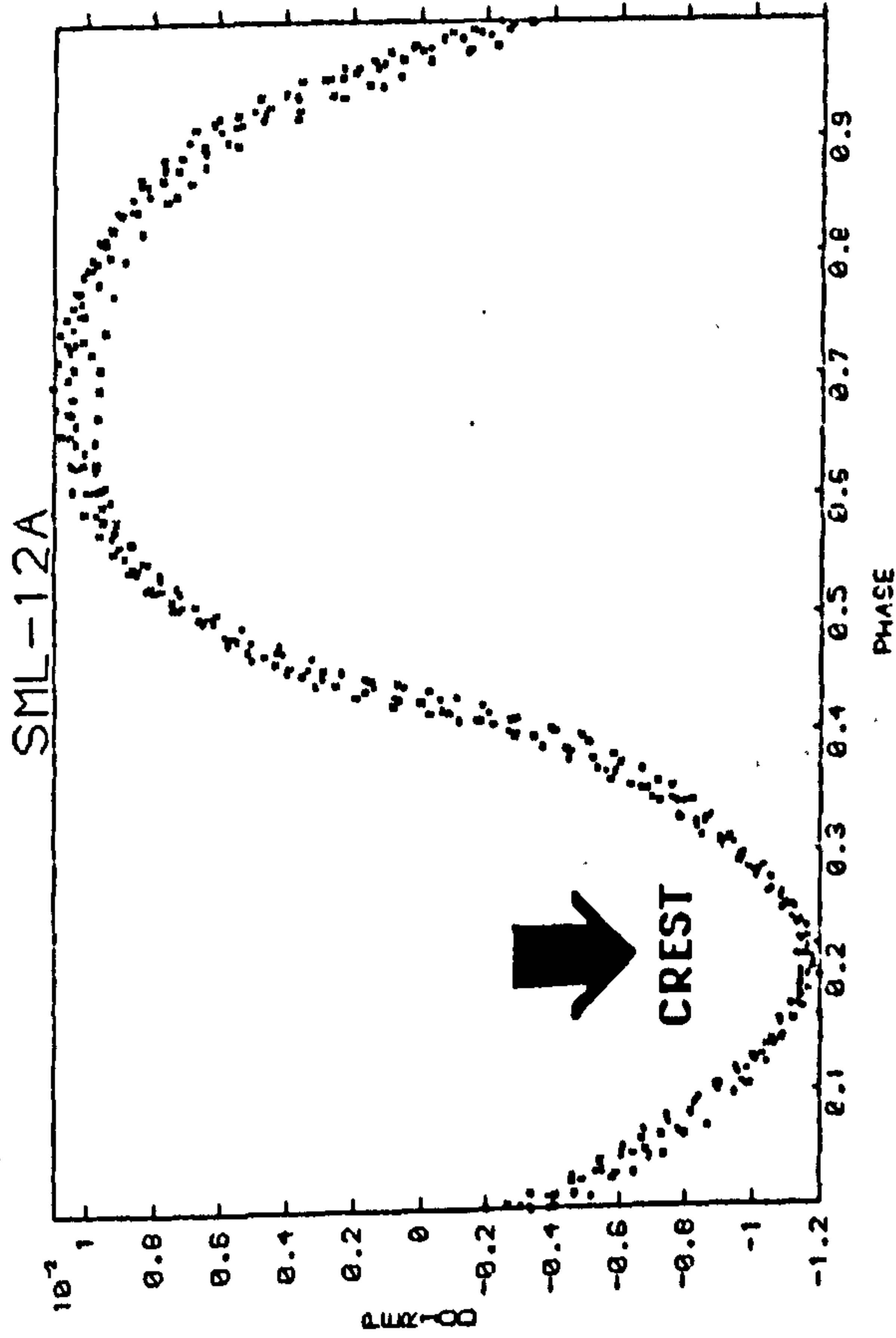
Study Code: SML-12a

Instrument: Transit theodolite

Maker: Thomas Jones

Date: ca.1830

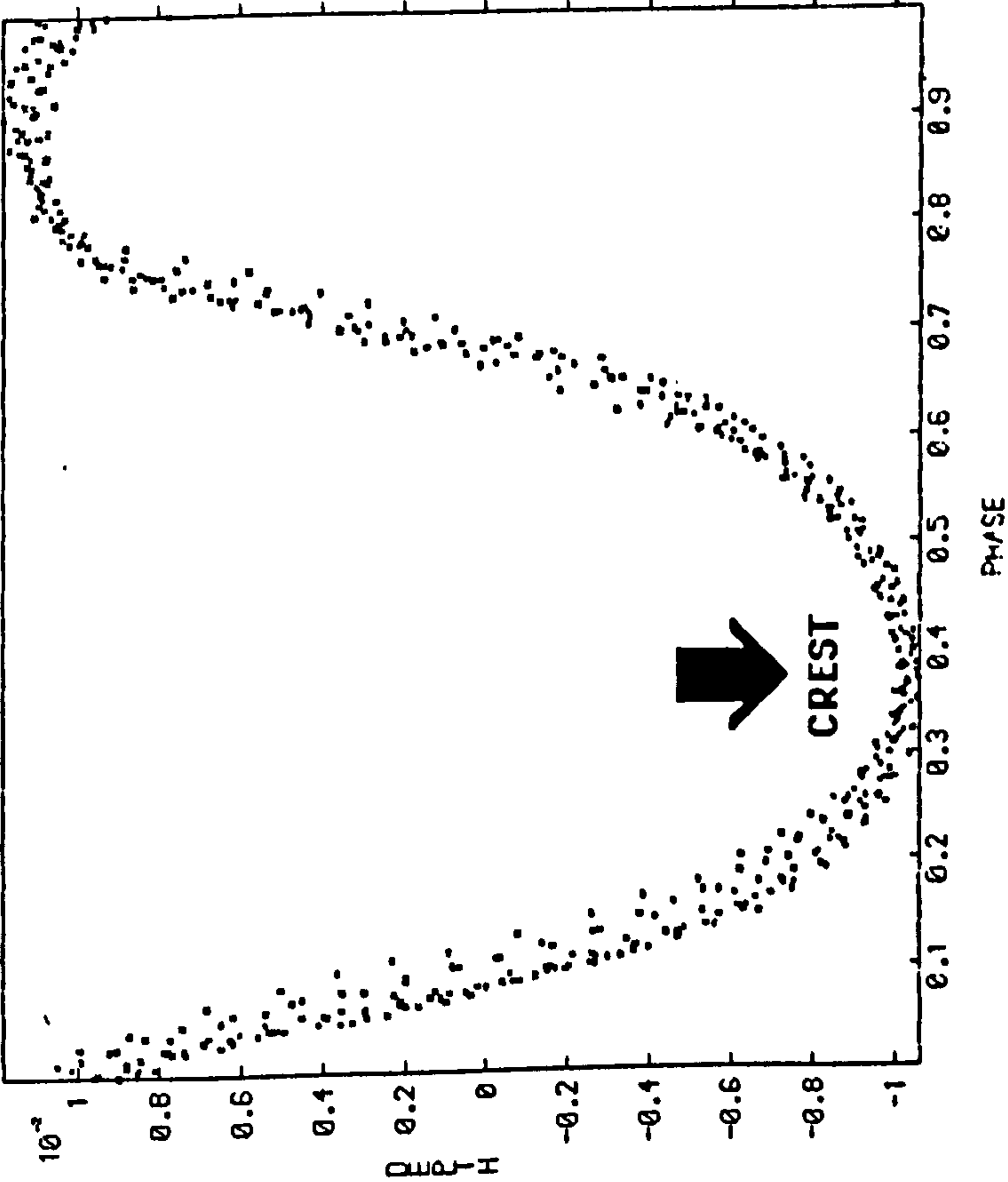
Ser./Acq. No. 1876-1206



Mu	Filar	
	Scale	
	Bench	
	Div. Eng.	
	Adjust.	
	Leveling	
	Focus	
	Eye P.	
	Tube	
	Tool	
	Gauge	
	Binding	
	Misc.	

(Azimuth—coarse)

SML-12B



Characteristics:

Screw ☒ Nut ☐

Leng: 1.25"

Diameter: 0.1447"

Steel ☐ Brass ☒

Other:

Instrument Identification:

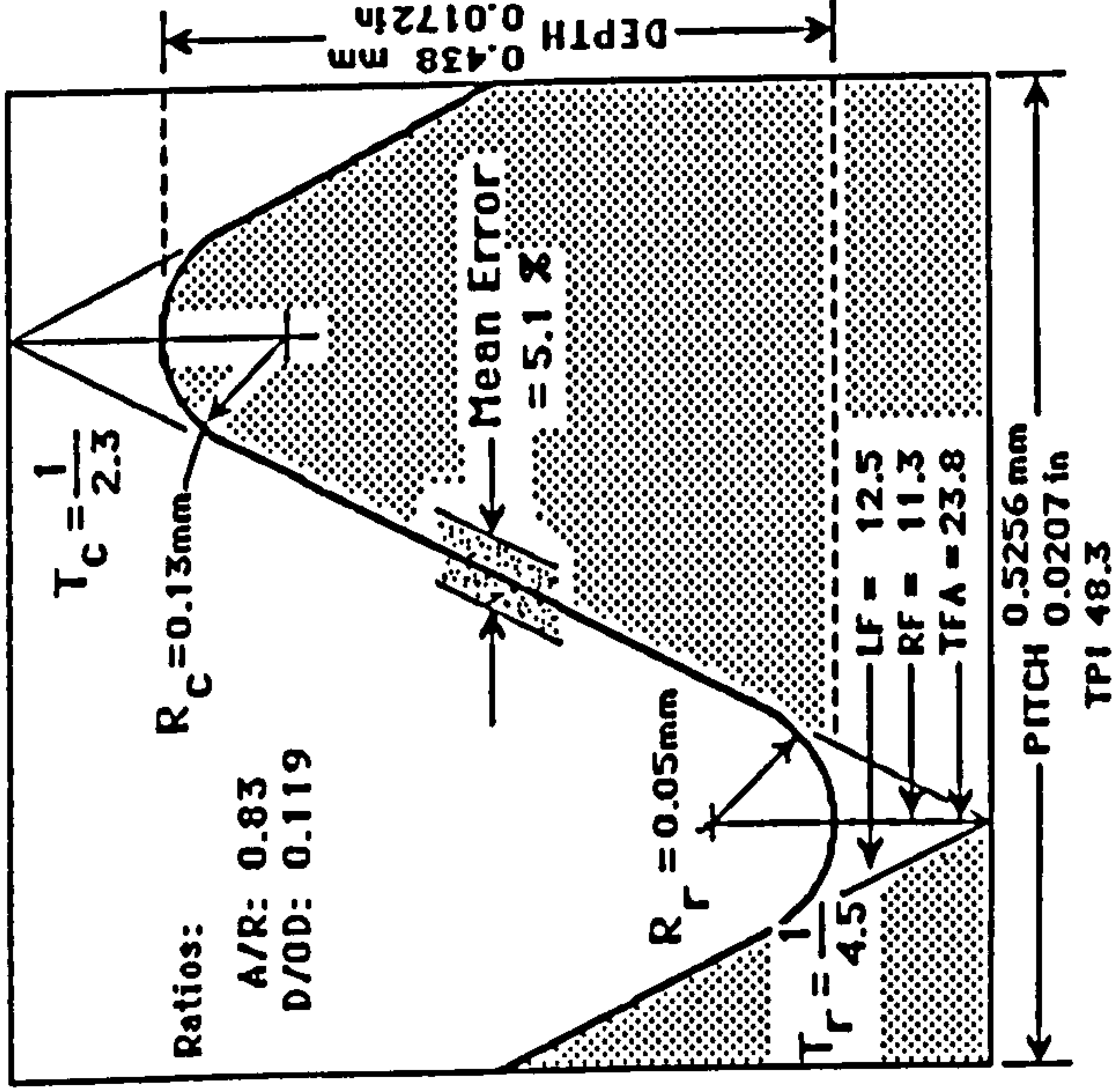
Study Code: SML-12b

Instrument: Transit theodolite

Maker: Thomas Jones

Date: ca.1830

Ser./Acq. No. 1976-1206



Mu	Filar	
	Scale	
Bench	Div. Eng.	
	Adjust.	
Leveling	Focus	
	Eye P.	
Tube	Tool	
	Gauge	
Binding	Misc.	

(Azimuth—fine)

Characteristics:

Screw

Nut

Leng: 1.813"

Diameter: 0.1870"

Steel

Brass

Other:

Instrument Identification:

Study Code: SML-13b

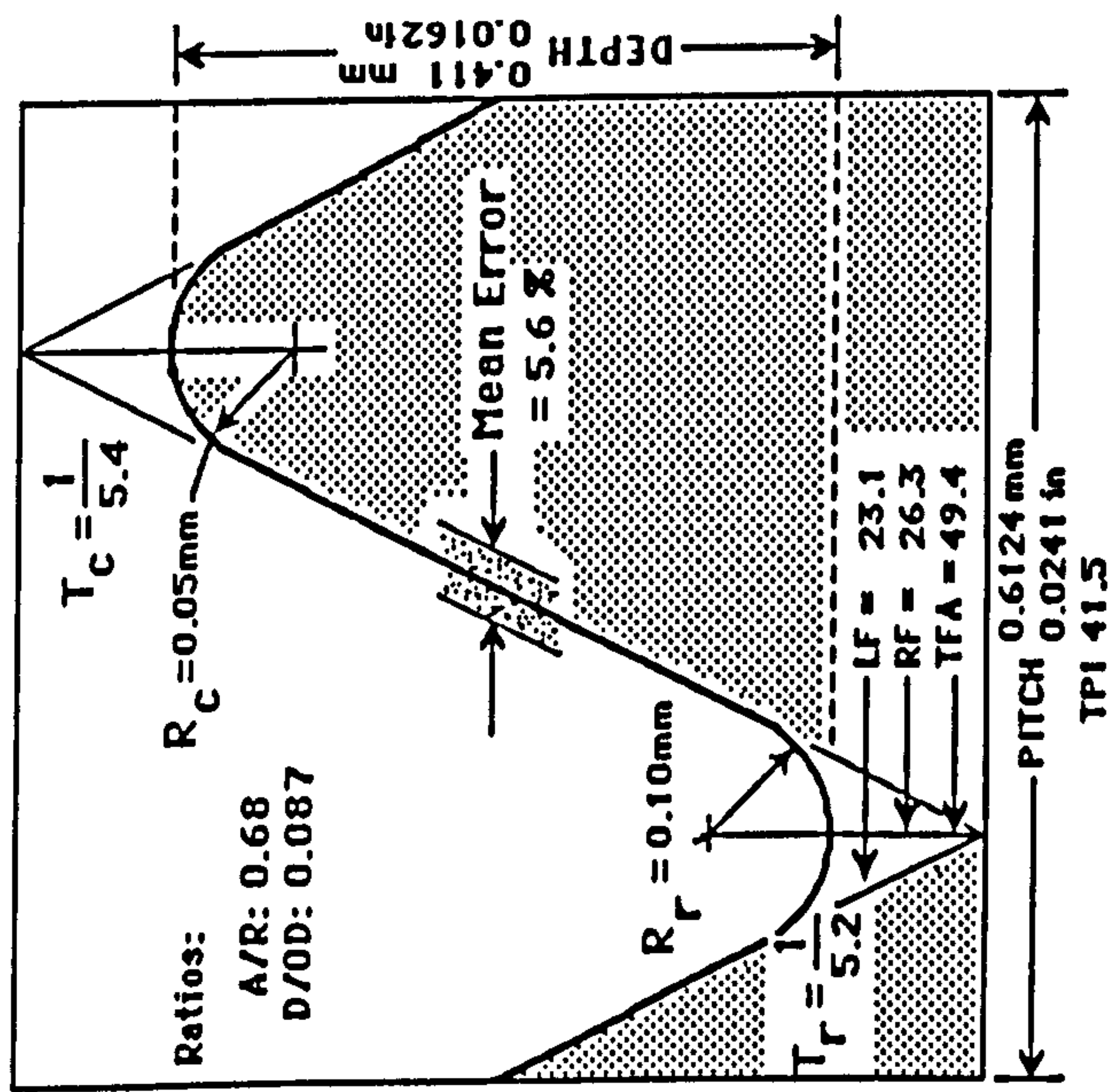
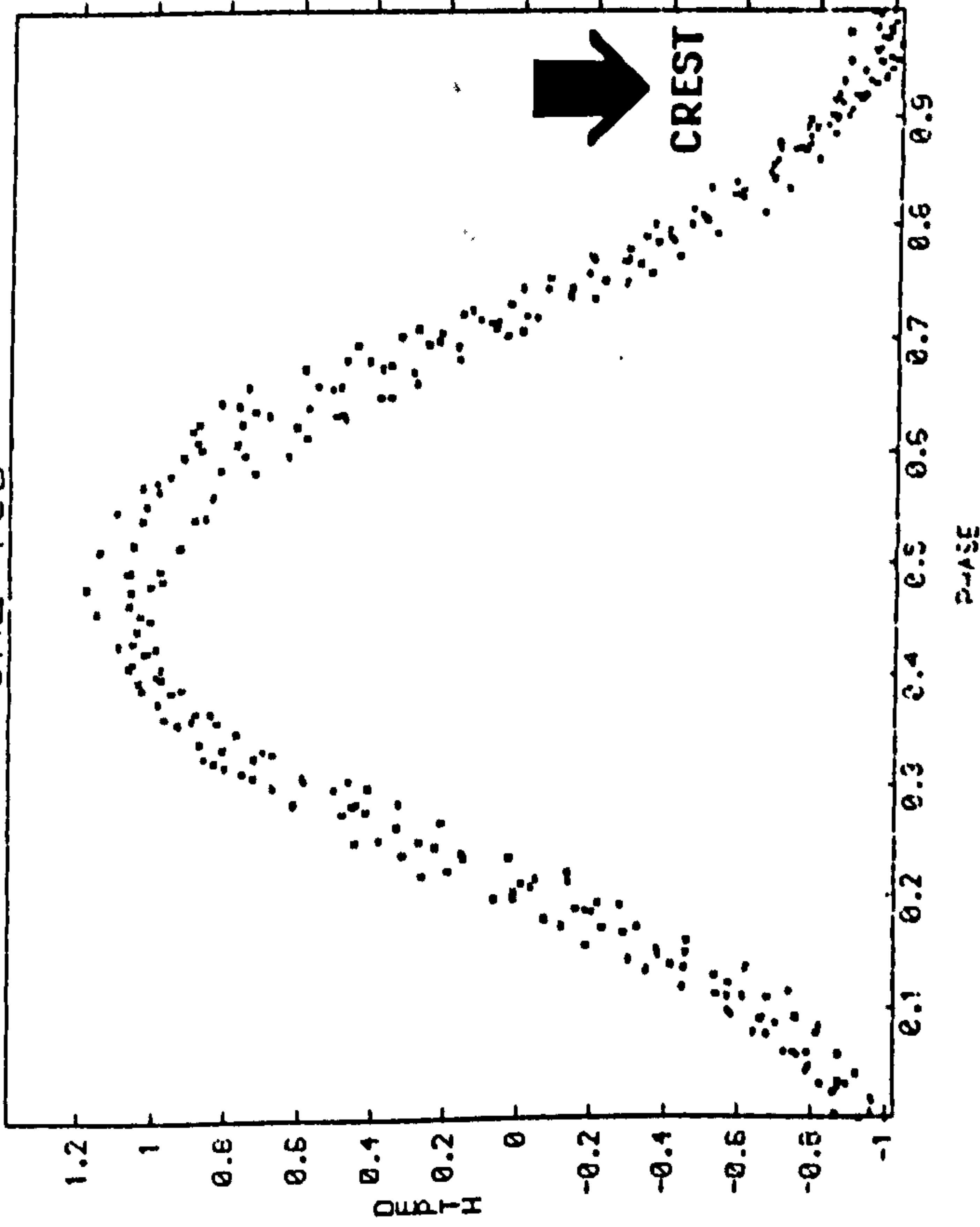
Instrument: Geodetic theodolite

Maker: Ramsden

Date: 1790

Ser./Acq. No. 1876-1206

SML-13B



Mu

Filar

Scale

Bench

Div. Eng.

Adjust.

Leveling

Focus

Eye P.

Tube

Tool

Gauge

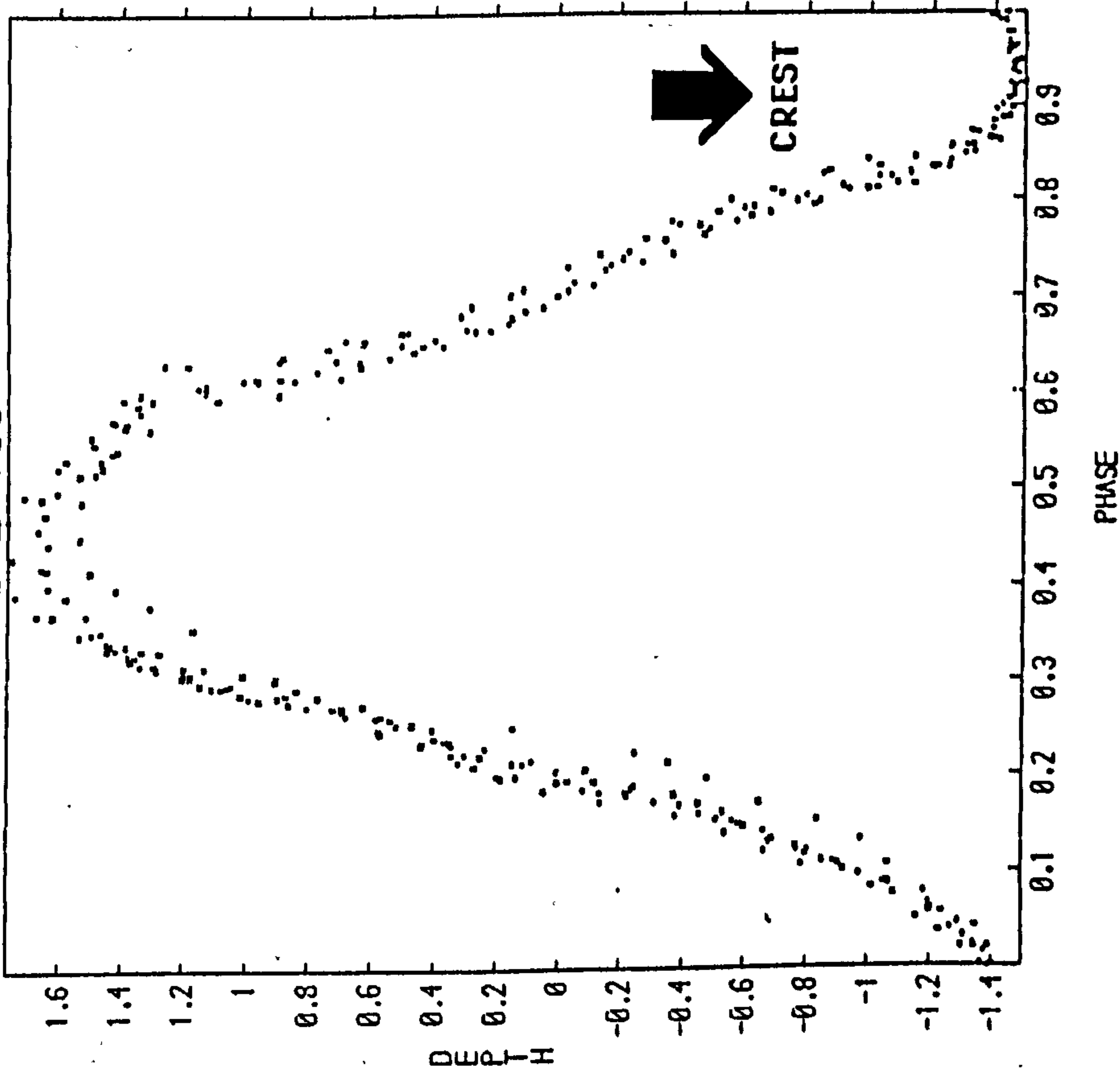
Binding

Misc.

(vernier—left)



SML-13C



Characteristics:

Screw ☒ Nut ☐

Leng: 1.188"

Diameter: 0.1850"

Steel ☐ Brass ☒

Other:

Instrument Identification:

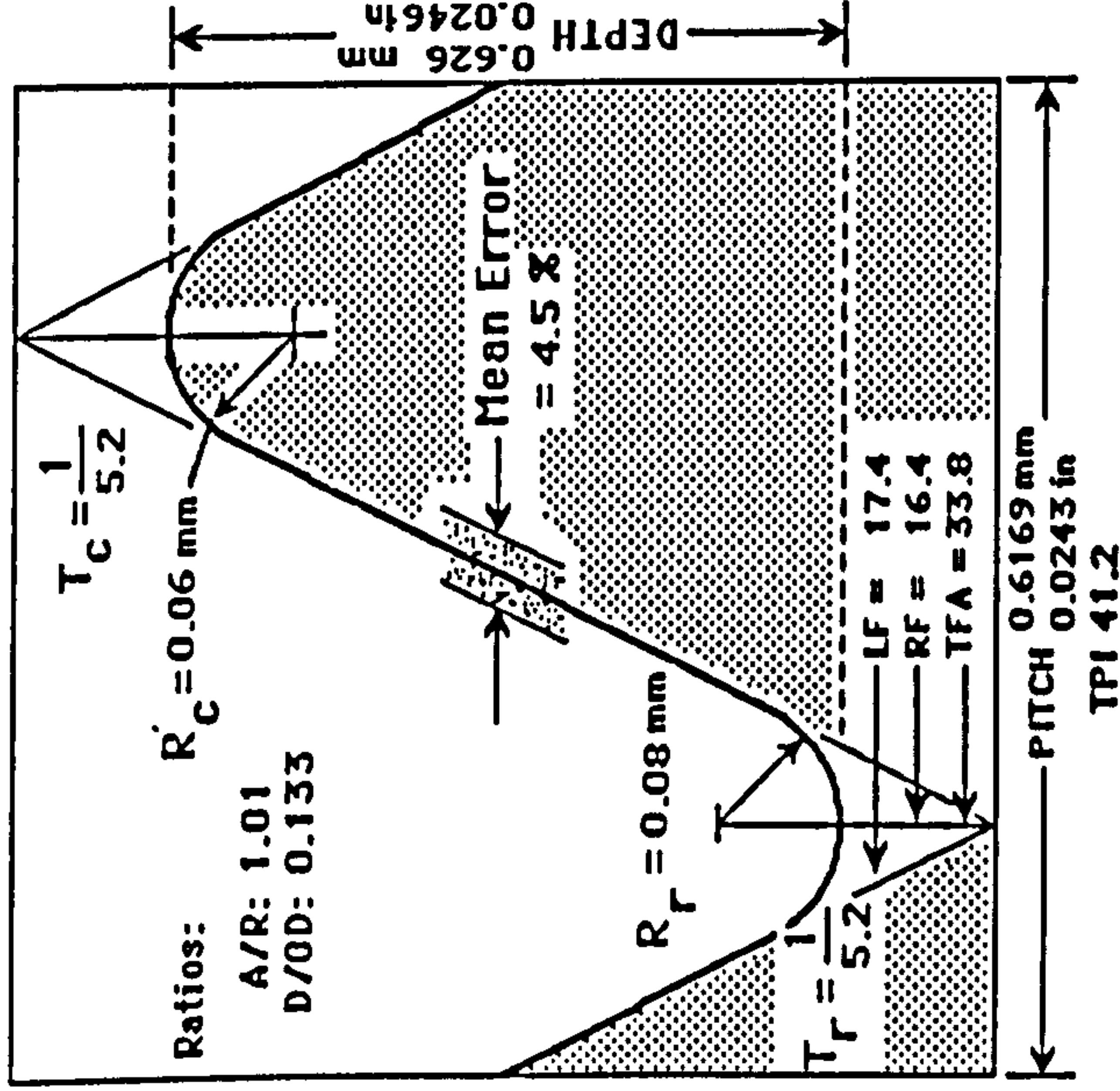
Study Code: SML-13c

Instrument: Geodetic theodolite

Maker: Ramsden

Date: 1 18th c

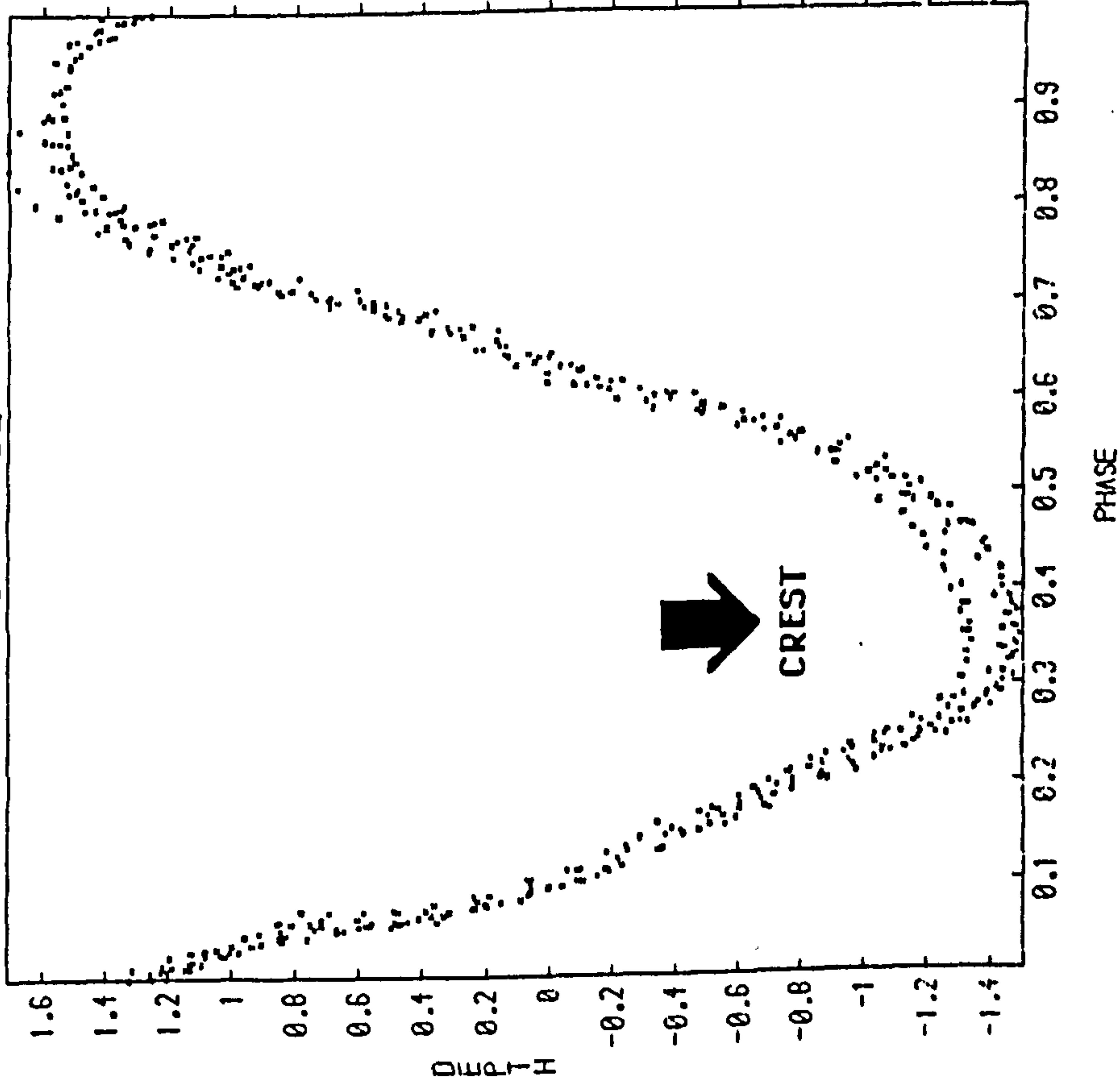
Ser./Acq. No. 1981-111



Mu	[	Filar	
		Scale	
[	]	Bench	
		Div. Eng.	
[	]	Adjust.	
		Leveling	
[	]	Focus	
		Eye P.	
[	]	Tube	
		Tool	
[	]	Gauge	
		Binding	
[	]	Misc.	



# SML-13D

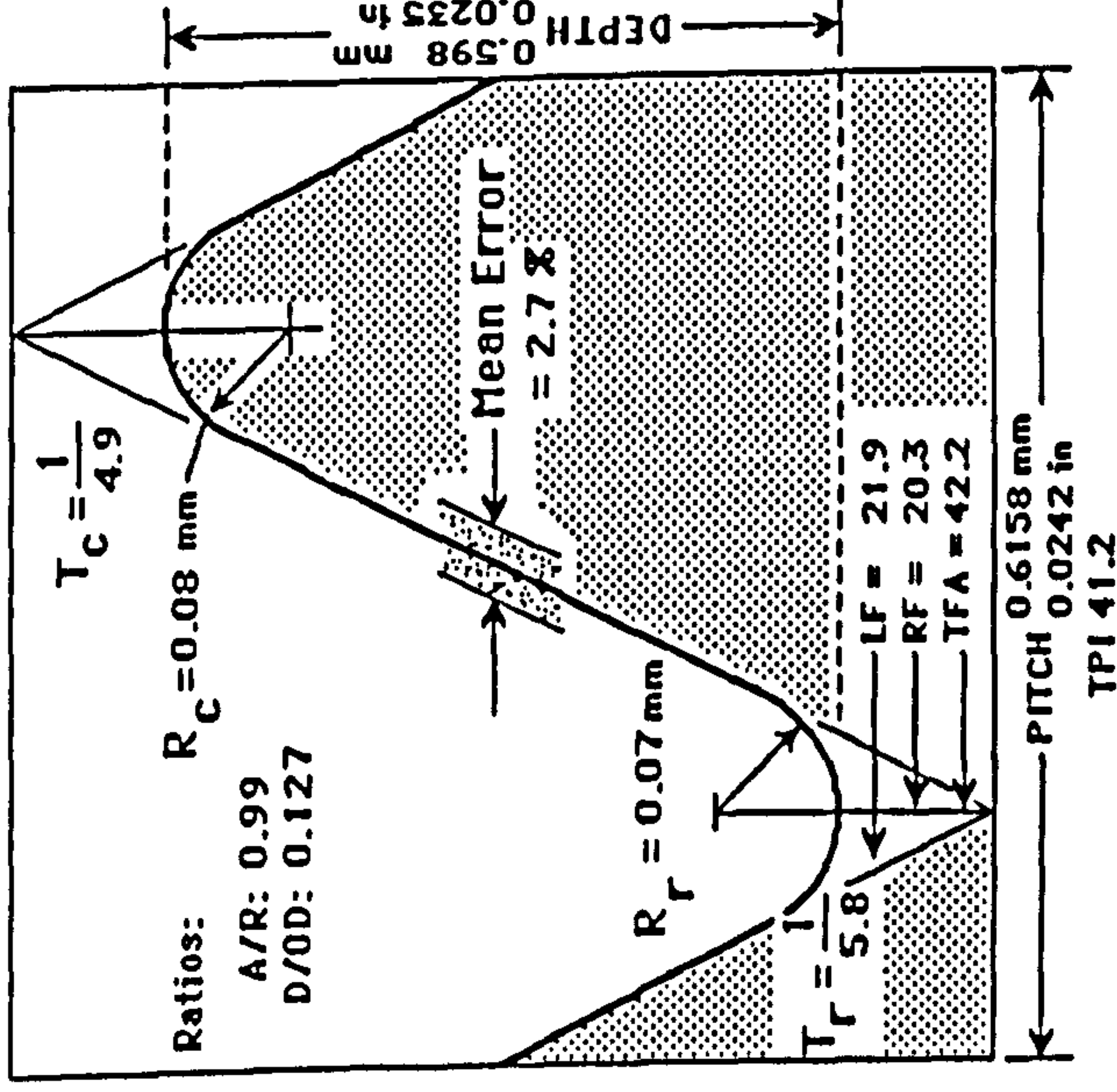


## Characteristics:

Screw ☒ Nut ☐  
 Leng: 1.188"  
 Diameter: 0.1849"  
 Steel ☐ Brass ☒  
 Other:

## Instrument Identification:

Study Code: SML-13d  
 Instrument: Geodetic theodolite  
 Maker: Ramsden  
 Date: 1 19th c  
 Ser./Acq. No. 1981-111



Mu — [ Filar Scale Bench Div. Eng. Adjust. Leveling Focus Eye P. Tube Tool Gauge Binding Misc.

Characteristics:

Screw ☒ Nut ☐

Leng: 2.313"

Diameter: 0.1825"

Steel ☐ Brass ☒

Other:

Instrument Identification:

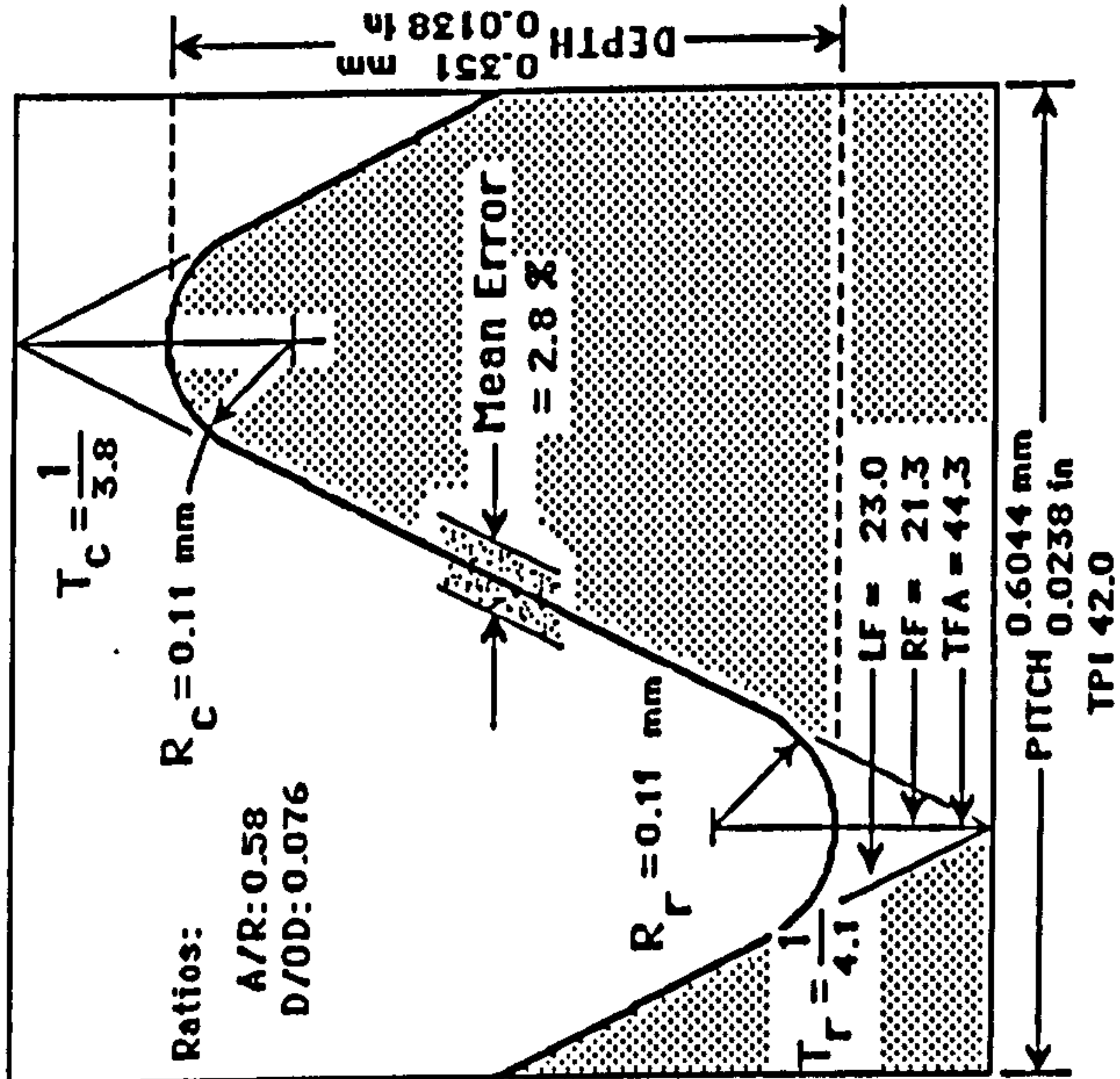
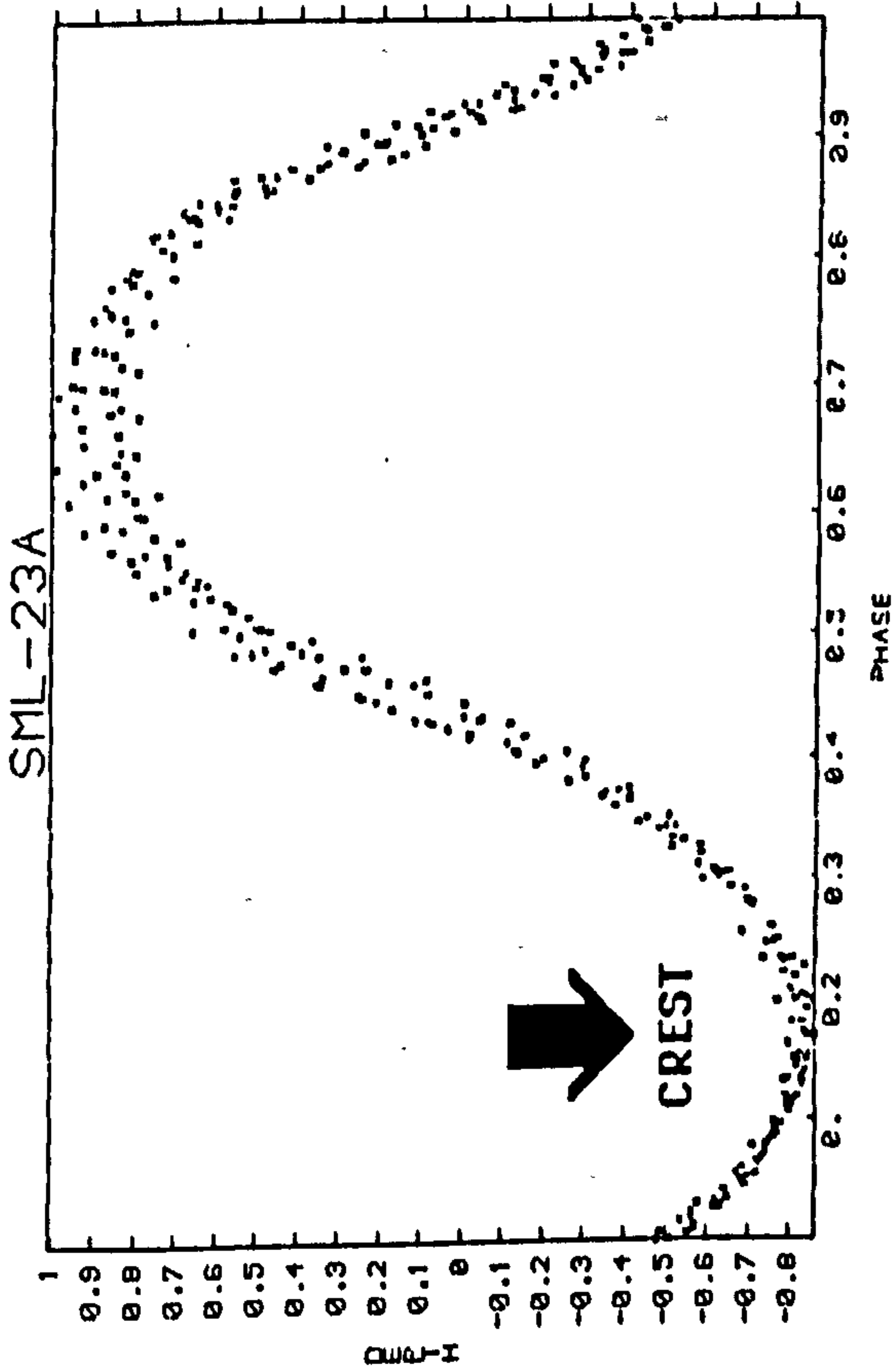
Study Code: SML-23a

Instrument: Portable Quadrant

Maker: Peter Dollond

Date: ca.1767

Ser./Acq. No. 1911-214



Mu	—	Filar	
		Scale	
—	—	Bench	
		Div. Eng.	
—	—	Adjust.	
		Leveling	
—	—	Focus	
		Eye P.	
—	—	Tube	
		Tool	
—	—	Gauge	
		Binding	
—	—	Misc.	

Used in survey of Quebec  
by Samuel Holland

Characteristics:

Screw

Nut

Leng:1.5" / 0.375"

Diameter: 0.156"

Steel

Brass

Other:

Instrument Identification:

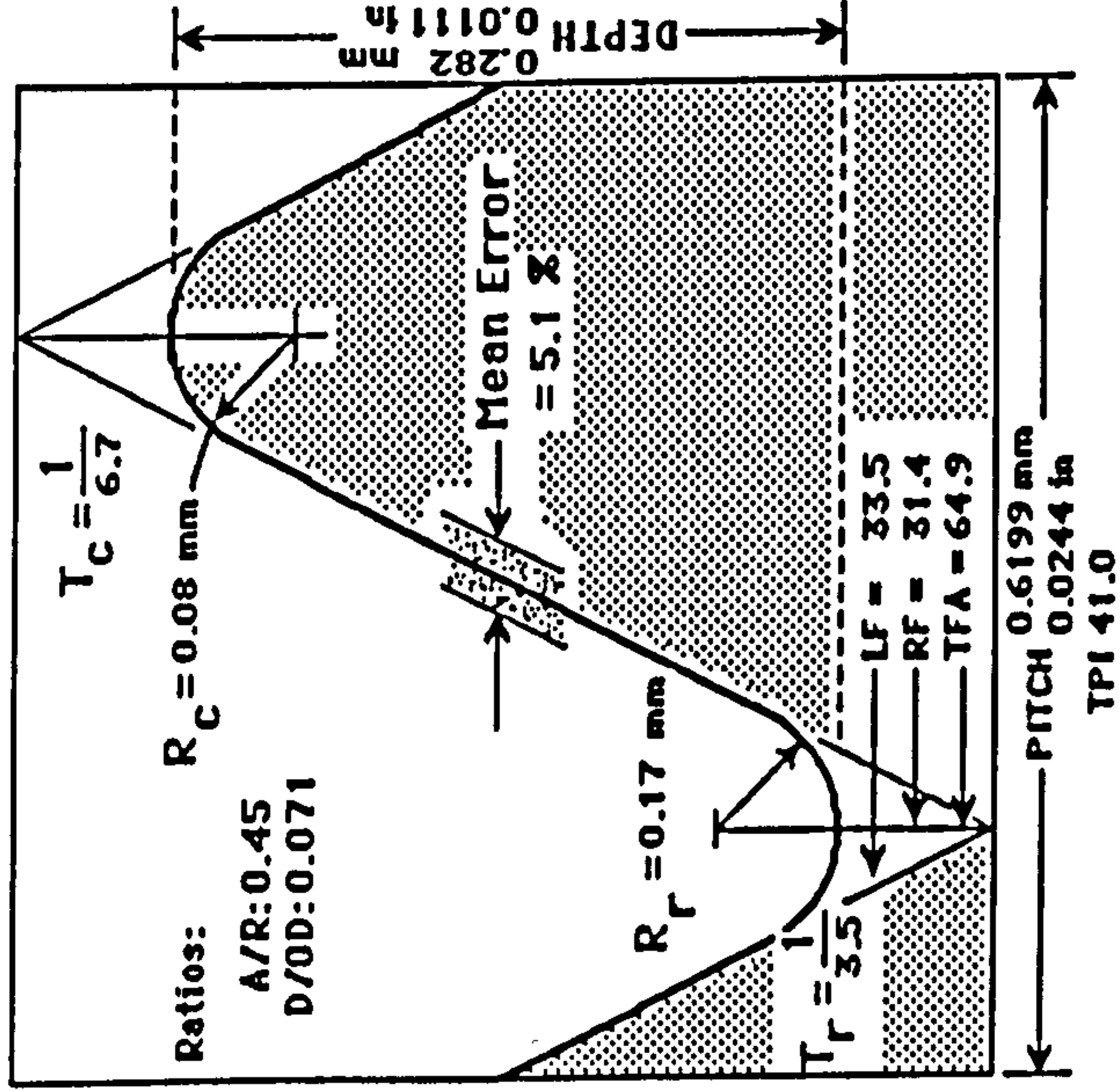
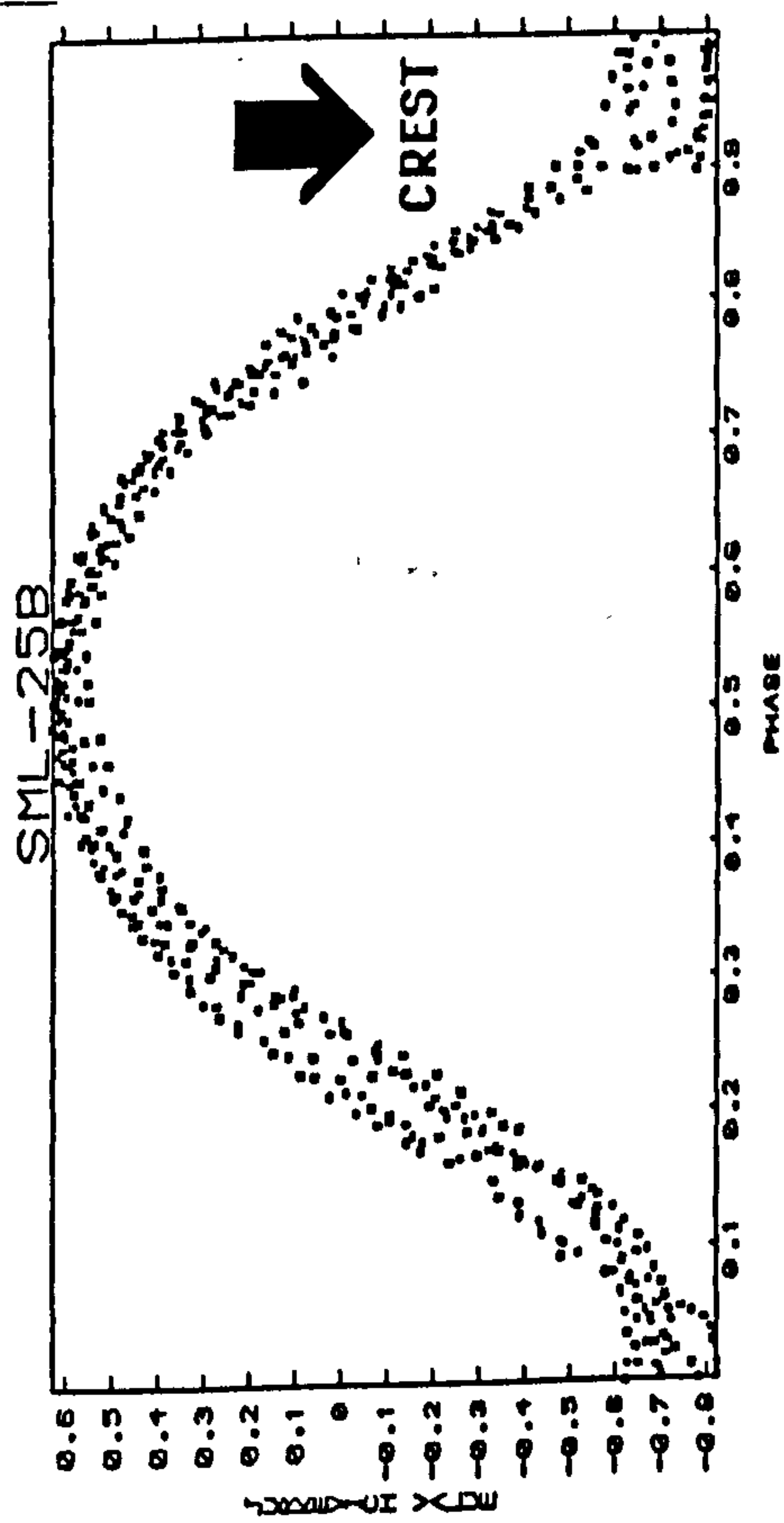
Study Code: SML-25b

Instrument: Portable Quadrant

Maker: John Bird

Date: ca.1767

Ser./Acq. No. SML 1900-138

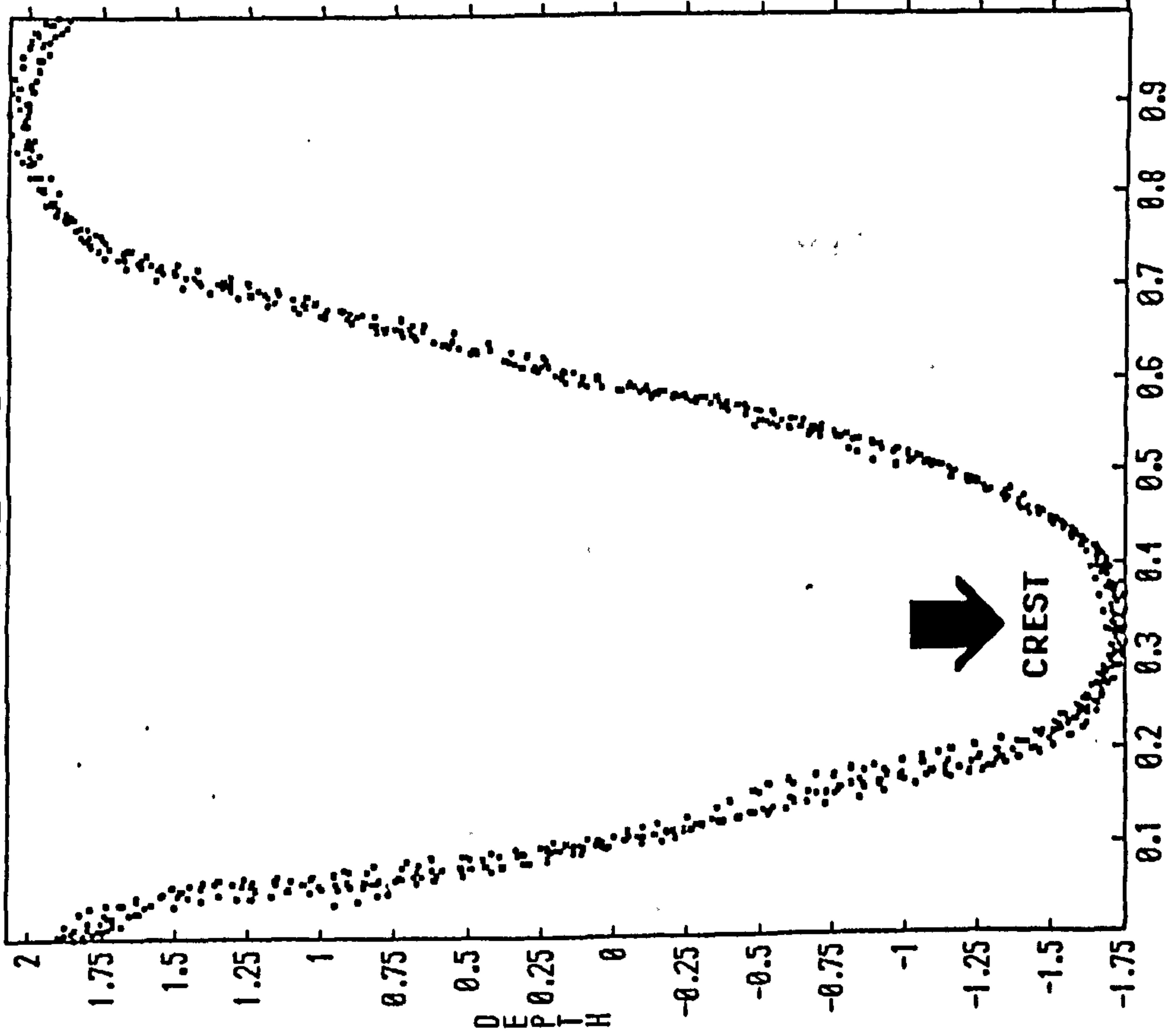


MU	Filar
	Scale
	Bench
	Div. Eng.
	Adjust.
	Leveling
	Focus
	Eye P.
	Tube
	Tool
	Gauge
	Binding
	Misc.

Formally property of  
Royal Society (RS #63)  
(see also SML-C092)



SML-34B



PHASE

Characteristics:

Screw ☒ Nut ☐

Leng: 2.875" / 1.063"

Diameter: 0.3115"

Steel ☒ Brass ☐

Other:

Instrument Identification:

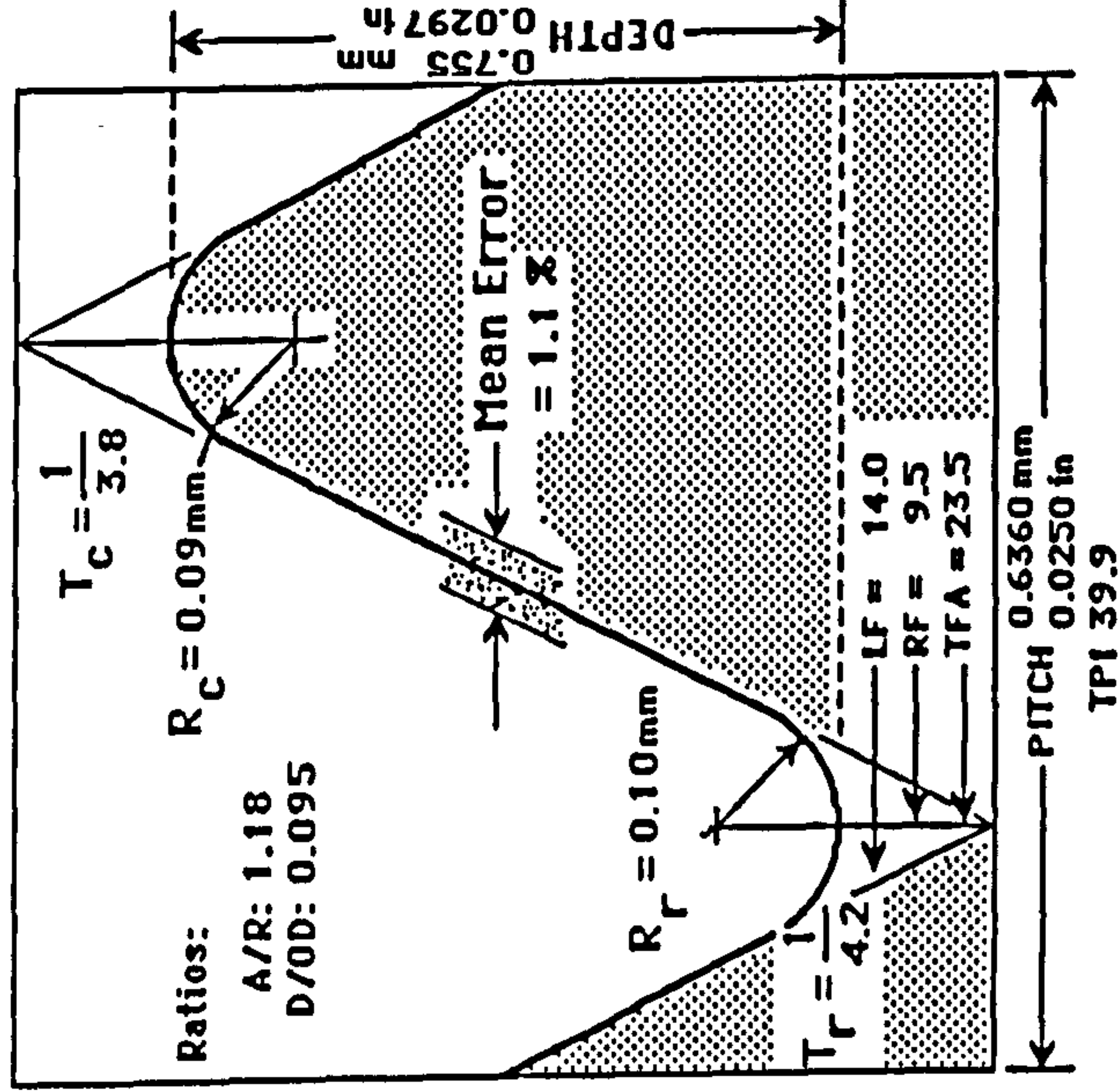
Study Code: SML-34b

Instrument: Ruling Engine

Maker: John Barton

Date: ca.1820

Ser./Acq. No. 1926-32



Mu	Filar
	Scale
	Bench
	Div. Eng.
	Adjust.
	Leveling
	Focus
	Eye P.
	Tube
	Tool
	Gauge
	Binding
	Misc.

(Cross slide screw)



Characteristics:

Screw

Nut

Leng: 0.75"

Diameter: 0.1411"

Steel

Brass

Other:

Instrument Identification:

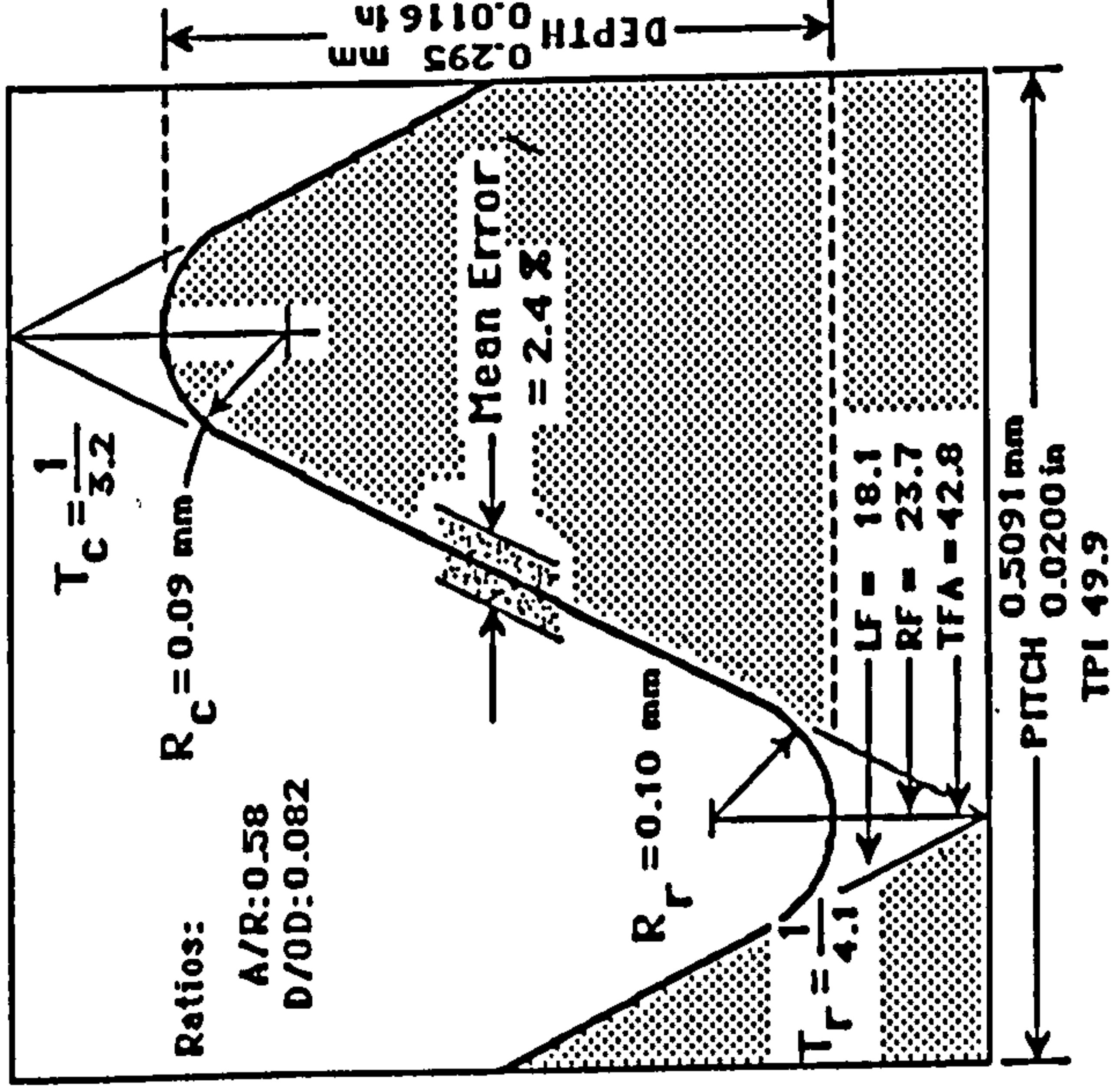
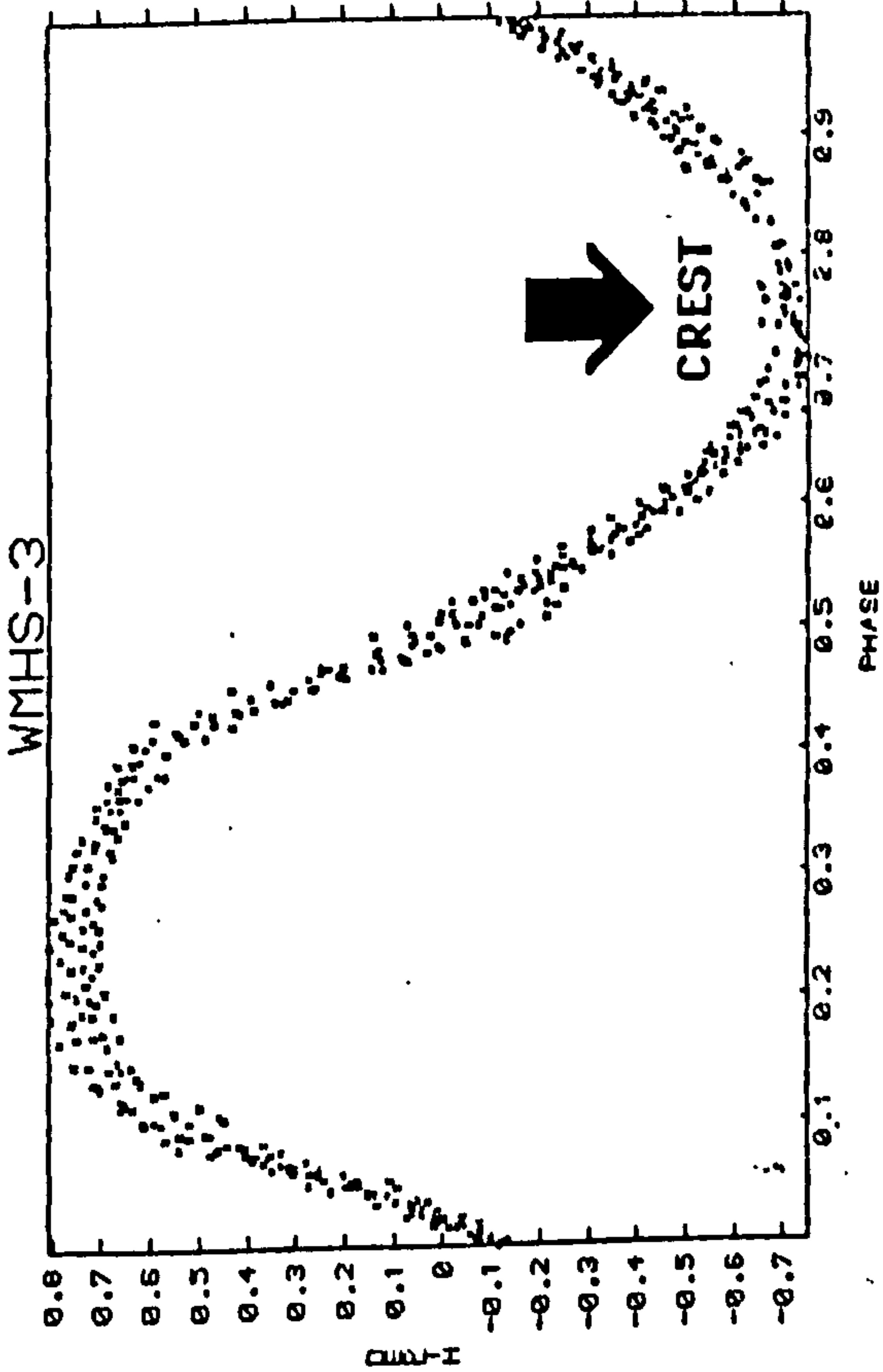
Study Code: WMHS-3

Instrument: Sextant

Maker: Ramsden

Date: ca. 1790

Ser./Acq. No. 2122



Mu

Filar

Scale

Bench

Div. Eng.

Adjust.

Leveling

Focus

Eye P.

Tube

Tool

Gauge

Binding

Misc.

Characteristics:

Screw

Nut

Leng: 0.938" / 0.25"

Diameter: 0.1511"

Steel

Brass

Other:

Instrument Identification:

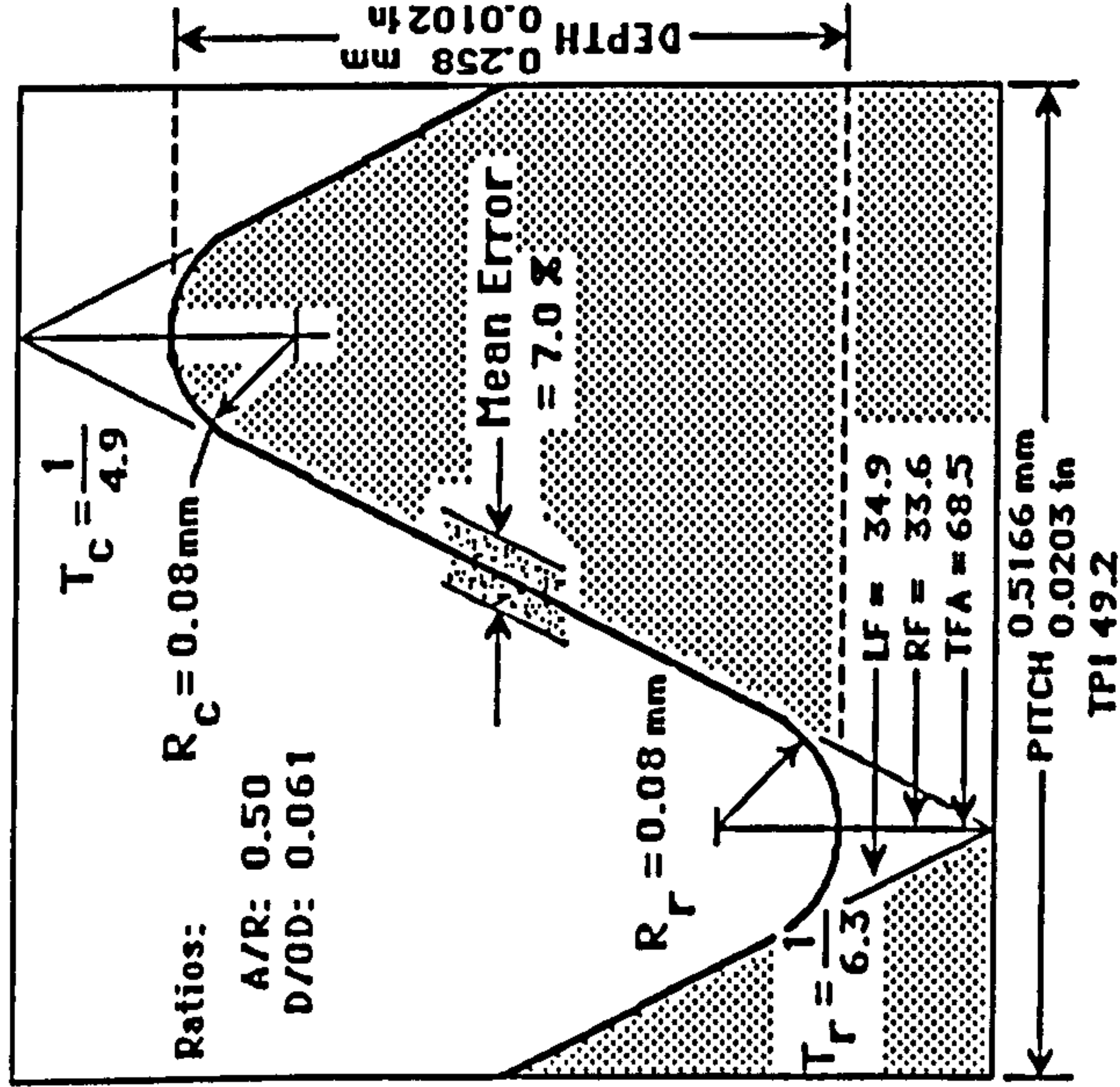
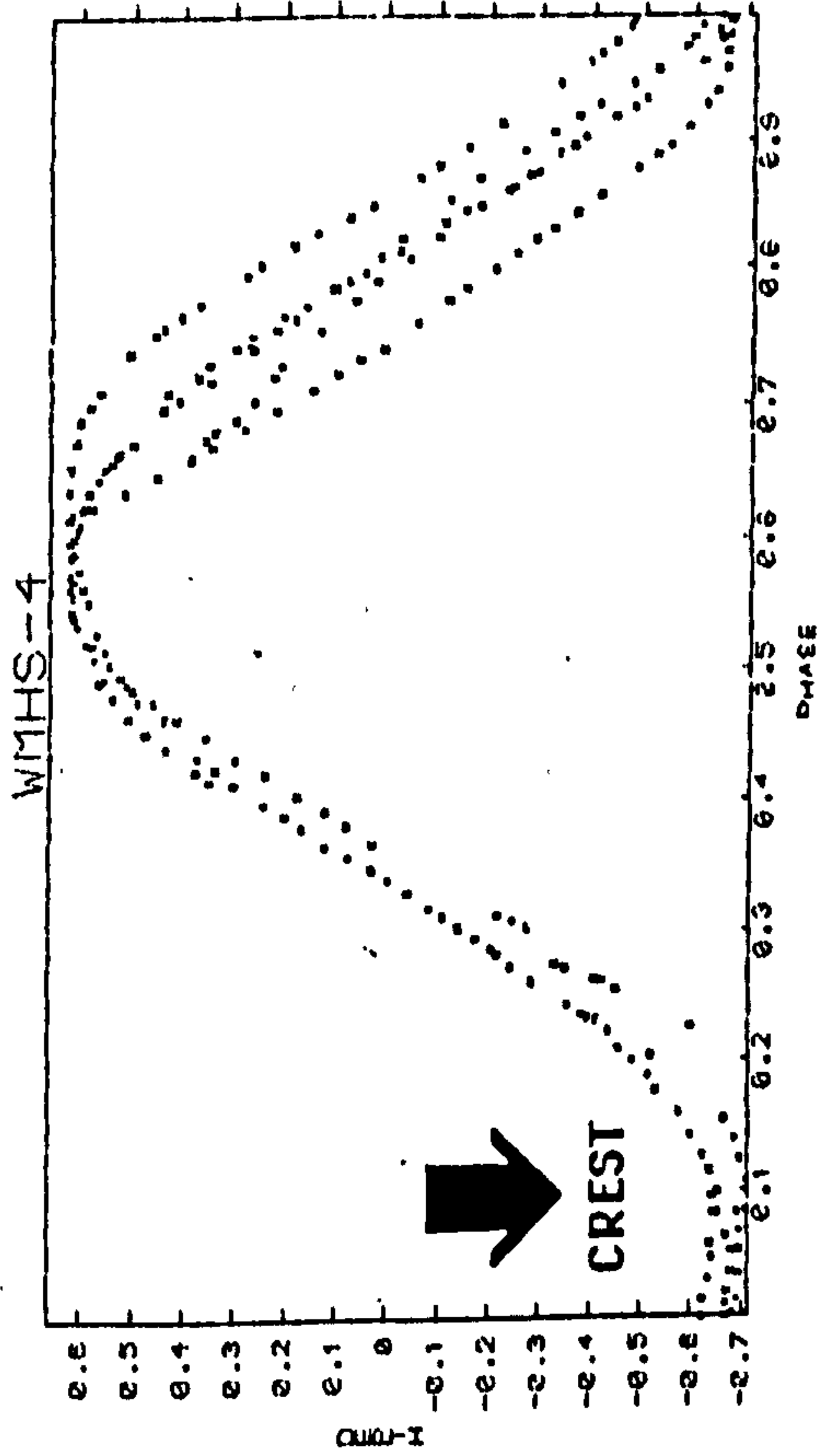
Study Code: WMHS-4

Instrument: Universal instrument

Maker: Utzschneider & Fraunhofer

Date: ca.1825

Ser./Acq. No. 2172



	Filar
	Scale
	Bench
	Div. Eng.
	Adjust.
	Leveling
	Focus
	Eye P.
	Tube
	Tool
	Gauge
	Binding
	Misc.

Characteristics:

Screw ☒ Nut ☐

Leng: 0.875" / 0.375"

Diameter: 0.1372"

Steel ☒ Brass ☐

Other: ☐

Instrument Identification:

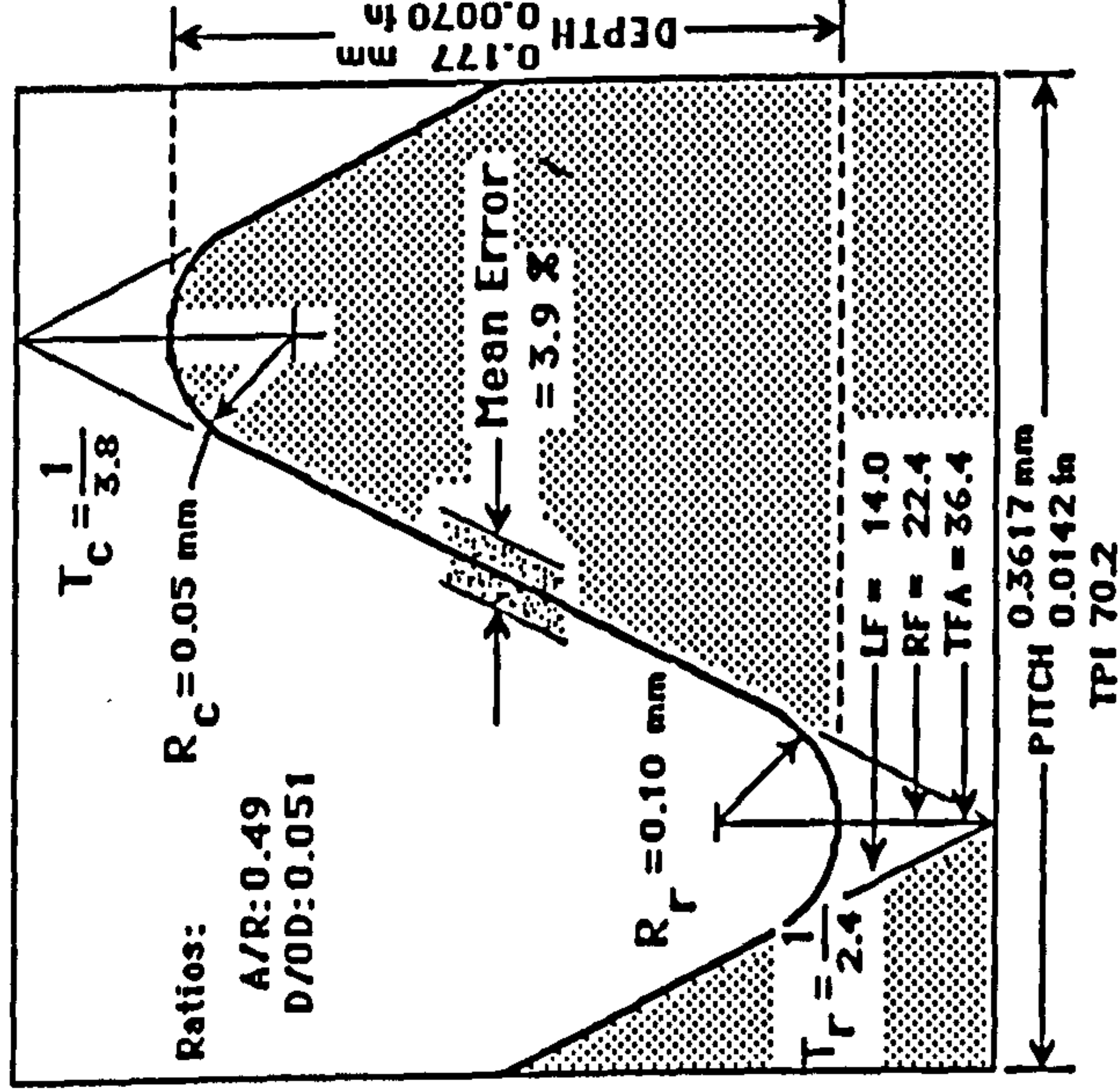
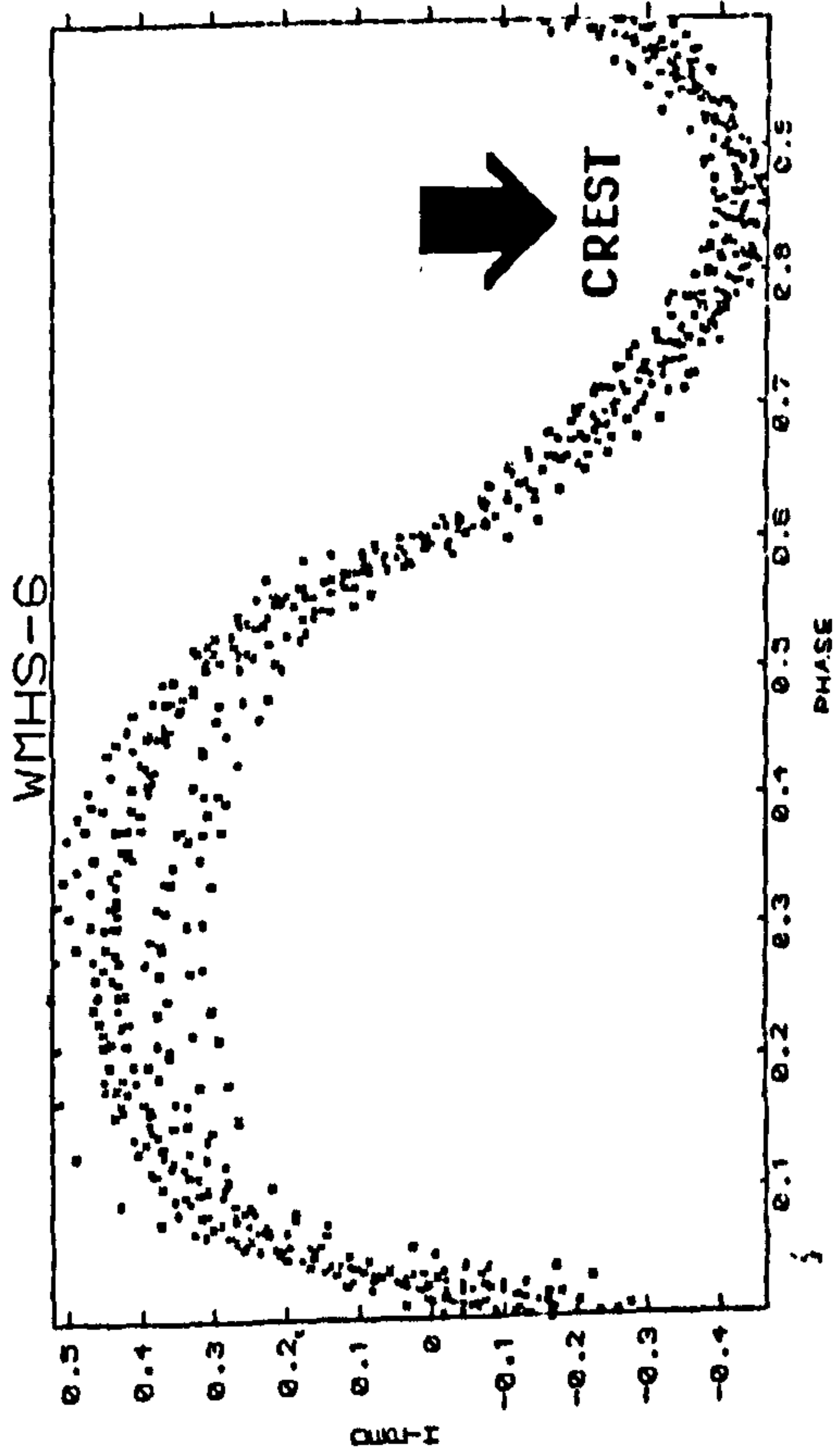
Study Code: WMHS-6

Instrument: Azimuth Instrument

Maker: Ertel & Sohn

Date: ca.1840

Ser./Acq. No. 2135



Mu

Filar

Scale

Bench

Div. Eng.

Adjust.

Leveling

Focus

Eye P.

Tube

Tool

Gauge

Binding

Misc.

On vertical axis



Characteristics:

Screw

Nut

Leng: 0.875"

Diameter: 0.3519"

Steel

Brass

Other:

Instrument Identification:

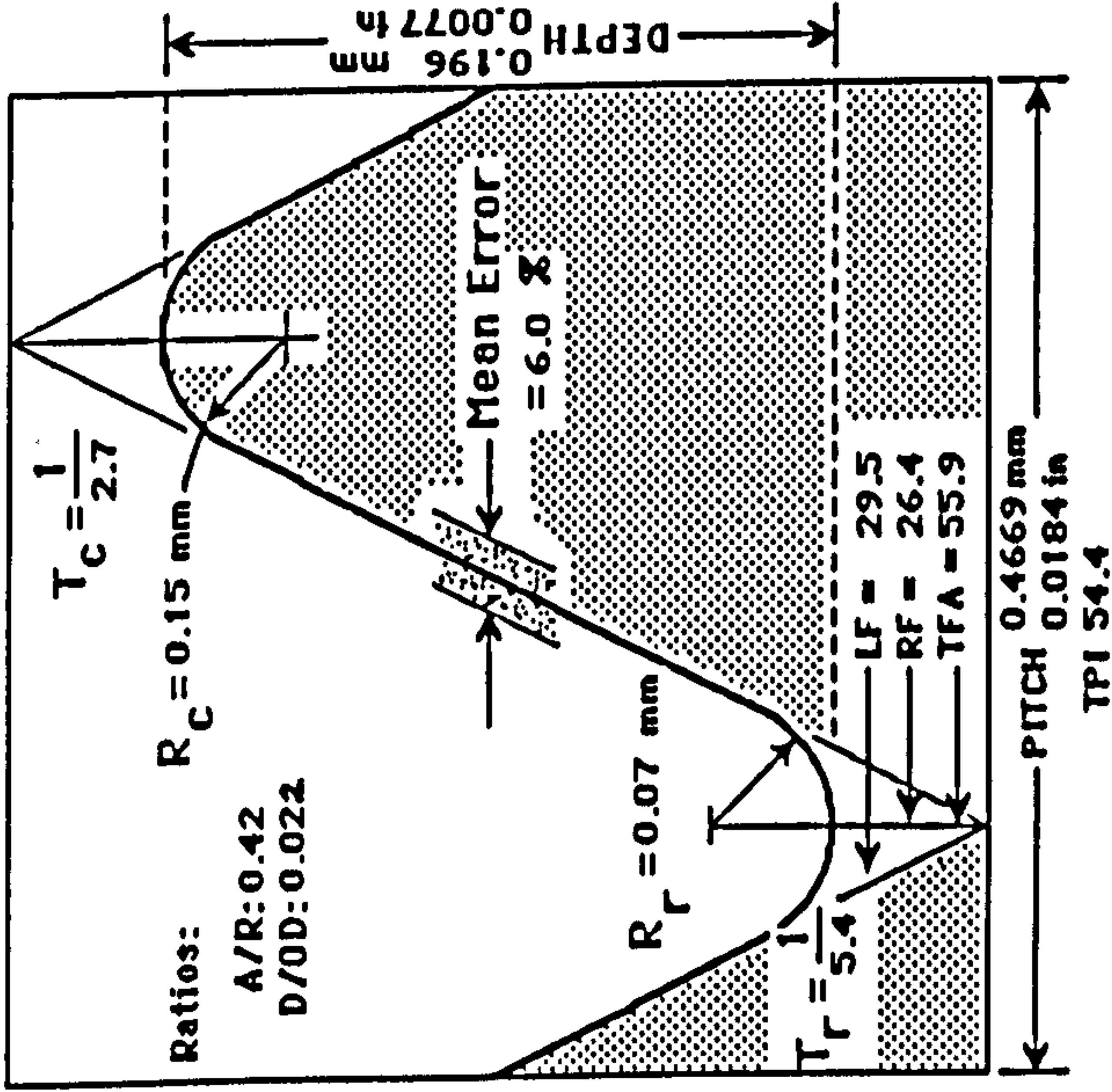
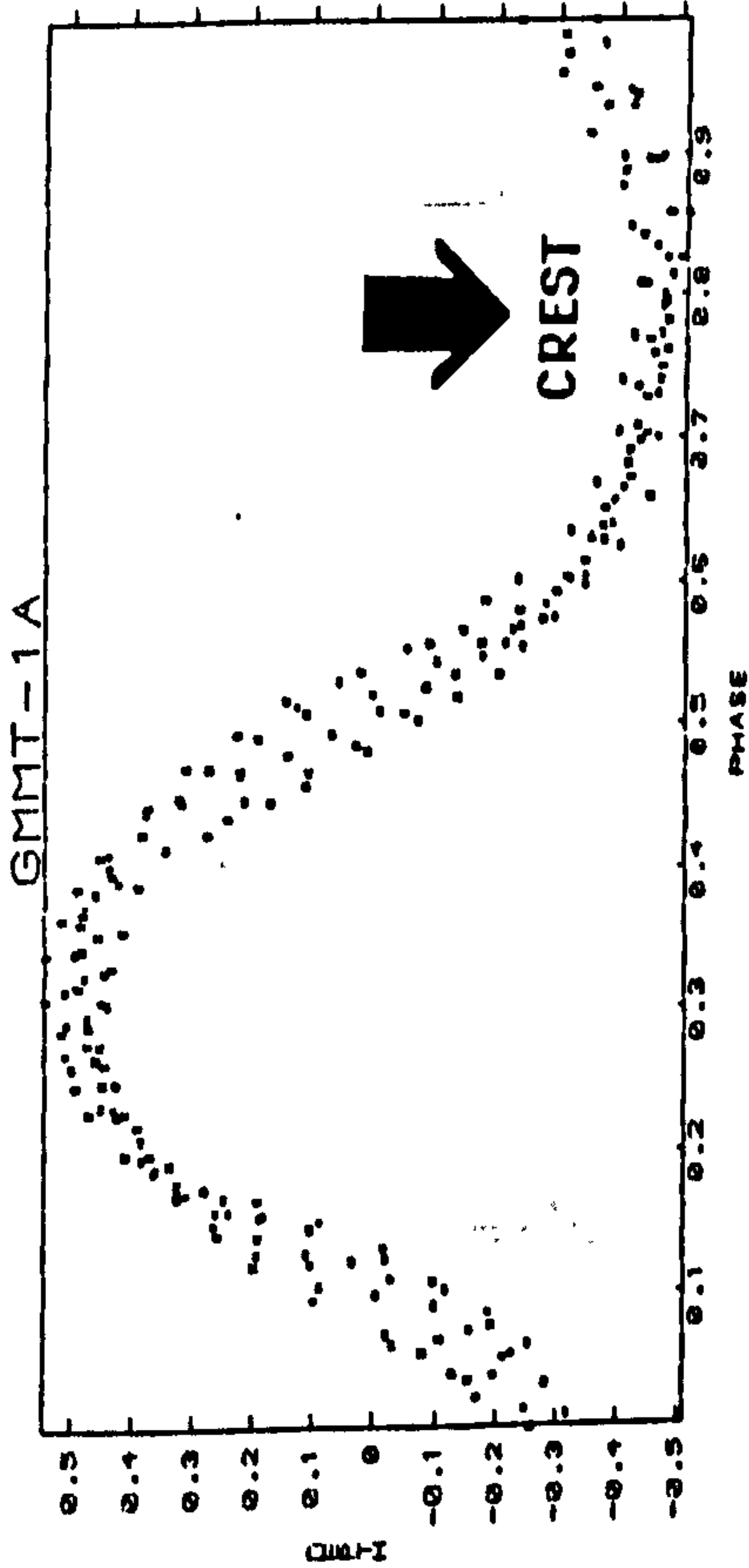
Study Code: GMT-1a

Instrument: Dumpy Level

Maker: J.B. Dancer

Date: 3rd q 19th c

Ser./Acq. No. 1970.1



Mu

Filar

Scale

Bench

Div. Eng.

Adjust.

Leveling

Focus

Eye P.

Tube

Tool

Gauge

Binding

Misc.



Characteristics:

Screw

Nut

Leng: 0.625"

Diameter: 0.1825"

Steel

Brass

Other:

Instrument Identification:

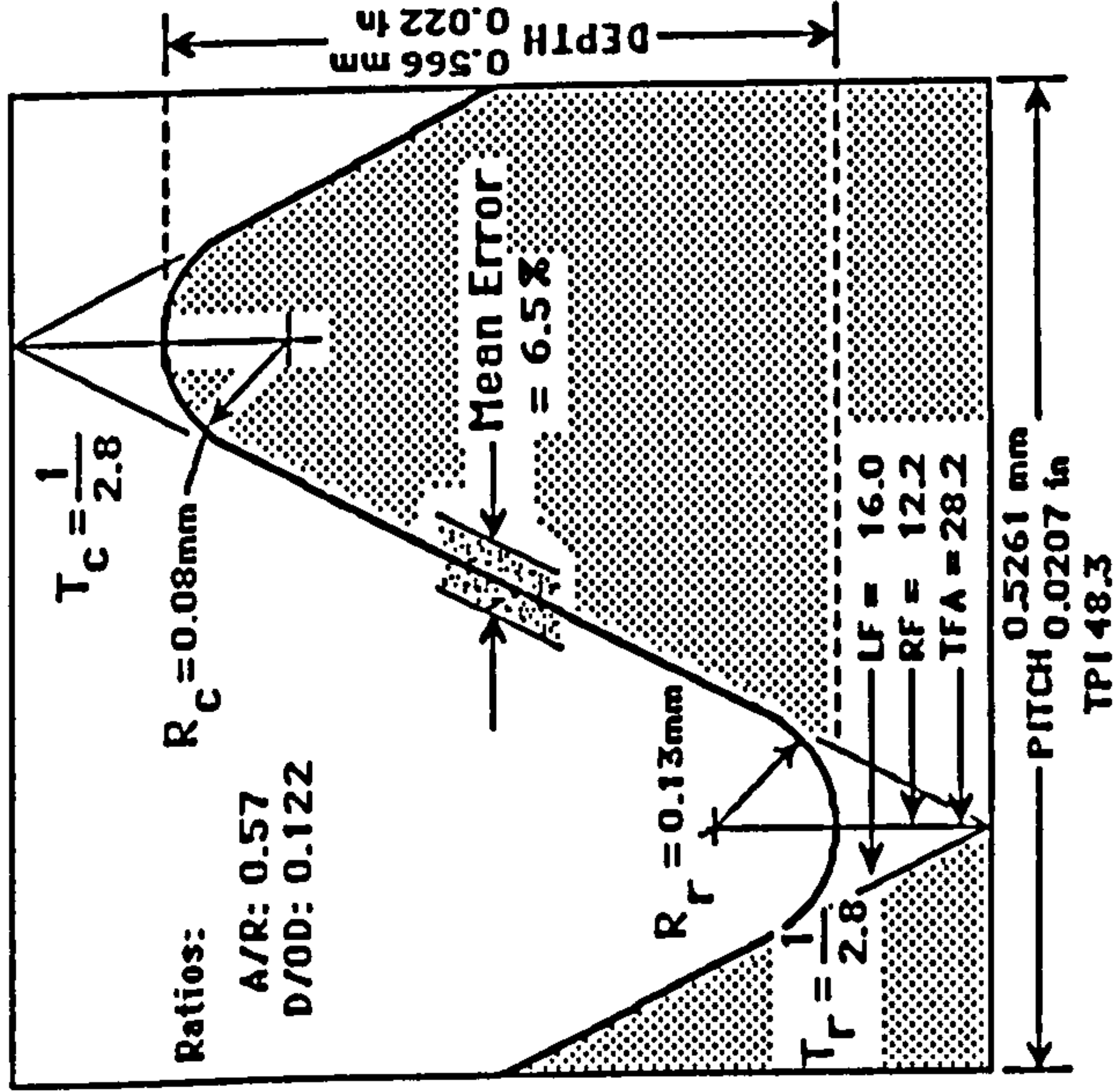
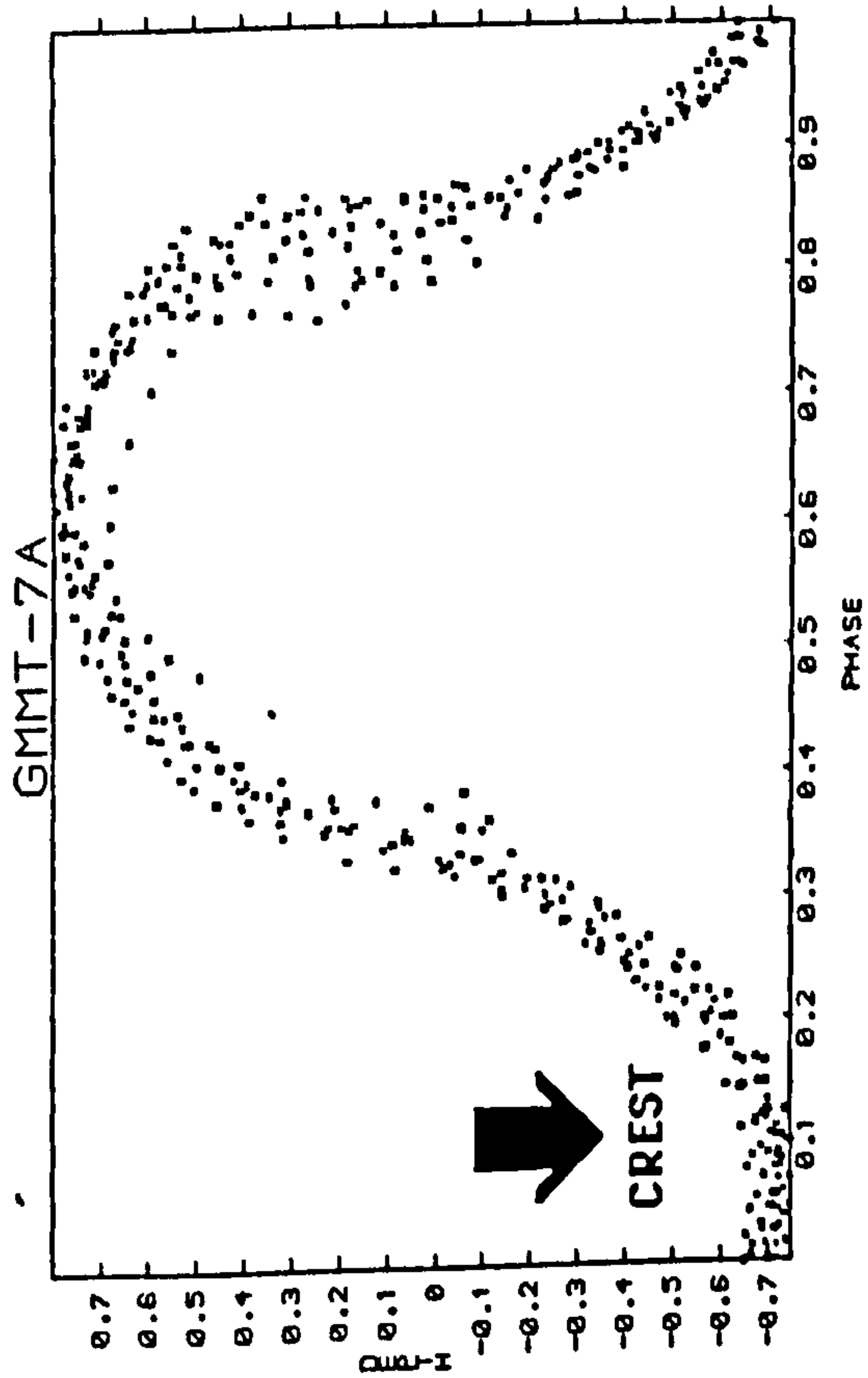
Study Code: GMT-7a

Instrument: Level

Maker: Rothwell, Manchester

Date: 3rd q 19th c

Ser./Acq. No. 1986.242.1



Mu

Filar

Scale

Bench

Div. Eng.

Adjust.

Leveling

Focus

Eye P.

Tube

Tool

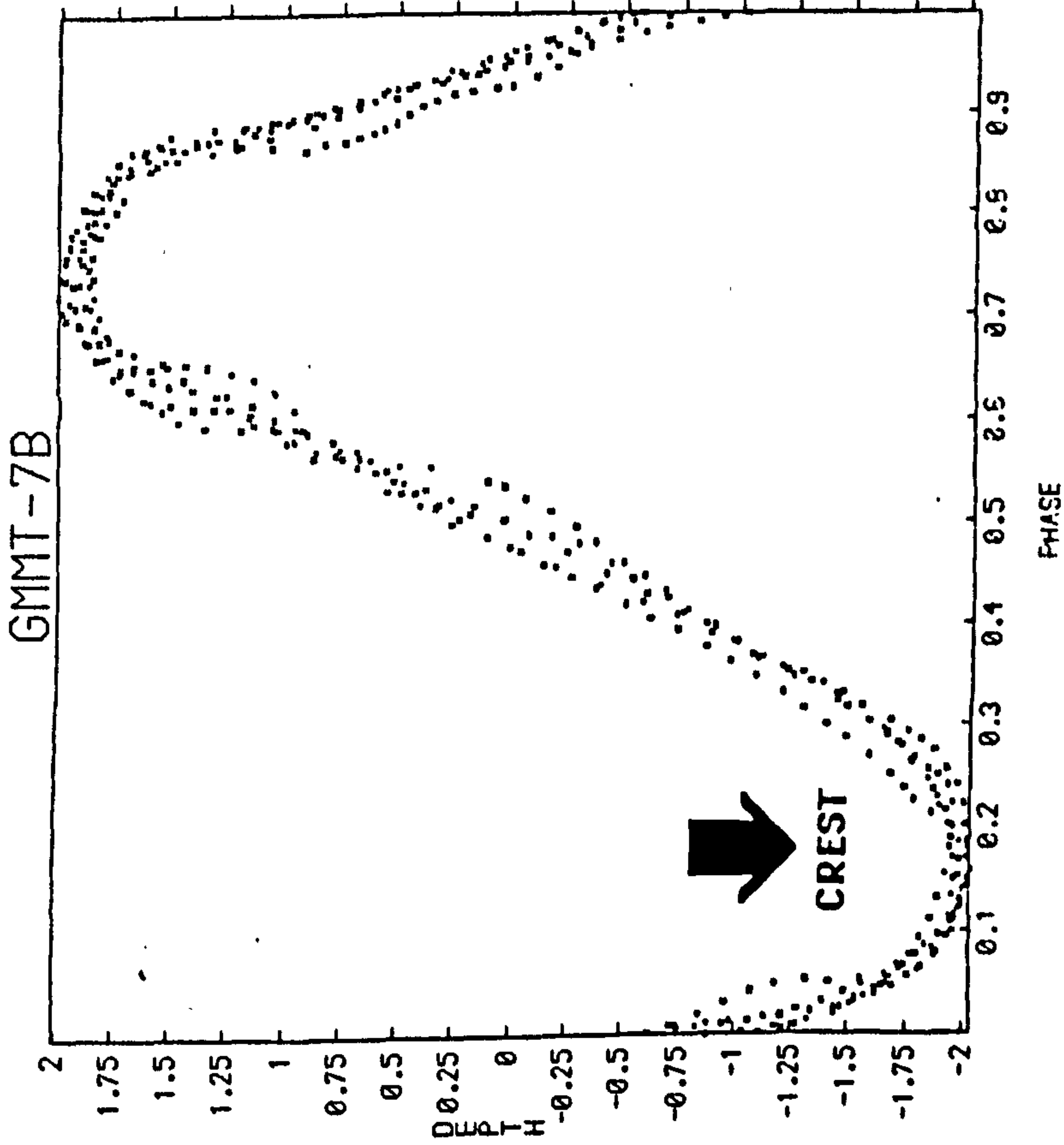
Gauge

Binding

DEPTH 0.566 mm

0.022 in

(for telescope tube)



Characteristics:

Screw ☒ Nut ☐

Leng: ~1.5"

Diameter: 0.265"

Steel ☐ Brass ☒

Other:

Instrument Identification:

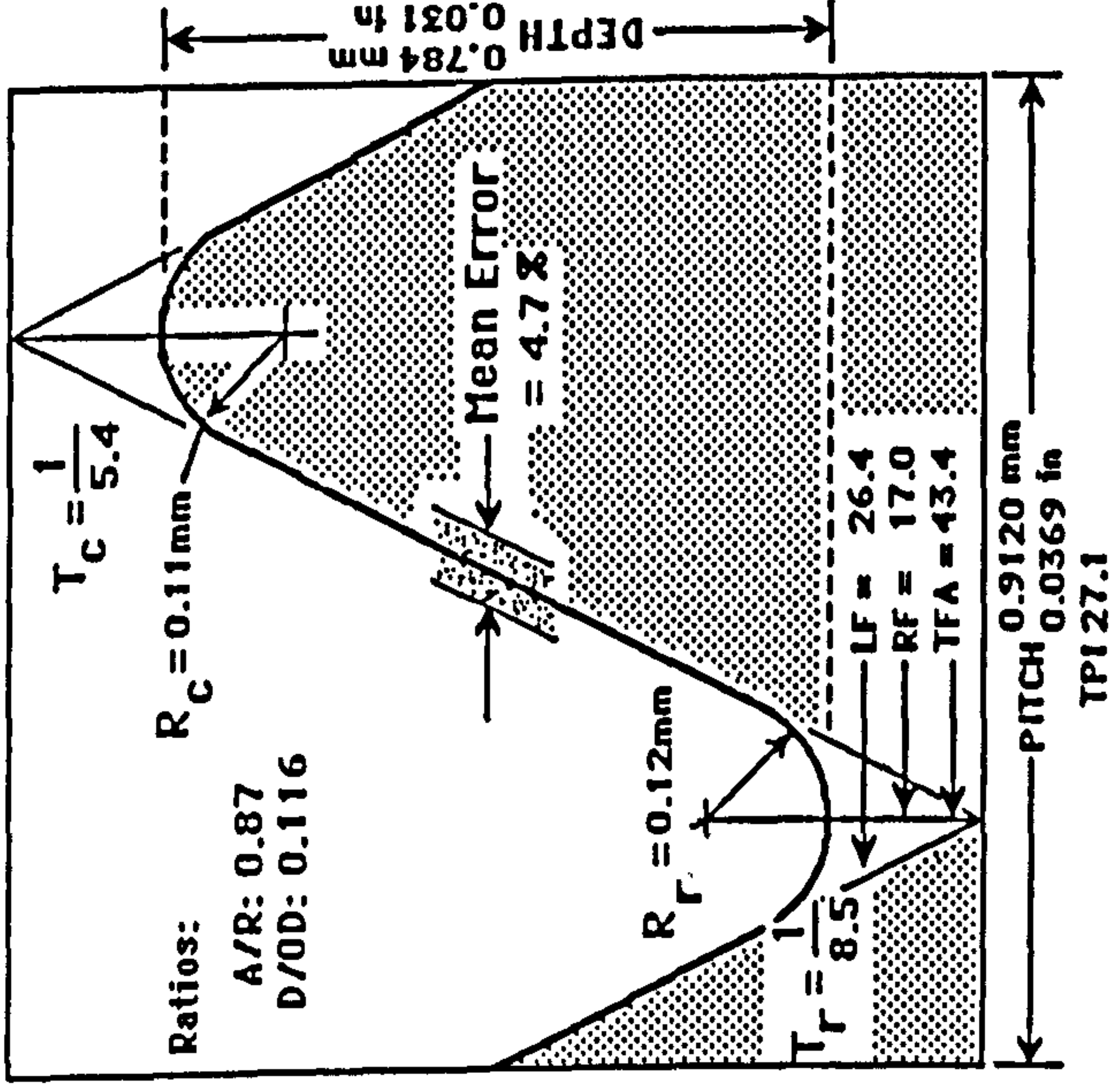
Study Code: GMT-7b

Instrument: Level

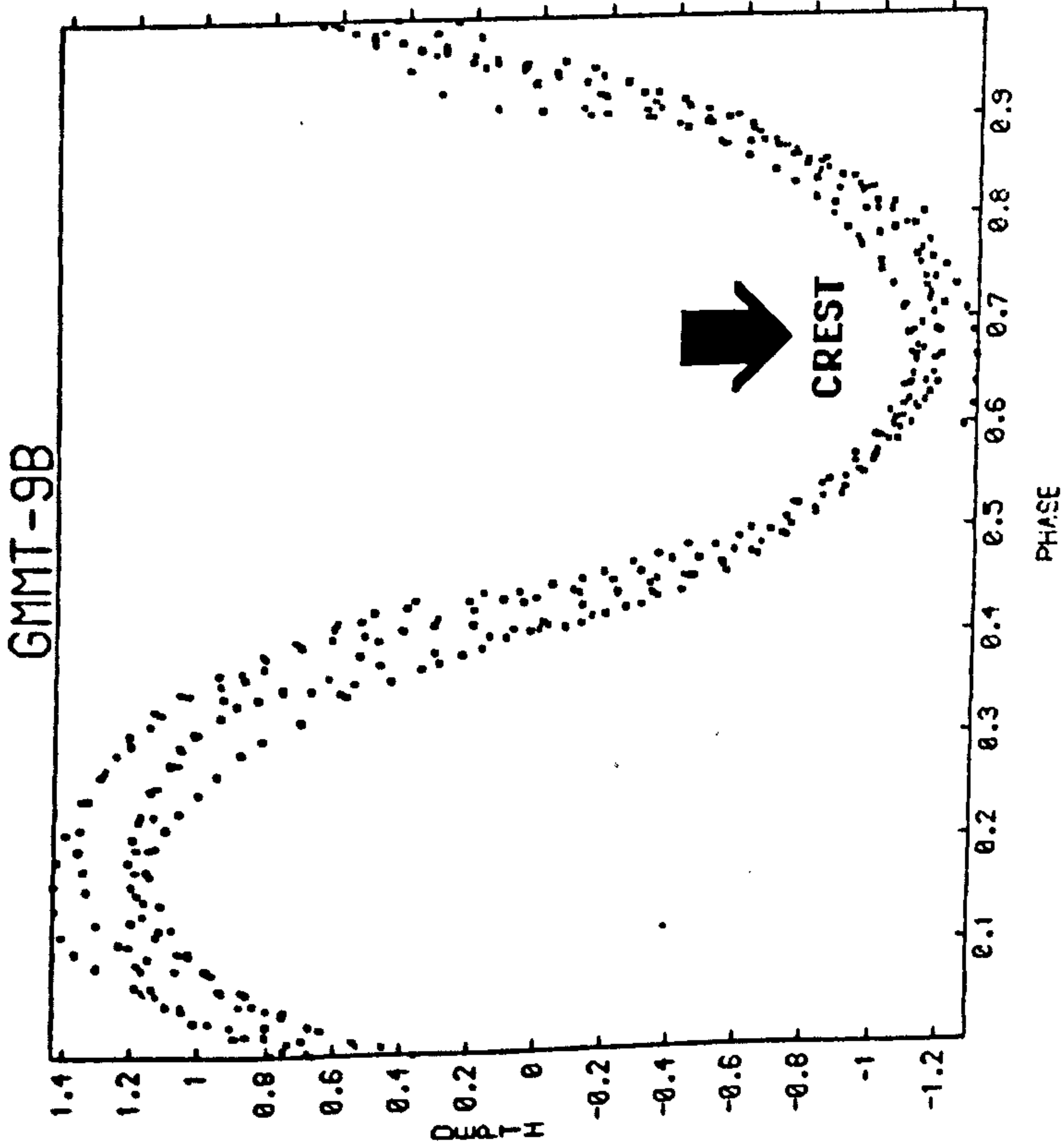
Maker: Rothwell, Manchester

Date: 3rd q 19th c

Ser./Acq. No. 1986.242.1



Mu — [ Filar Scale Bench Div. Eng. Adjust. Leveling Focus Eye P. Tube Tool Gauge Binding (Foot)



Characteristics:

Screw ☒ Nut ☐

Leng: 1.5"

Diameter: 0.3333"

Steel ☐ Brass ☒

Other:

Instrument Identification:

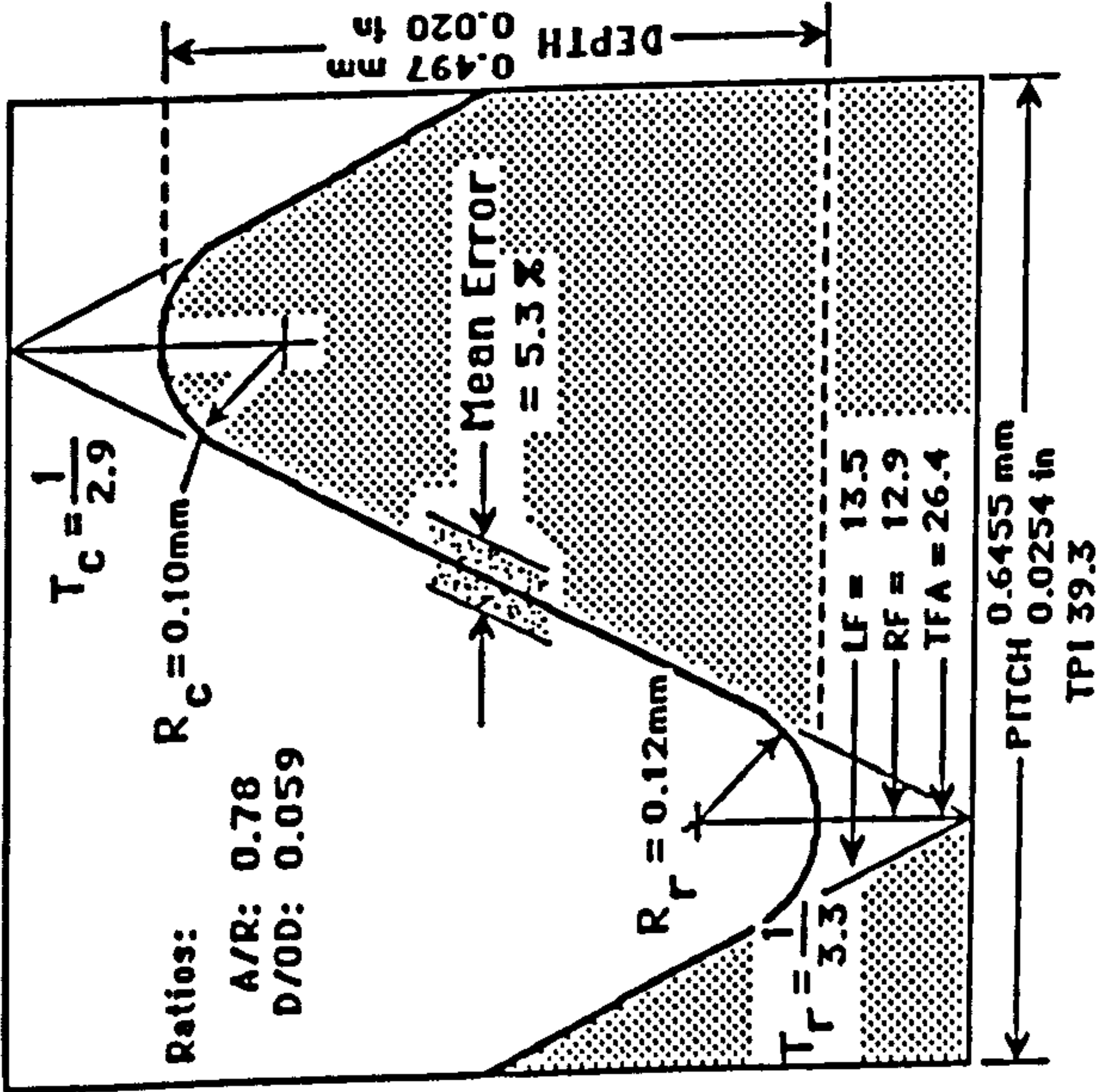
Study Code: GMT-9b

Instrument: Y-Level

Maker: W & S Jones

Date: ca.1840

Ser./Acq. No. 1968.15



Filar  
Scale  
Bench  
Div. Eng.  
Adjust.  
Leveling  
Focus  
Eye P.  
Tube  
Tool  
Gauge  
Binding  
Misc.  
(Foot)

Characteristics:

Screw

Nut

Leng: 2.25" / 0.75"

Diameter: 0.3690"

Steel

Brass

Other:

Instrument Identification:

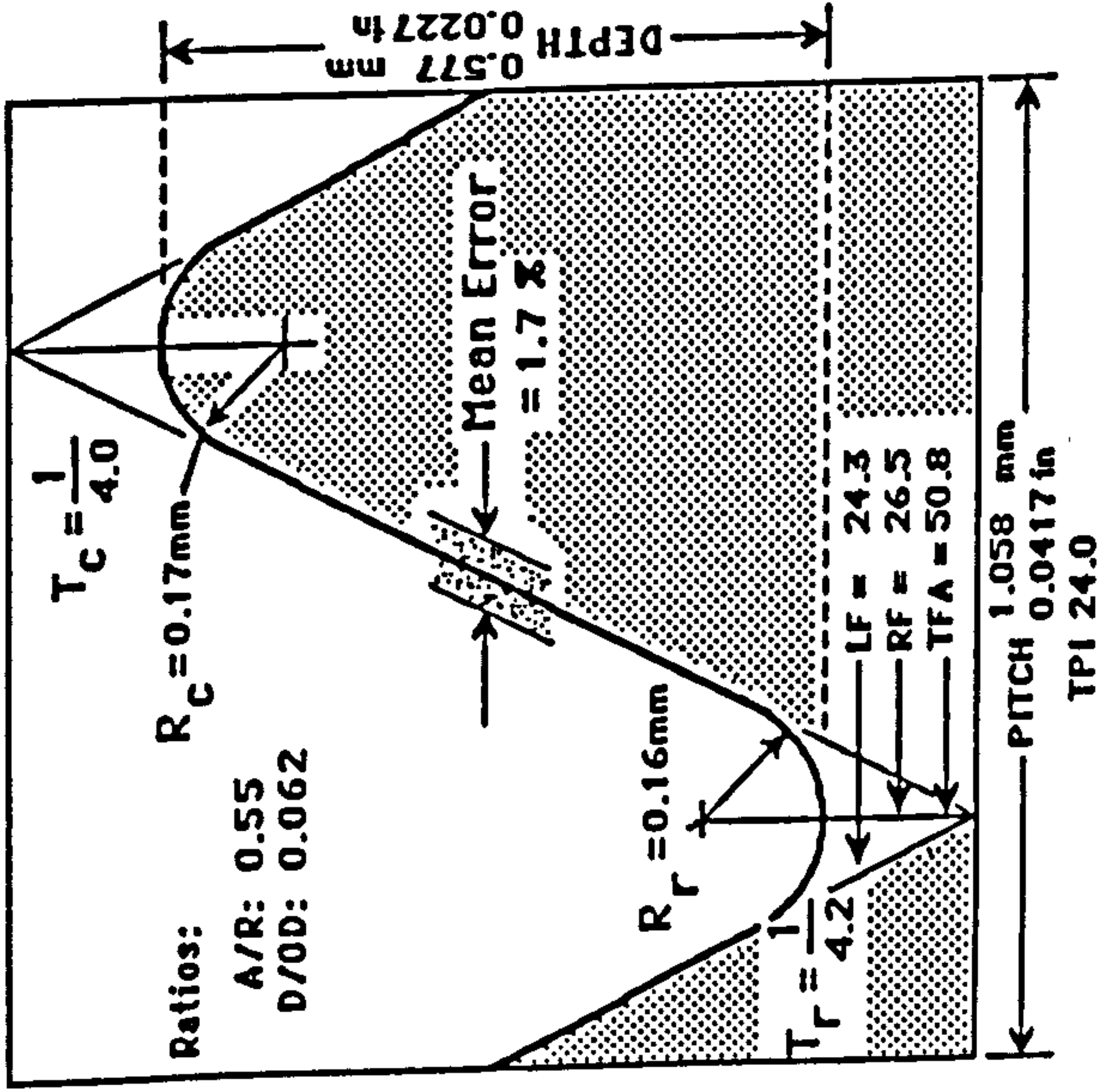
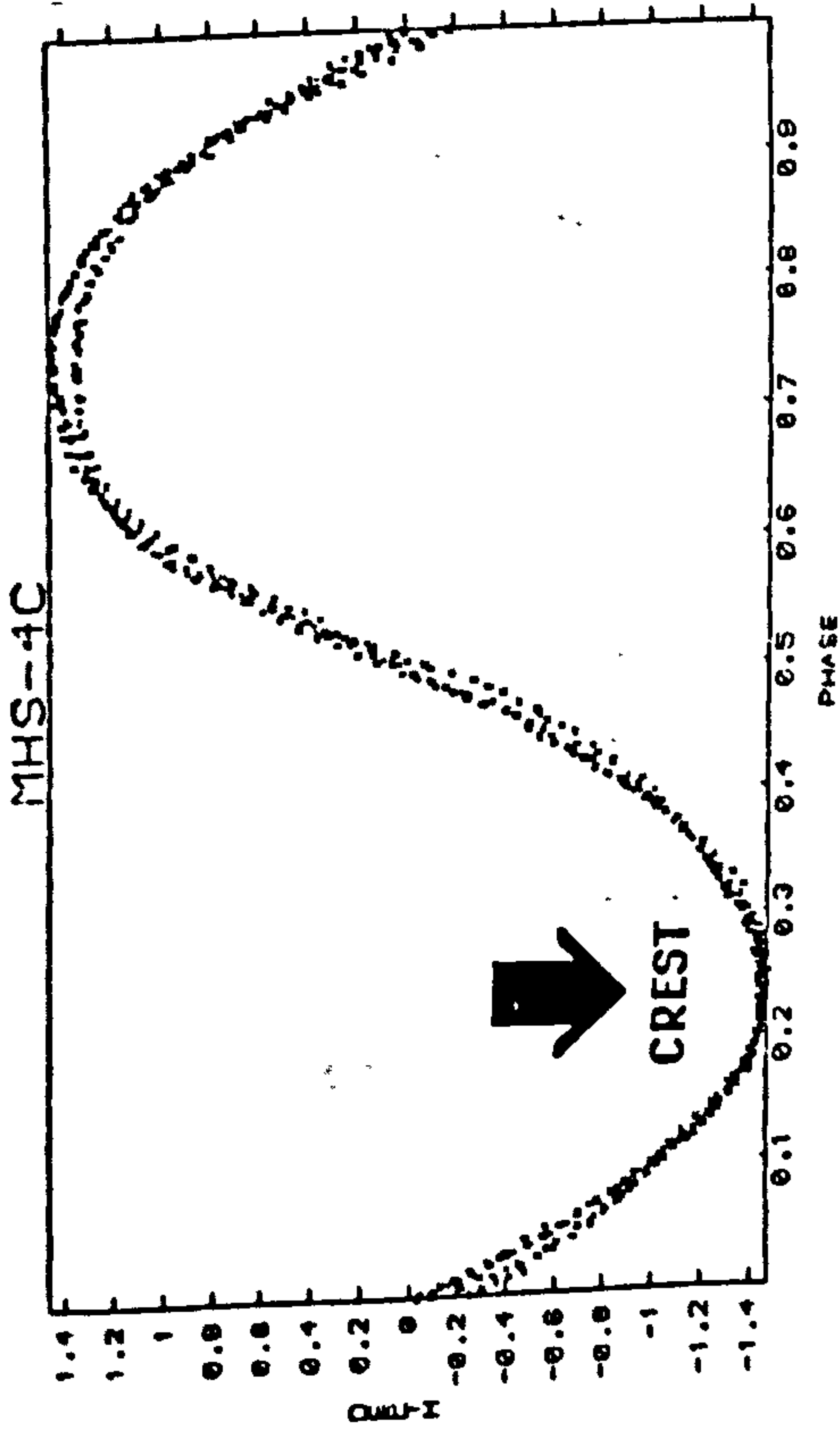
Study Code: MHS-4c

Instrument: Portable quadrant

Maker: John Bird

Date: 1770

Ser./Acq. No. none



Mu

Filar

Scale

Bench

Div. Eng.

Adjust.

Leveling

Focus

Eye P.

Tube

Tool

Gauge

Binding

Misc.





Characteristics:

Screw

Nut

Leng: 0.75" / ~0.125"

Diameter: 0.1560"

Steel

Brass

Other: Iron

Instrument Identification:

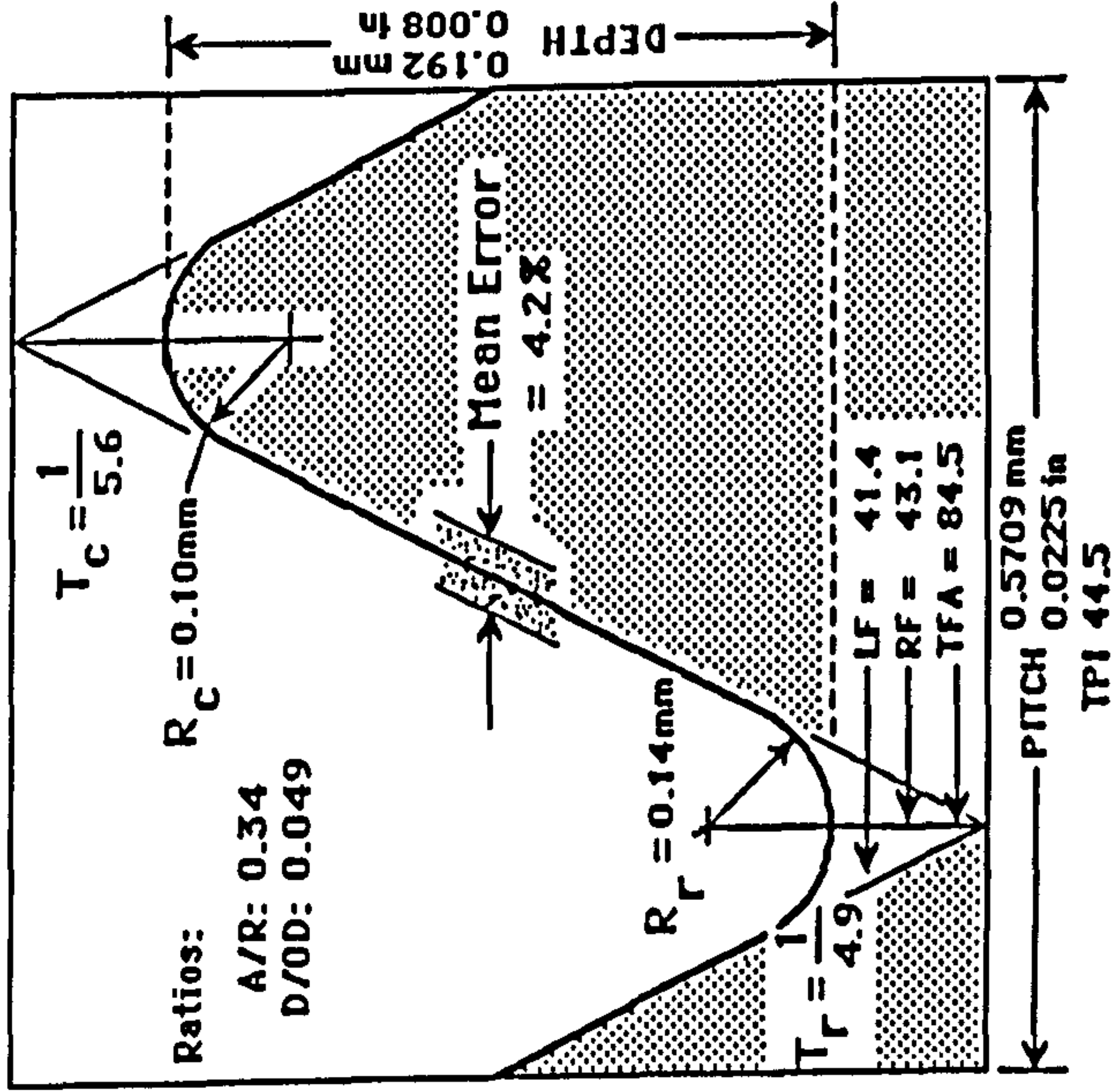
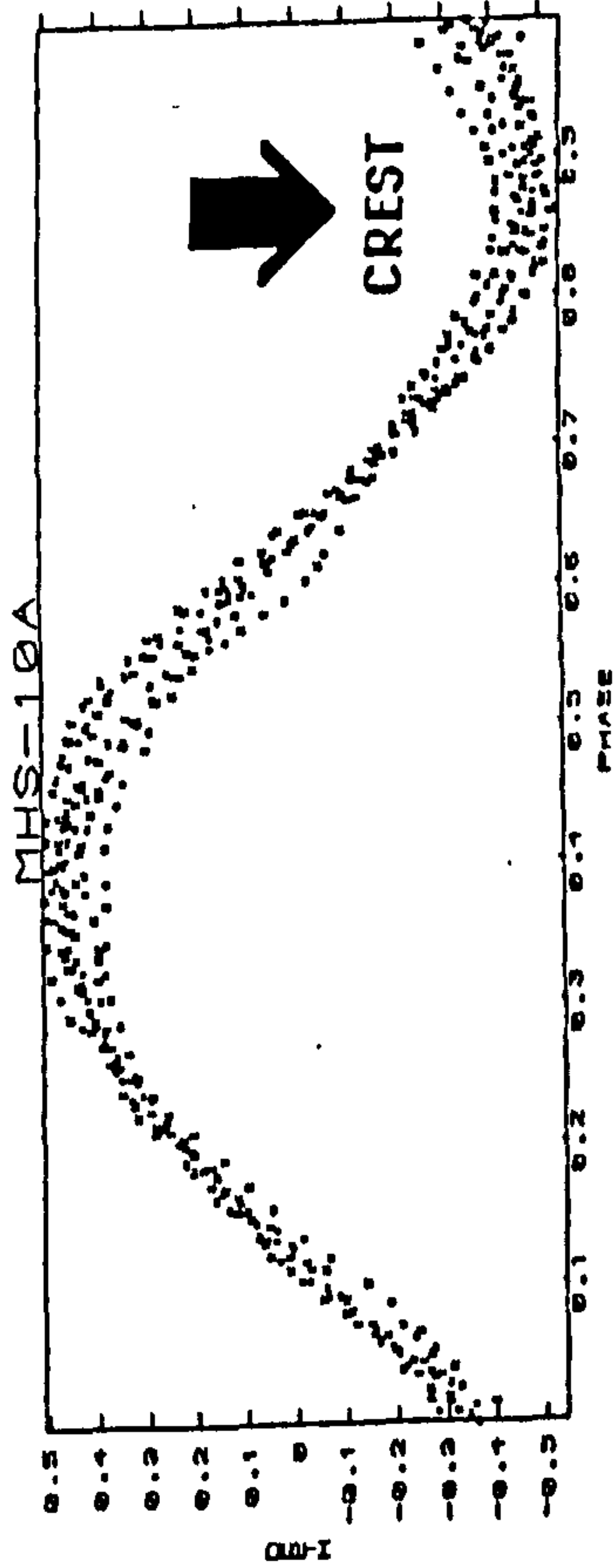
Study Code: MHS-10a

Instrument: Surveyor's level

Maker: Thomas Wright

Date: 1724

Ser./Acq. No. 32.29



Mu	Filar
	Scale
	Bench
	Div. Eng.
	Adjust.
	Leveling
	Focus
	Eye P.
	Tube
	Tool
	Gauge
	Binding
	Misc.





Characteristics:

Screw

Nut

Leng:

Diameter: 0.274"

Steel

Brass

Other:

Instrument Identification:

Study Code:

SML-9b

Instrument:

Portable Equatorial

Maker:

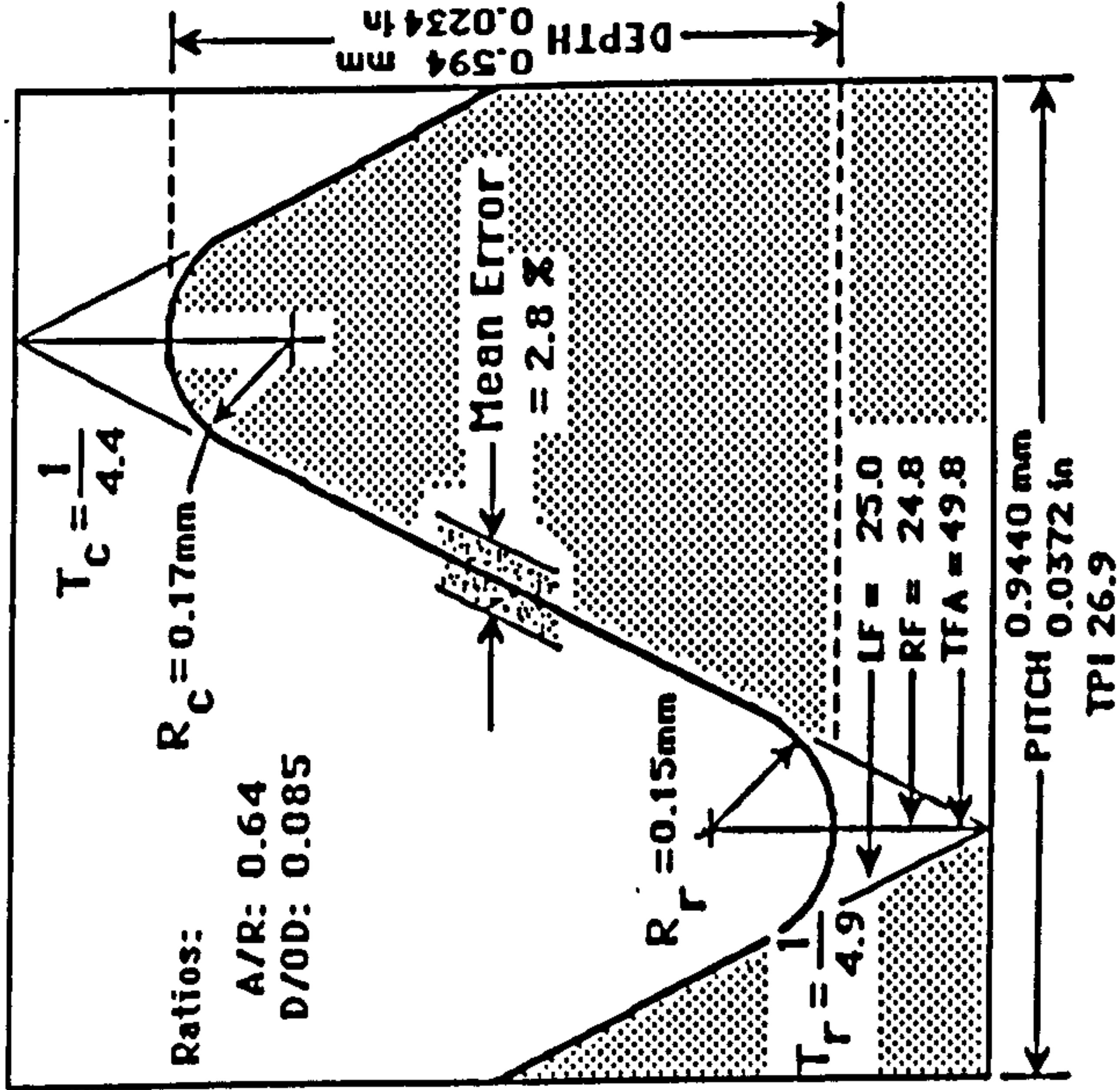
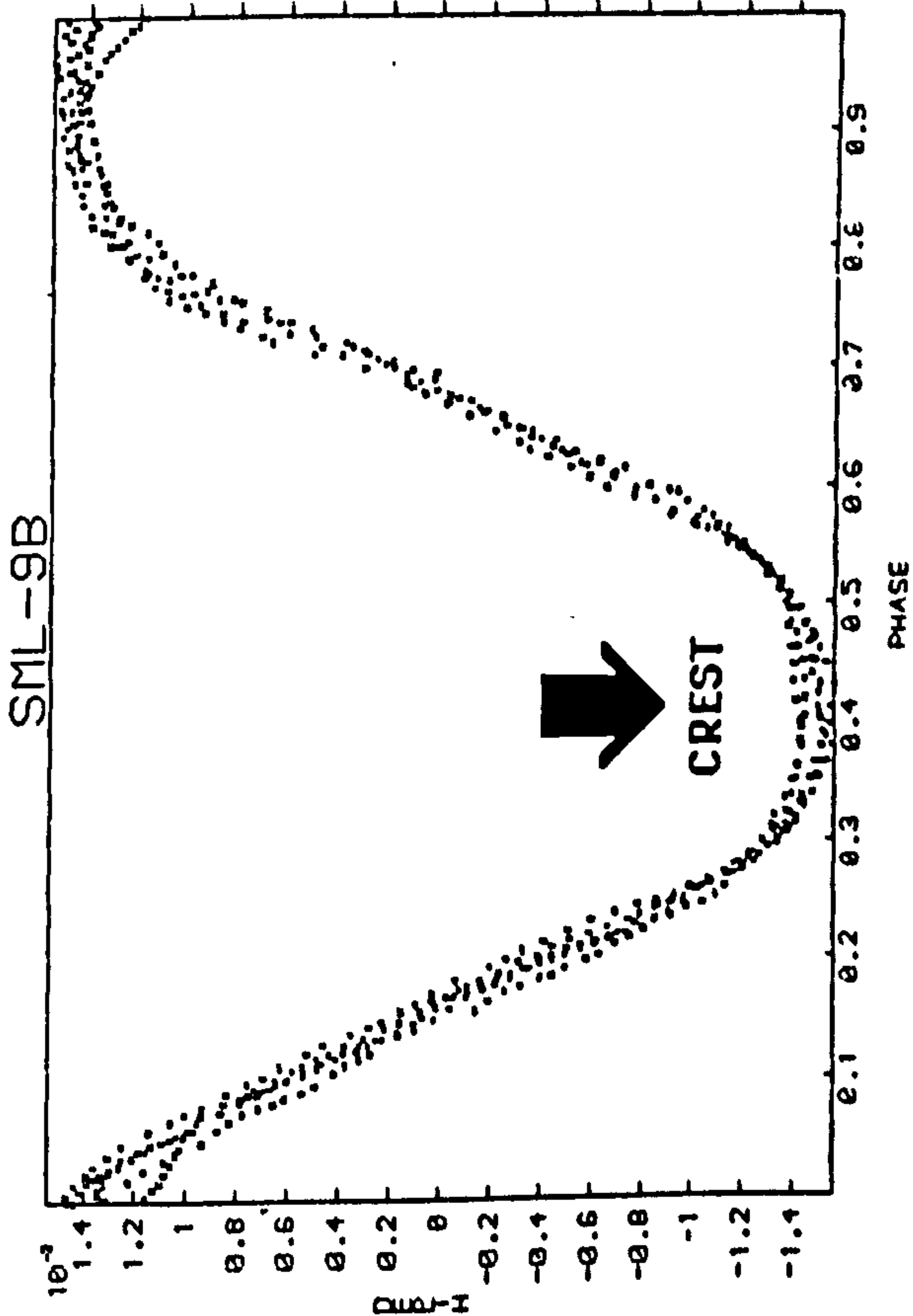
Ramdsen

Date:

1775

Ser./Acq. No.

1928-1329



Mu	Filar	
	Scale	
	Bench	
	Div. Eng.	
	Adjust.	
	Leveling	
	Focus	
	Eye P.	
	Tube	
	Tool	
	Gauge	
	Binding	
	Misc.	



Characteristics:

Screw

Nut

Leng: 1.5"

Diameter: 0.3141"

Steel

Brass

Other:

Instrument Identification:

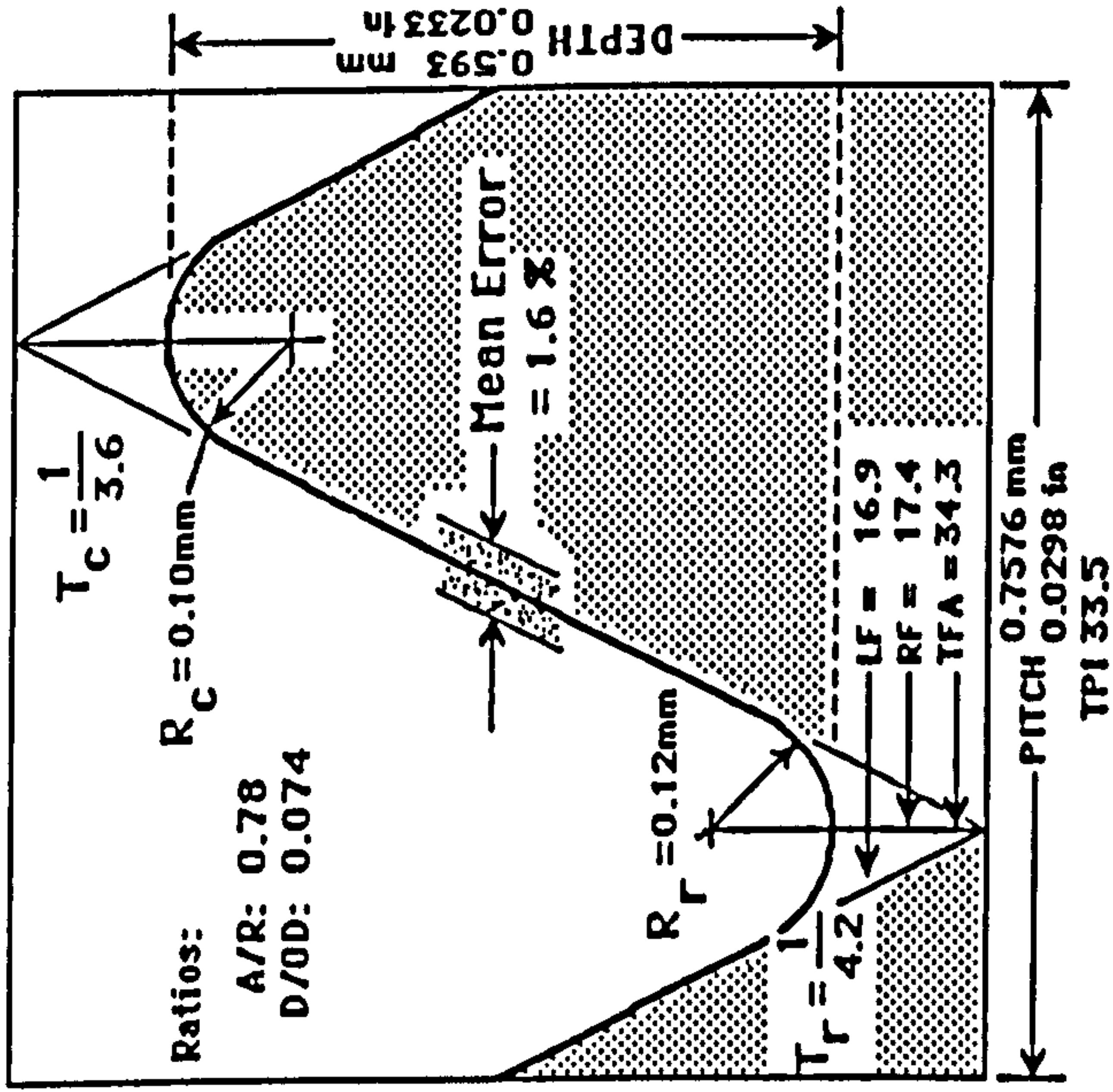
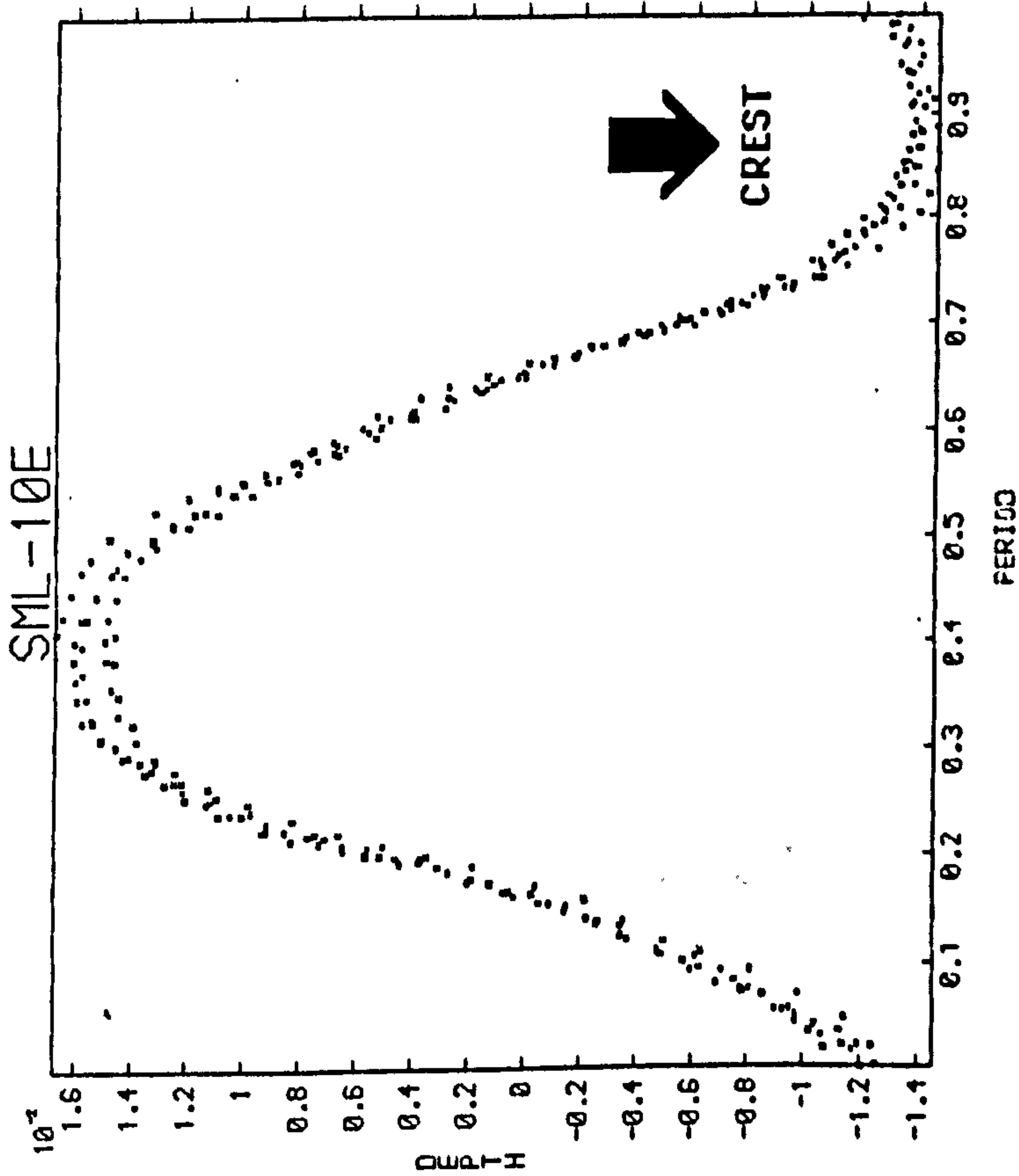
Study Code: SML-10e

Instrument: Geodetic Theodolite

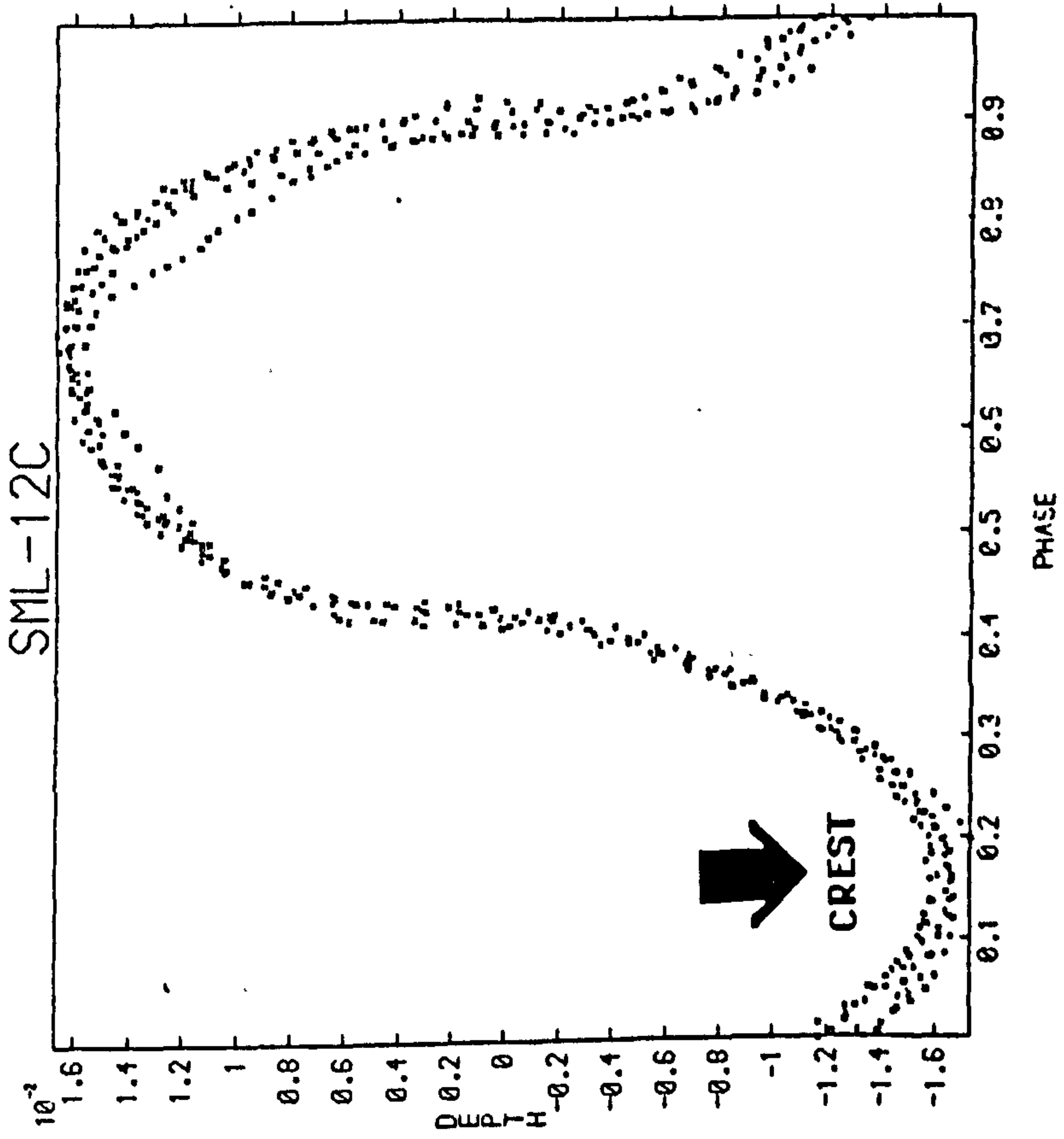
Maker: Ertel & Sohn

Date: 2nd q 19th c

Ser./Acq. No. 1950-246



Mu	—	Filar	
		Scale	
	—	Bench	
		Div. Eng.	
	—	Adjust.	
		Leveling	
	—	Focus	
		Eye P.	
	—	Tube	
		Tool	
	—	Gauge	
		Binding	
	—	Misc.	
		(Foot-rear left)	



Characteristics:

Screw ☒ Nut ☐

Leng: 1.375"

Diameter: 0.3318"

Steel ☐ Brass ☒

Other:

Instrument Identification:

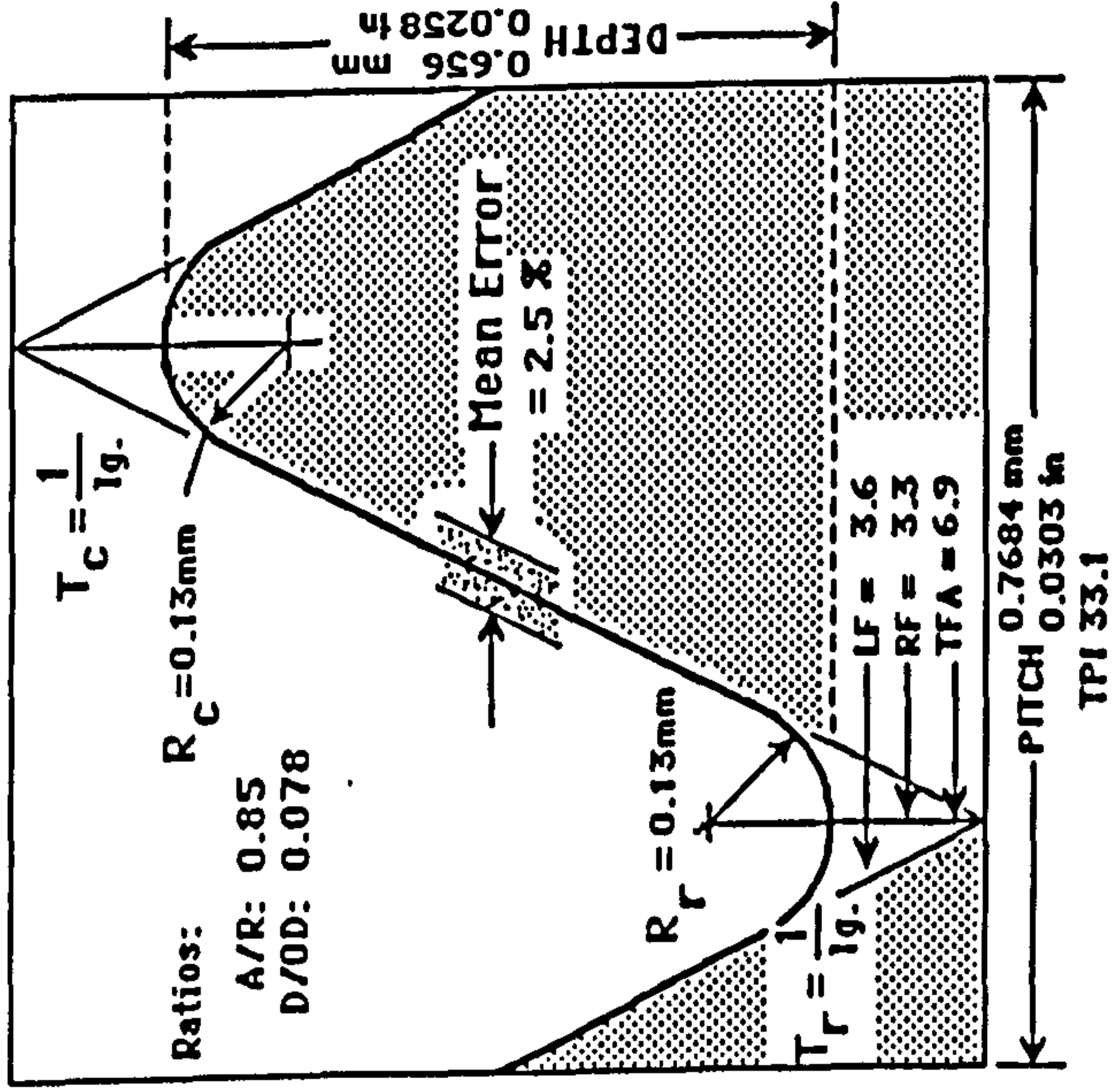
Study Code: SML-12c

Instrument: Transit theodolite

Maker: Thomas Jones

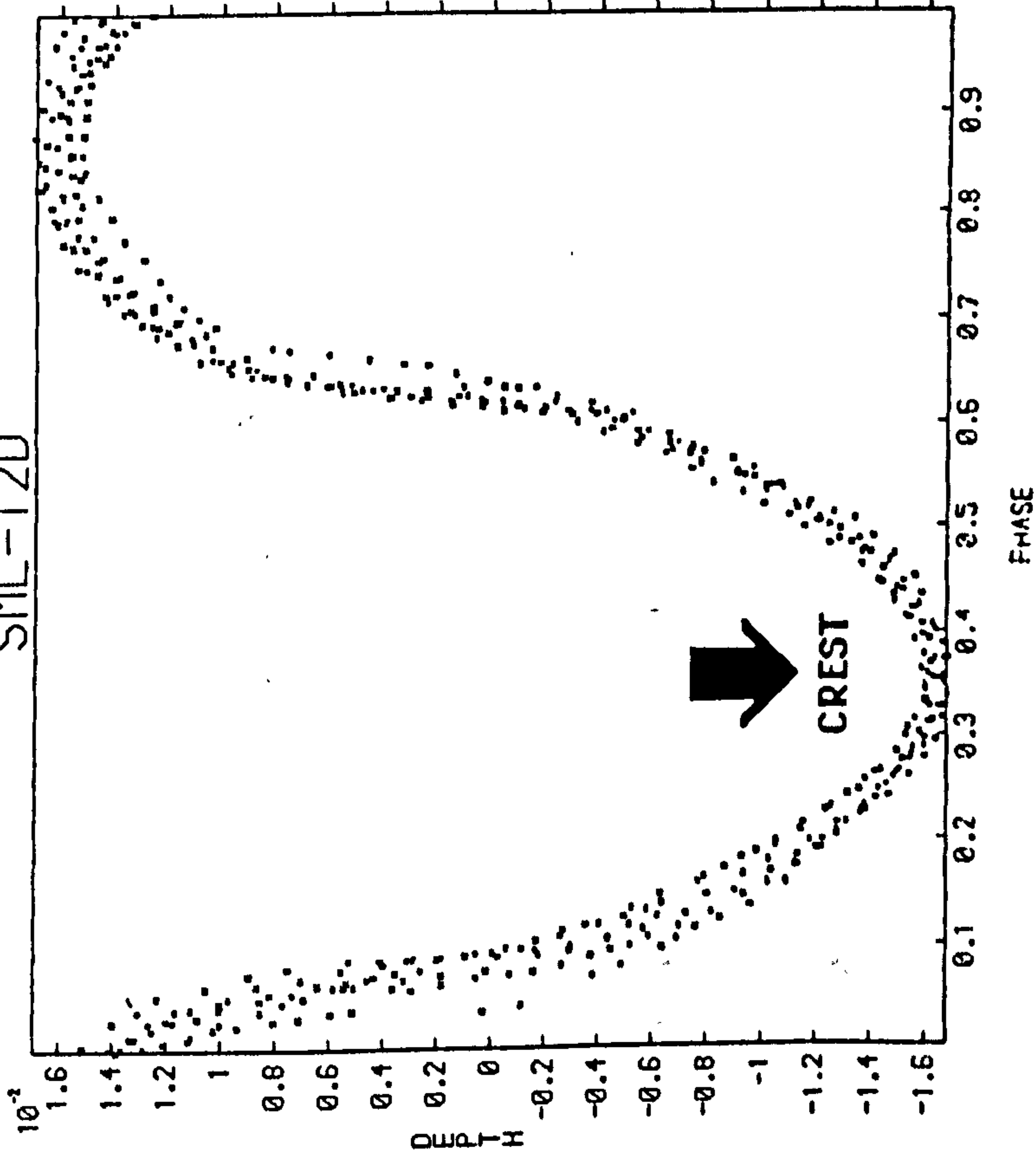
Date: 2nd q 19th c

Ser./Acq. No. 1876-1206



Mu	Filar	
	Scale	
Bench	Div. Eng.	
	Adjust.	
Leveling	Focus	
	Eye P.	
Tube	Tool	
	Gauge	
Binding	Misc.	

SML-12D



Characteristics:

Screw ☒ Nut ☐

Leng: 1.375"

Diameter: 0.3299"

Steel ☐ Brass ☒

Other:

Instrument Identification:

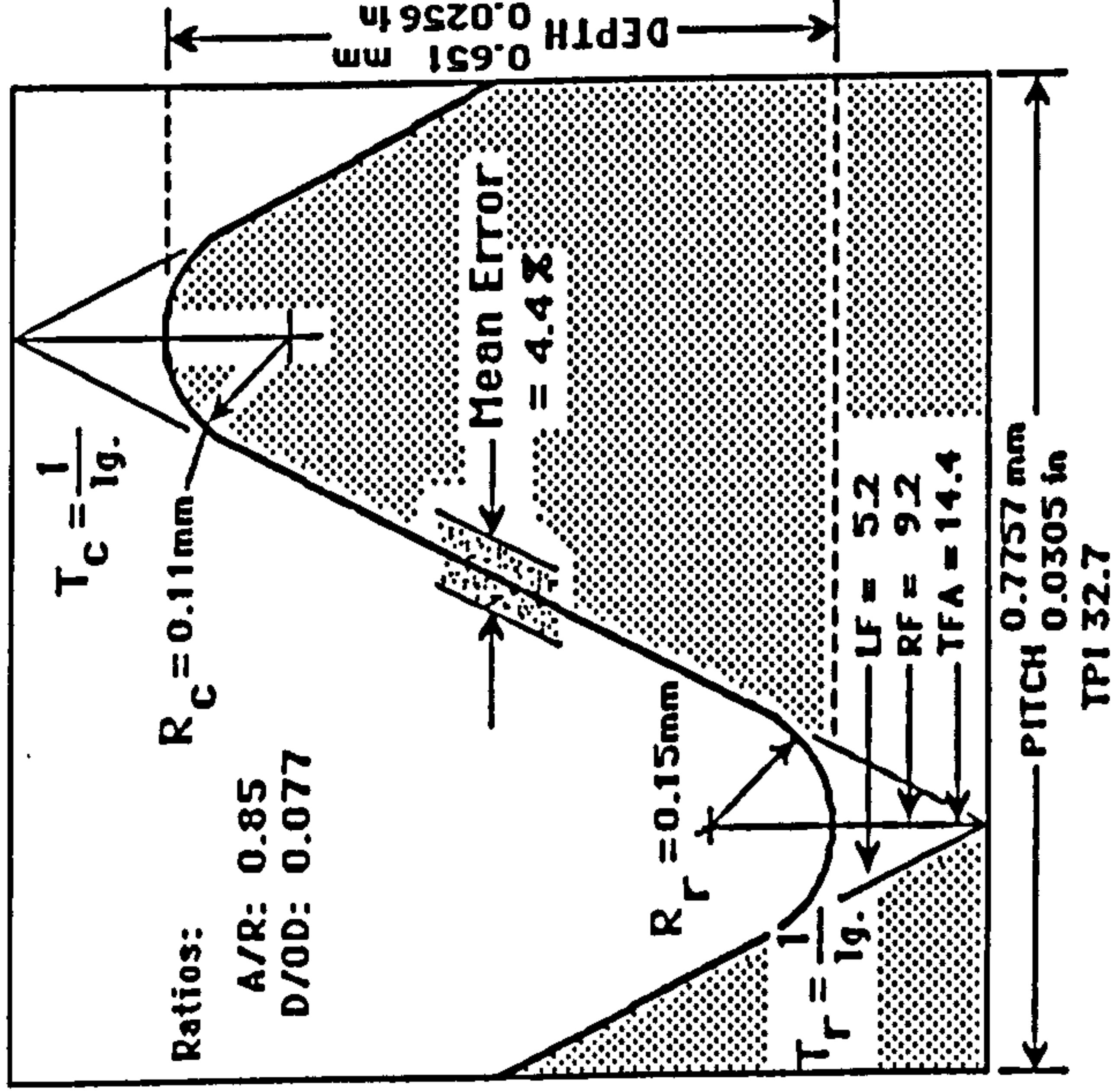
Study Code: SML-12d

Instrument: Transit Theodolite

Maker: Thomas Jones

Date: 2nd q 19th c

Ser./Acq. No. 1876-1206



Mu — [

Filar

Scale

Bench

Div. Eng.

Adjust.

Leveling

Focus

Eye P.

Tube

Tool

Gauge

Binding

Misc.



Characteristics:

Screw ☒ Nut ☐

Leng: 2.188"

Diameter: ~0.5"

Steel ☒ Brass ☐

Other:

Instrument Identification:

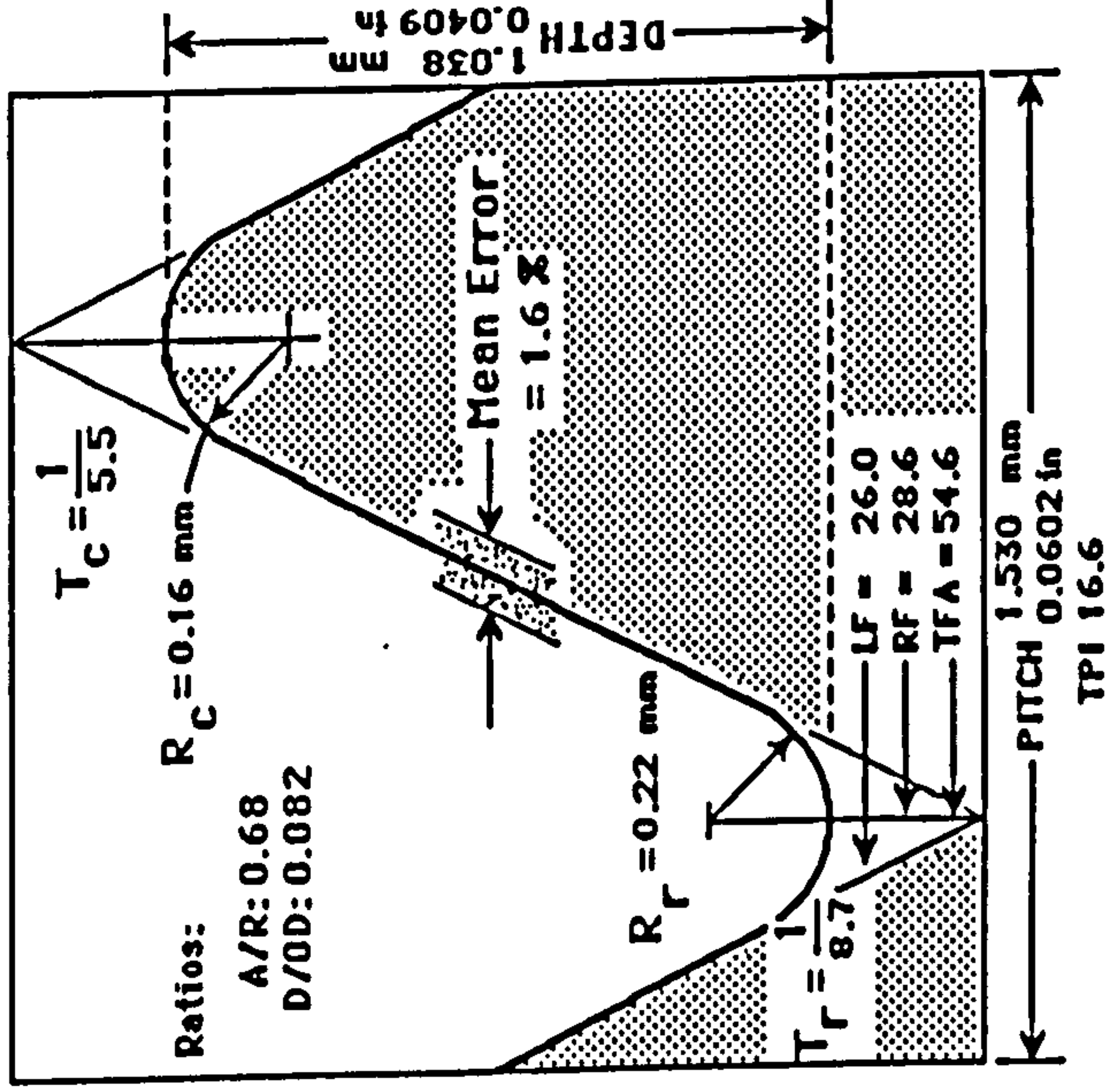
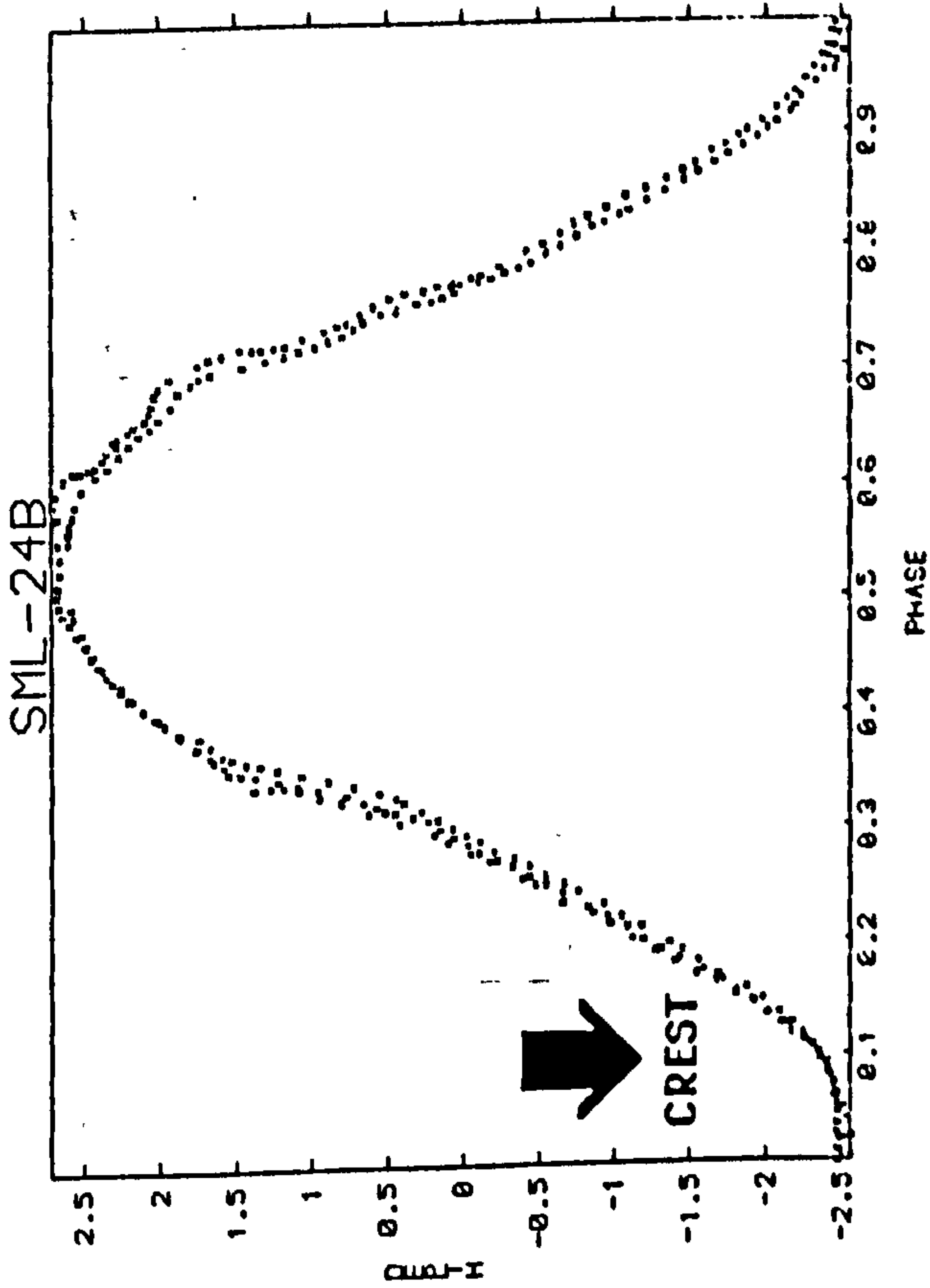
Study Code: SML-24b

Instrument: Portable Quadrant

Maker: John Bird

Date: ca.1770

Ser./Acq. No. 1937-600



Mu — [ Filar Scale Bench Div. Eng. Adjust. Leveling Focus Eye P. Tube Tool Gauge Binding Misc. ]



Characteristics:

Screw

Nut

Leng: 2.25"

Diameter: 0.362"

Steel

Brass

Other:

Instrument Identification:

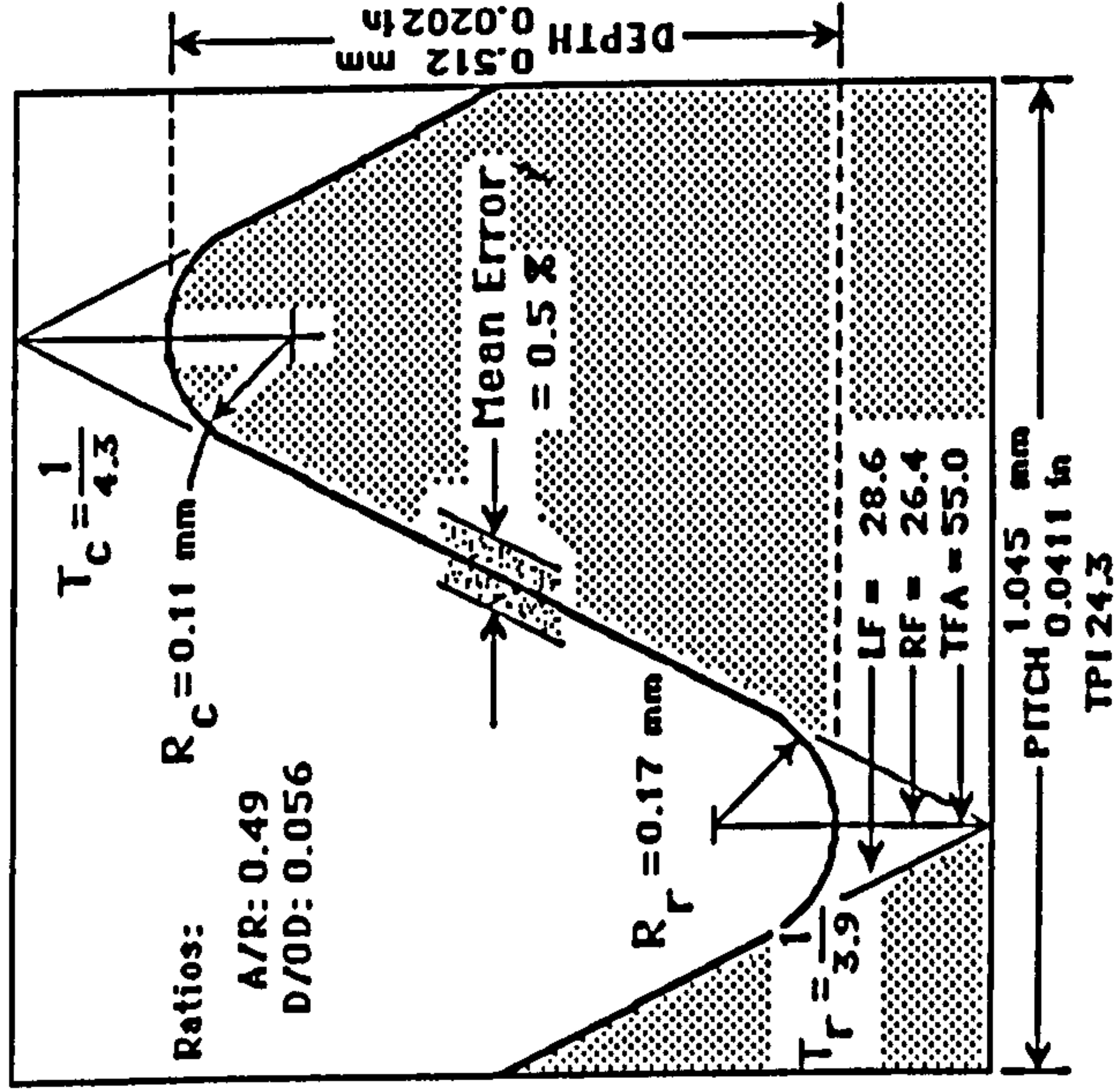
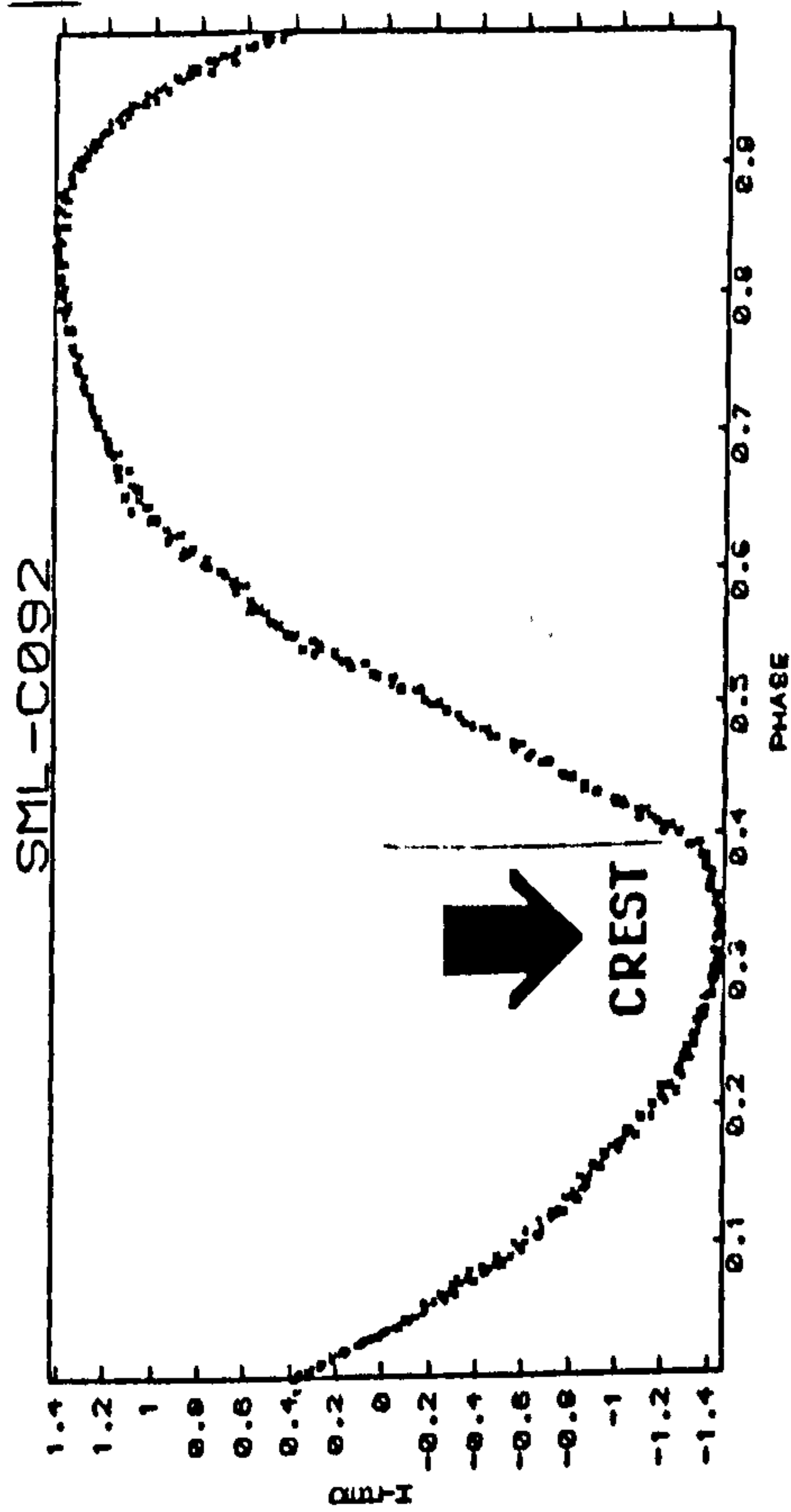
Study Code: SML-C092

Instrument: 12" Quadant

Maker: John Bird

Date: ca.1767

Ser./Acq. No. 1900-138



Mu

Fillar

Scale

Bench

Div. Eng.

Adjust.

Leveling

Focus

Eye P.

Tube

Tool

Gauge

Binding

Misc.

(see also SML-25a/b  
for other screws on  
this instrument)  
(Used for transit of  
Yenus-1769)

Characteristics:

Screw

Nut

Leng: >1.125"/0.5"

Diameter: 0.281"

Steel

Brass

Other:

Instrument Identification:

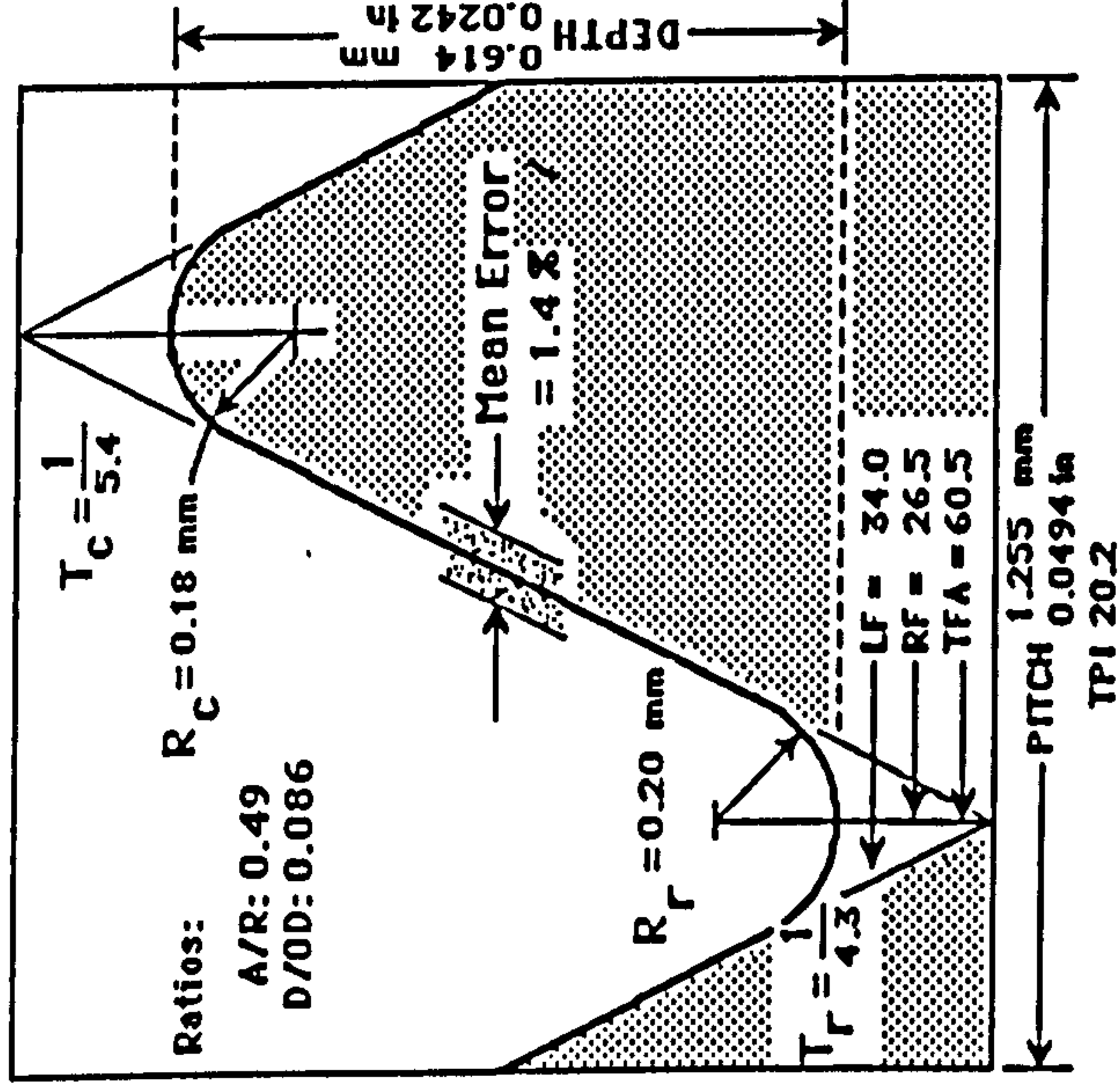
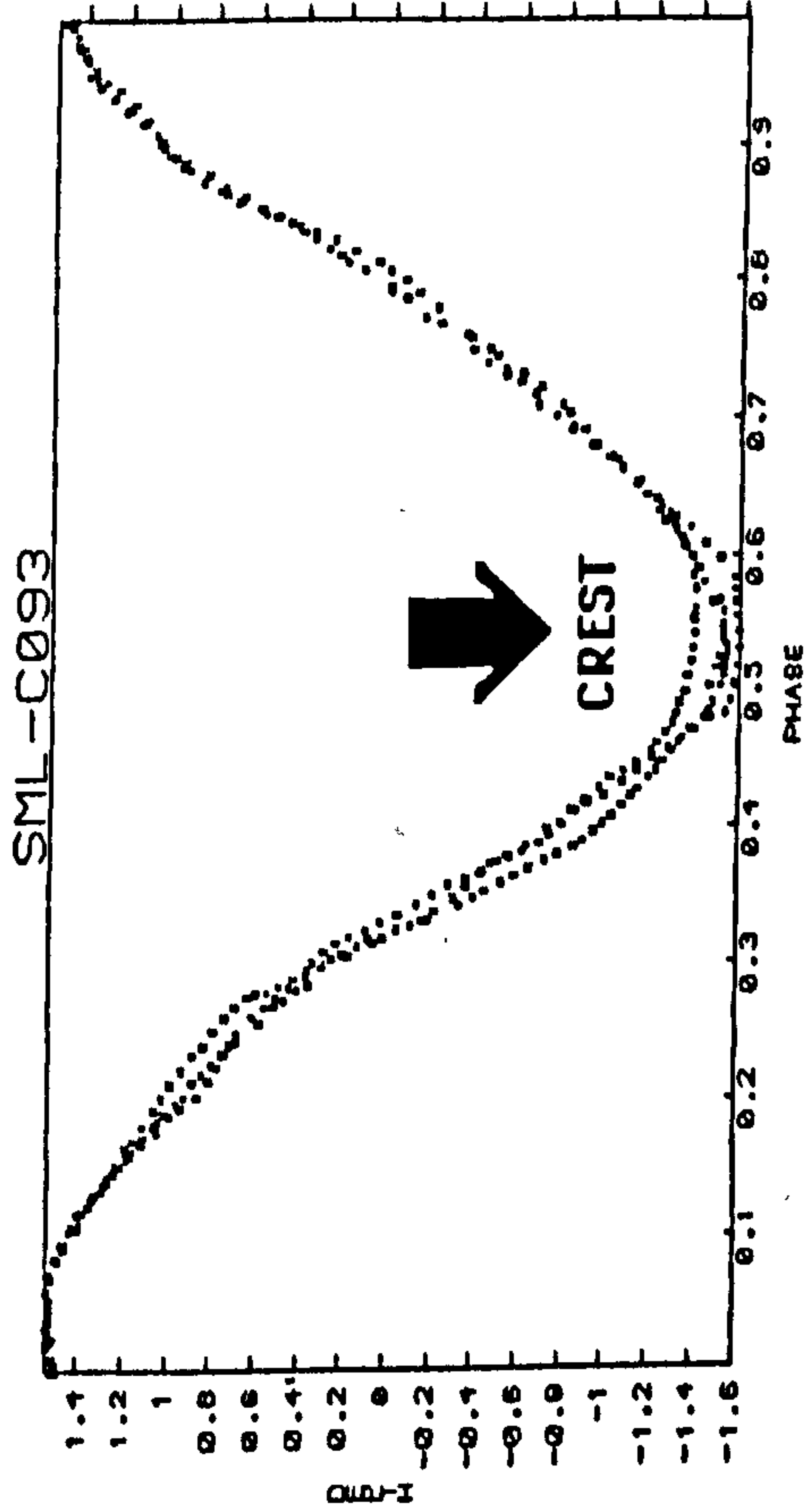
Study Code: SML-C093

Instrument: 3" Gregorian

Maker: Benjamin Martin

Date: ca.1750

Ser./Acq. No. 1911-283



MU	Filar
	Scale
	Bench
	Div. Eng.
	Adjust.
	Leveling
	Focus
	Eye P.
	Tube
	Tool
	Gauge
	Binding
	Misc.

Note ware in root  
Split nut

Characteristics:

Screw

Nut

Leng: 1.75" / ~1.5"

Diameter: 0.266"

Steel

Brass

Other:

Instrument Identification:

Study Code: SML-C094

Instrument: 2" equatorial refractor

Maker: Dollond

Date: ca.1800

Ser./Acq. No. 1912-204

MU	—	Filar	
		Scale	
—	—	Bench	
		Div. Eng.	
—	—	Adjust.	
		Leveling	
—	—	Focus	
		Eye P.	
—	—	Tube	
		Tool	
—	—	Gauge	
		Binding	
—	—	Misc.	

(Ill. in Bennett, 1987  
P.124, f.122)



Characteristics:

Screw

Nut

Leng: ~2.5" / 1.875"

Diameter: 0.511"

Steel

Brass

Other:

Instrument Identification:

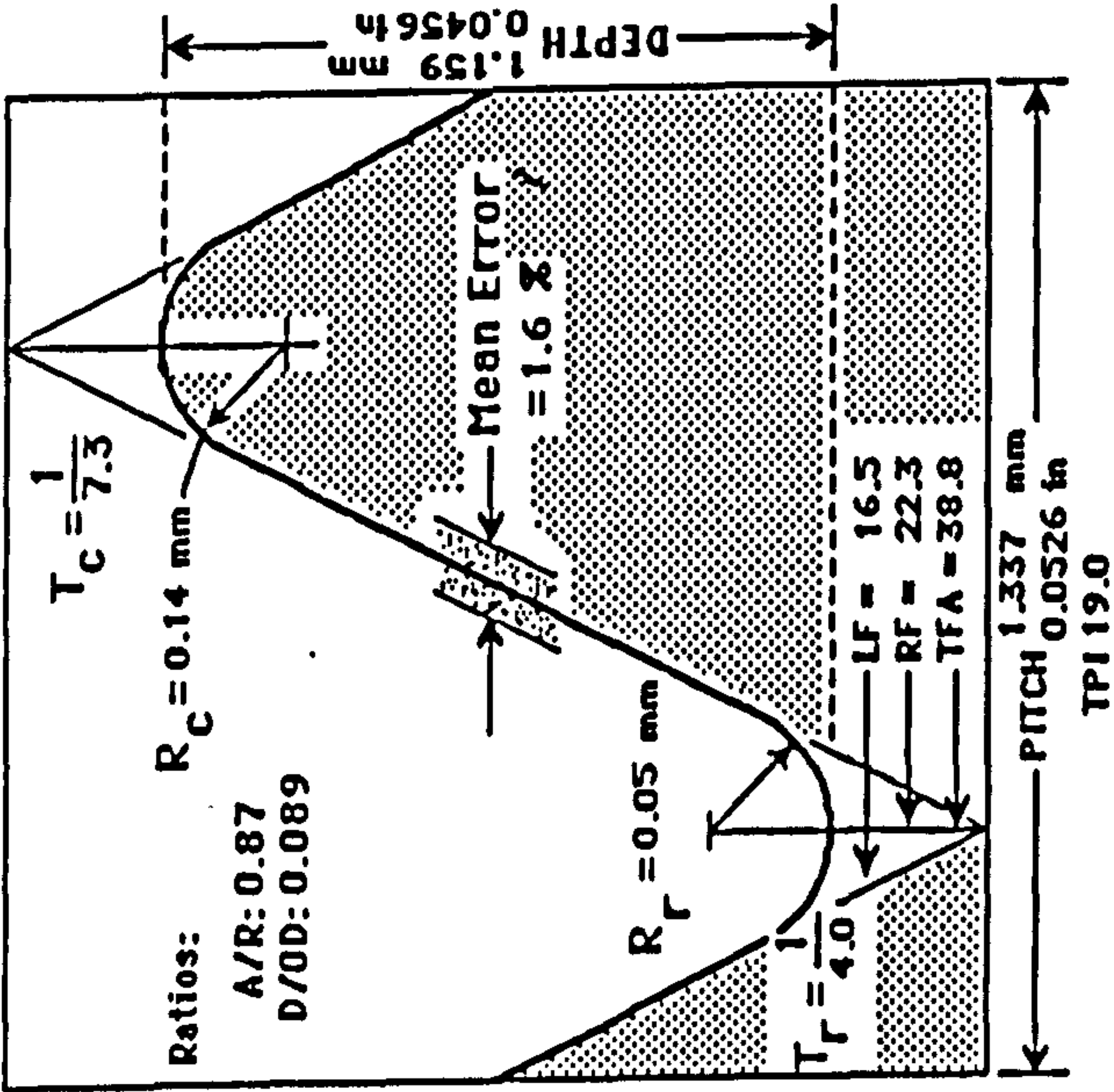
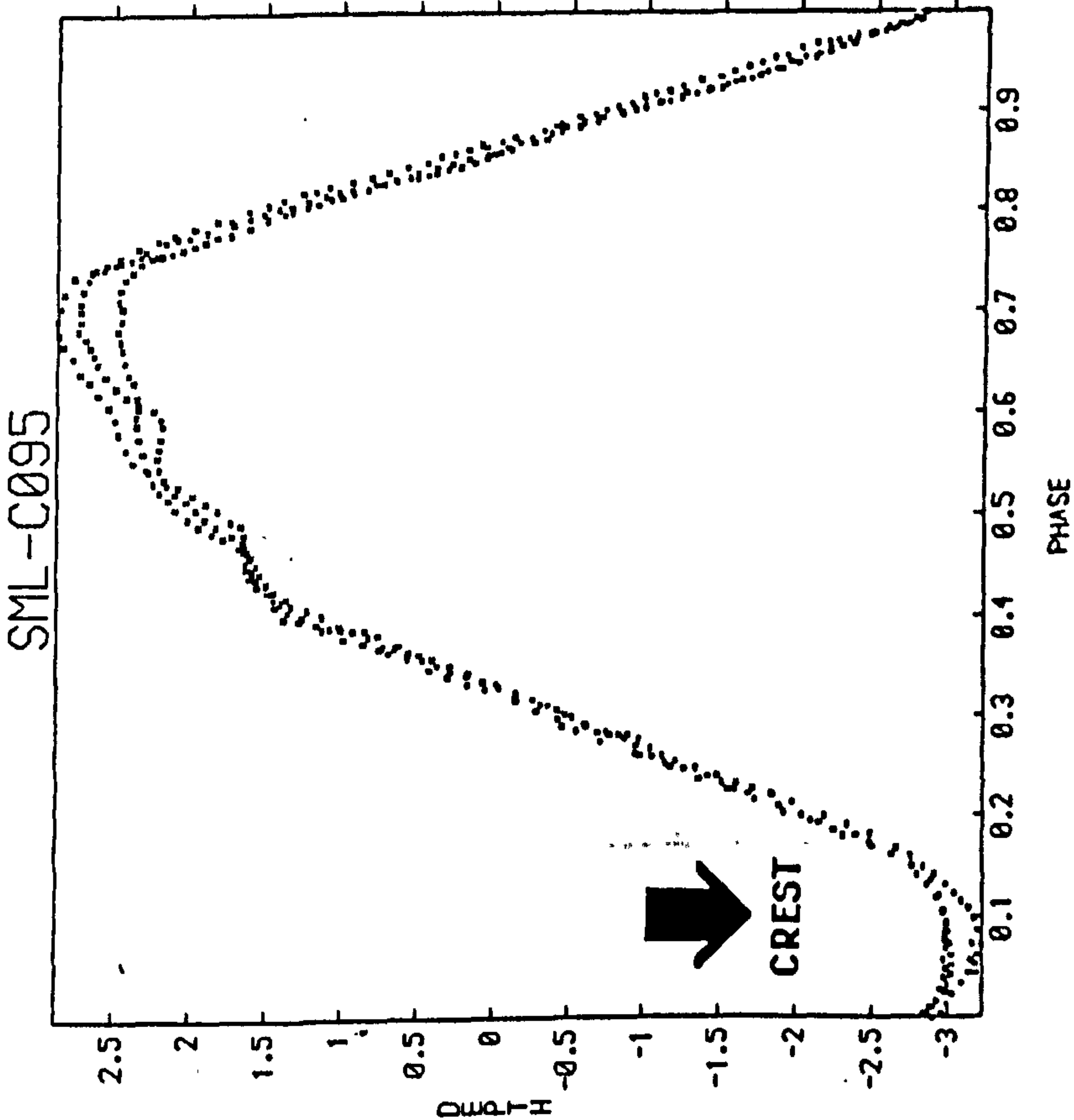
Study Code: SML-C095

Instrument: Cassegrain Reflector

Maker: Ramsden

Date: ca.1775

Ser./Acq. No. 1913-281

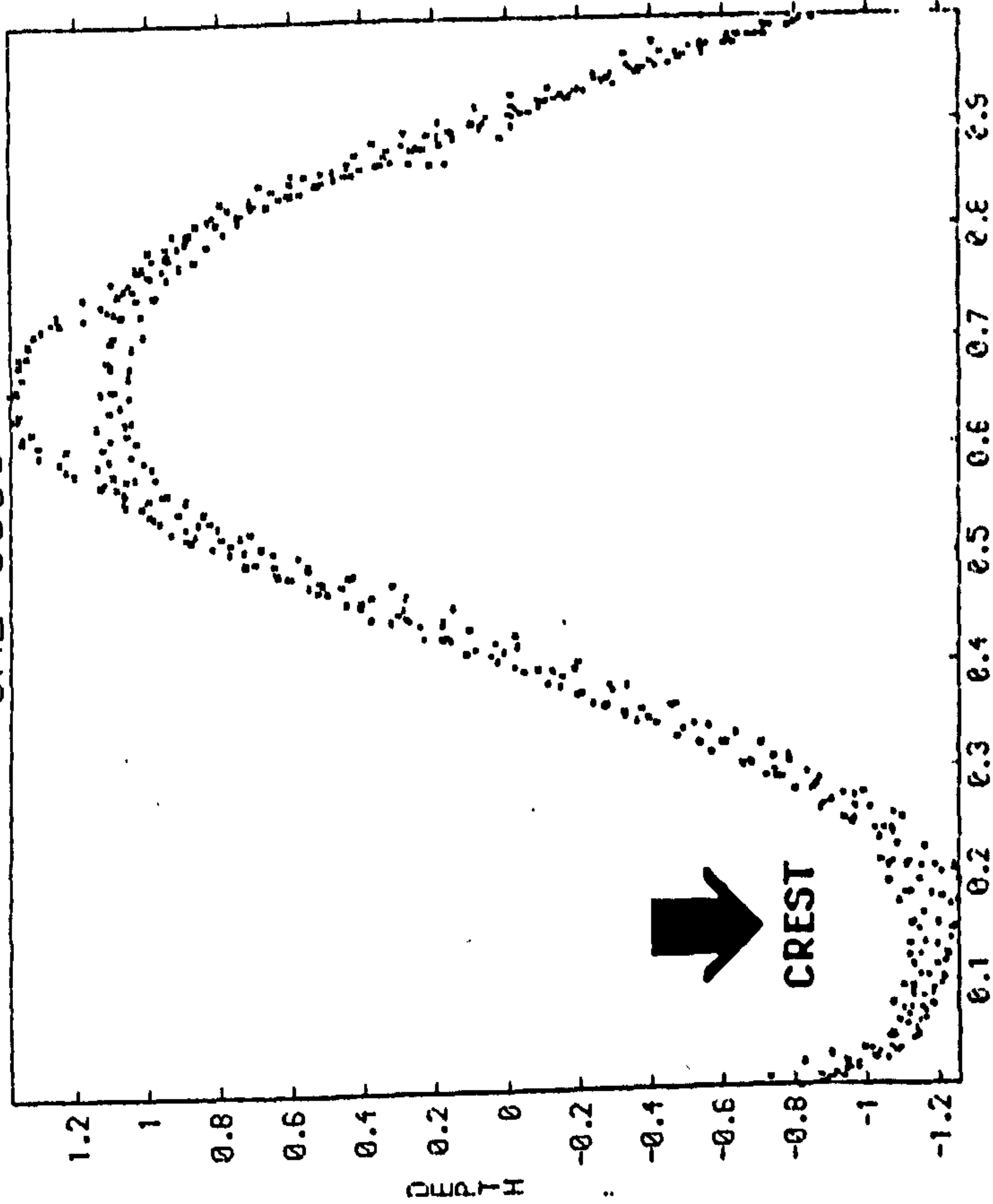


Mu	Filar	
	Scale	
	Bench	
	Div. Eng.	
	Adjust.	
	Leveling	
	Focus	
	Eye P.	
	Tube	
	Tool	
	Gauge	
	Binding	
	Misc.	

Ramsden's 1775 patent design



SML-C096



Characteristics:

Screw ☒ Nut ☐

Leng:  $\approx 1.5''$

Diameter: 0.187"

Steel ☐ Brass ☒

Other:

Instrument Identification:

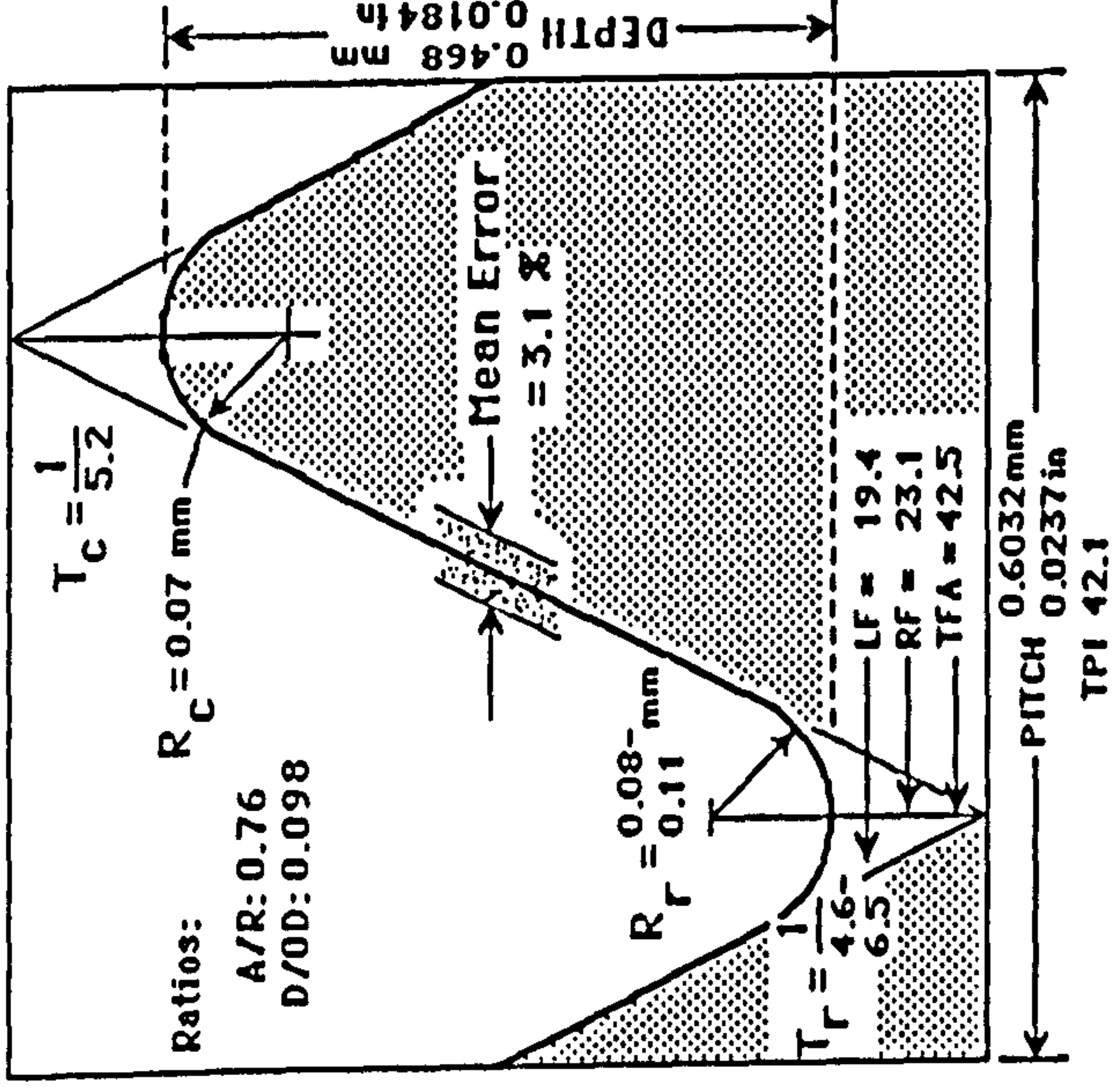
Study Code: SML-C096

Instrument: 6" Quadrant

Maker: Sisson

Date: 3rd q 18th c

Ser./Acq. No. 1918-1651



Mu	Filar	
	Scale	
	Bench	
	Div. Eng.	
	Adjust.	
	Leveling	
	Focus	
	Eye P.	
	Tube	
	Tool	
	Gauge	
	Binding	
	Misc.	

Characteristics:

Screw

Nut

Leng: ~1.125" / 0.375"

Diameter: 0.188"

Steel

Brass

Other:

Instrument Identification:

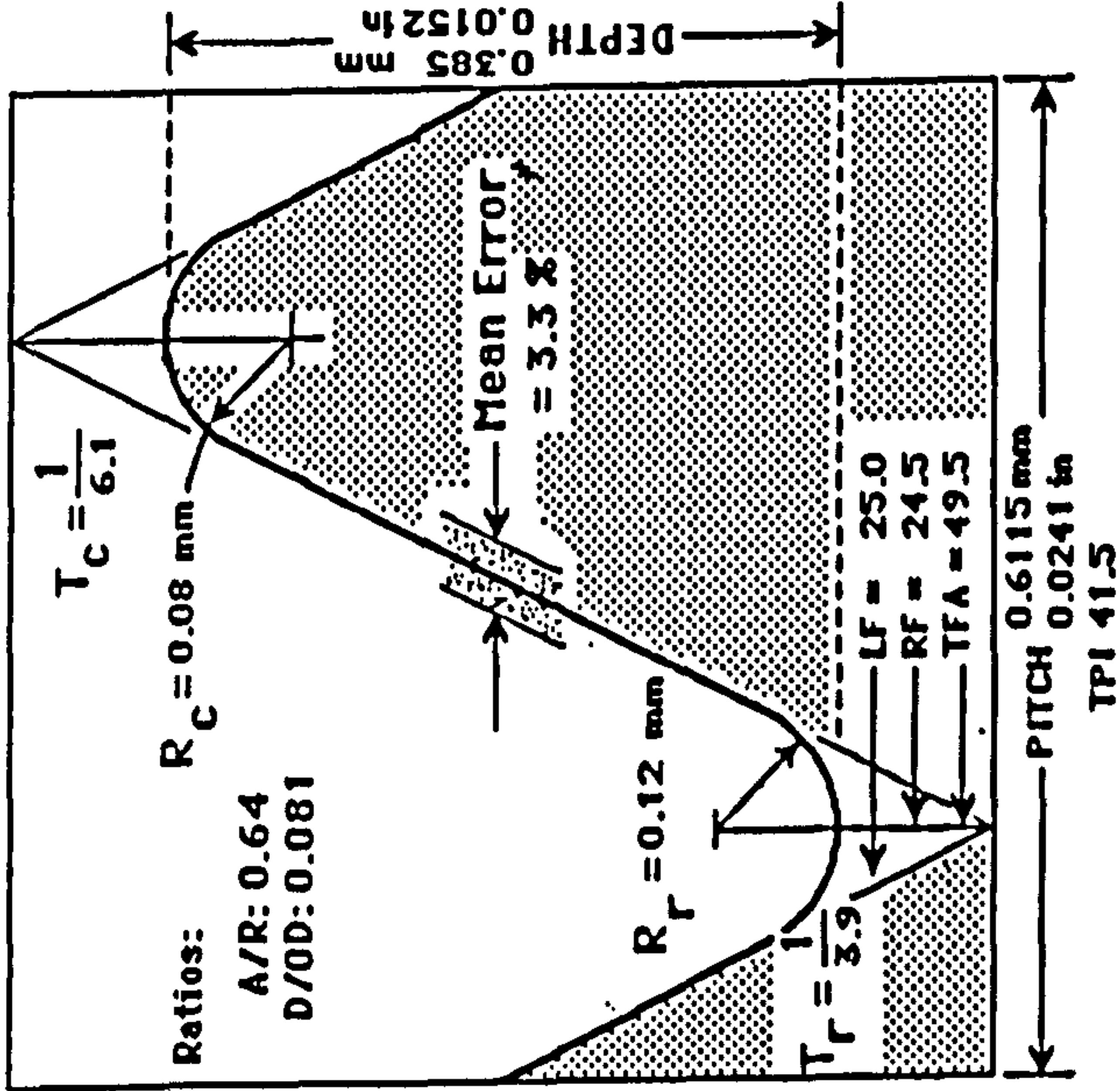
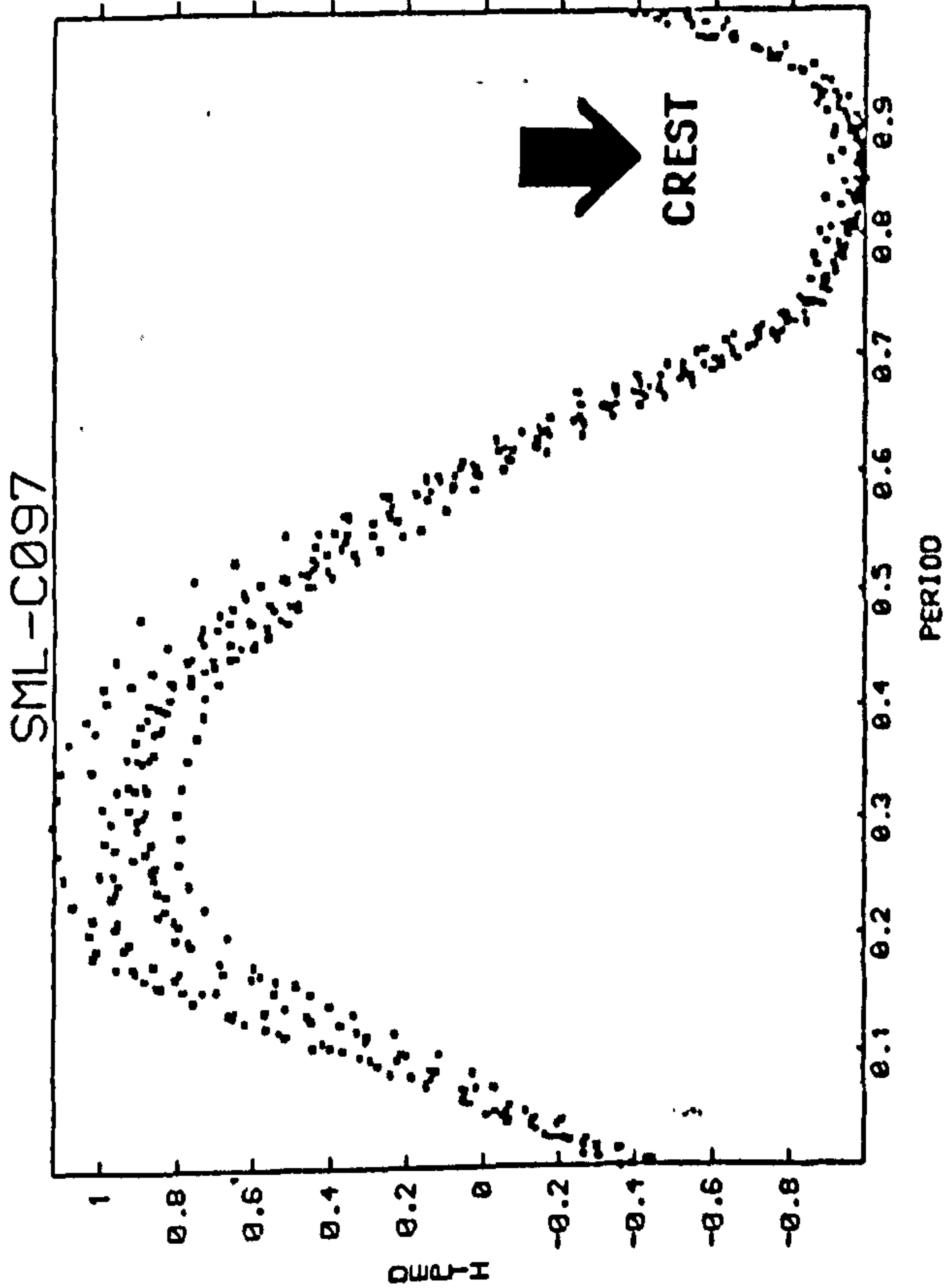
Study Code: SML-C097

Instrument: 6" Quadrant(?)

Maker: Sisson

Date: 3rd q 18th c

Ser./Acq. No. 1918-168



Mu

Filar

Scale

Bench

Div. Eng.

Adjust.

Leveling

Focus

Eye P.

Tube

Tool

Gauge

Binding

Misc.

Characteristics:

Screw

Nut

Leng: 1.5 / ~0.625"

Diameter: 0.184"

Steel

Brass

Other: (nut of wood)

Instrument Identification:

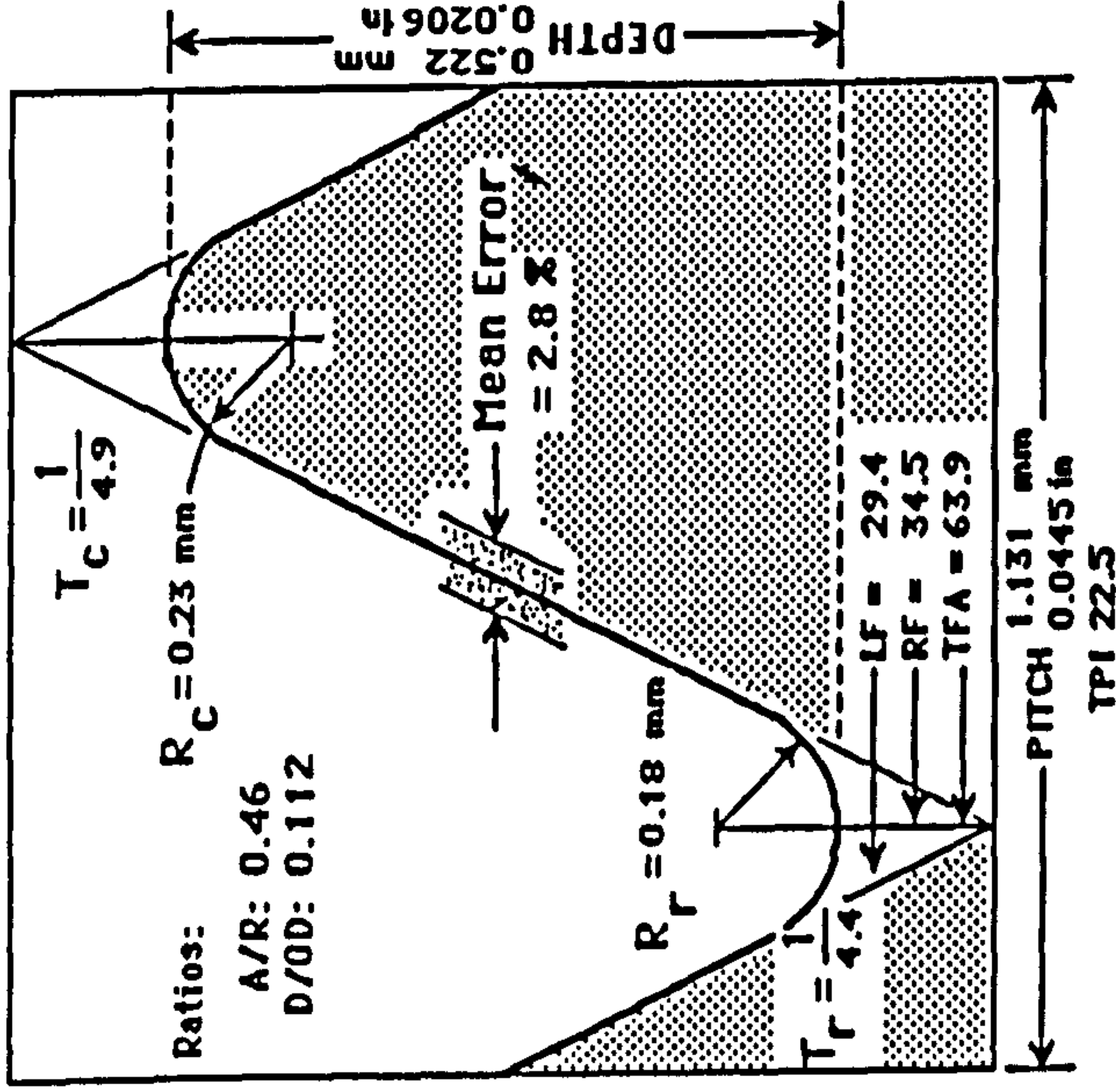
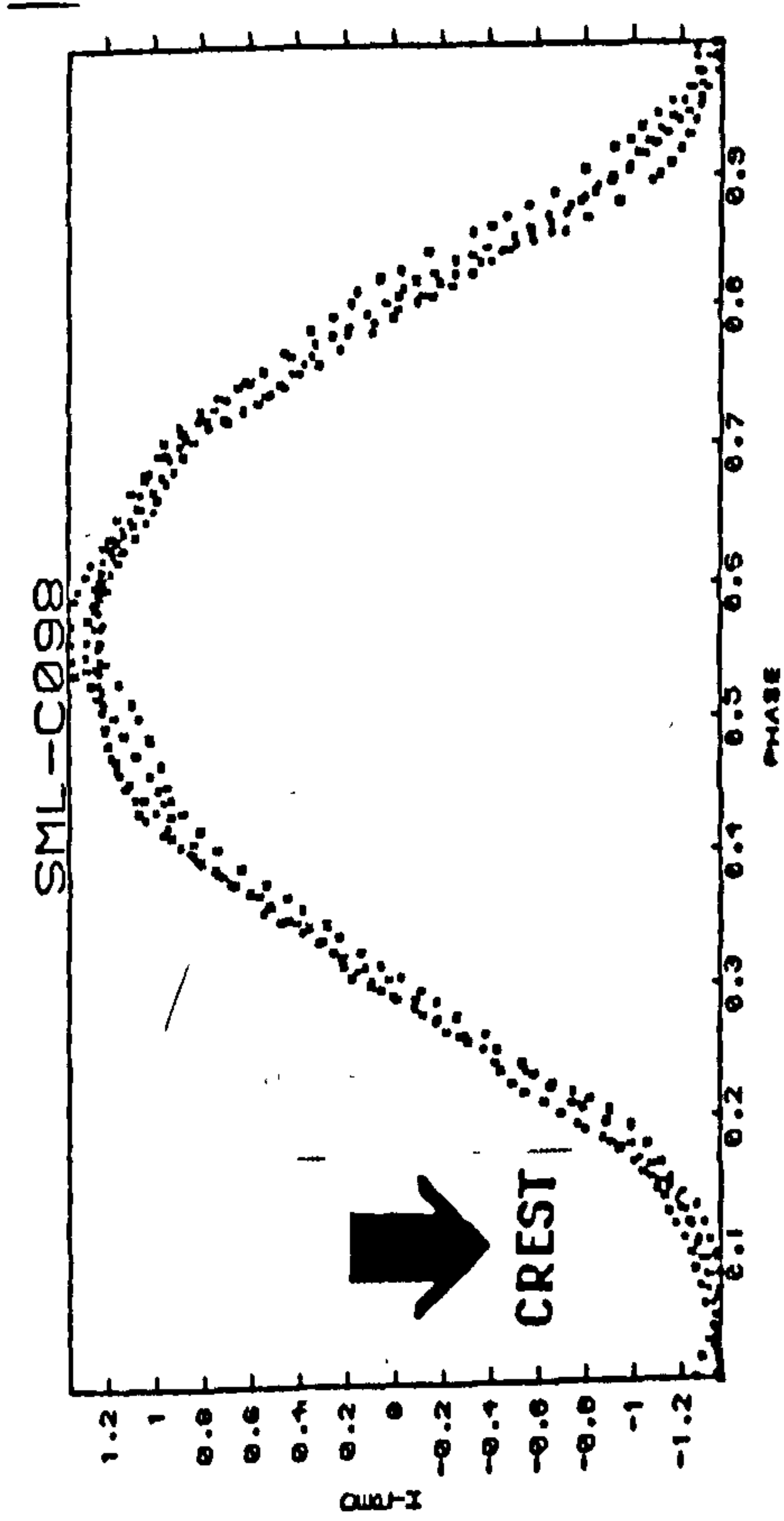
Study Code: SML-C098

Instrument: Gunter Quadrant

Maker: Thomas Wright

Date: 1715-40

Ser./Acq. No. 1920-439



Mu	[	Filar	
		Scale	
		Bench	
		Div. Eng.	
		Adjust.	
		Leveling	
		Focus	
		Eye P.	
		Tube	
		Tool	
		Gauge	
		Binding	
		Misc.	

(double thread)



Characteristics:

Screw

Nut

Leng: ~1.0" / 0.75"

Diameter: 0.206"

Steel

Brass

Other:

Instrument Identification:

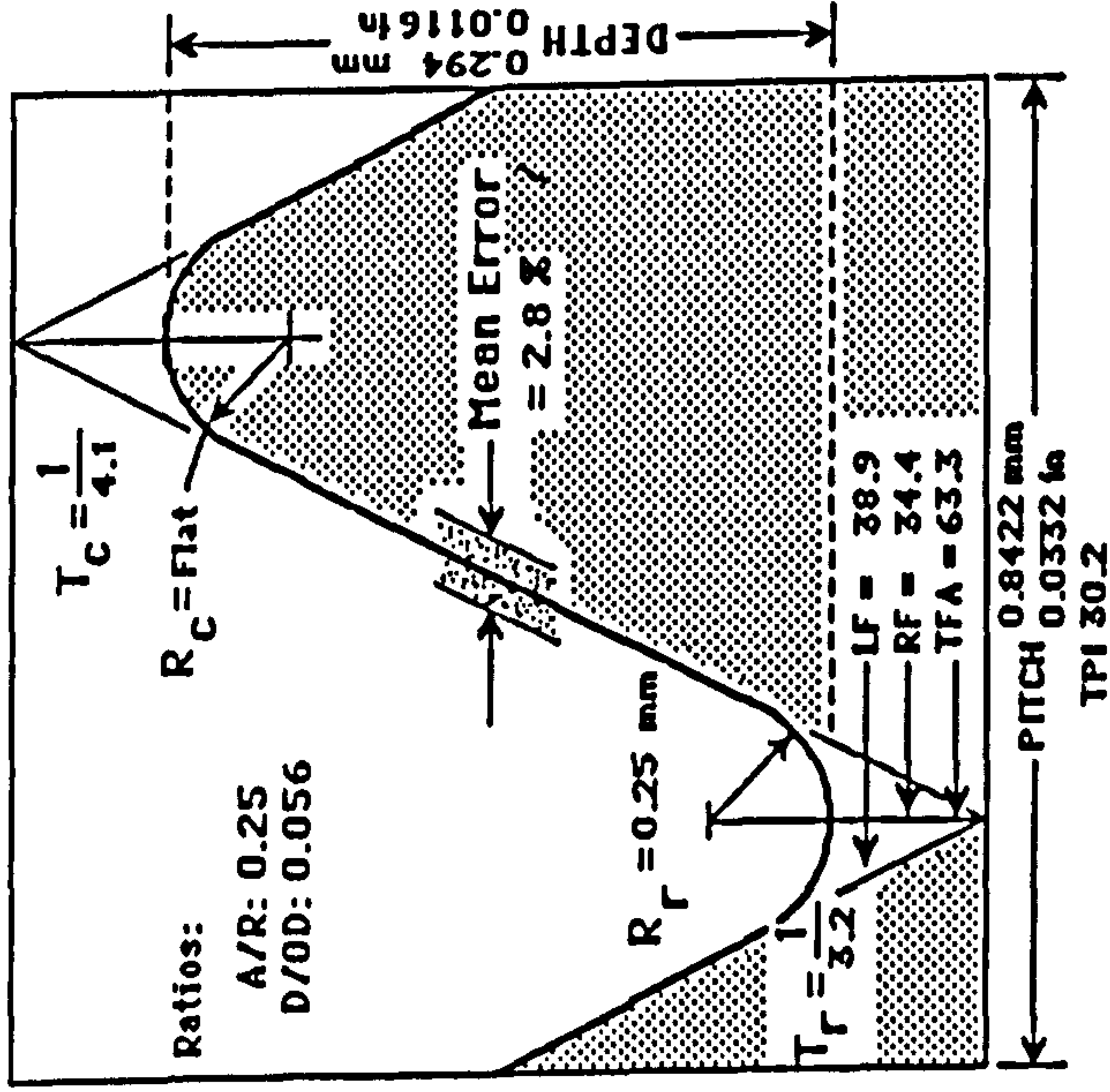
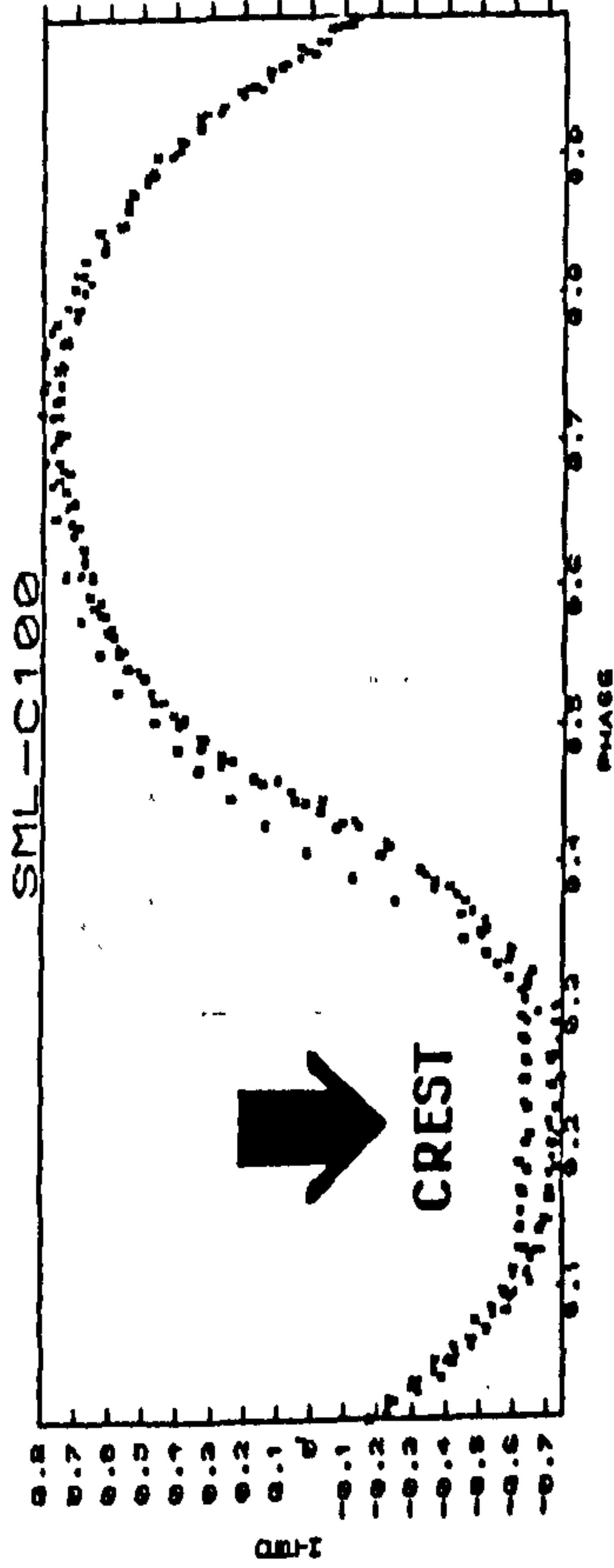
Study Code: SML-C100

Instrument: Surveying sextant

Maker: J & E Troughton

Date: <1806

Ser./Acq. No. 1931-95



Mu	Filar
	Scale
	Bench
	Div. Eng.
	Adjust.
	Leveling
	Focus
	Eye P.
	Tube
	Tool
	Gauge
	Binding
	Misc.

Thread is double



Characteristics:

Screw

Nut

Leng: 1.25"

Diameter: 0.281"

Steel

Brass

Other:

Instrument Identification:

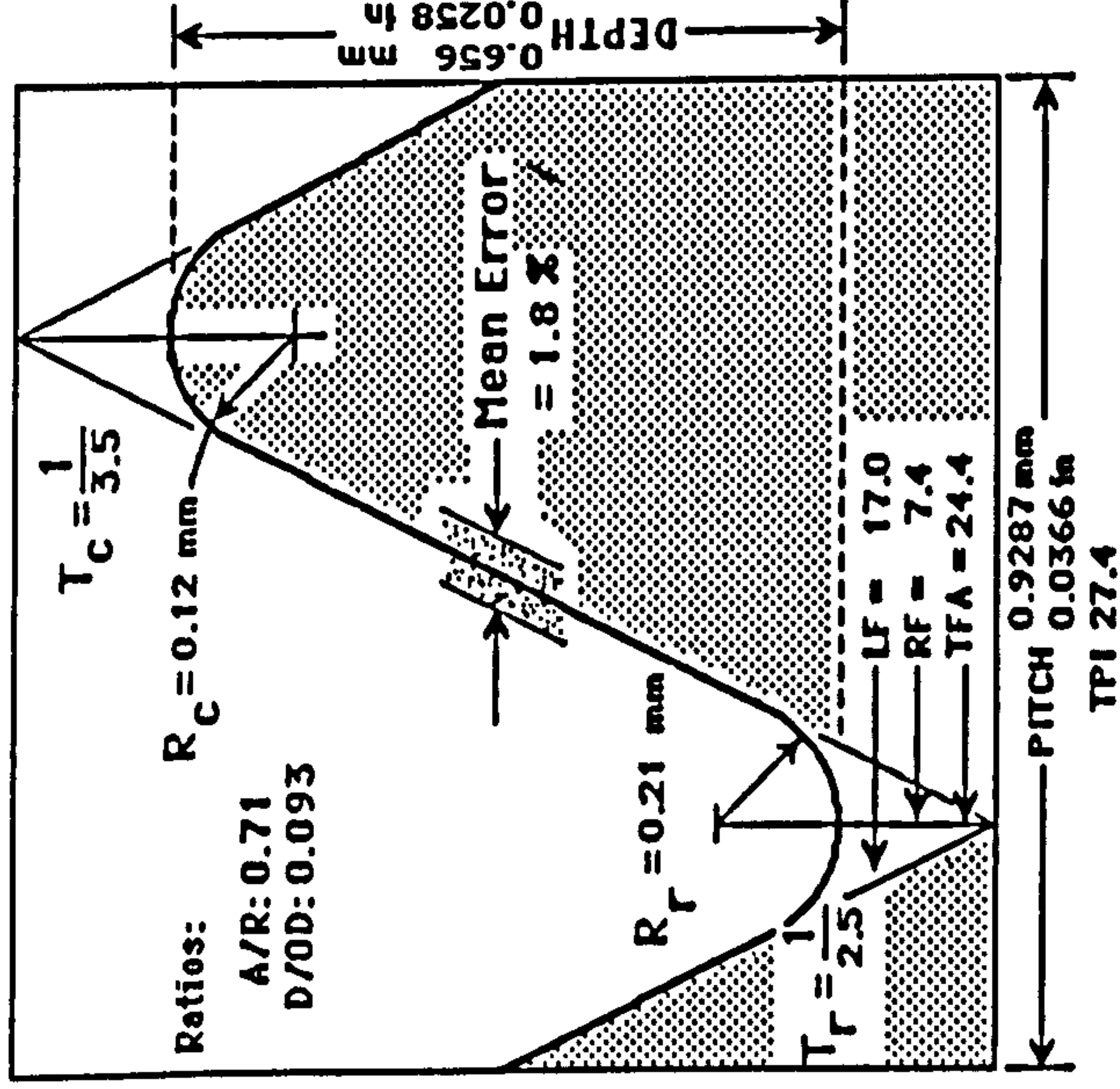
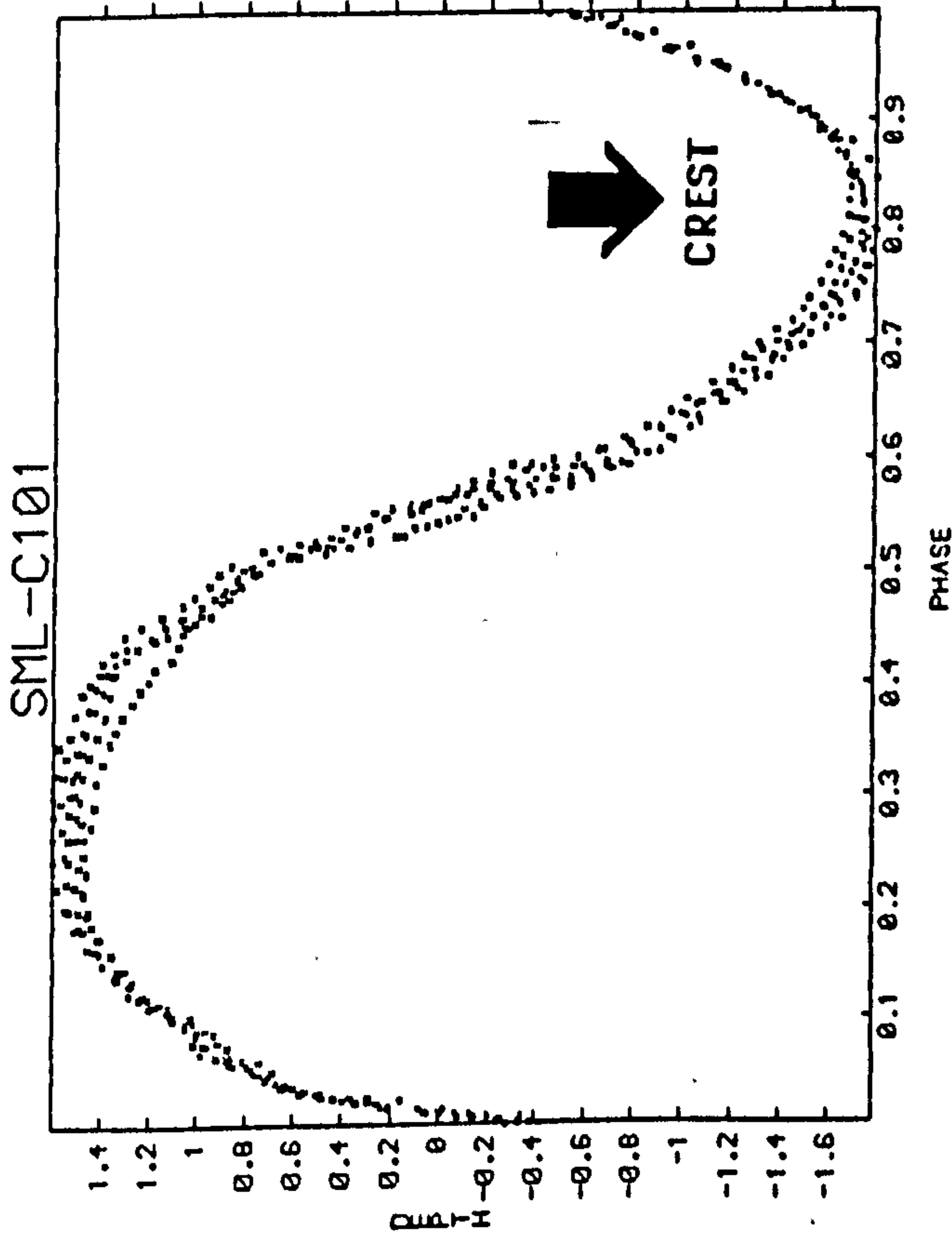
Study Code: SML-C101

Instrument: Octant on stand

Maker: Benjamin Martin

Date: ca.1760

Ser./Acq. No. 1937-118



Mu

Filar

Scale

Bench

Div. Eng.

Adjust.

Leveling

Focus

Eye P.

Tube

Tool

Gauge

Binding

Misc.

See Bennett, 1987, fig.83

Characteristics:

Screw

Nut

Leng: 1.375"

Diameter: 0.208"

Steel

Brass

Other:

Instrument Identification:

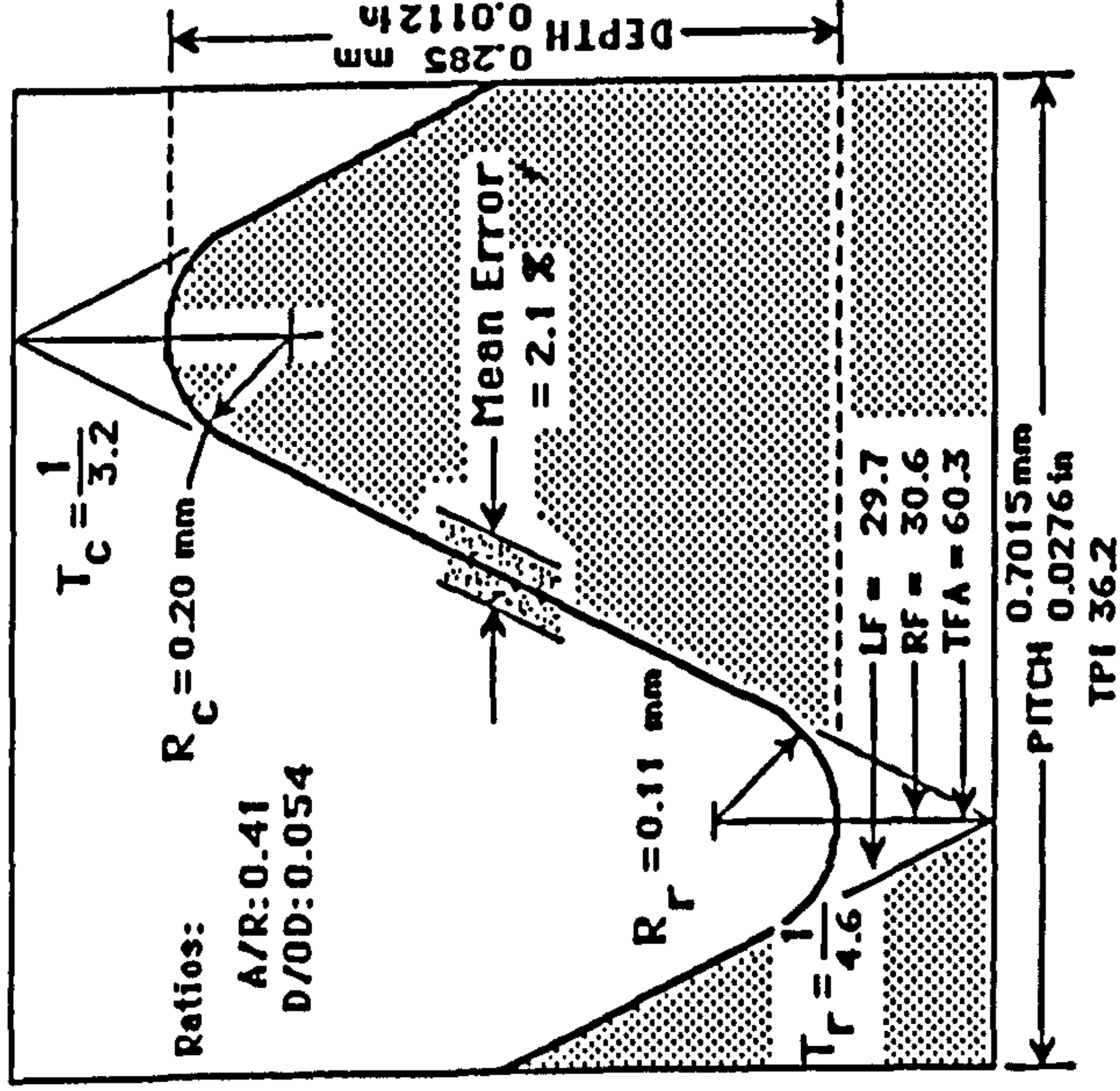
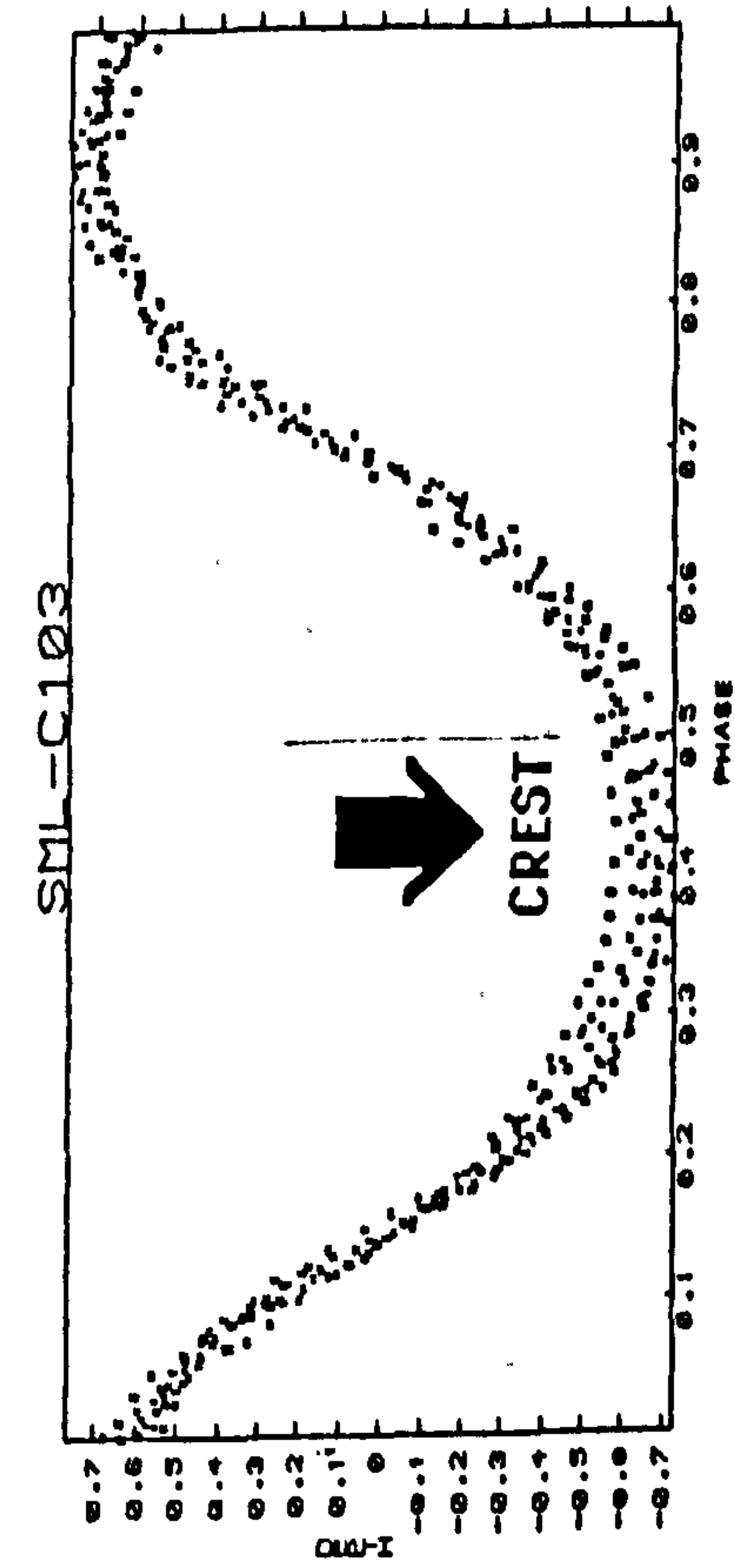
Study Code: SML-C103

Instrument: Not known

Maker: Not known

Date: 1 18th-e 19th c

Ser./Acq. No.



Mu	Filar	
	Scale	
	Bench	
	Div. Eng.	
	Adjust.	
	Leveling	
	Focus	
	Eye P.	
	Tube	
	Tool	
Gauge		
Binding		
Misc.		

Charles Maddison's 11-2

Characteristics:

Screw

Nut

Leng: ~1.25"

Diameter: 0.276"

Steel

Brass

Other:

Instrument Identification:

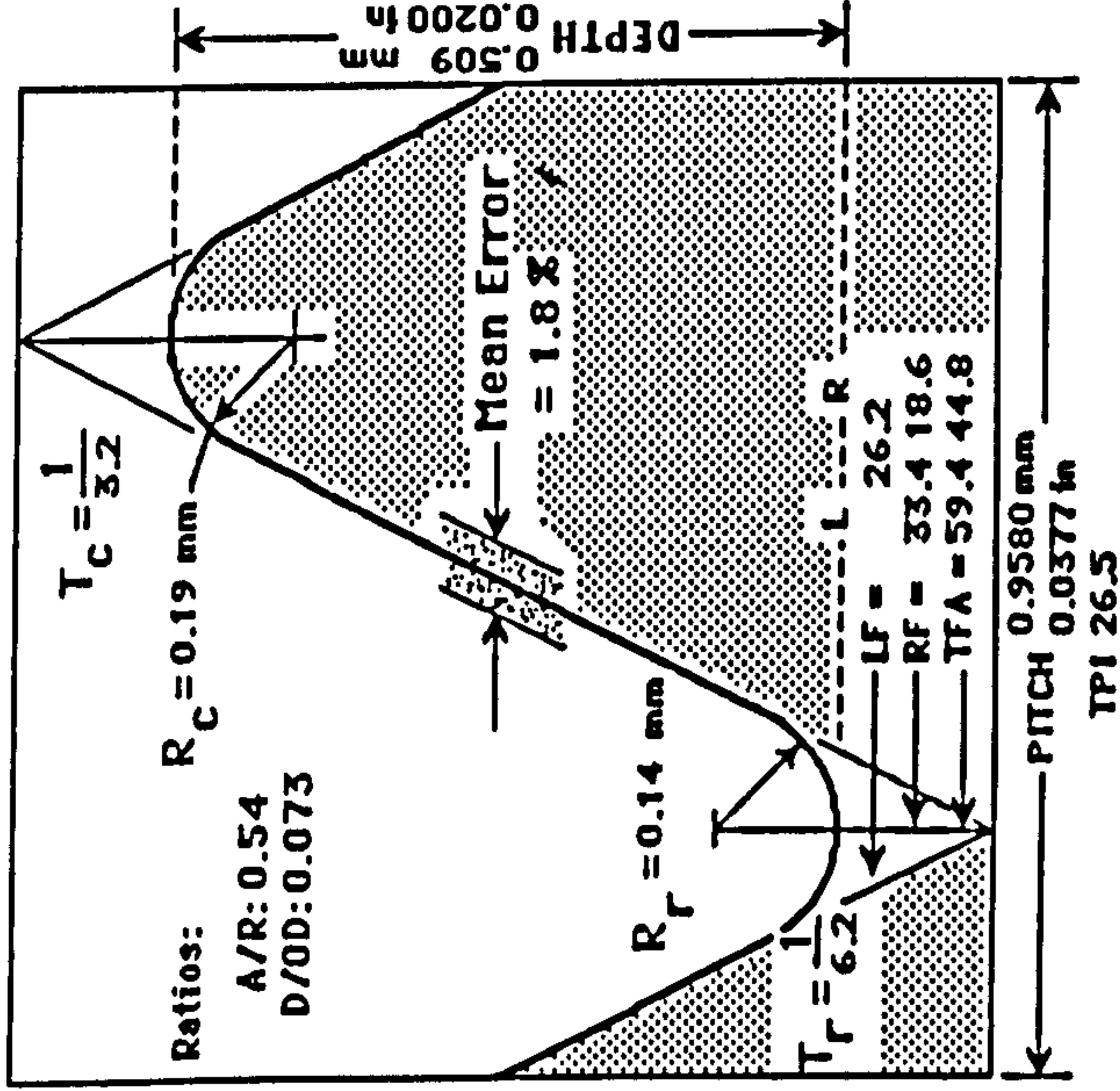
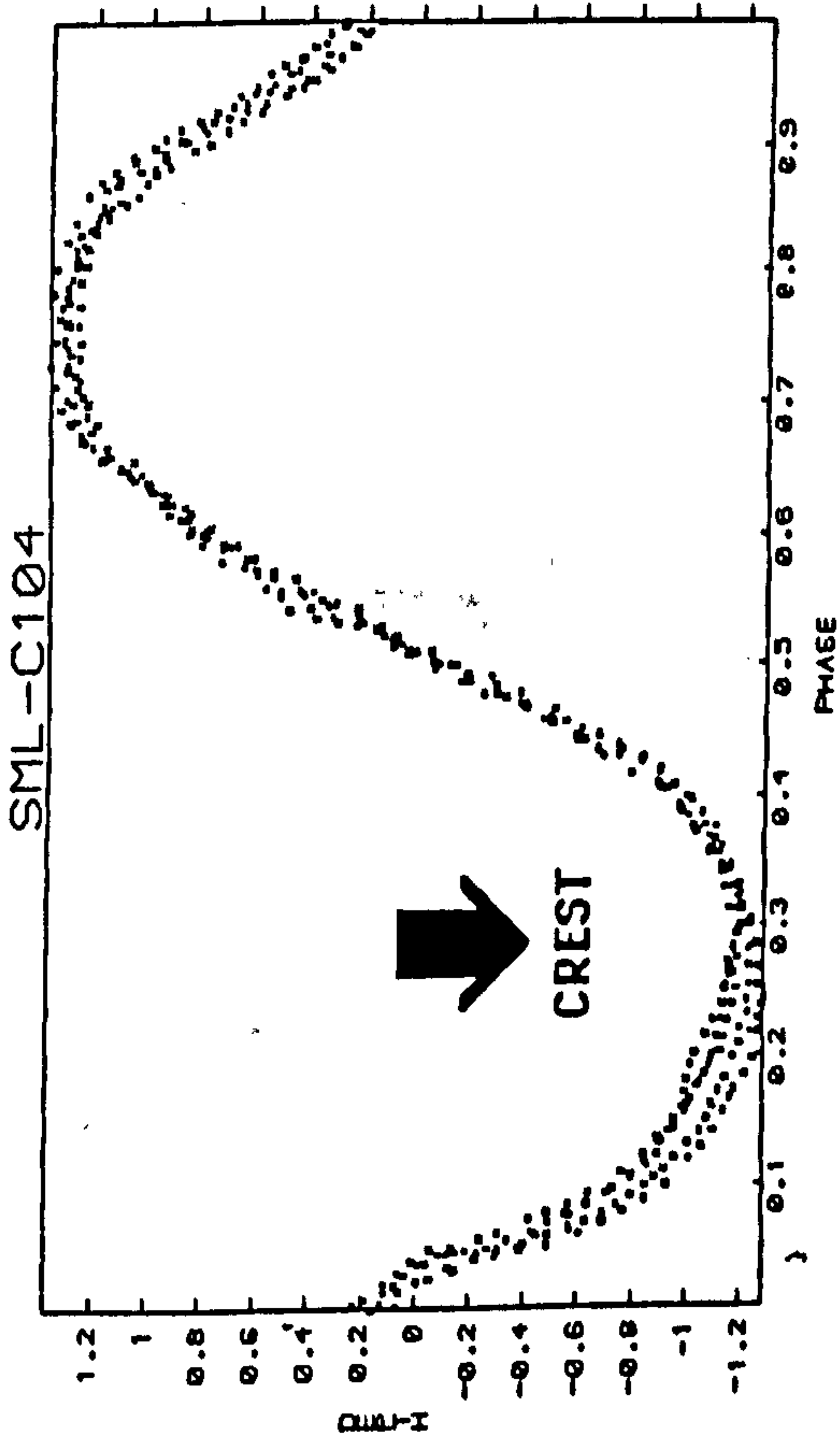
Study Code: SML-C104

Instrument: not known

Maker: not known

Date: not known

Ser./Acq. No. Maddison's #10-2



Mu	[	Filar	
		Scale	
		Bench	
		Div. Eng.	
		Adjust.	
		Leveling	
		Focus	
		Eye P.	
		Tube	
		Tool	
		Gauge	
		Binding	
		Misc.	

Charles Maddison's 10-2



Characteristics:

Screw

Nut

Leng: 1.188"

Diameter: 0.163"

Steel

Brass

Other:

Instrument Identification:

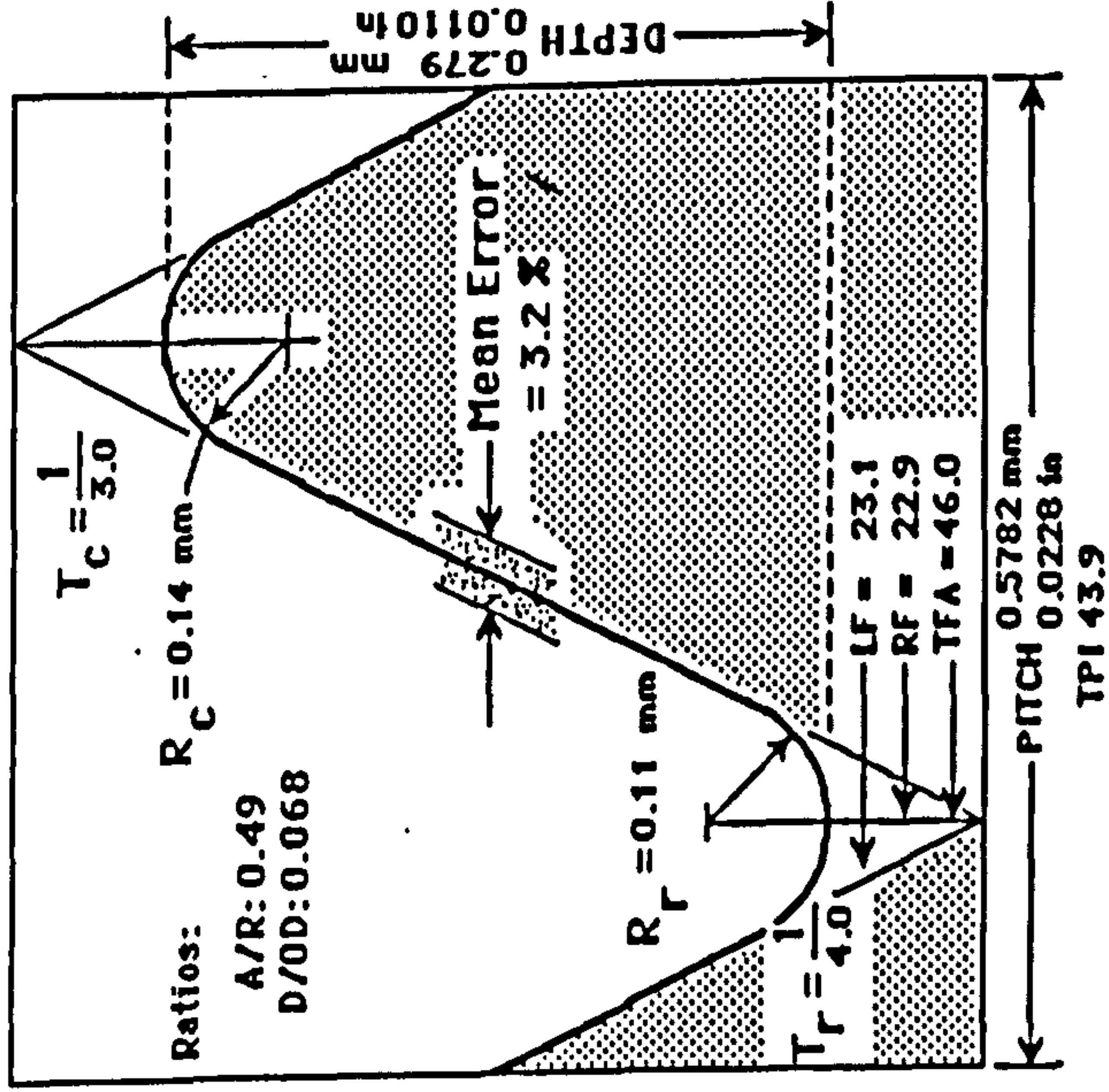
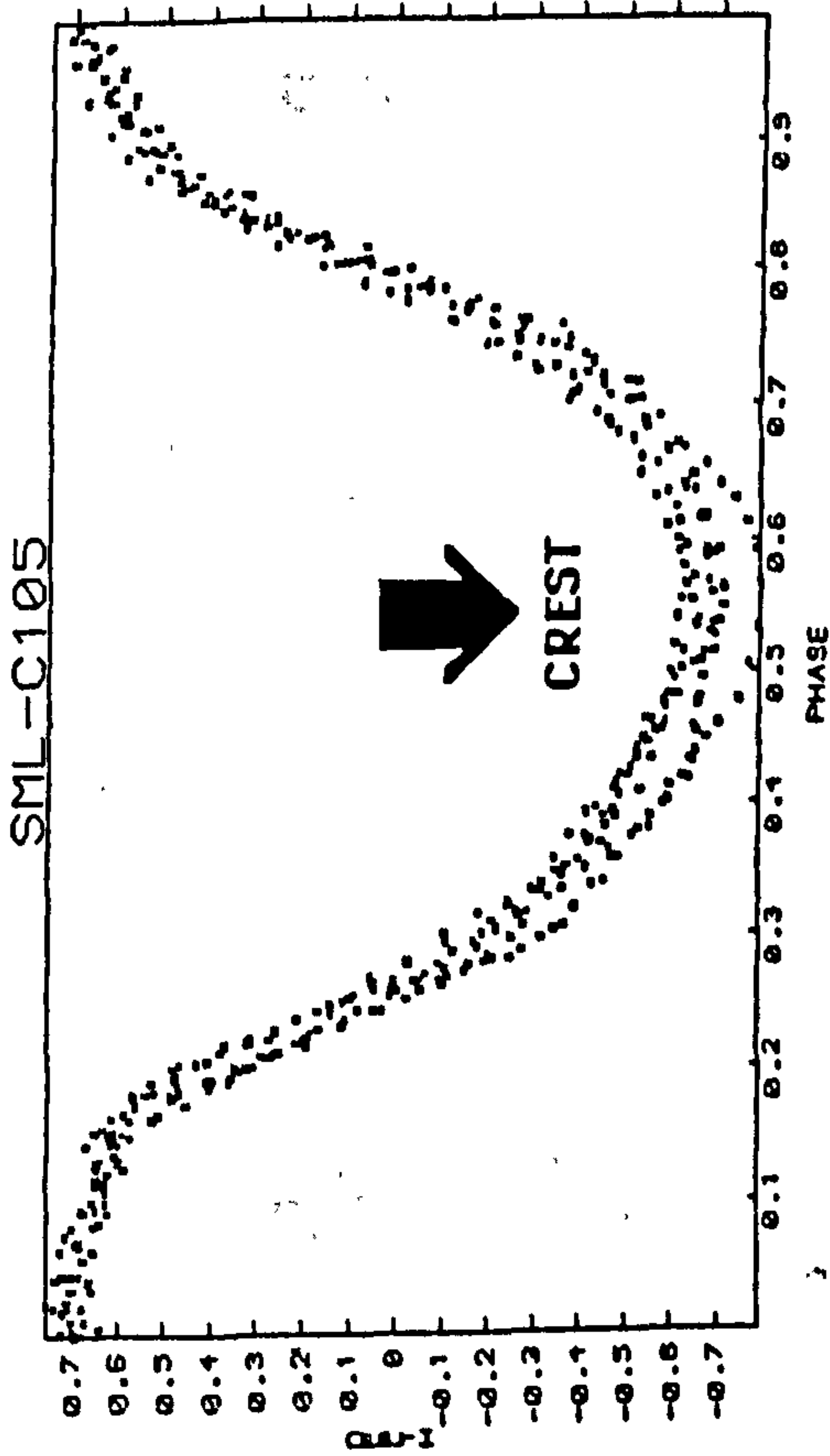
Study Code: SML-C105

Instrument: not known

Maker: not known

Date: not known

Ser./Acq. No. Maddison's #9-2



Mu	Filar	
	Scale	
	Bench	
	Div. Eng.	
	Adjust.	
	Leveling	
	Focus	
	Eye P.	
	Tube	
	Tool	
	Gauge	
	Binding	
	Misc.	

Charles Maddison's 9-2



Characteristics:

Screw

Nut

Leng: 1.125"

Diameter: 0.232"

Steel

Brass

Other:

Instrument Identification:

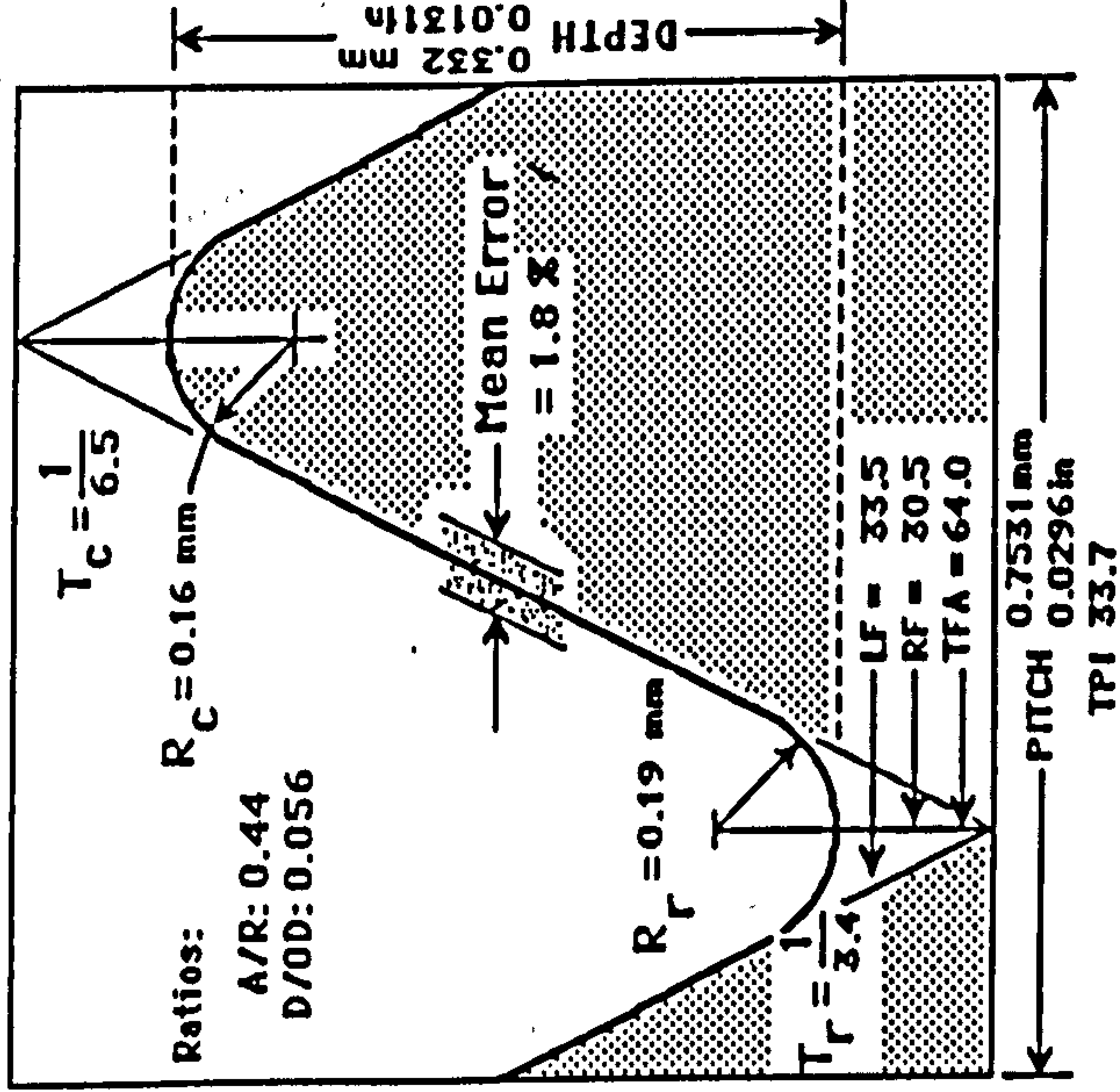
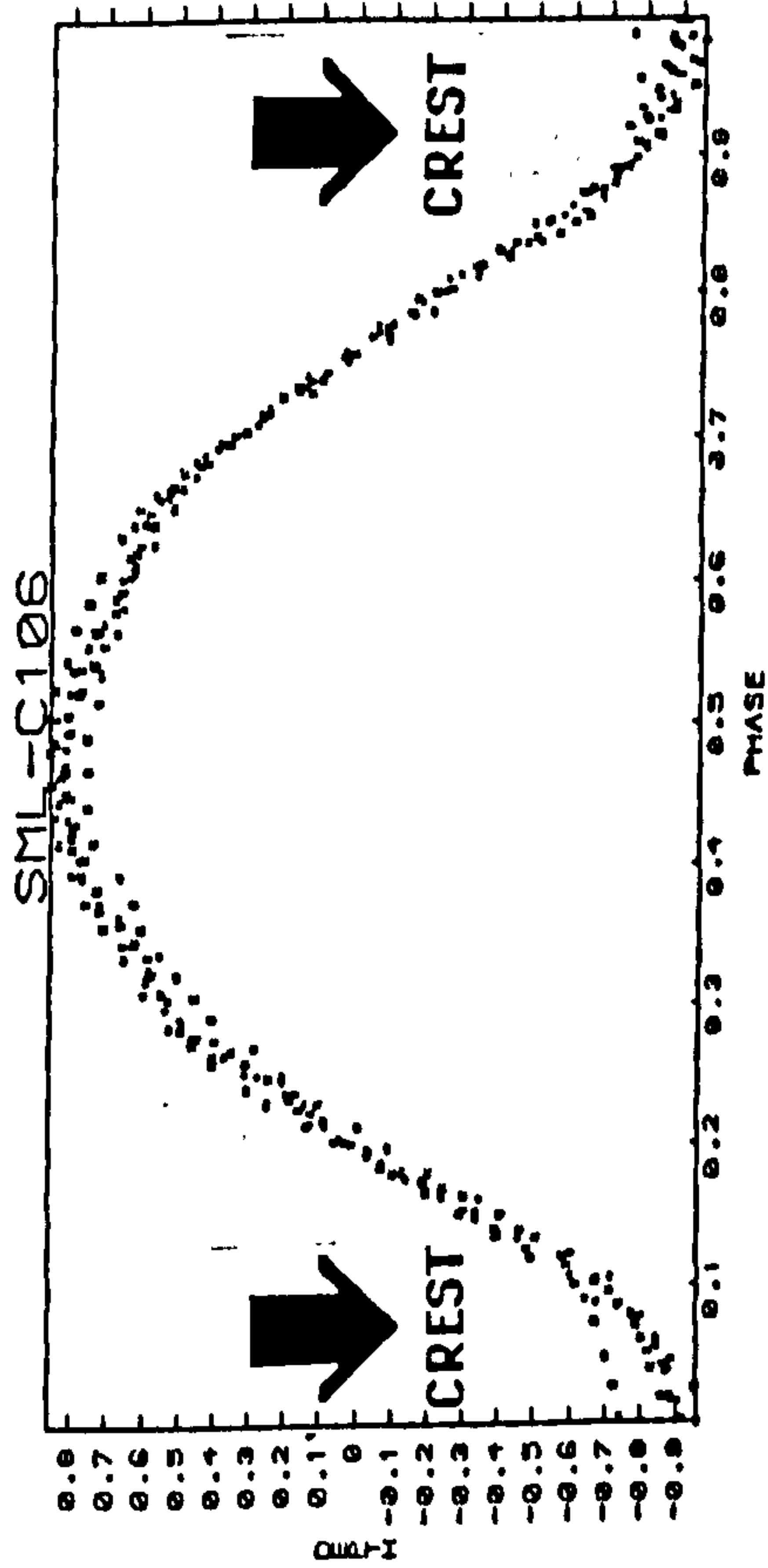
Study Code: SML-C106

Instrument: Sundial

Maker: not known

Date: not known

Ser./Acq. No.Maddison's Sundial 2



Mu	Filar	
	Scale	
	Bench	
	Div. Eng.	
	Adjust.	
	Leveling	
	Focus	
	Eye P.	
	Tube	
	Tool	
	Gauge	
	Binding	
	Misc.	

Charles Maddison's "Sundial-2"

Characteristics:

Screw

Nut

Leng: 2.5"

Diameter: 0.3209"

Steel

Brass

Other:

Instrument Identification:

Study Code:

GMT-3a

Instrument:

Gregorian

Maker:

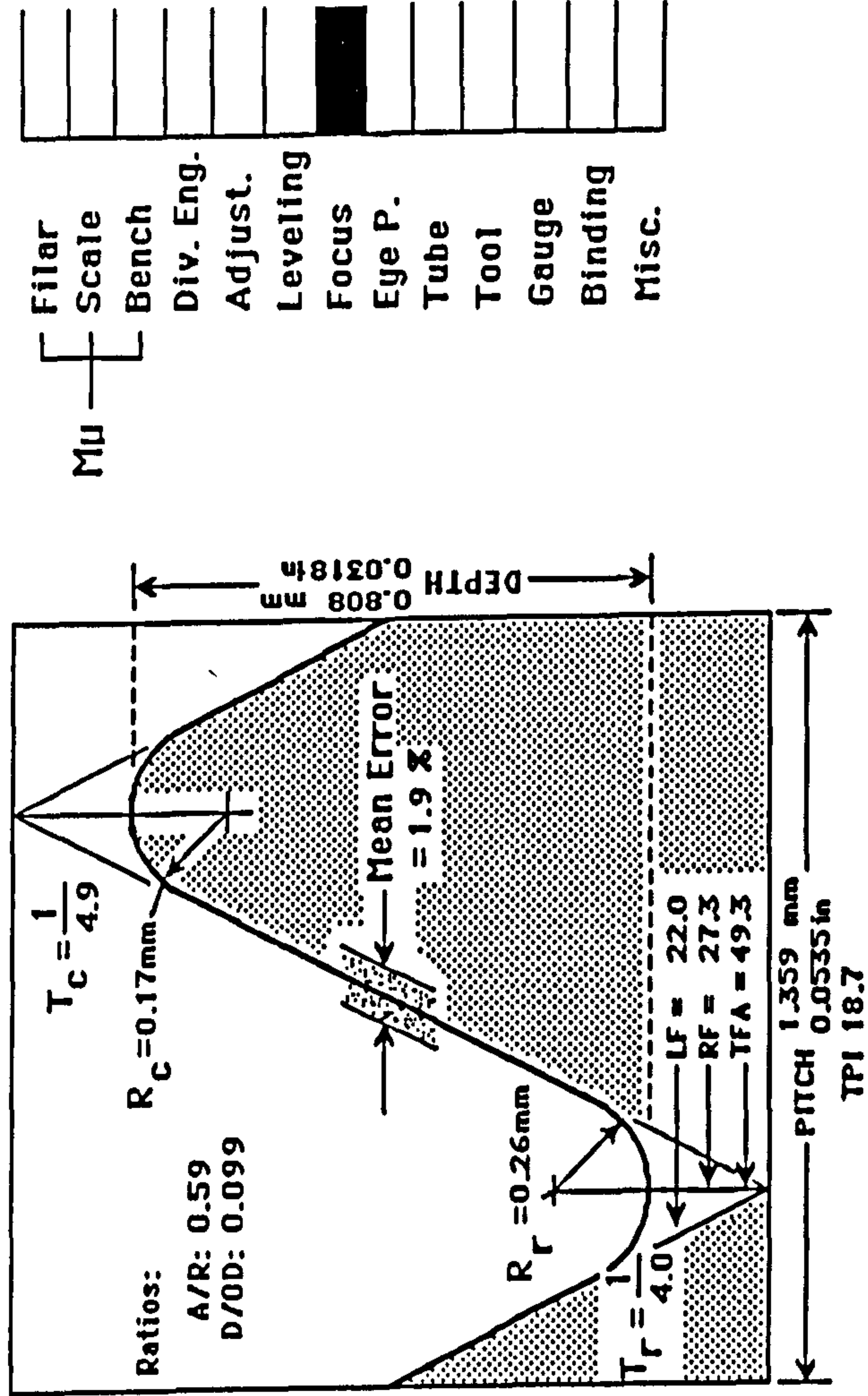
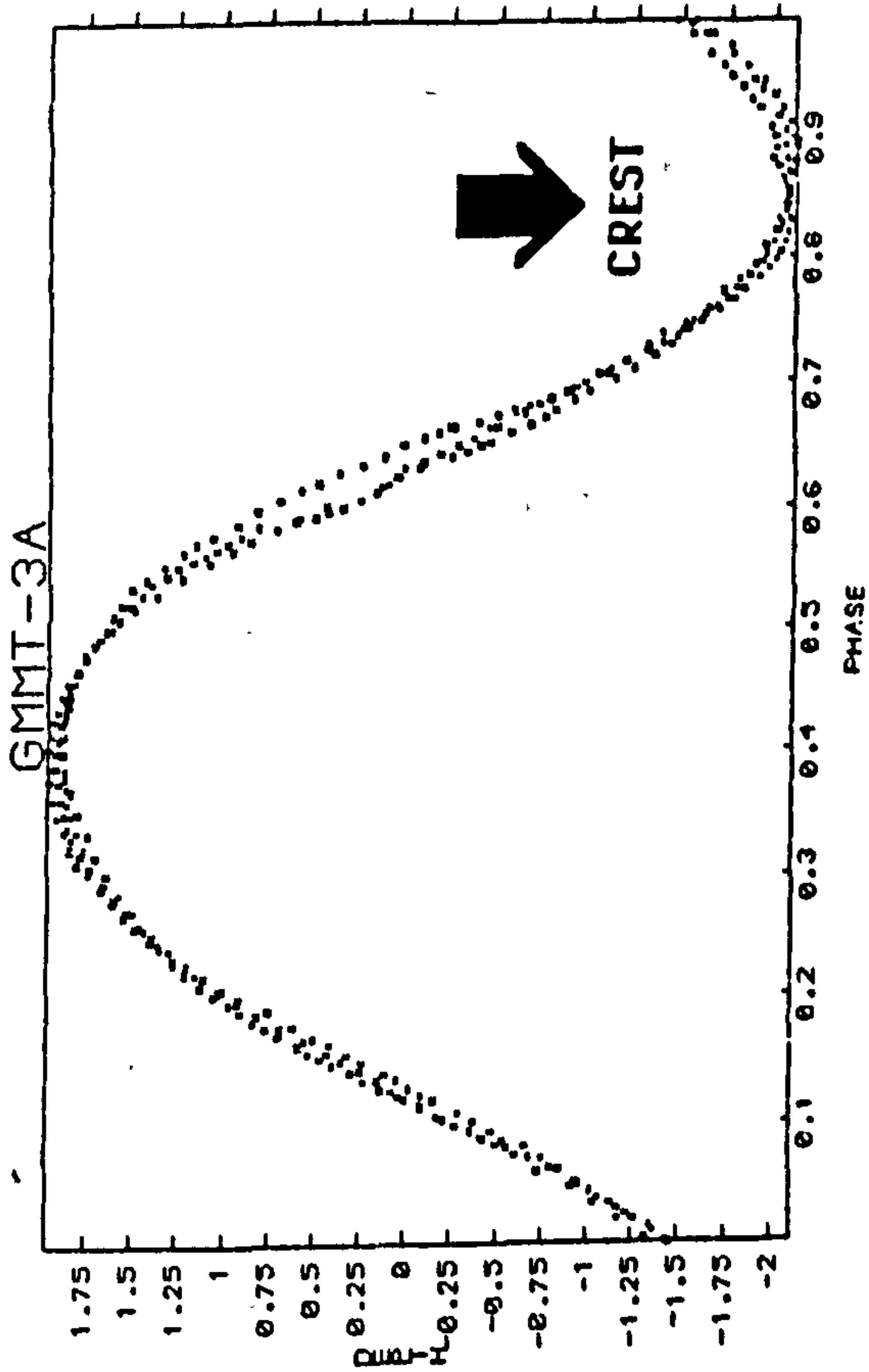
Francis Watkins I

Date:

ca.1770

Ser./Acq. No.

L1970.3



Characteristics:

Screw

Nut

Leng: 0.313 / 0.188"

Diameter: 0.1408"

Steel

Brass

Other:

Instrument Identification:

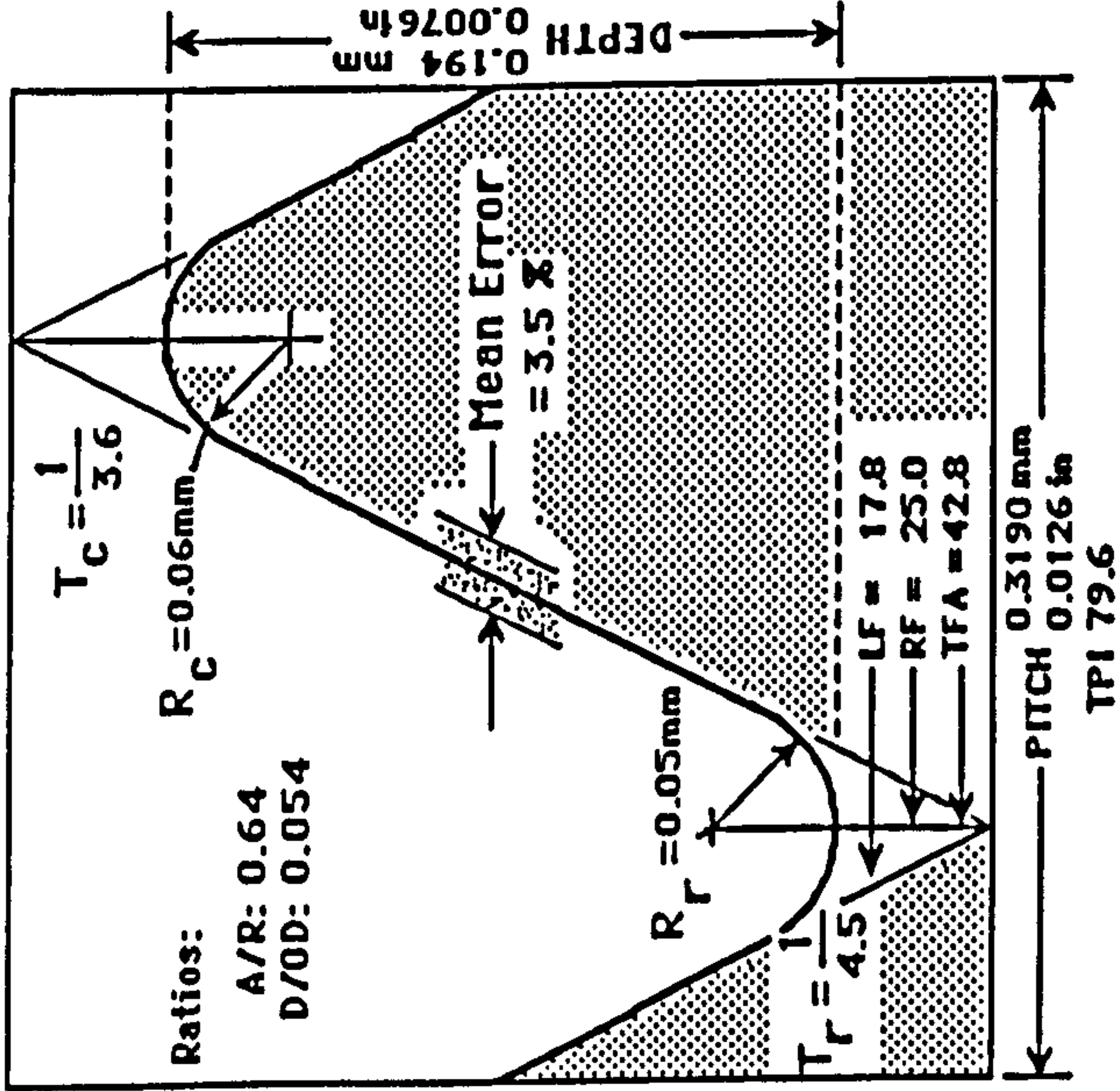
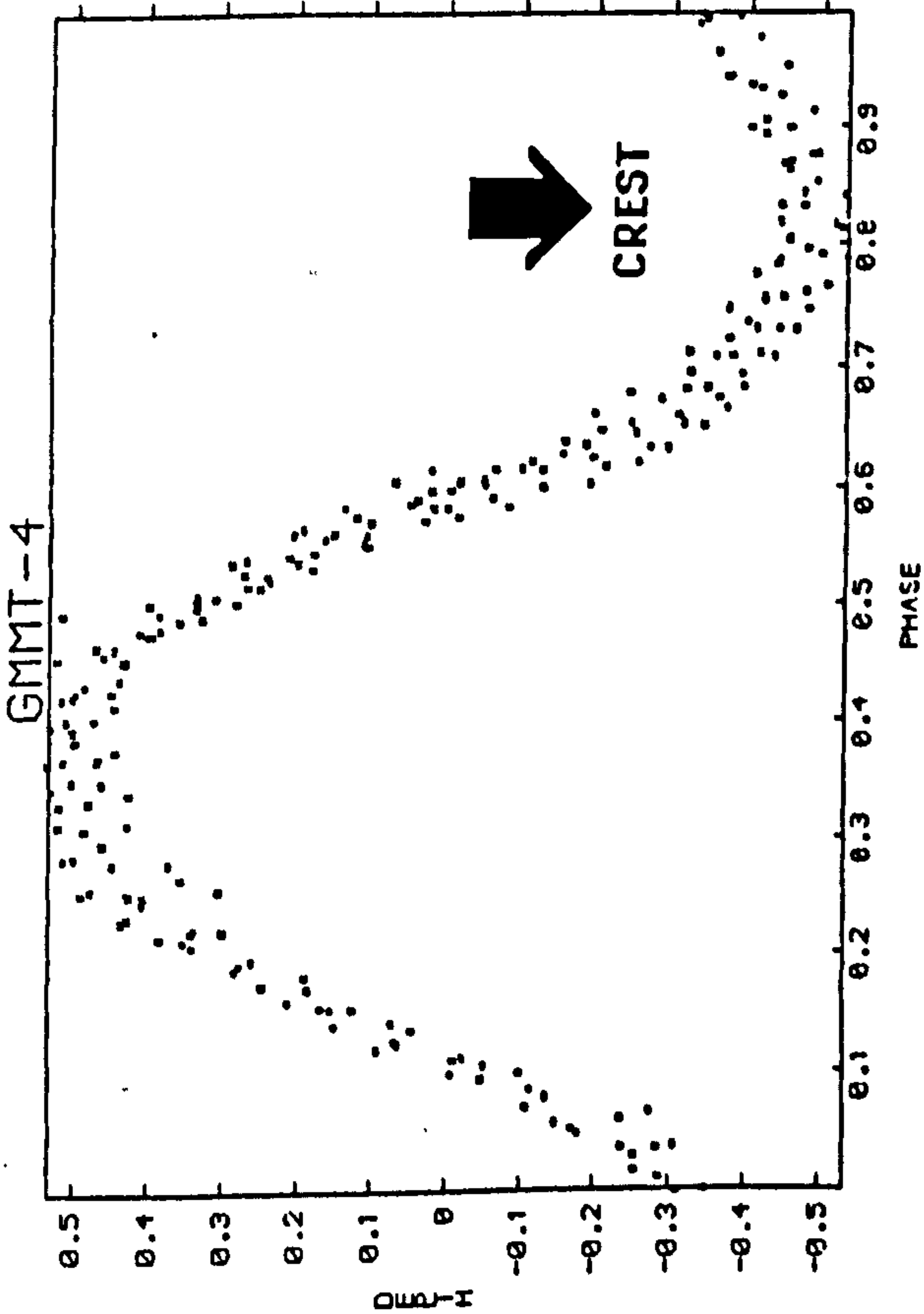
Study Code: GMT-4

Instrument: Wenham microscope

Maker: J.B. Dancer

Date: ca.1880

Ser./Acq. No. 1984.168.1



Mu

Filar

Scale

Bench

Div. Eng.

Adjust.

Leveling

Focus

Eye P.

Tube

Tool

Gauge

Binding

Misc.



Characteristics:

Screw

Nut

Leng: 2.25 / 0.401"

Diameter: 0.1557"

Steel

Brass

Other:

Instrument Identification:

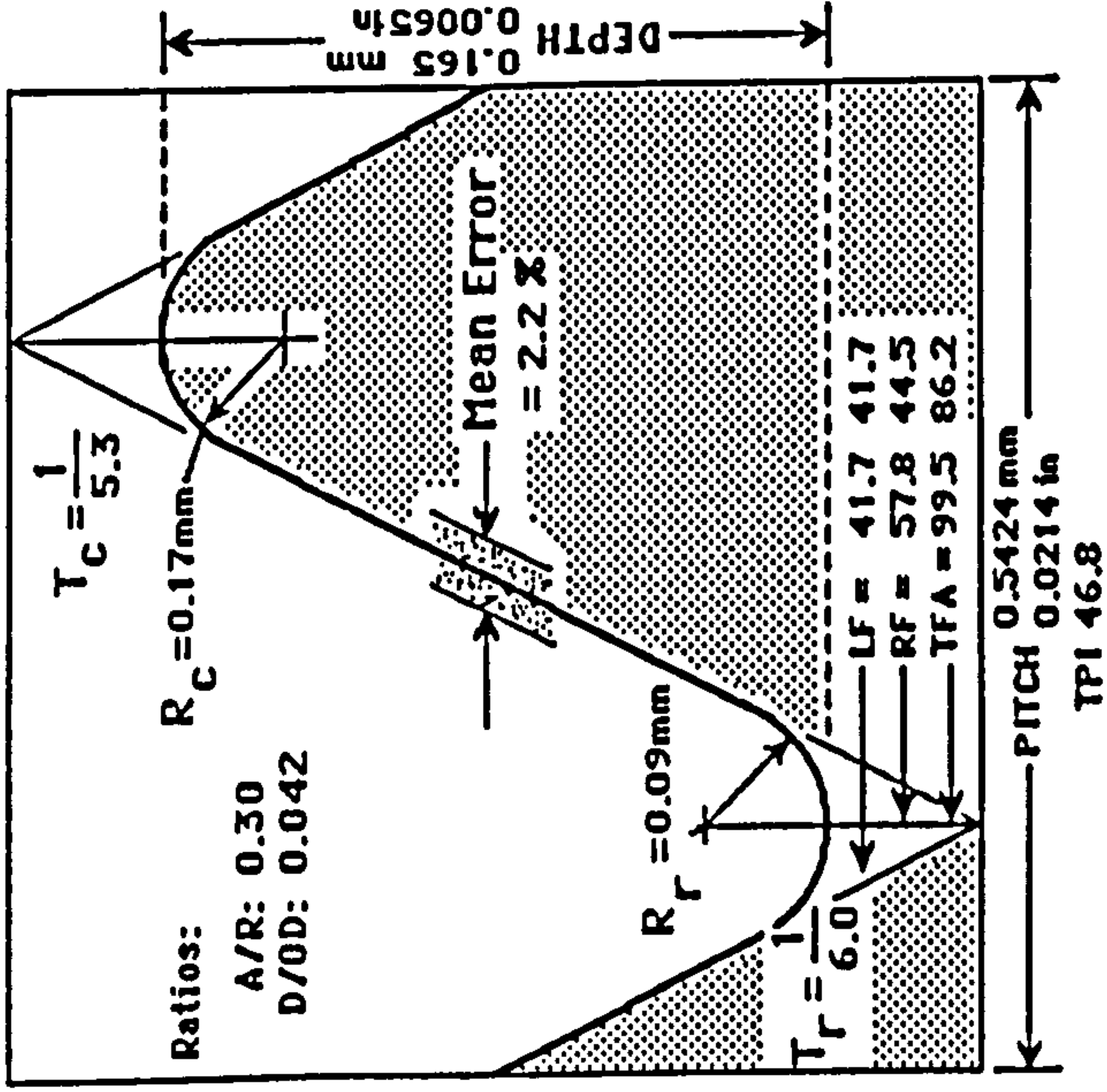
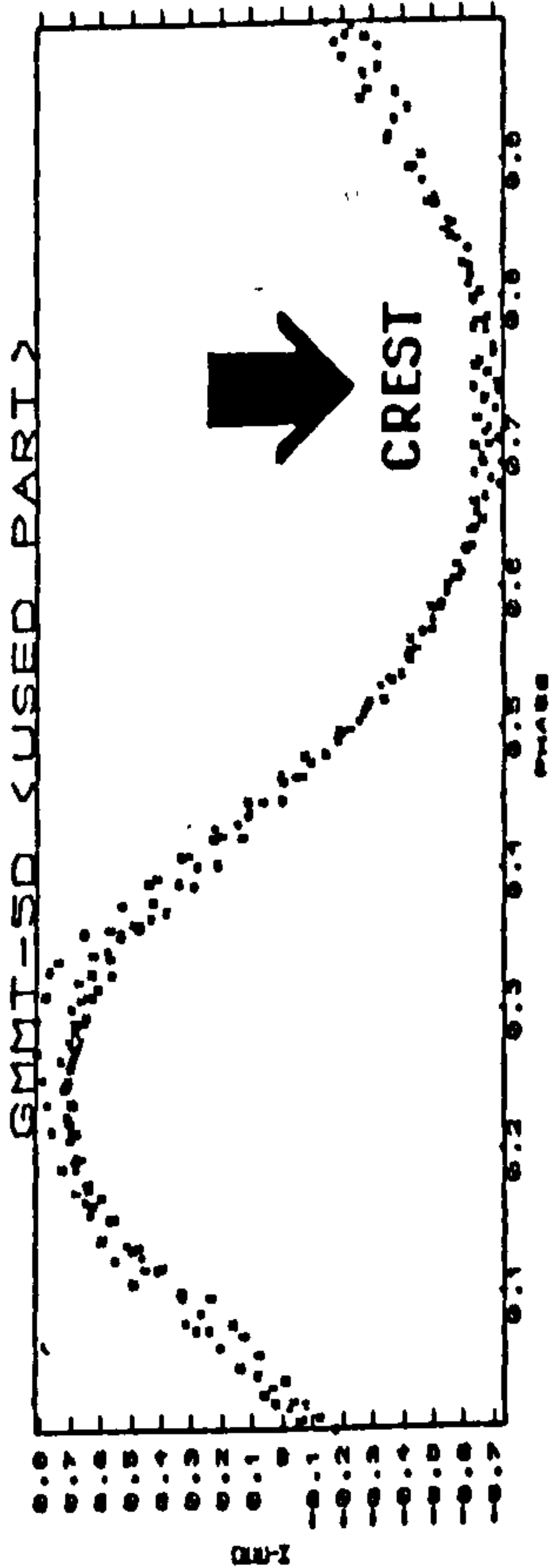
Study Code: GMT-5d

Instrument: Gregrian

Maker: John Cuff

Date: 3rd q18th c

Ser./Acq. No. 1986.3



Mu

Filar

Scale

Bench

Div. Eng.

Adjust.

Leveling

Focus

Eye P.

Tube

Tool

Gauge

Binding

Misc.

NB: Used portion of thread



Characteristics:

Screw

Nut

Leng: 2.25 / 0.401"

Diameter: 0.1539"

Steel

Brass

Other:

Instrument Identification:

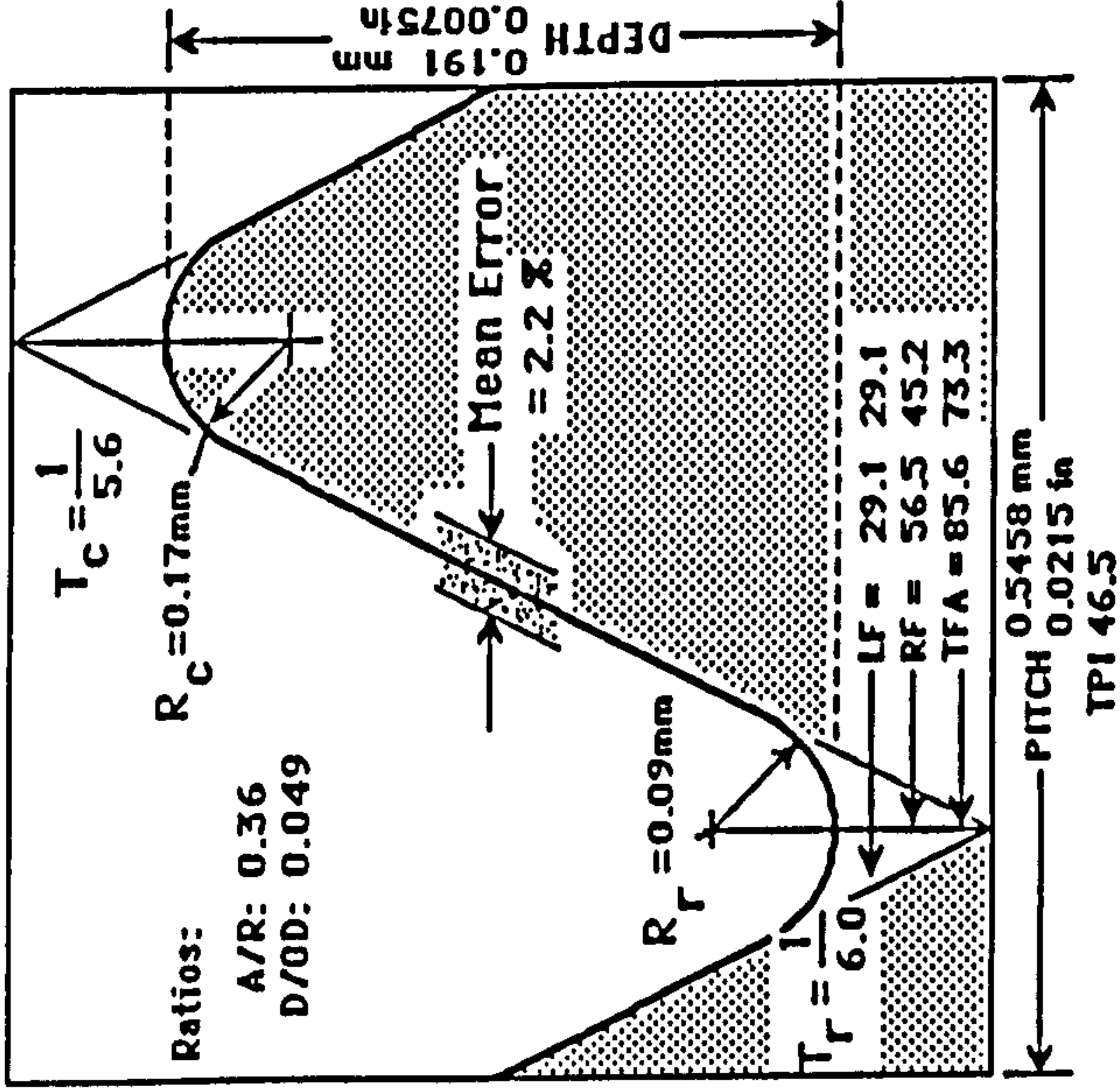
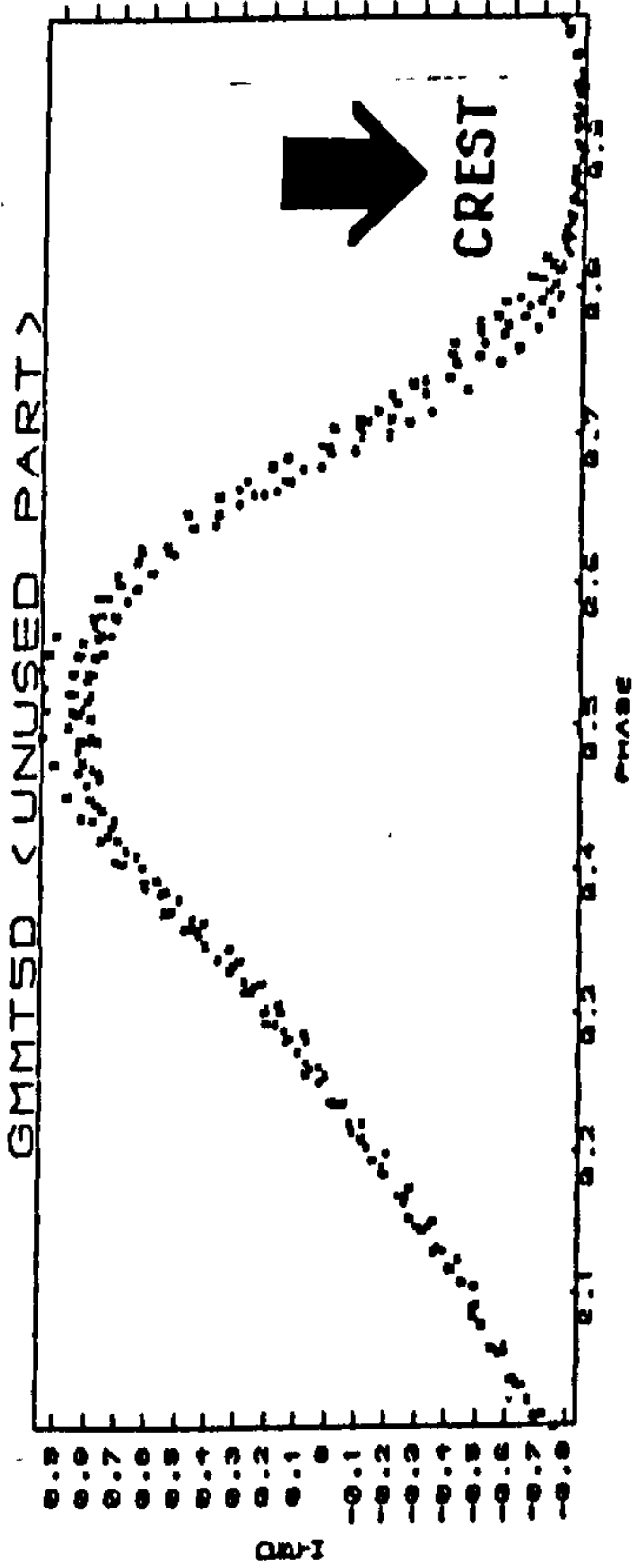
Study Code: GMT-5d

Instrument: Gregorian

Maker: John Cuff

Date: 3rd q 18th c

Ser./Acq. No. 1986.3



Mu

Filar

Scale

Bench

Div. Eng.

Adjust.

Leveling

Focus

Eye P.

Tube

Tool

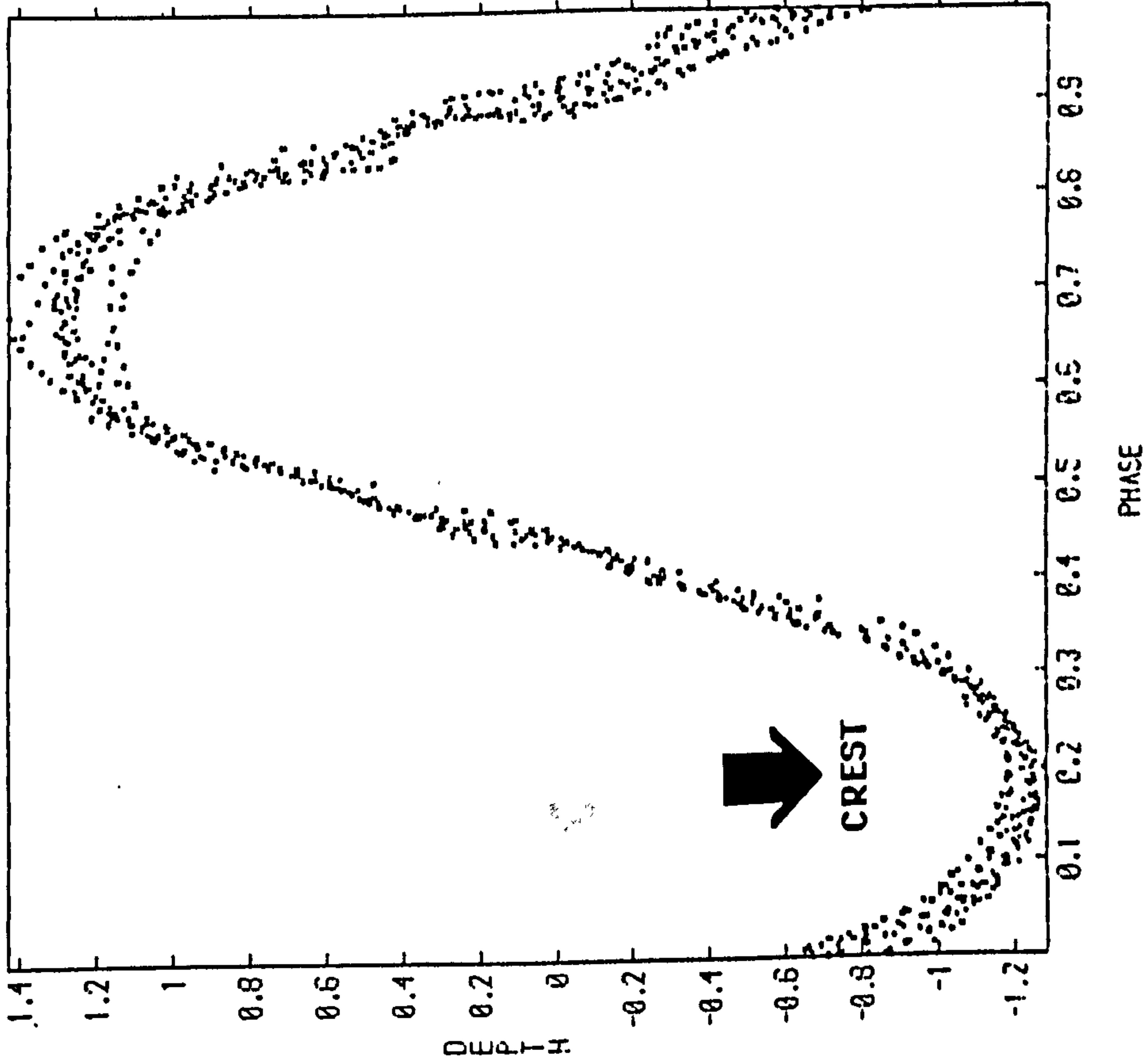
Gauge

Binding

Misc.

MB: Unused portion  
of thread

ITT-7



Characteristics:

Screw ☒ Nut ☐

Leng: 1.60cm / 1.00cm

Diameter: 0.467cm

Steel ☒ Brass ☐

Other:

Instrument Identification:

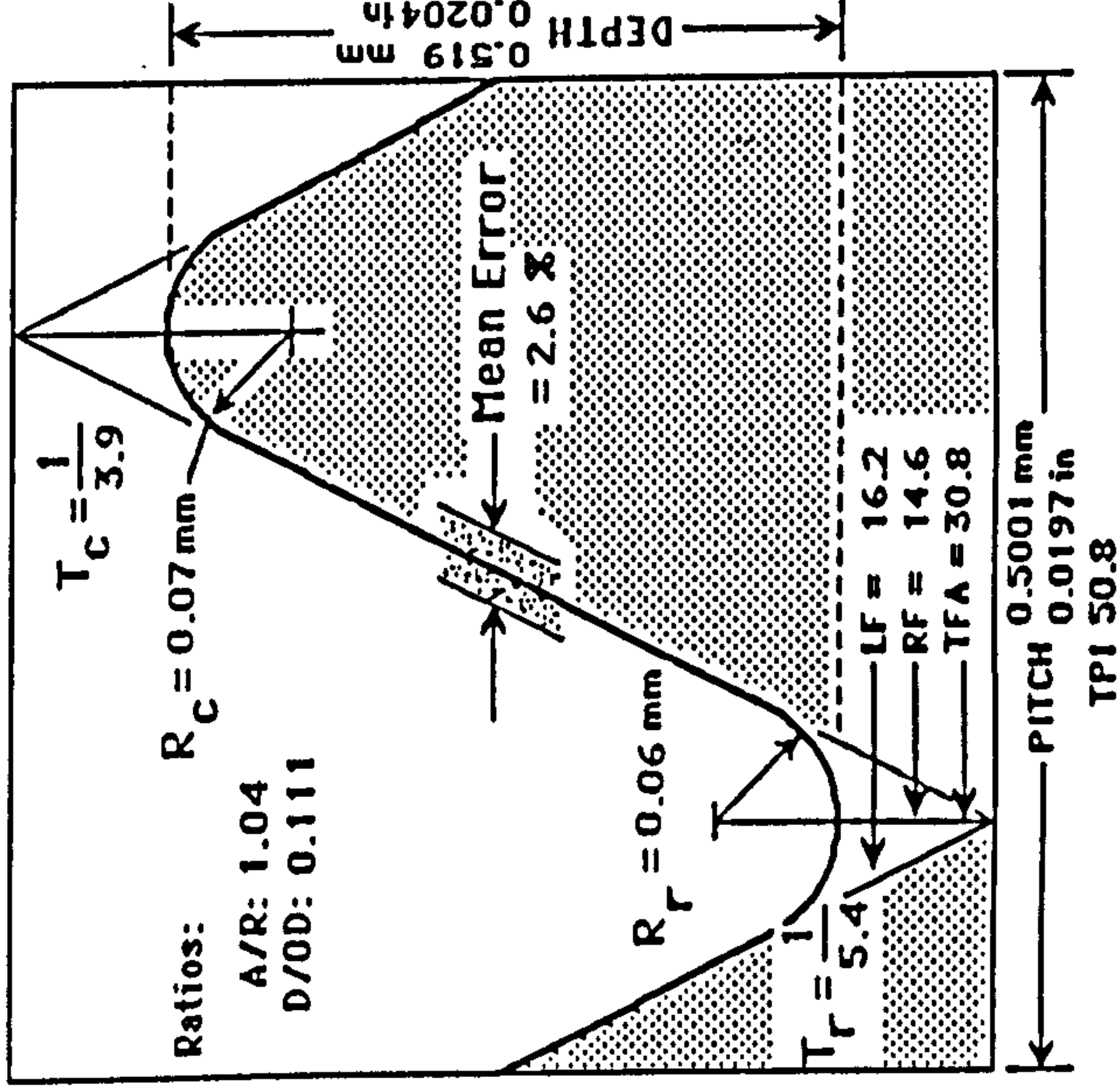
Study Code: ITT-7

Instrument: Crystalography Mic.

Maker: Fuess, Berlin

Date: 1855-78

Ser./Acq. No. #312



Mu	—	Filar	
		Scale	
—	—	Bench	
		Div. Eng.	
—	—	Adjust.	
		Leveling	
—	—	Focus	
		Eye P.	
—	—	Tube	
		Tool	
—	—	Gauge	
		Binding	
—	—	Misc.	

Characteristics:
 

Screw ☒ Nut ☐

Leng: 1.188" / 0.125"
 

Diameter: 0.8590"
 

Steel ☐ Brass ☒

Other:

Instrument Identification:
 

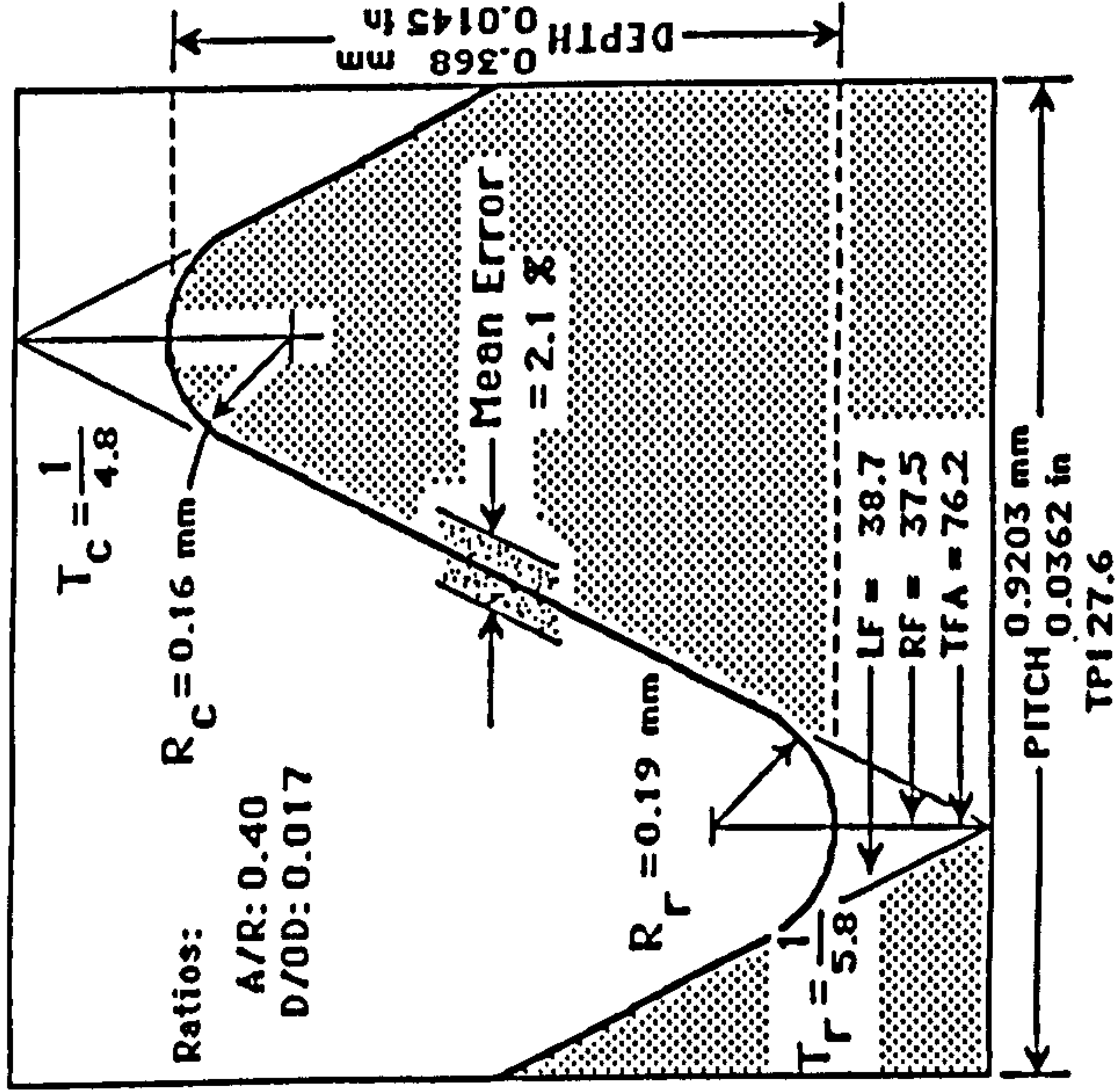
Study Code: MHS-13a
 

Instrument: Screw Barrel Micros.
 

Maker: Edward Scarlett (I)
 

Date: 2nd q 18th c
 

Ser./Acq. No. Clay Coll. #95



Mu	└─┬─┘	Filar	
		Scale	
		Bench	
		Div. Eng.	
		Adjust.	
		Leveling	
		Focus	
		Eye P.	
		Tube	
		Tool	
		Gauge	
		Binding	
		Misc.	



Characteristics:

Screw

Nut

Leng: 1.313" / 0.125"

Diameter: 0.859" nom.

Steel

Brass

Other:

Instrument Identification:

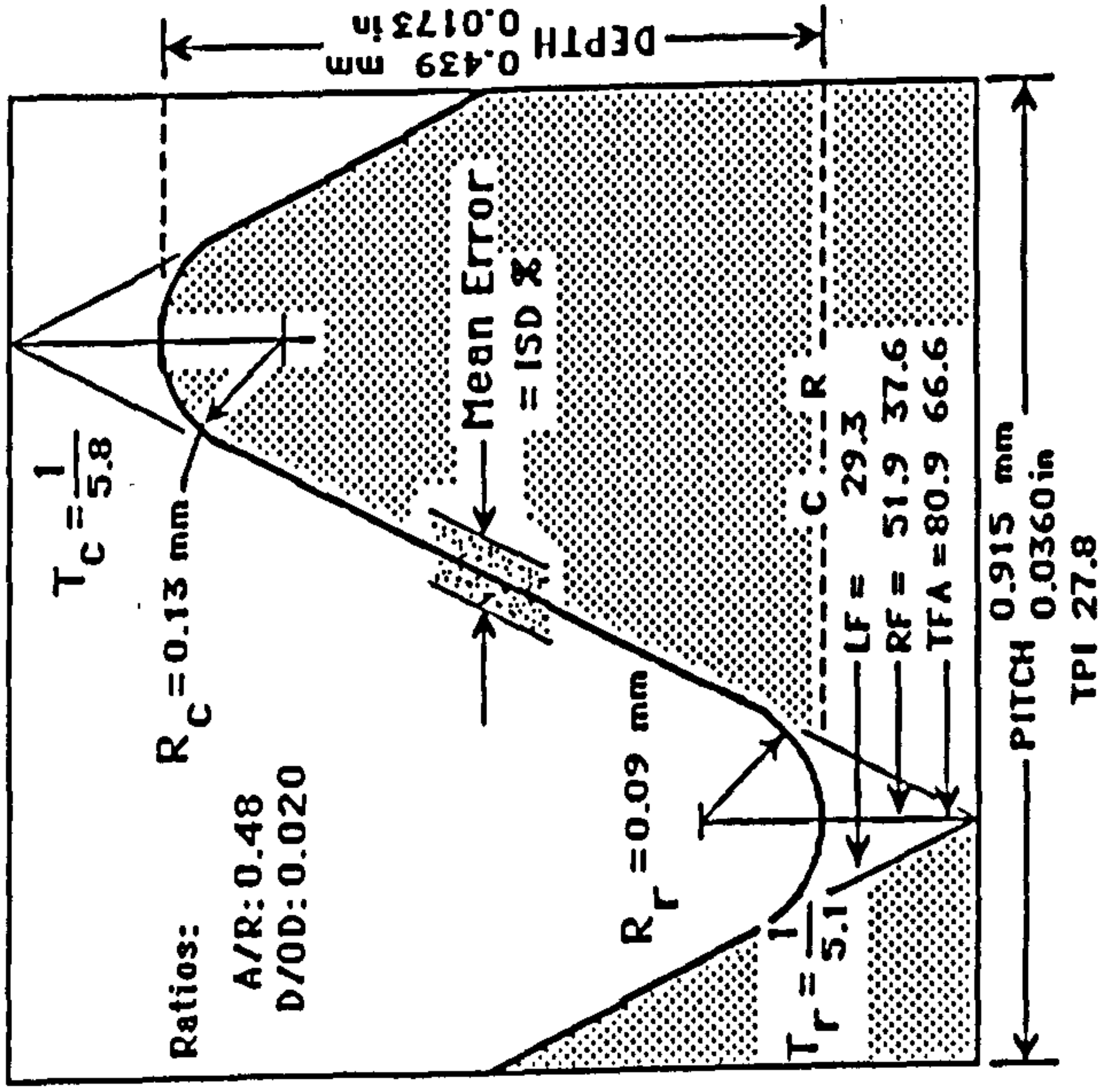
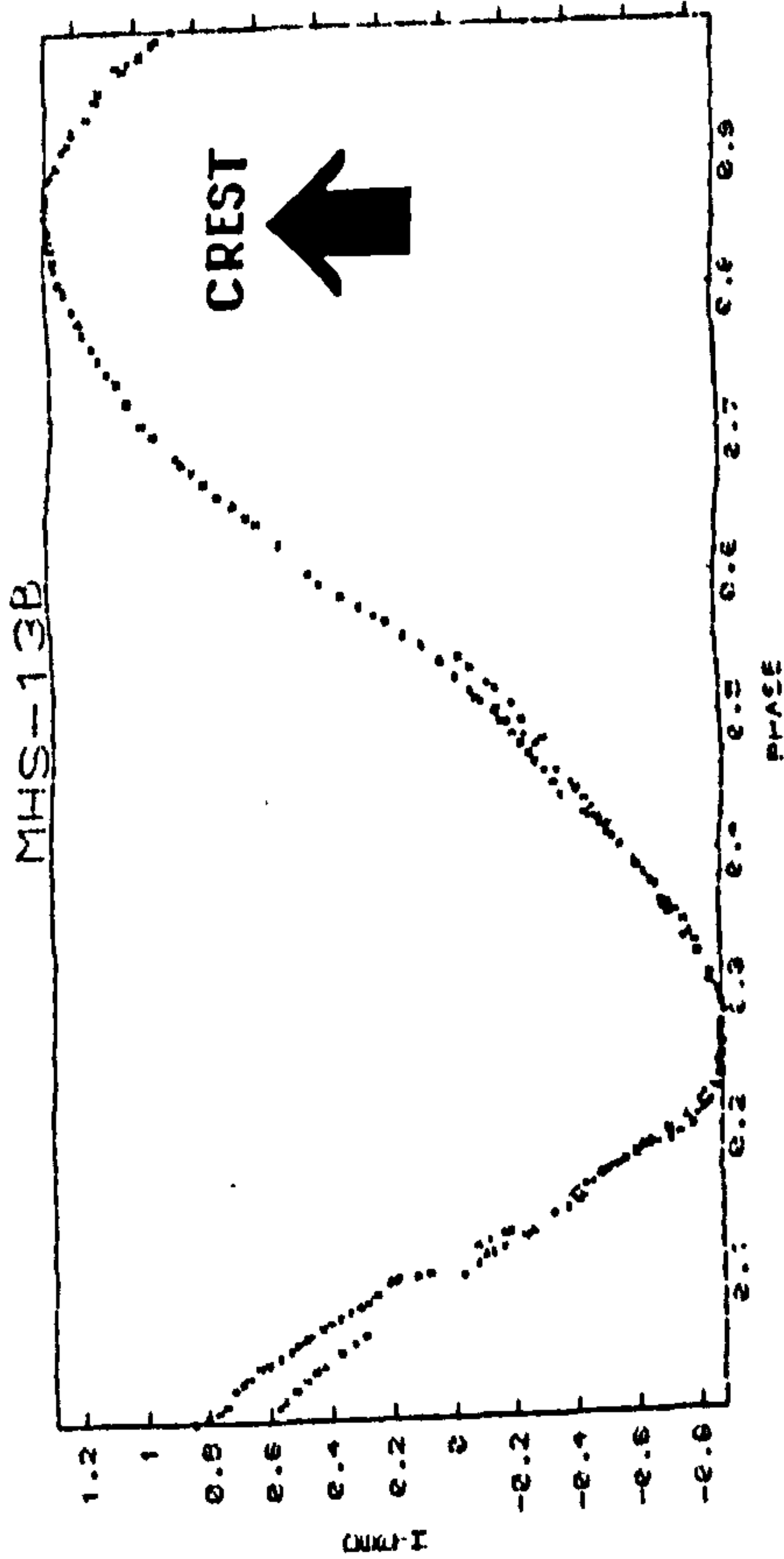
Study Code: MHS-13b

Instrument: Screw Barrel Micros.

Maker: Edward Scarlett (I)

Date: 2nd q 18th c

Ser./Acq. No. Clay Coll. #95



Mu

Filar

Scale

Bench

Div. Eng.

Adjust.

Leveling

Focus

Eye P.

Tube

Tool

Gauge

Binding

Misc.



Characteristics:

Screw

Nut

Leng: 1.125" / 0.125"

Diameter: 0.863" nom.

Steel

Brass

Other:

Instrument Identification:

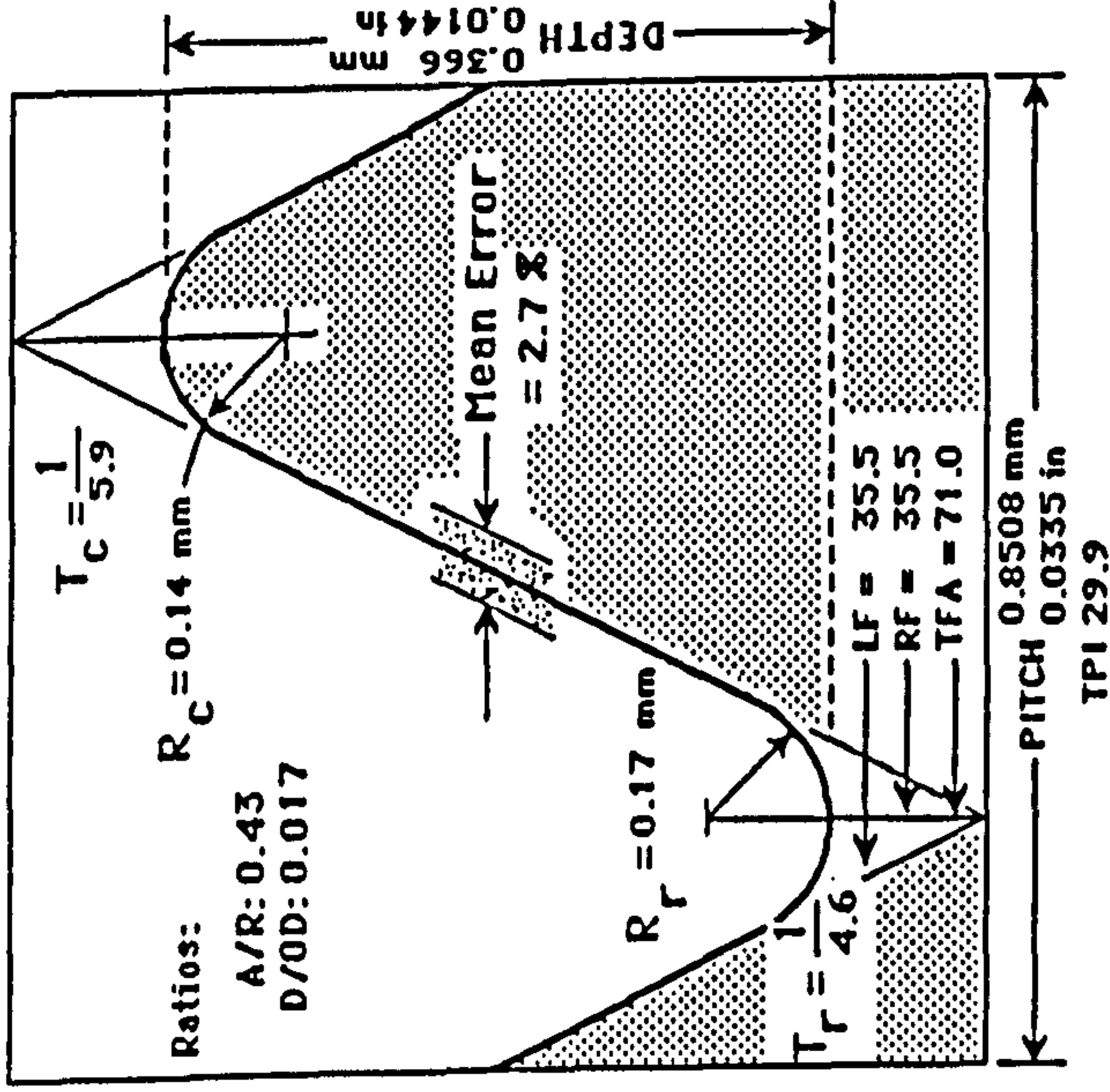
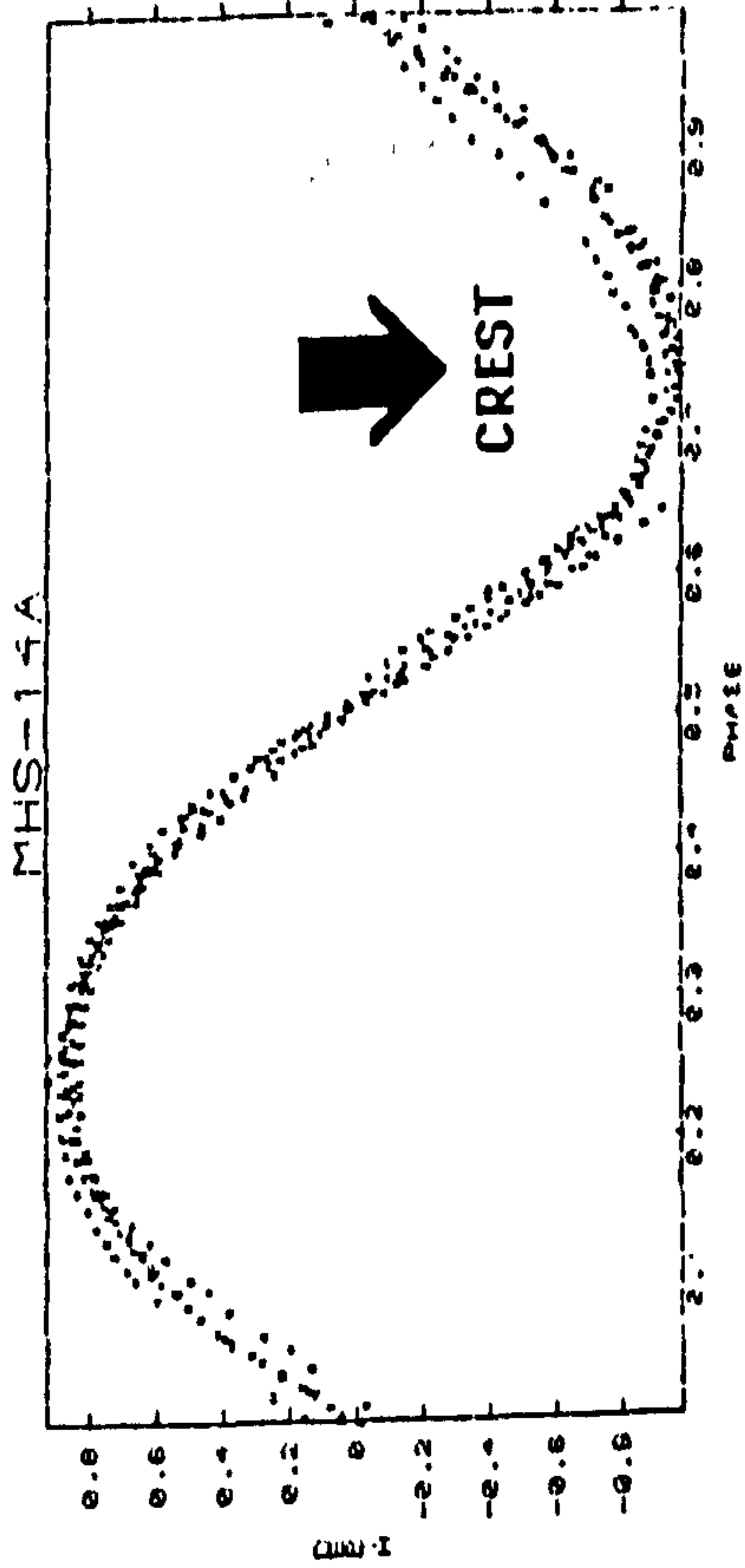
Study Code: MHS-14a

Instrument: Screw Barrel Micros.

Maker: Edmund Culpepper

Date: <1738

Ser./Acq. No. Clay coll. #92



Mu	Filar	
	Scale	
	Bench	
	Div. Eng.	
	Adjust.	
	Leveling	
	Focus	
	Eye P.	
	Tube	
	Tool	
	Gauge	
	Binding	
	Misc.	

Characteristics:

Screw

Nut

Leng: 1.125" / 0.125"

Diameter: 0.8627"nom.

Steel

Brass

Other:

Instrument Identification:

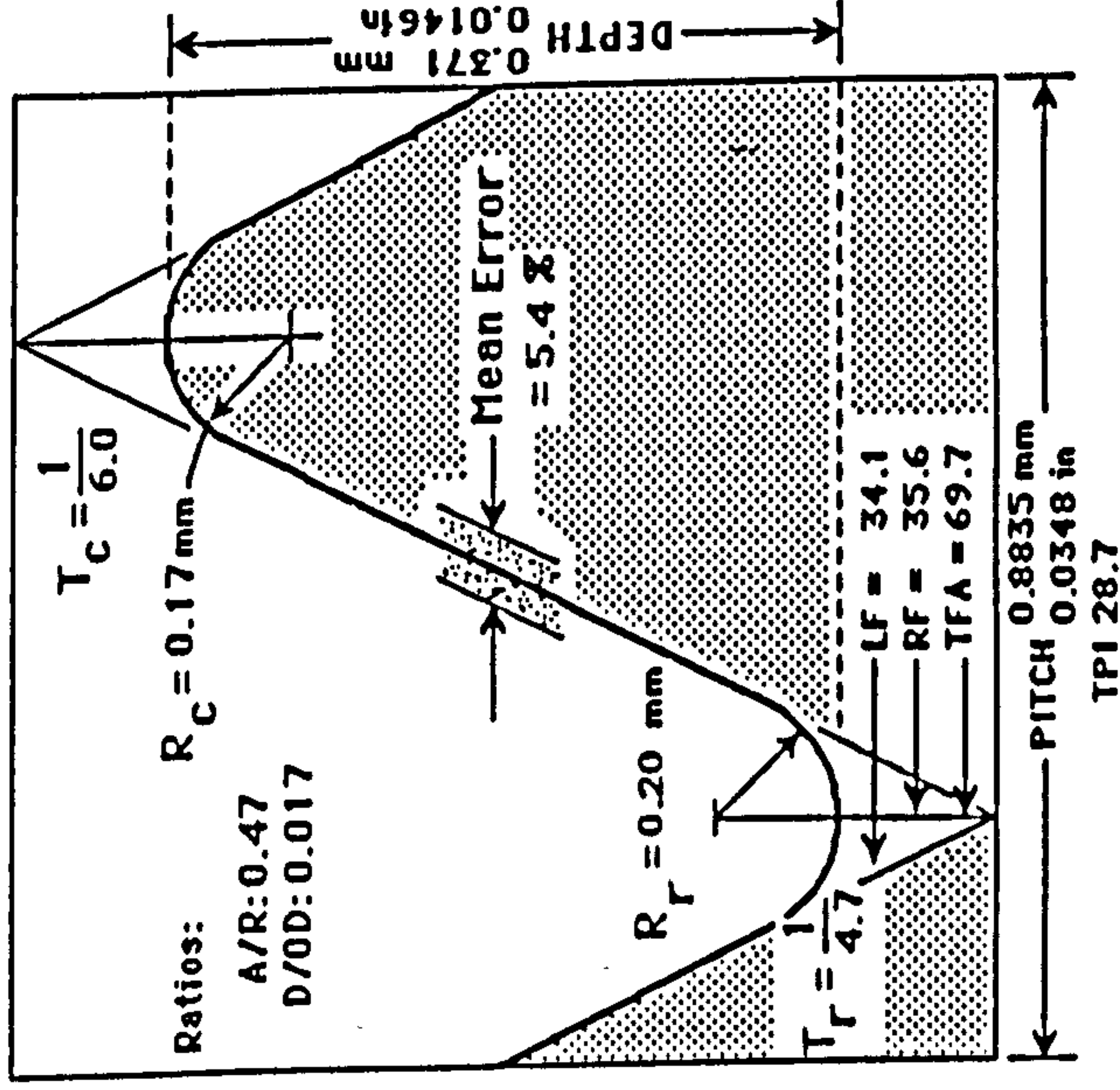
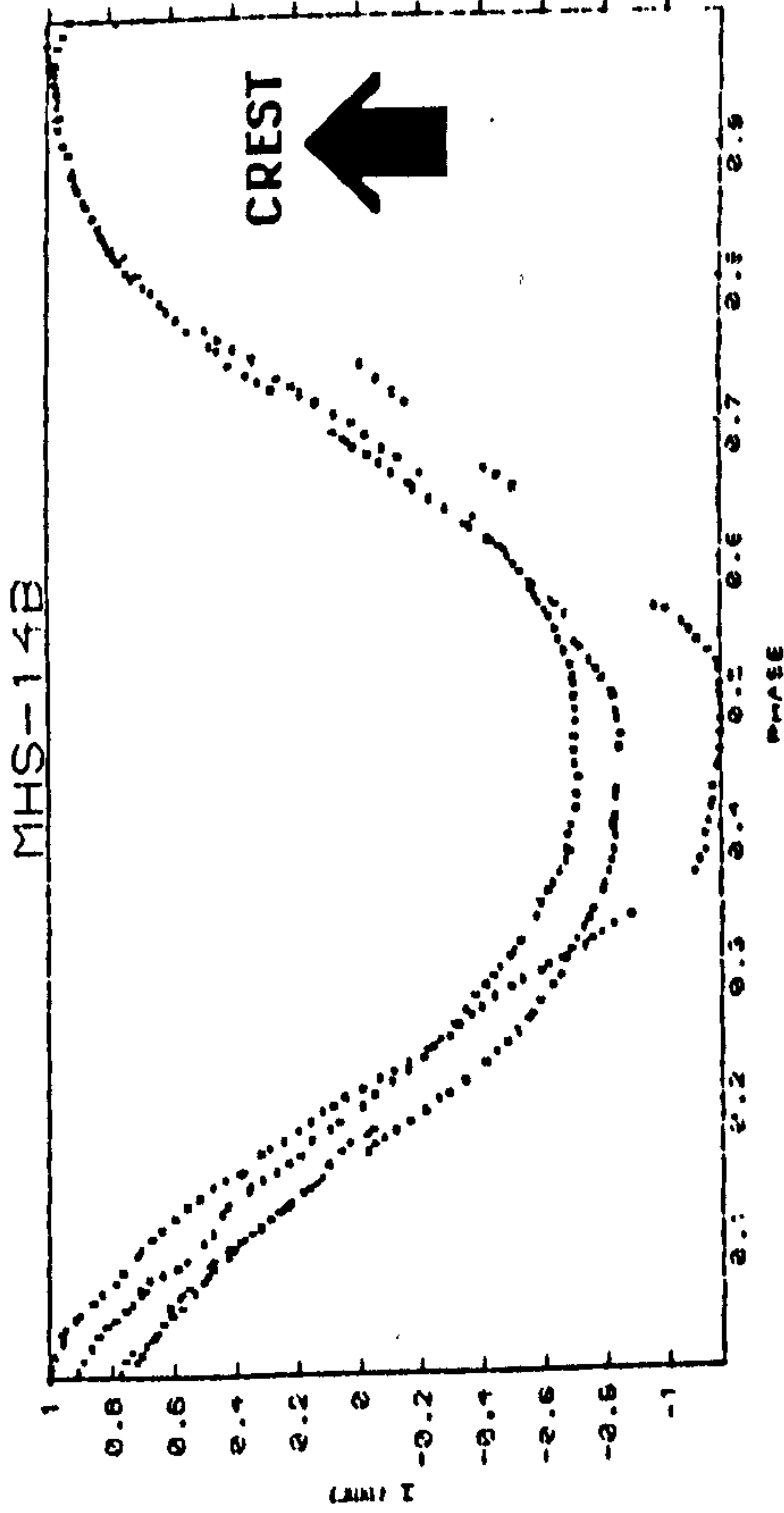
Study Code: MHS-14b

Instrument: Wilson screw barrel microscope

Maker: Edmund Culpepper

Date: <1738

Ser./Acq. No.: Clay Collection #92



Mu	Filar
	Scale
	Bench
	Div. Eng.
	Adjust.
	Leveling
	Focus
	Eye P.
	Tube
	Tool
	Gauge
	Binding
	Misc.

Coarse focusing screw on tube.



Characteristics:

Screw

Nut

Leng: 1.563" / 0.25"

Diameter: 0.1397"

Steel

Brass

Other:

Instrument Identification:

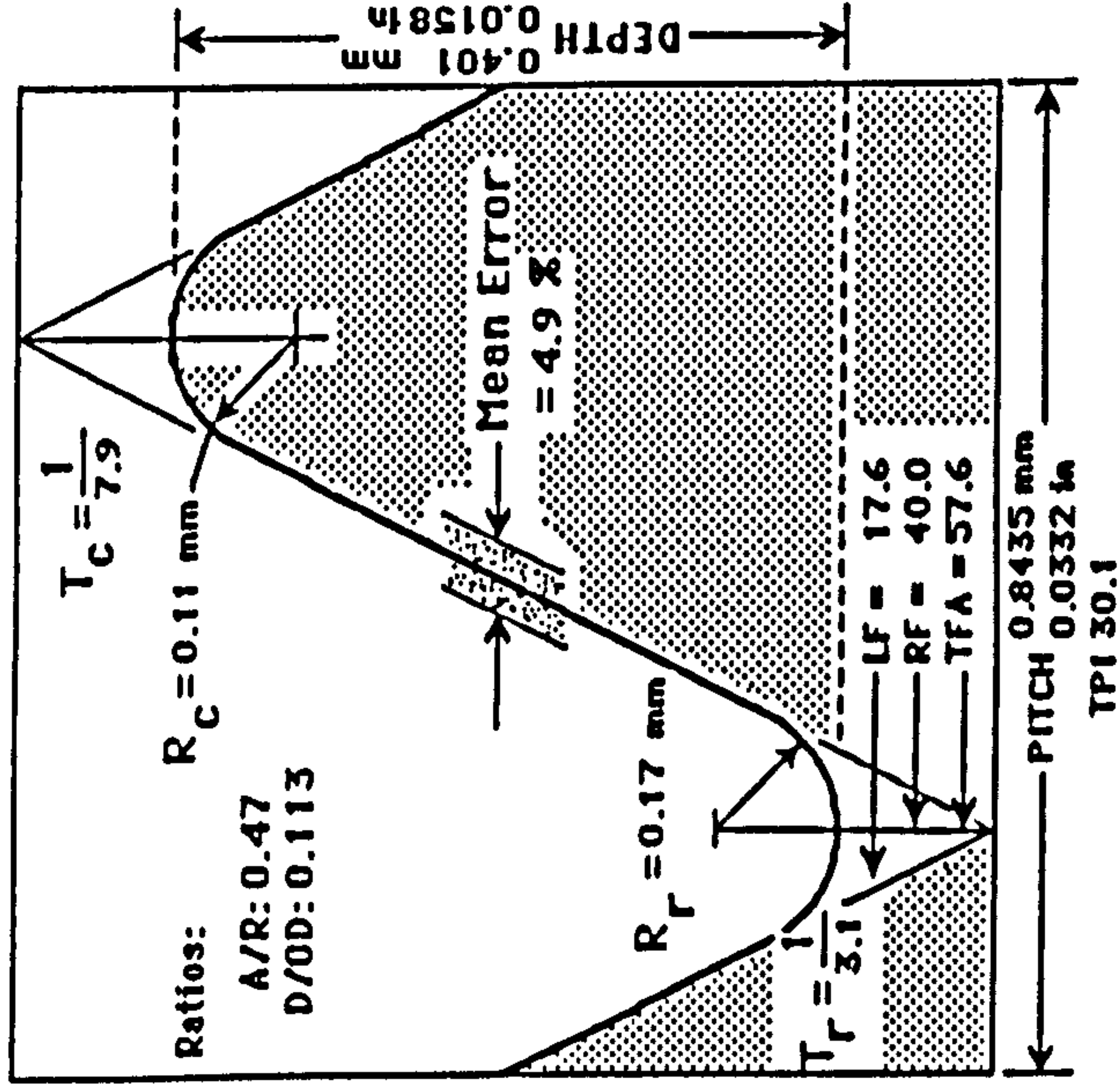
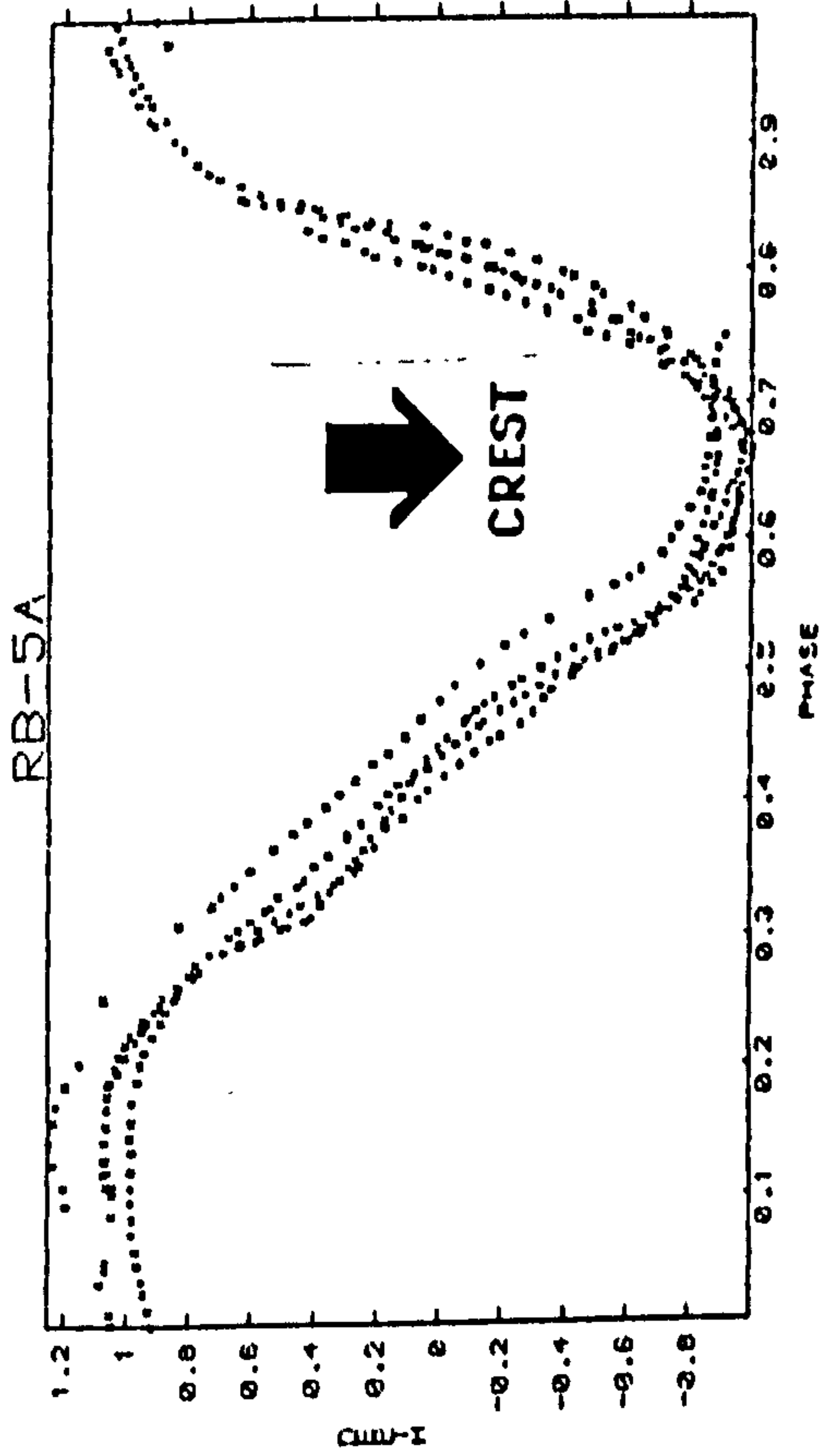
Study Code: RB-5a

Instrument: Gregorian Telescope

Maker: unsigned

Date: >1790

Ser./Acq. No.



Mu	[	Filar	
		Scale	
		Bench	
		Div. Eng.	
		Adjust.	
		Leveling	
		Focus	
		Eye P.	
		Tube	
		Tool	
		Gauge	
		Binding	
		Misc.	



Characteristics:

Screw

Nut

Leng: 0.938"

Diameter: 0.1391"

Steel

Brass

Other:

Instrument Identification:

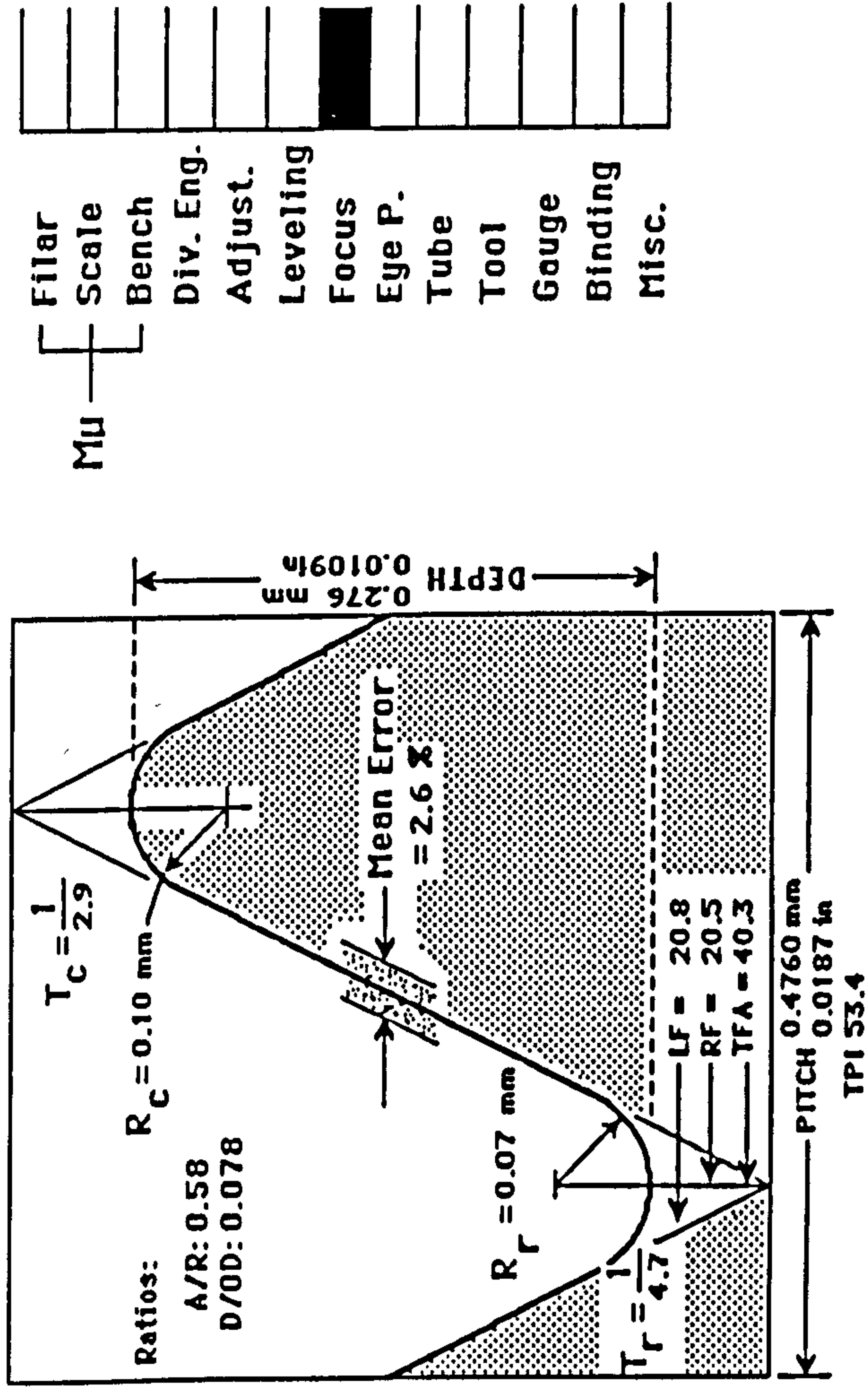
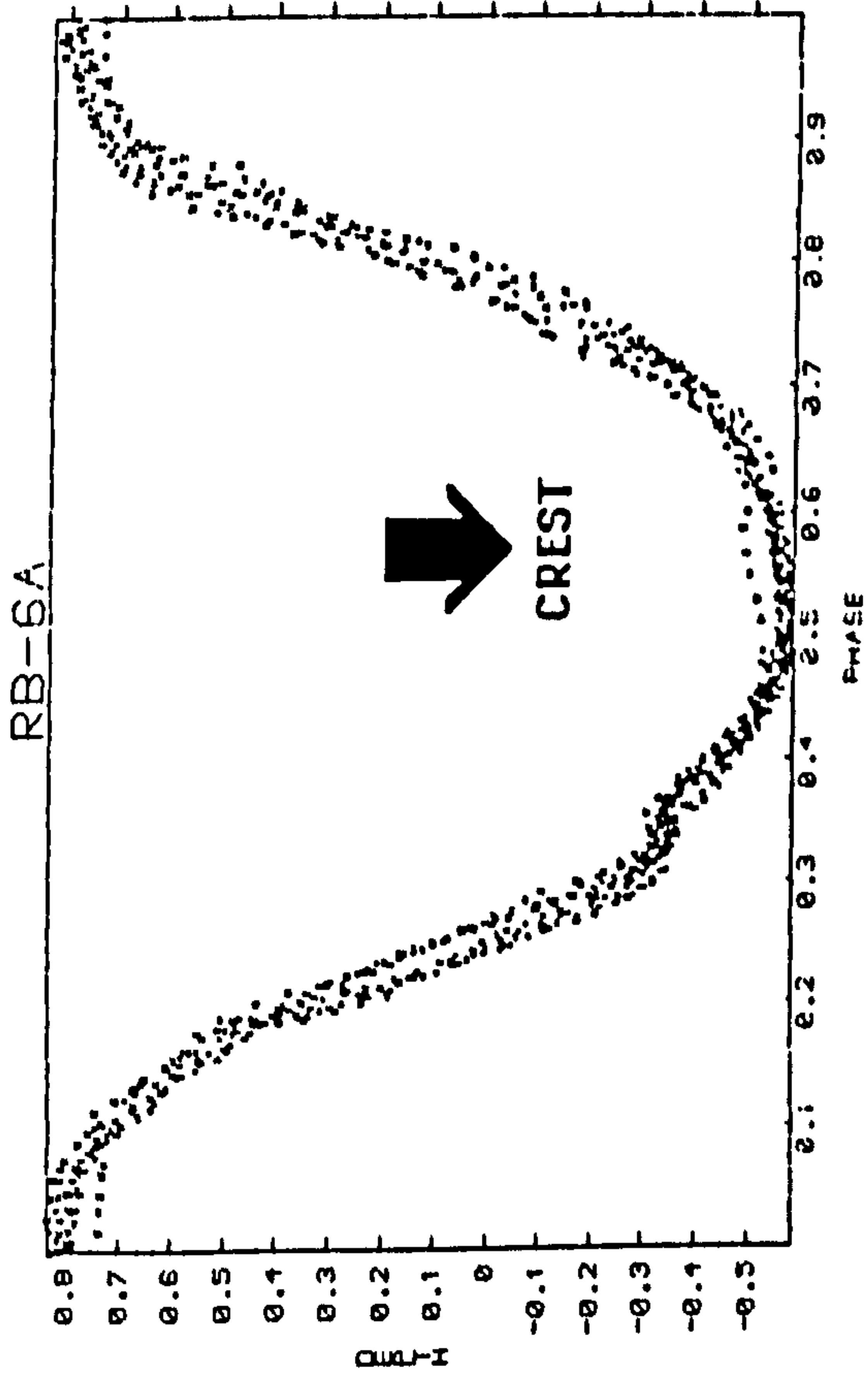
Study Code: RB-6a

Instrument: Bar-limb Microscope

Maker: Hartnack

Date: ca.1892/3

Ser./Acq. No.



Characteristics:

Screw

Nut

Leng:

0.188"

Diameter: 1.0"

Steel

Brass

Other:

Instrument Identification:

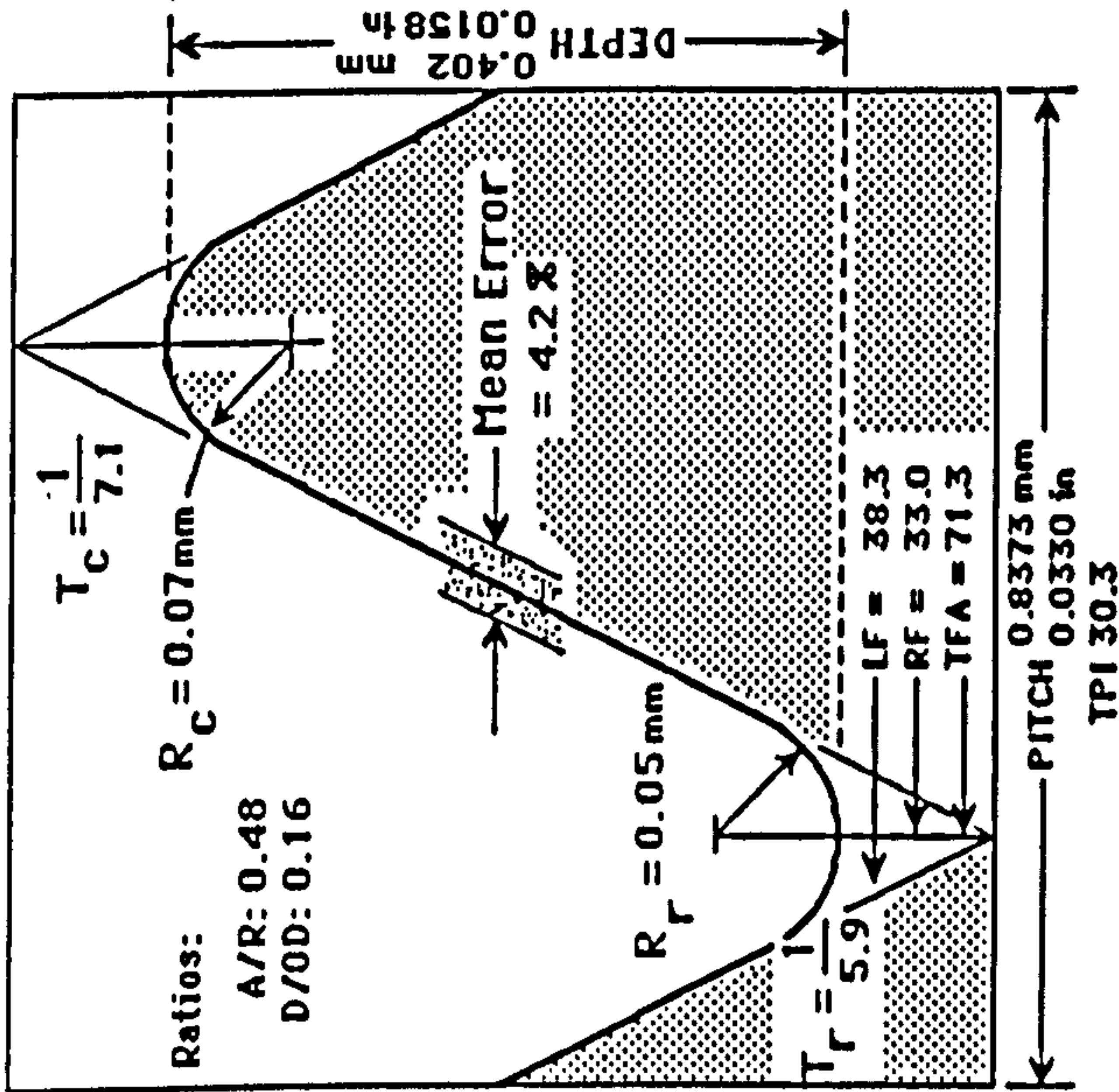
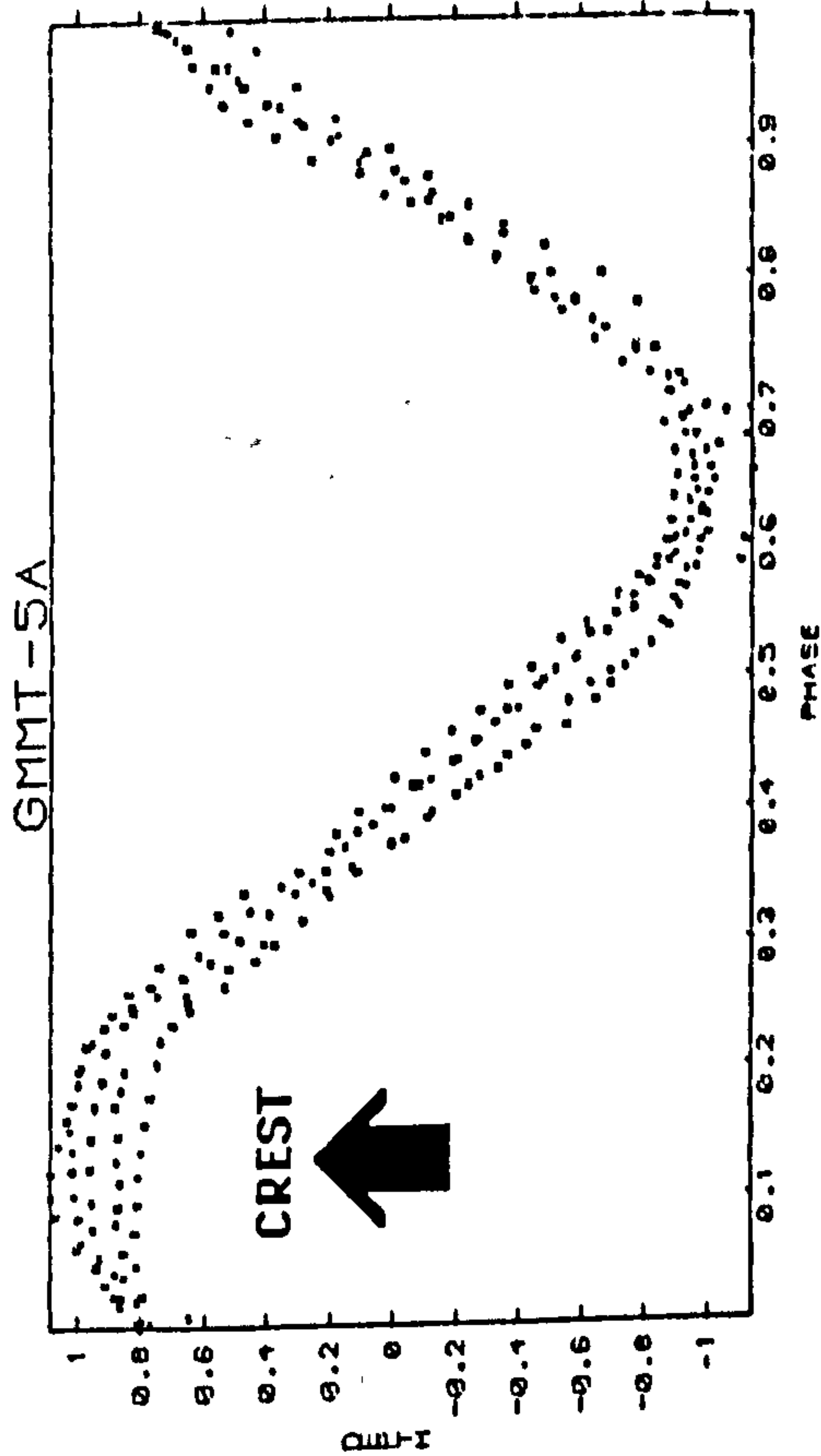
Study Code: GMT-5a

Instrument: Gregorian telescope

Maker: John Cuff

Date: ca.1770

Ser./Acq. No. 1986.3



Mu	Filar
	Scale
	Bench
	Div. Eng.
	Adjust.
	Leveling
	Focus
	Eye P.
	Tube
	Tool
	Gauge
	Binding
	Misc.

(Nut for GMT-5a & 5c)









Characteristics:

Screw

Nut

Leng:

0.25"

Diameter:  $\approx 1.375$ "

Steel

Brass

Other:

Instrument Identification:

Study Code:

MCML-1b

Instrument:

Transit Telescope

Maker:

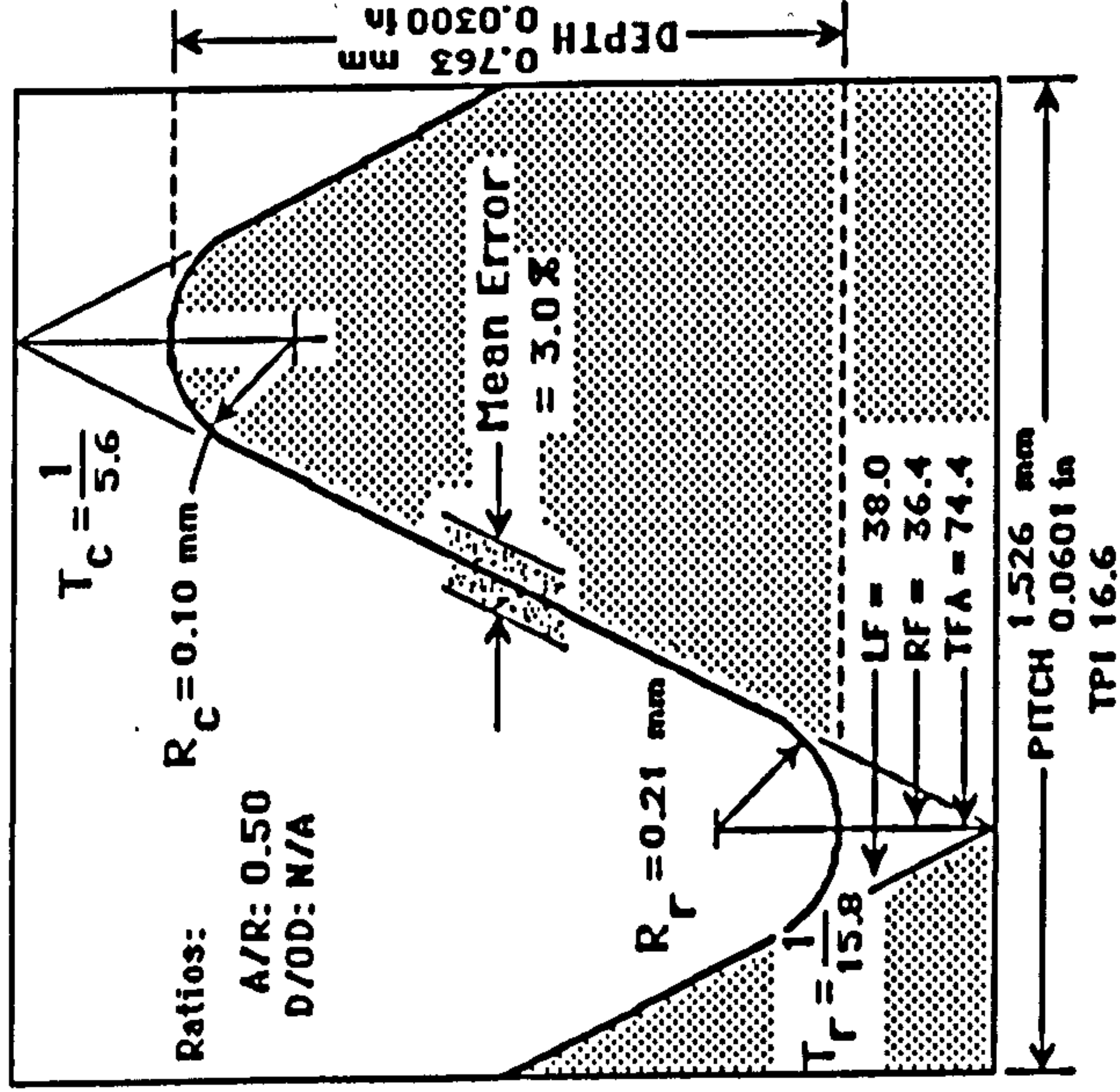
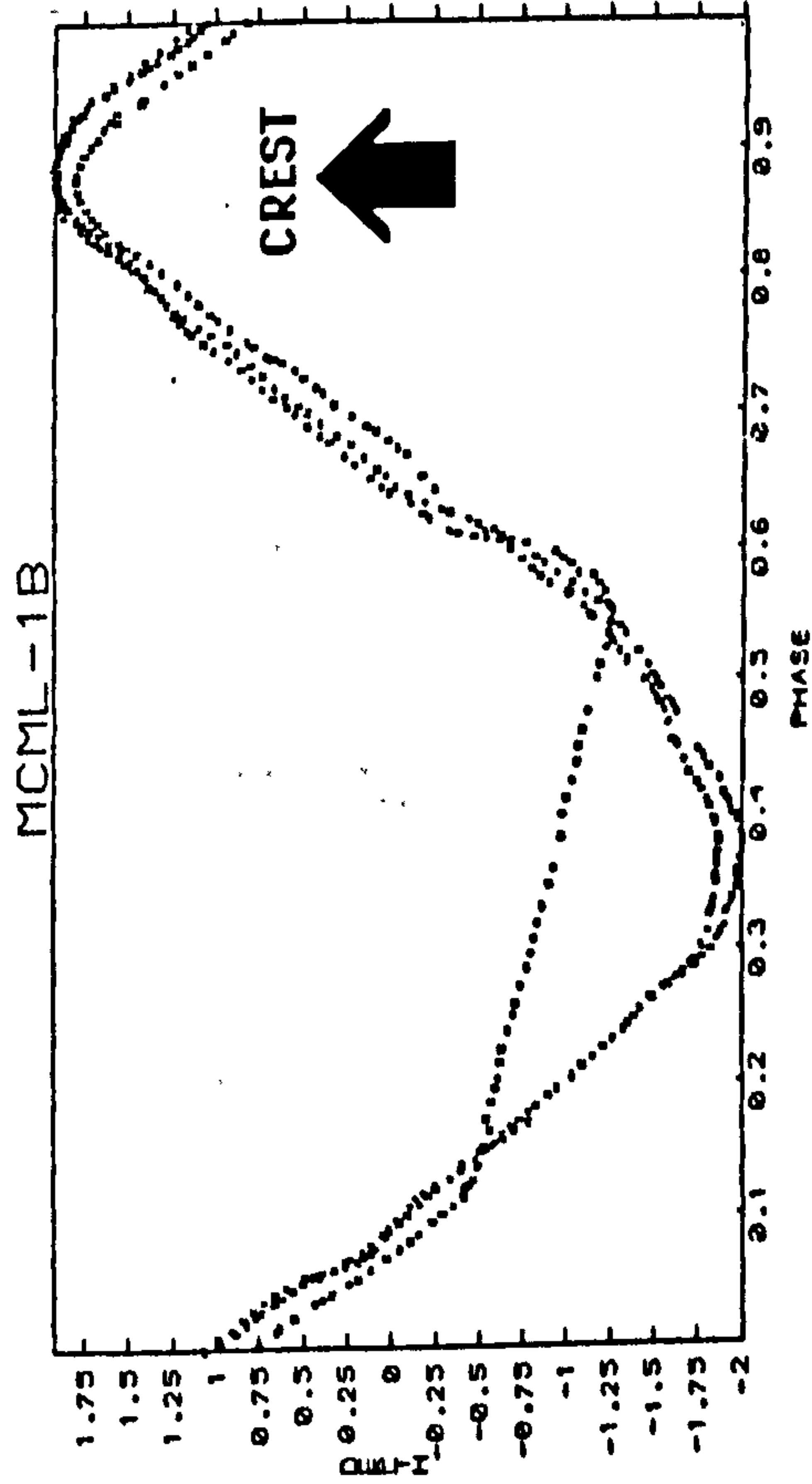
Troughton & Simms

Date:

ca.1860

Ser./Acq. No.

1976-537.6



Mu

Filar

Scale

Bench

Div. Eng.

Adjust.

Leveling

Focus

Eye P.

Tube

Tool

Gauge

Binding

Misc.

From Bidston Obs.,  
Liverpool

Characteristics:

Screw ☐ Nut ☒

Leng: 0.375" / 0.25"

Diameter: 1.375"

Steel ☐ Brass ☒

Other:

Instrument Identification:

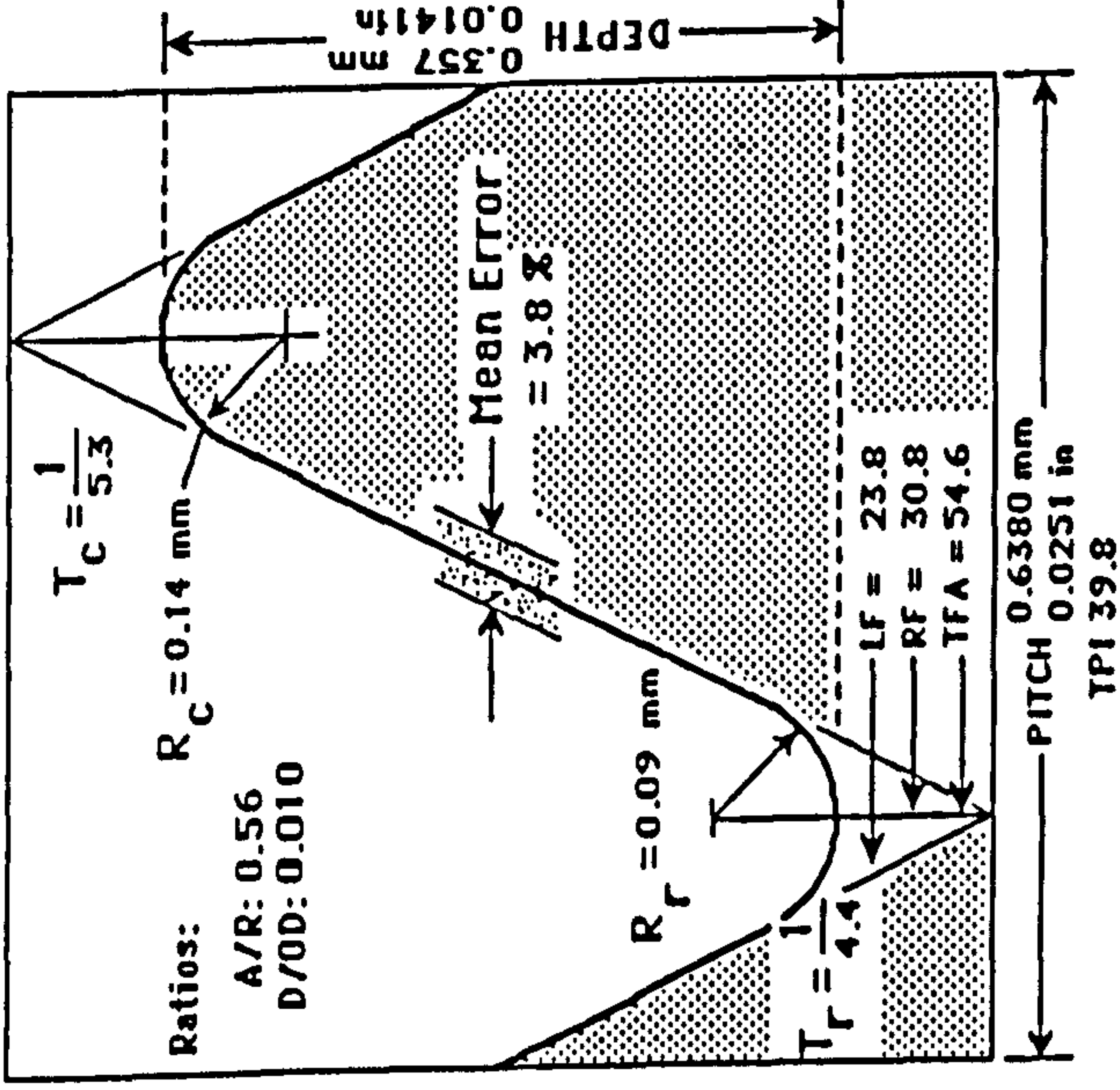
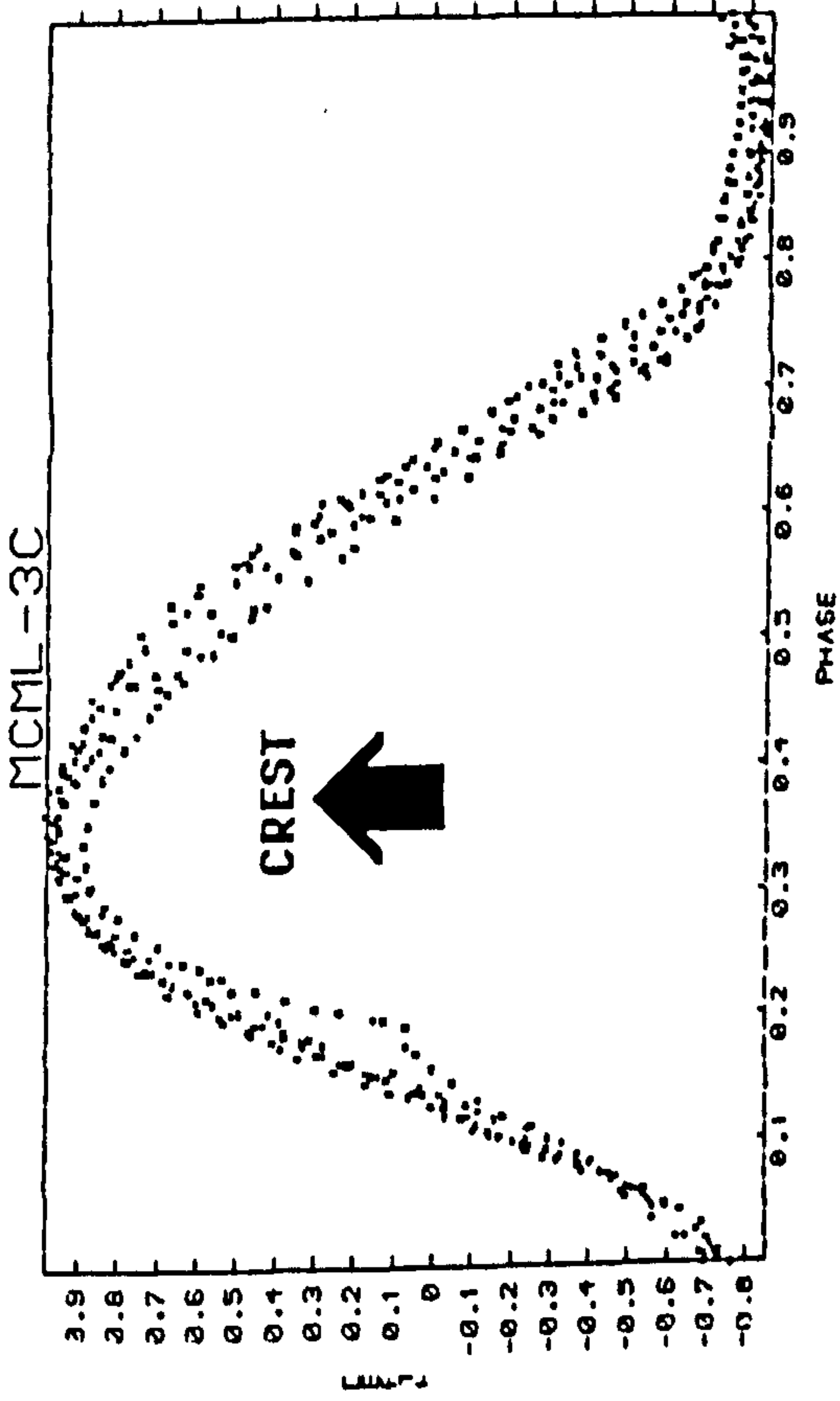
Study Code: MCML-3c

Instrument: Transit Telescope

Maker: Troughton & Simms

Date: ca.1860

Ser./Acq. No.



Mu — [ Filar Scale Bench Div. Eng. Adjust. Leveling Focus Eye P. Tube Tool Gauge Binding Misc.





Characteristics:

Screw

Nut

Leng: ~0.5" / 0.219"

Diameter: 0.7111"

Steel

Brass

Other:

Instrument Identification:

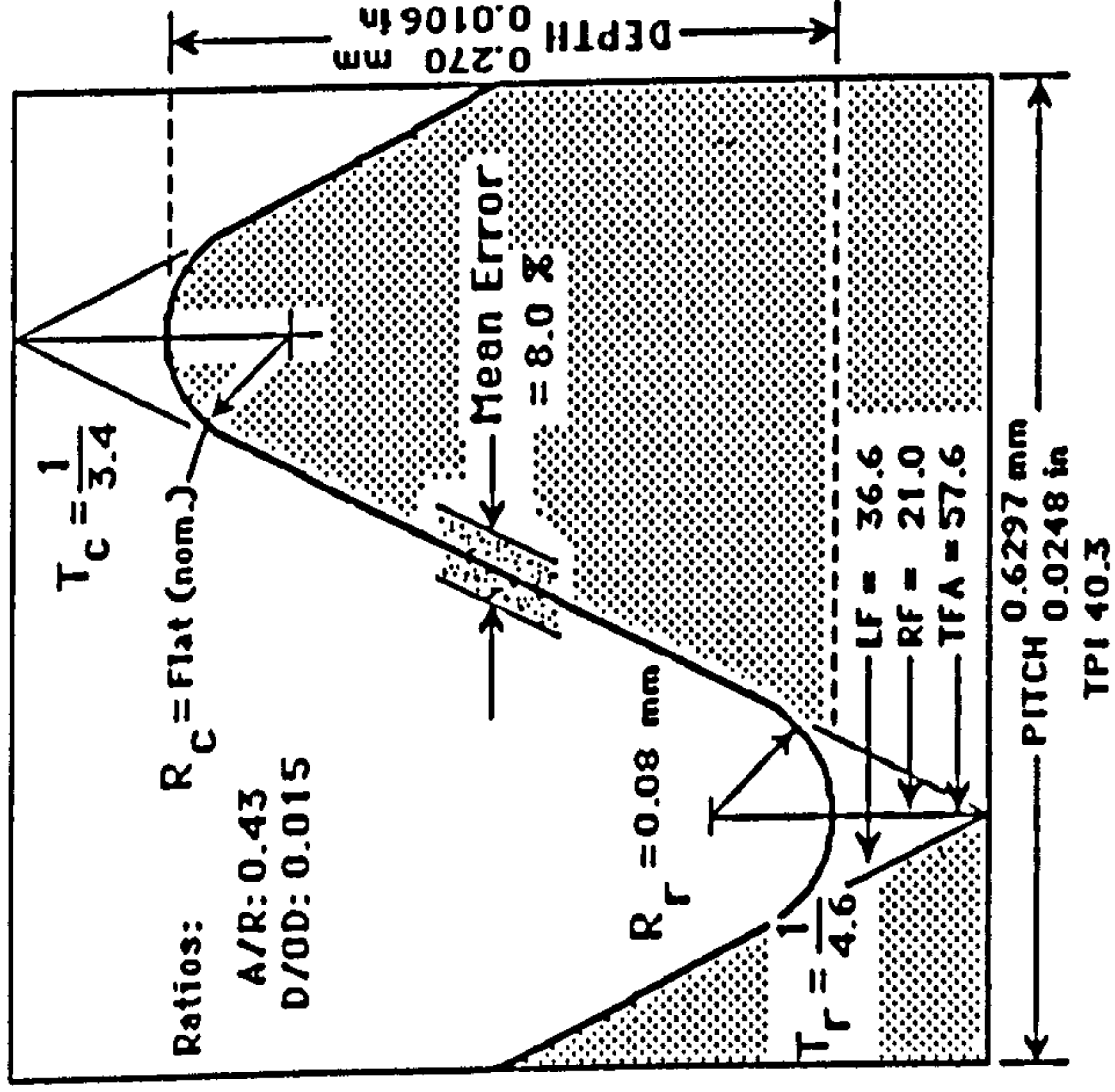
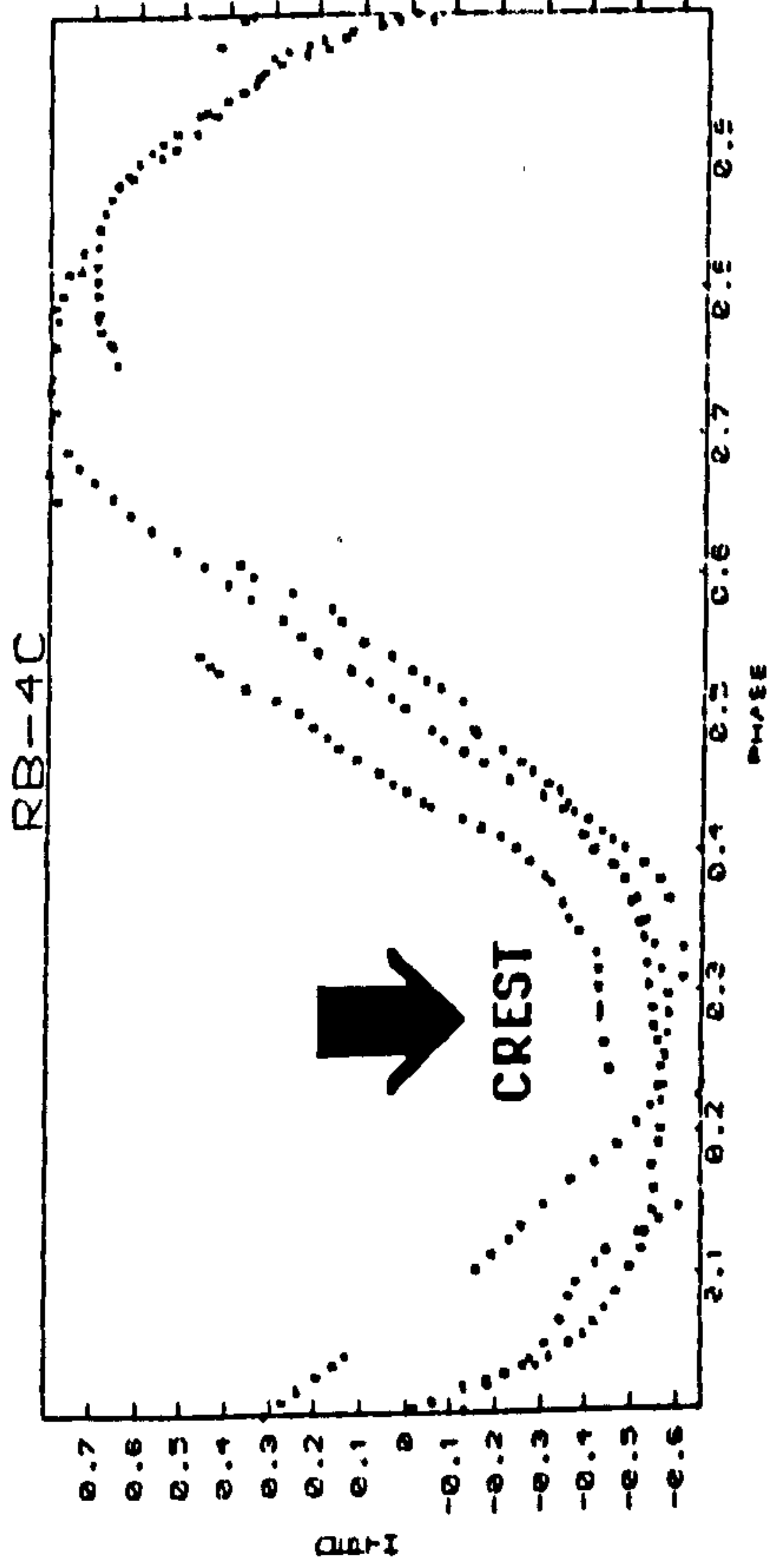
Study Code: RB-4c

Instrument: Dumpy Level

Maker: Yeates & Son

Date: late 1840's

Ser./Acq. No.



MU	Filar	
	Scale	
	Bench	
	Div. Eng.	
	Adjust.	
	Leveling	
	Focus	
	Eye P.	
	Tube	
	Tool	
	Gauge	
	Binding	
	Misc.	



Characteristics:

Screw

Nut

Leng: 0.188" / 0.375"

Diameter: 0.5944"

Steel

Brass

Other:

Instrument Identification:

Study Code: RB-5b

Instrument: Not signed

Maker: Gregorian telescope

Date: >ca.1790

Ser./Acq. No.

RB-5B

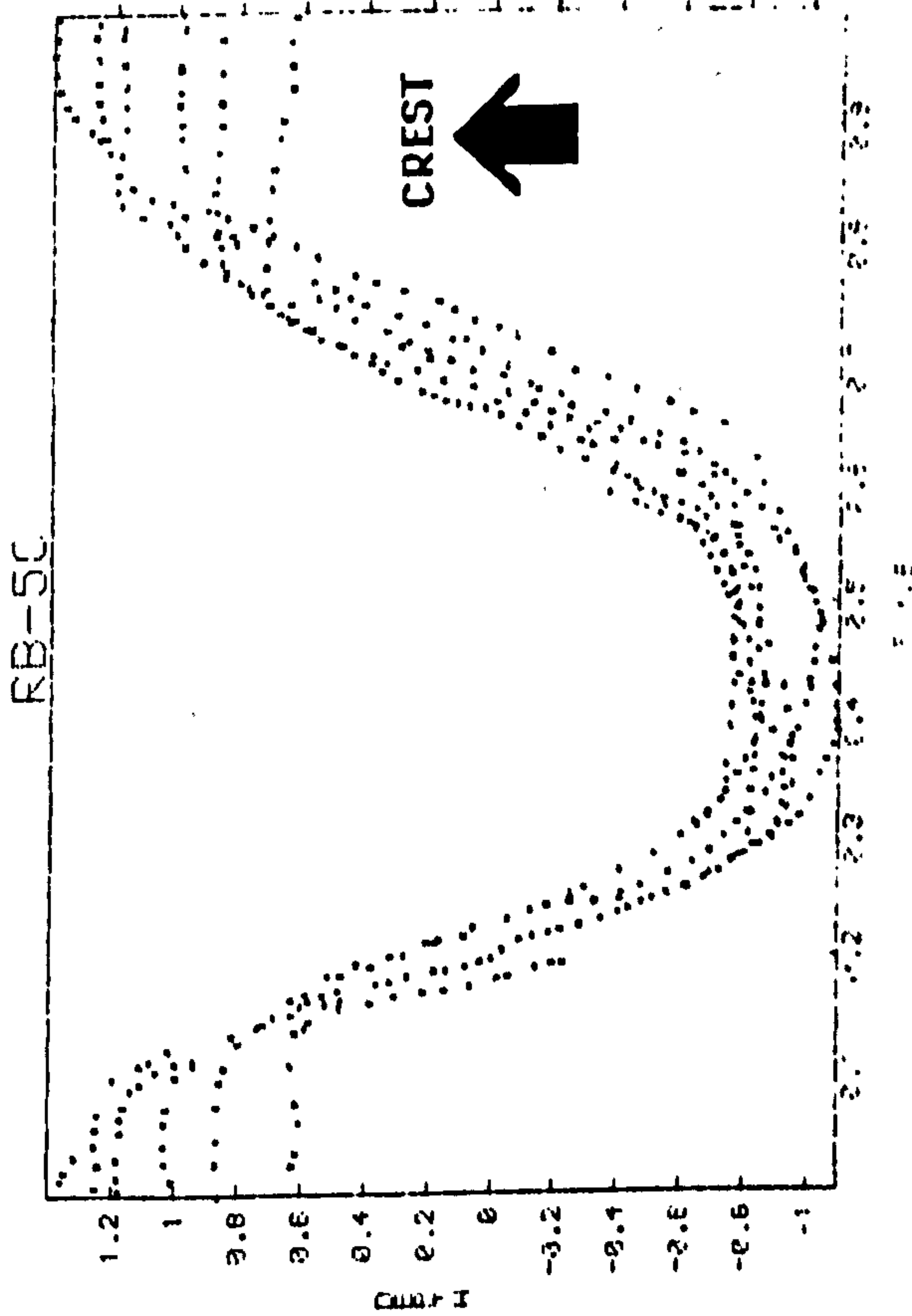
Amplitude vs Phase plot. The y-axis is labeled 'Amplitude' and ranges from -1.2 to 0.8. The x-axis is labeled 'Phase' and ranges from 2.1 to 2.9. A large black arrow points to the peak of the curve, labeled 'CREST'.

Diagram illustrating the geometry of a screw thread profile. Key parameters shown include:

- $T_c = \frac{1}{3.0}$
- $R_c = 0.11 \text{ mm}$
- $R_r = 0.17 \text{ mm}$
- $T_r = \frac{1}{4.1}$
- $\text{Mean Error} = 5.2 \%$
- $\text{Depth} = 0.399 \text{ mm}$
- $\text{Pitch} = 0.7530 \text{ mm}$
- $\text{Pitch} = 0.0296 \text{ in}$
- $\text{TPI} = 33.7$
- $\text{LF} = 11.1$
- $\text{RF} = 35.0$
- $\text{TFA} = 46.1$
- $\text{Ratios: } A/R: 0.53, D/OD: 0.028$

Mu	Filar	
	Scale	
Bench	Div. Eng.	
	Adjust.	
Leveling	Focus	
	Eye P.	
Tube	Tool	
	Gauge	
Binding	Misc.	

Mates with RB-5c

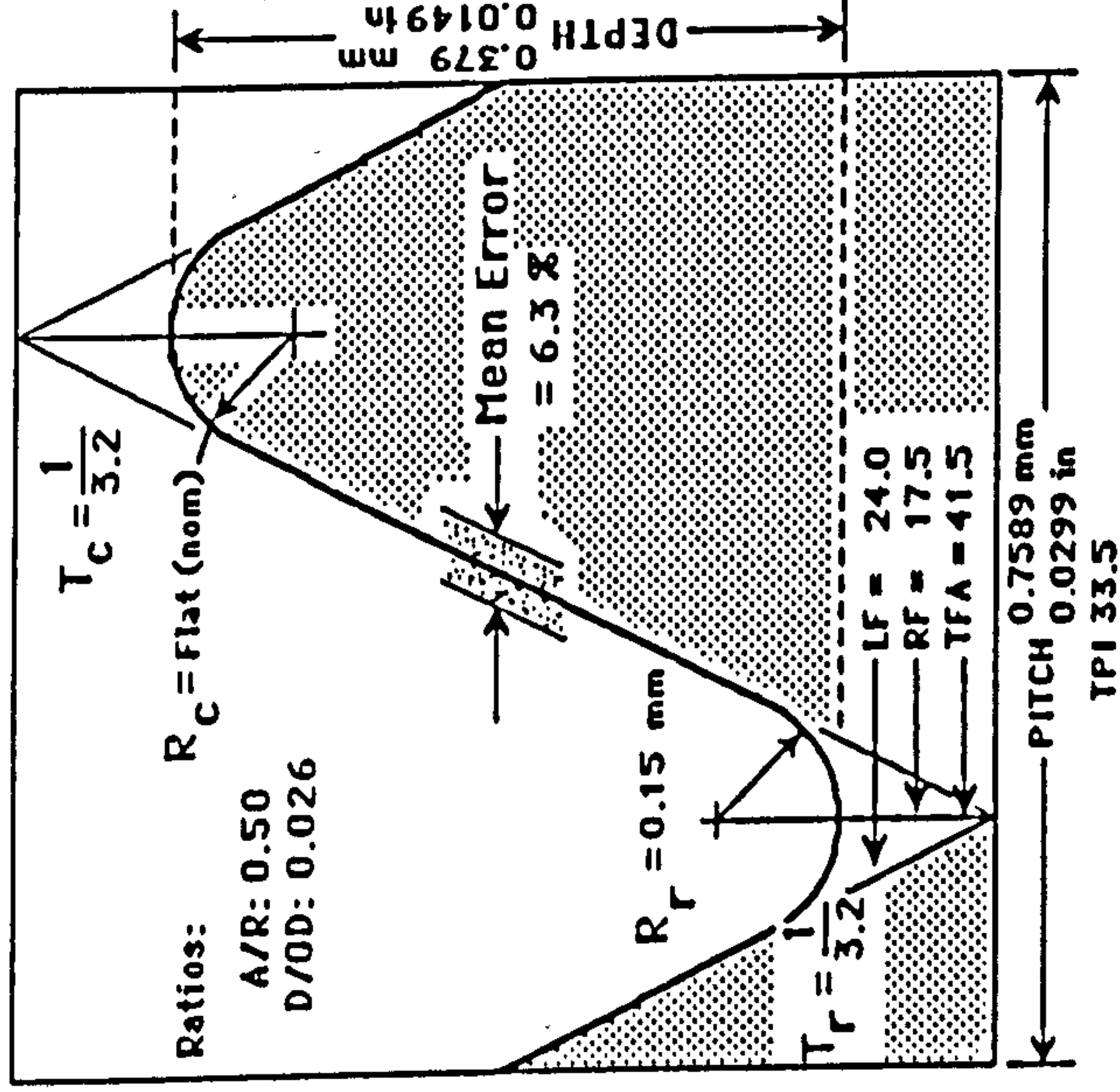


### Characteristics:

Screw ☐ Nut ☒  
 Leng: 0.188" / 0.375"  
 Diameter:  $\approx 0.563$ "  
 Steel ☐ Brass ☒  
 Other:

### Instrument Identification:

Study Code: RB-5c  
 Instrument: Gregorian Telescope  
 Maker: Not Signed  
 Date:  $\approx$ ca.1790  
 Ser./Acq. No.



Mu — [ Filar Scale Bench Div. Eng. Adjust. Leveling Focus Eye P. Tube Tool Gauge Binding Misc.

Mates with RB-5c

Characteristics:

Screw

Nut

Leng: 0.313"

Diameter: 1.188"

Steel

Brass

Other:

Instrument Identification:

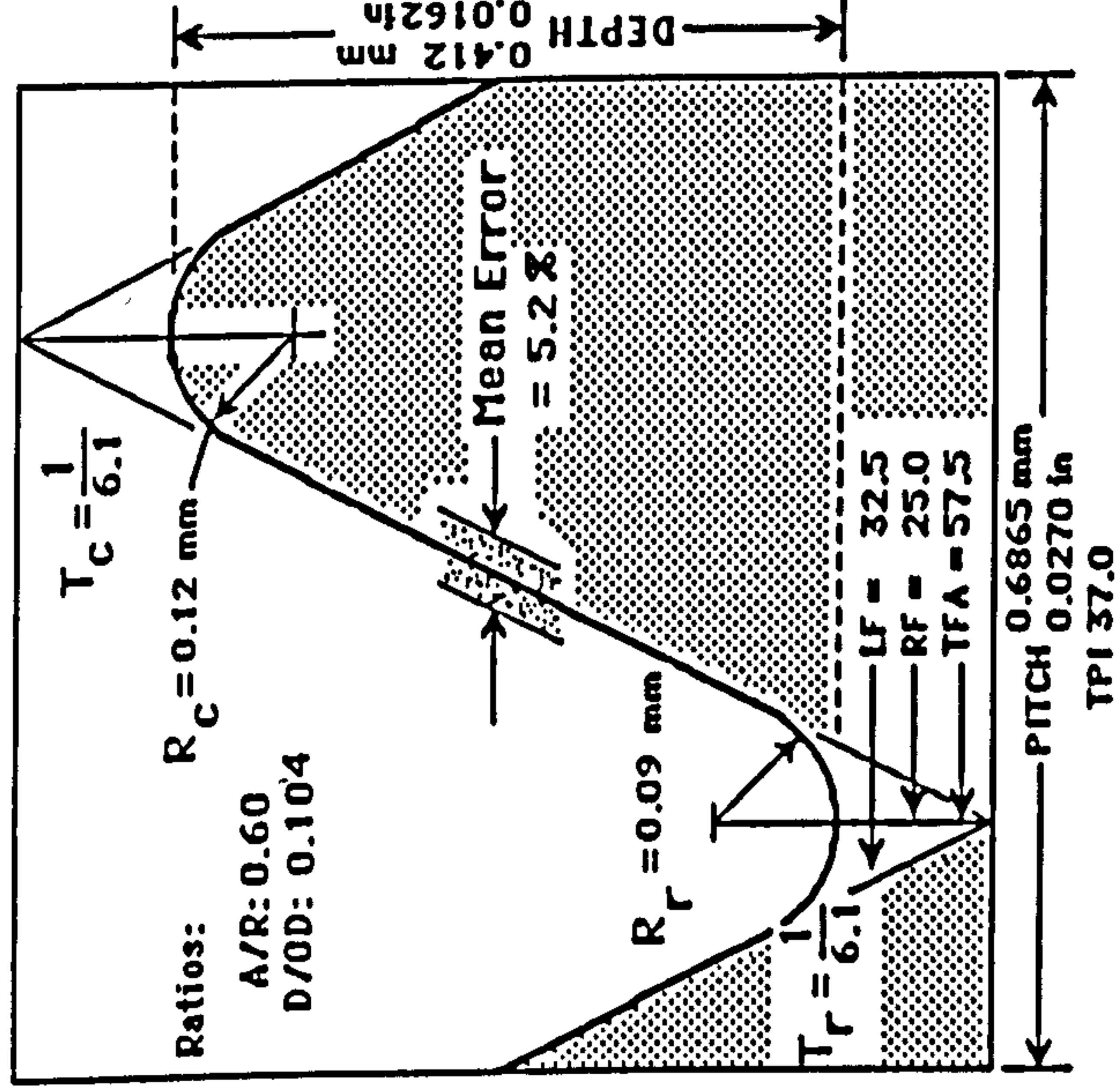
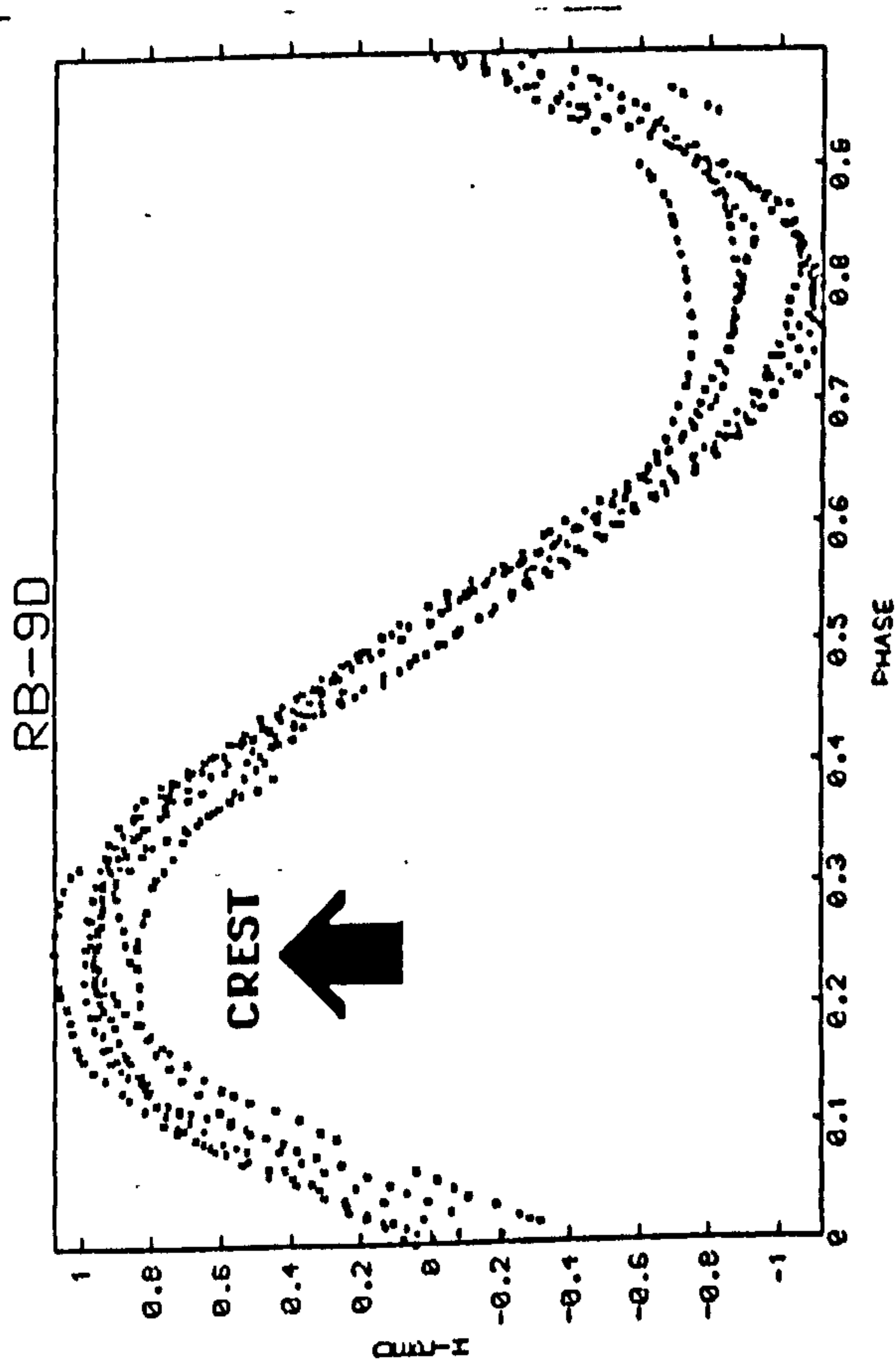
Study Code: RB-9d

Instrument: Refracting Telescope

Maker: Broadhurst/Clarkson

Date: >1858

Ser./Acq. No.



MU

Filar

Scale

Bench

Div. Eng.

Adjust.

Leveling

Focus

Eye P.

Tube

Tool

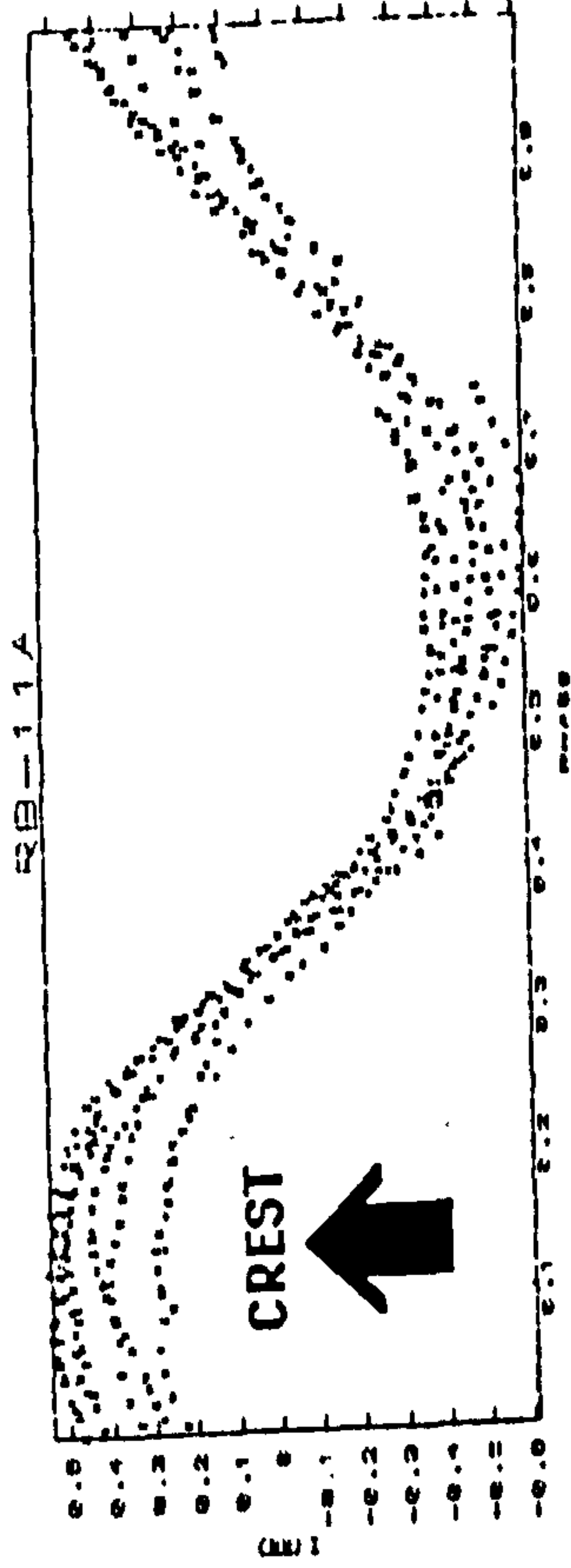
Gauge

Binding

Misc.

Filter for eyepiece





Characteristics:

Screw ☐ Nut ☒

Leng: 0.188" / 0.281"

Diameter: 0.844"

Steel ☐ Brass ☒

Other:

Instrument Identification:

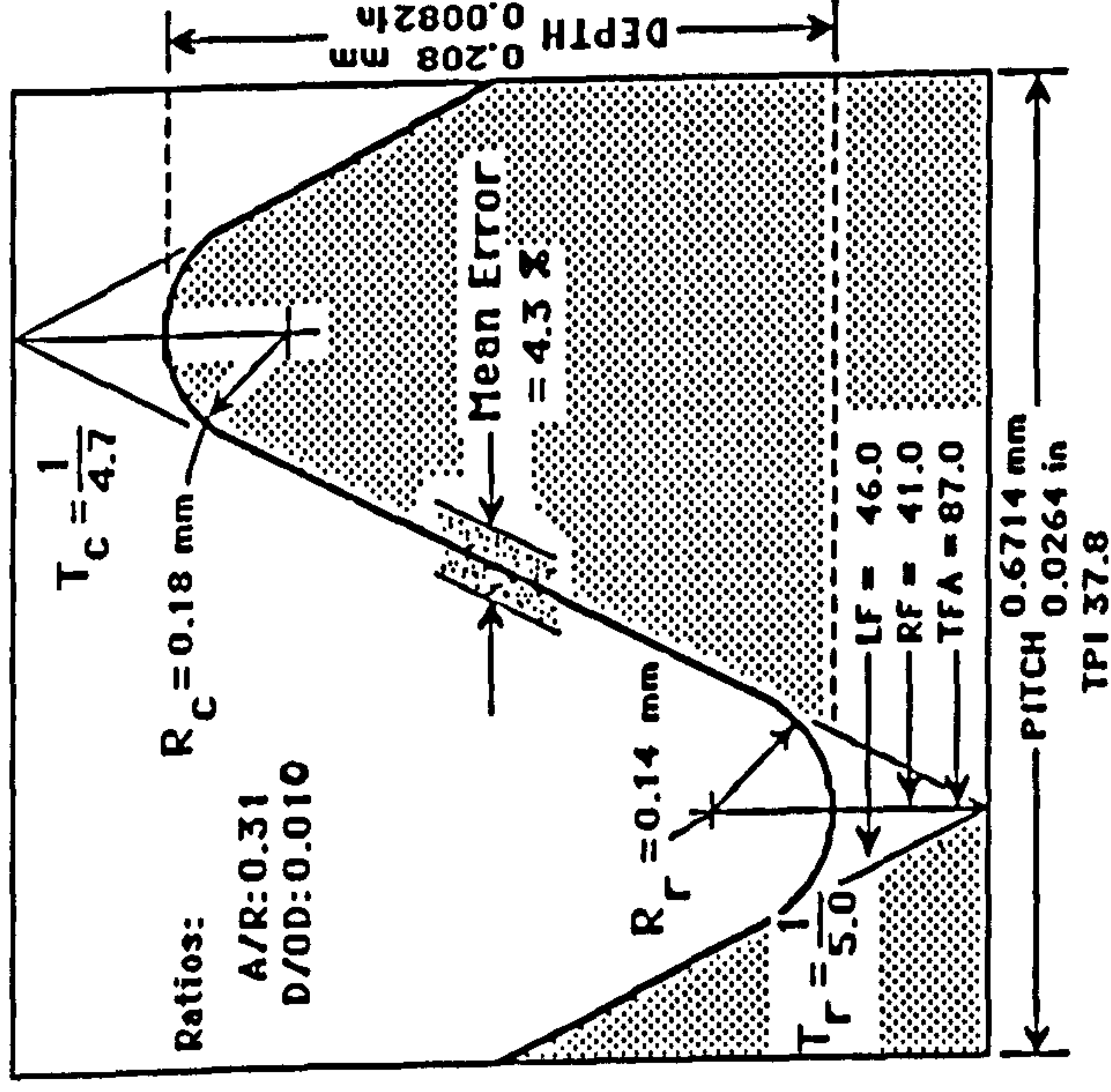
Study Code: RB-11a

Instrument: Spyglass

Maker: Not signed

Date: late 19th c

Ser./Acq. No.



Mu — [ Filar  
Scale  
Bench  
Div. Eng.  
Adjust.  
Leveling  
Focus  
Eye P.  
Tube  
Tool  
Gauge  
Binding  
Misc.

Internal thread on end  
cover of eye piece for 11b

Possibly of French  
manufacture



Characteristics:

Screw

Nut

Leng: 0.188" / 0.281"

Diameter: 0.8804"

Steel

Brass

Other:

Instrument Identification:

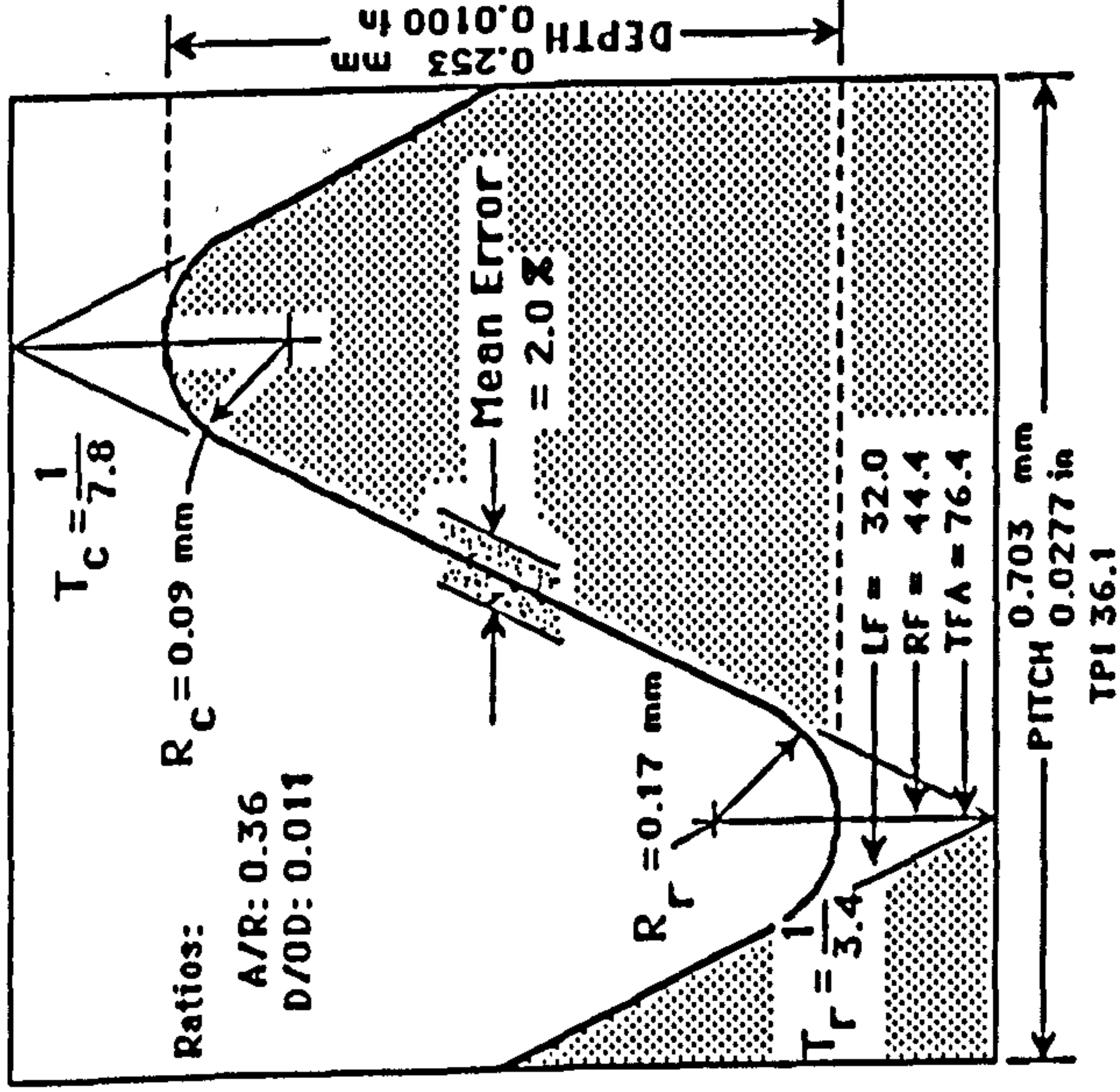
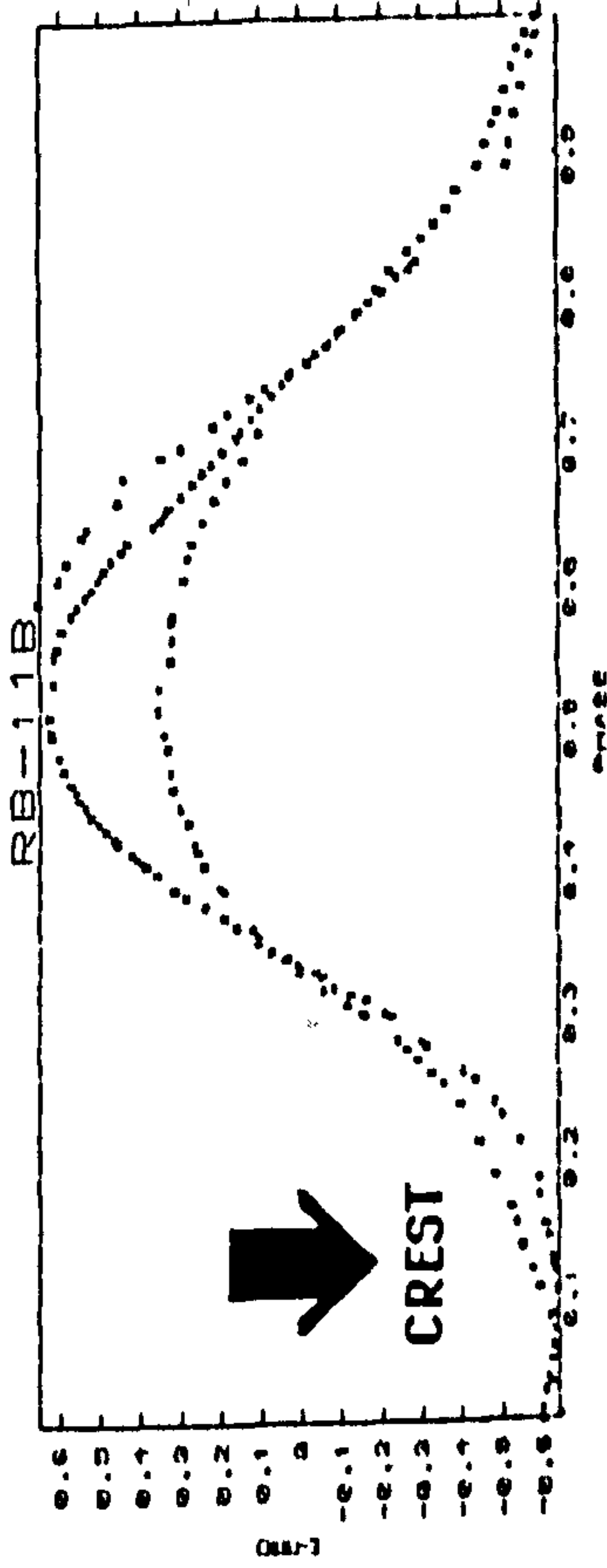
Study Code: RB-11b

Instrument: Spyglass

Maker: Not signed

Date: late 19th c

Ser./Acq. No.



MU

Filar

Scale

Bench

Div. Eng.

Adjust.

Leveling

Focus

Eye P.

Tube

Tool

Gauge

Binding

Misc.

Thread on end cover of  
eye piece for 11a

Possibly of French  
manufacture

Characteristics:

Screw ☒ Nut ☐

Leng: 0.156" / 0.313"

Diameter: 1.359"

Steel ☐ Brass ☒

Other:

Instrument Identification:

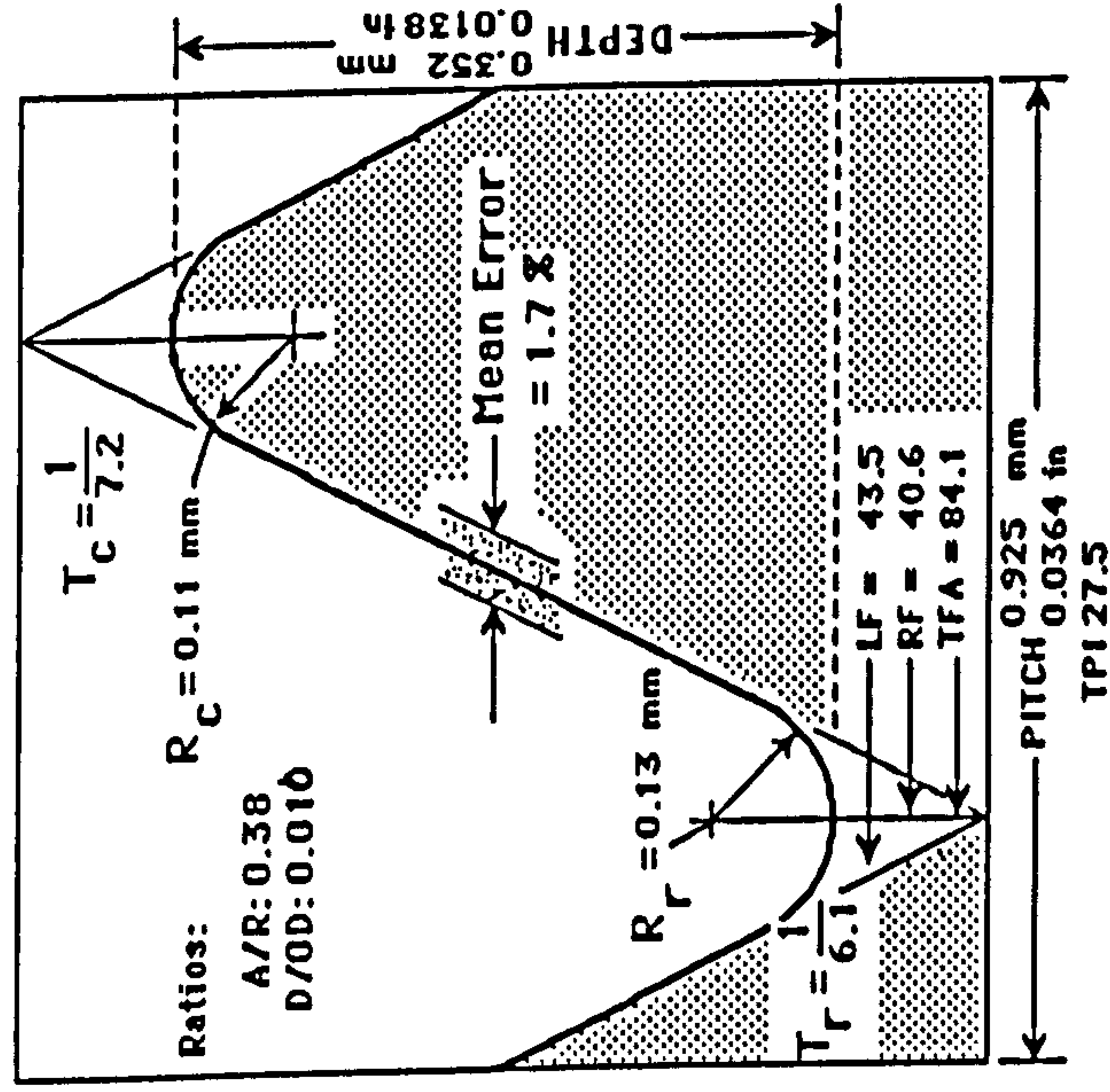
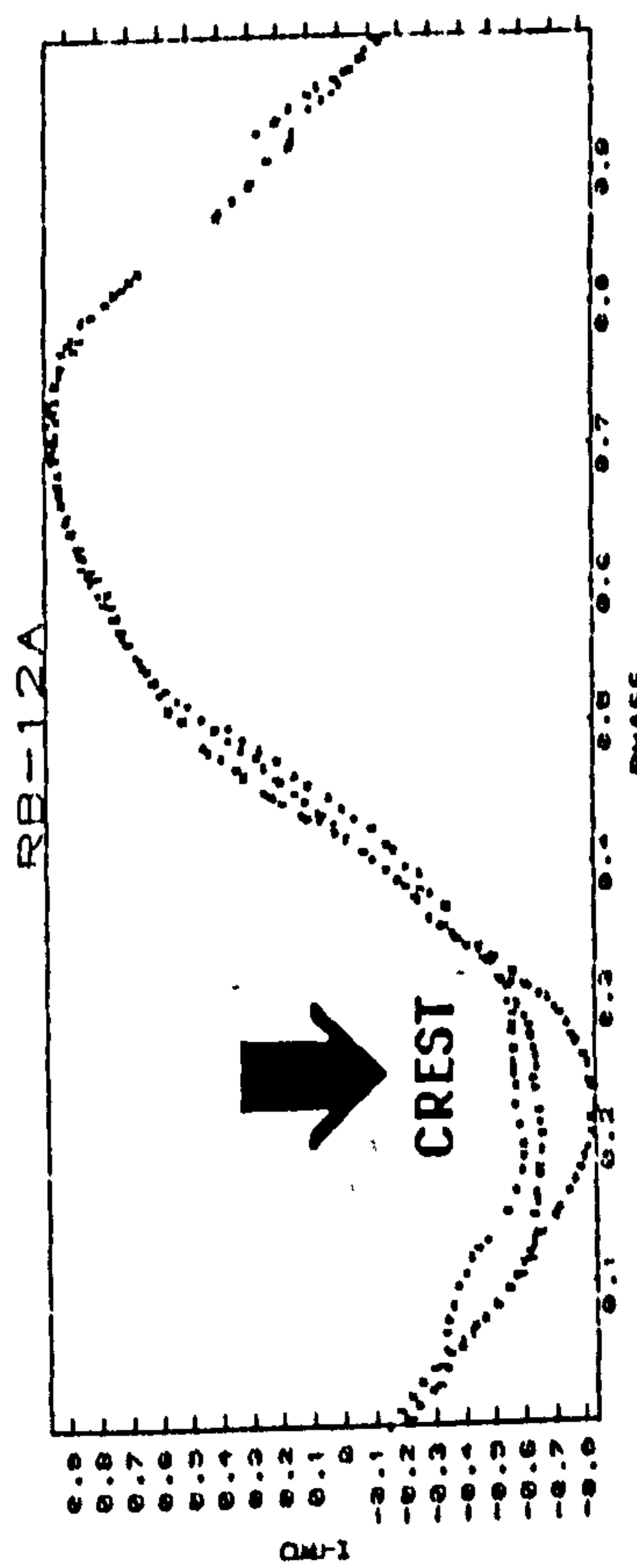
Study Code: RB-12a

Instrument: Spyglass

Maker: Harris & Co.

Date: m 1840's

Ser./Acq. No.



Mu	Filar	
	Scale	
	Bench	
	Div. Eng.	
	Adjust.	
	Leveling	
	Focus	
	Eye P.	
	Tube	
	Tool	
	Gauge	
	Binding	
	Misc.	

End cover thread

Characteristics:

Screw

Nut

Leng: 0.219"

Diameter: 1.234"

Steel

Brass

Other:

Instrument Identification:

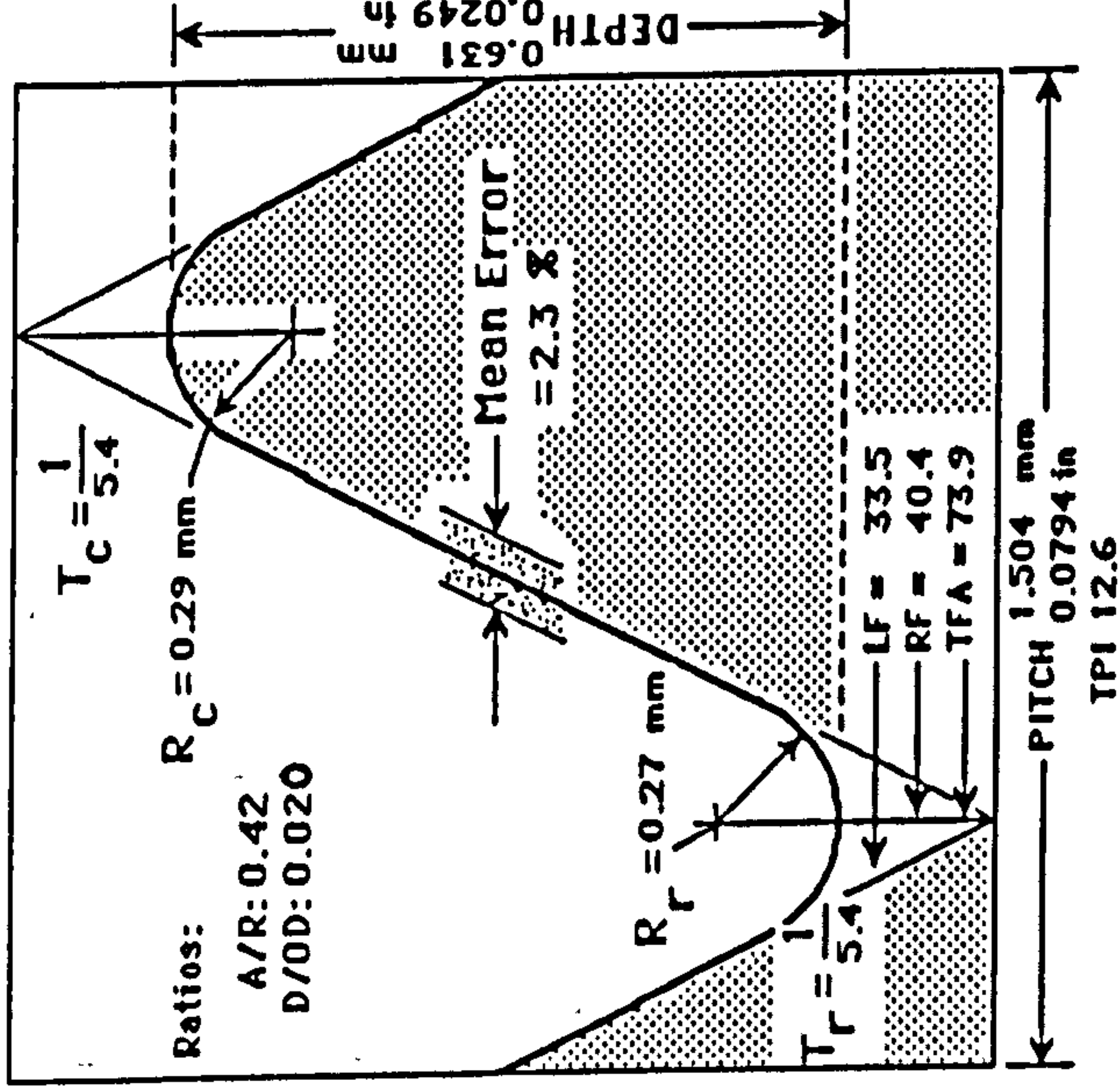
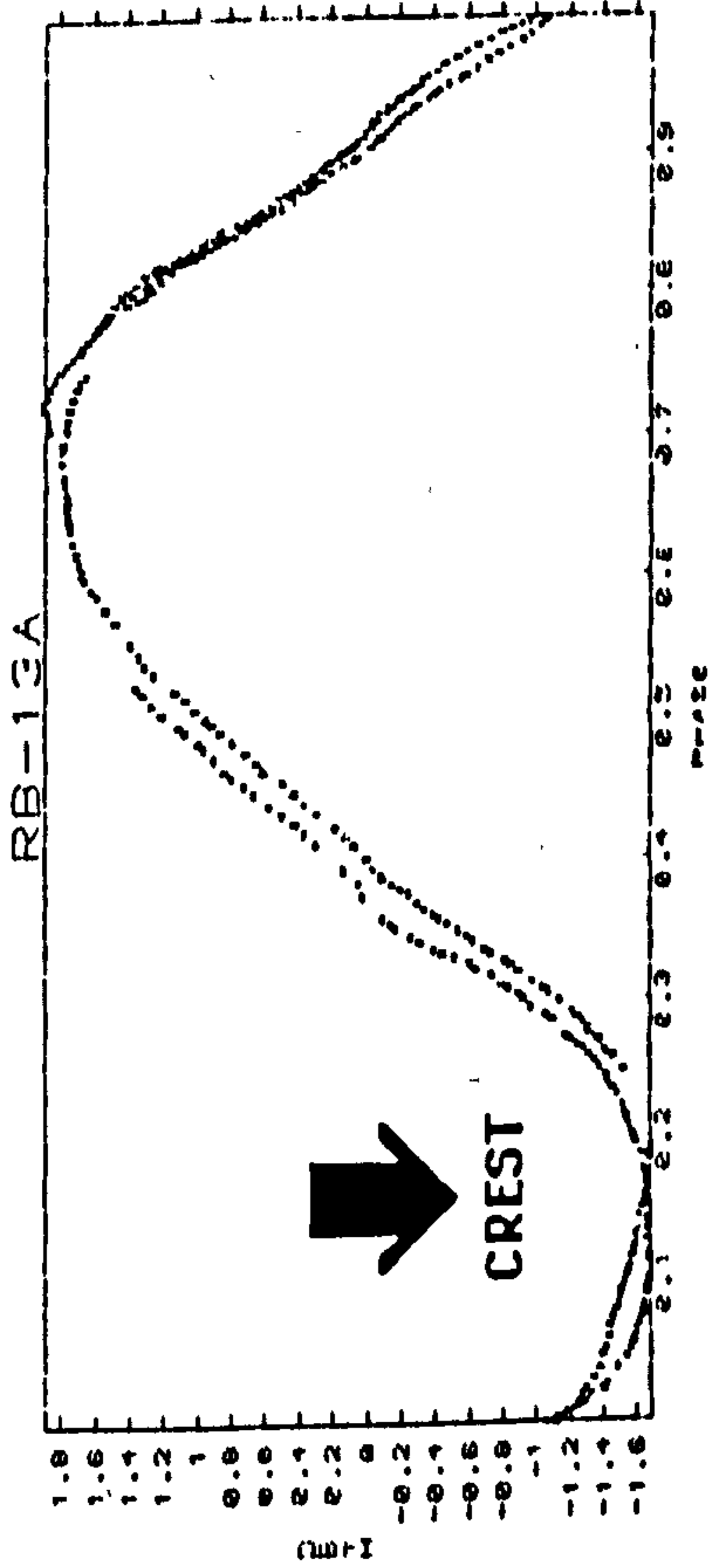
Study Code: RB-13a

Instrument: Telescope eyepiece set

Maker: Thomas Cooke(?)

Date: ca.1890

Ser./Acq. No.



Mu

Filar

Scale

Bench

Div. Eng.

Adjust.

Leveling

Focus

Eye P.

Tube

Tool

Gauge

Binding

Misc.

Mounting thread for EP

Characteristics:

Screw

Nut

Leng: 0.250"

Diameter: 1.00"

Steel

Brass

Other:

Instrument Identification:

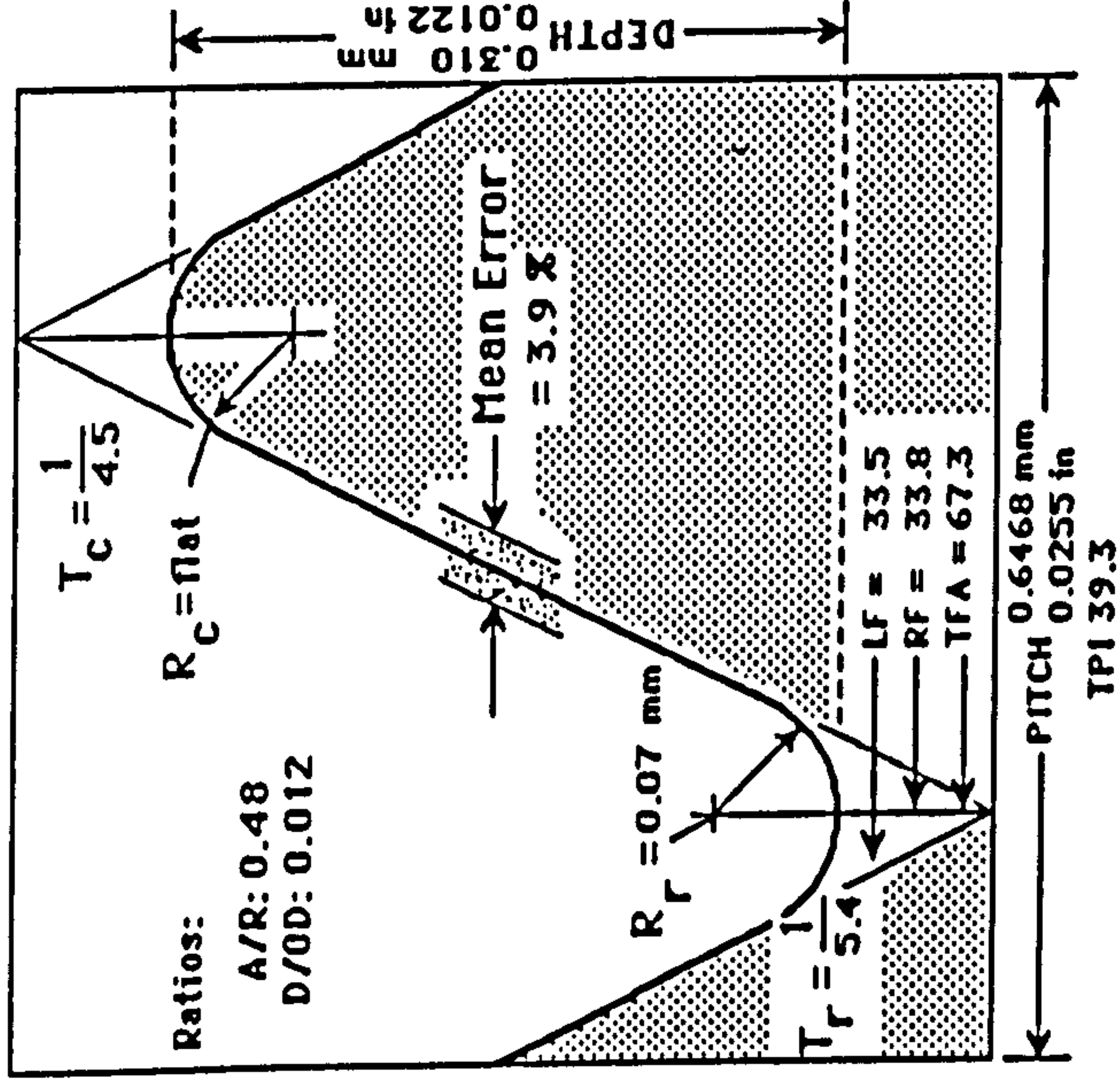
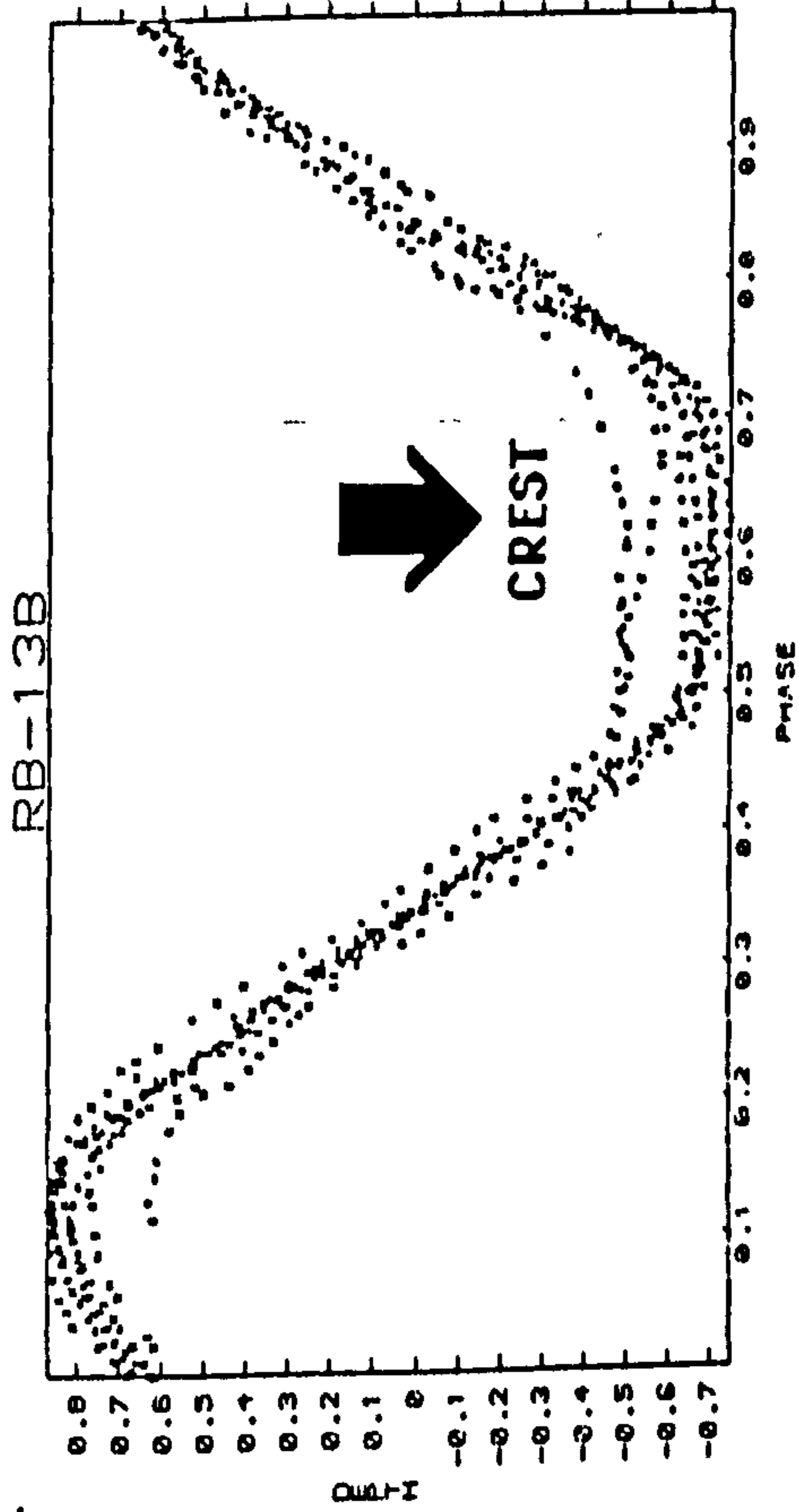
Study Code: RB-13b

Instrument: Telescope eyepiece set

Maker: Thomas Cooke(?)

Date: ca.1890

Ser./Acq. No.



Mu

Filar

Scale

Bench

Div. Eng.

Adjust.

Leveling

Focus

Eye P.

Tube

Tool

Gauge

Binding

Misc.

Thread on lens cell



Characteristics:

Screw

Nut

Leng: 0.156" / 0.219"

Diameter: 1.328"

Steel

Brass

Other:

Instrument Identification:

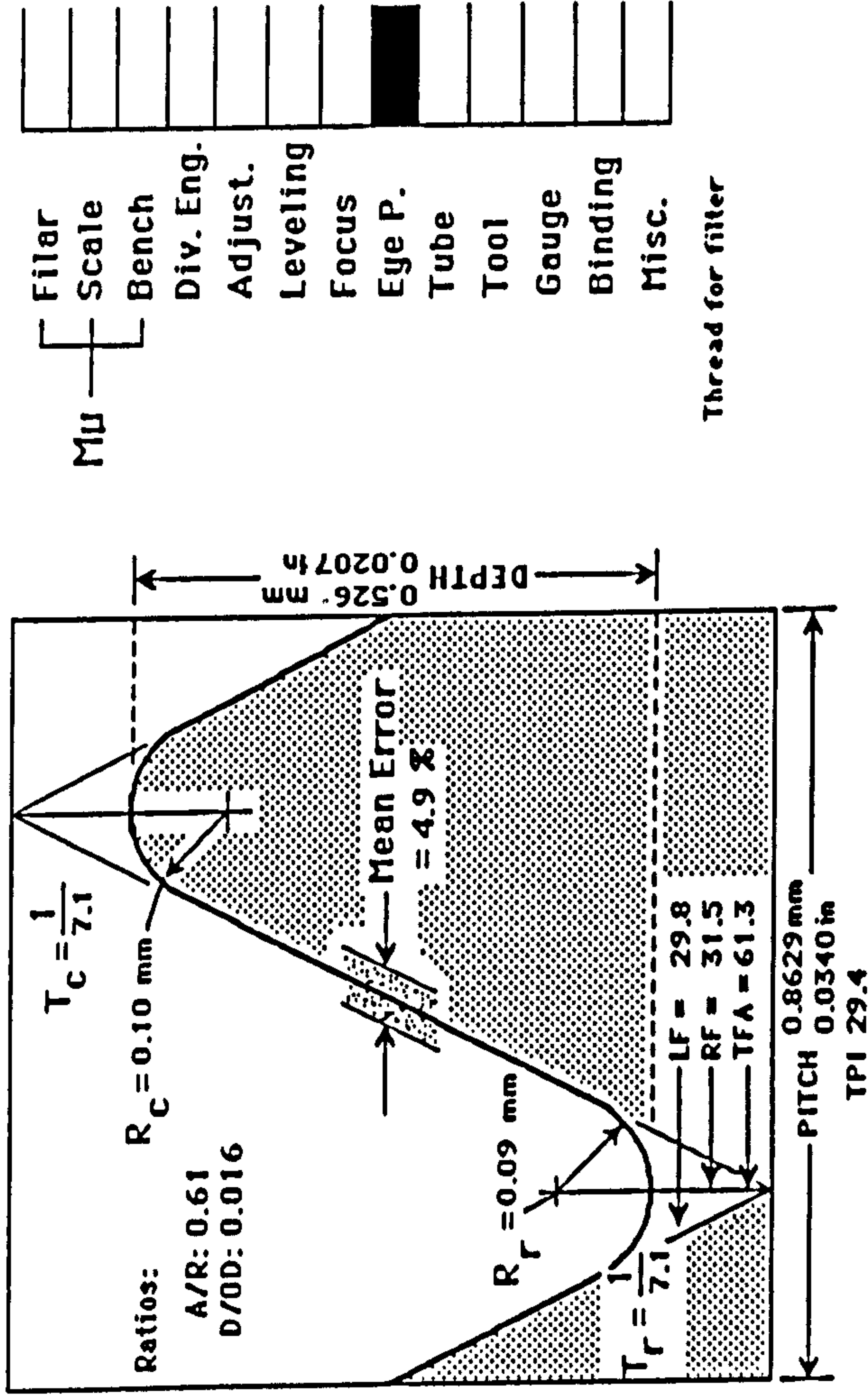
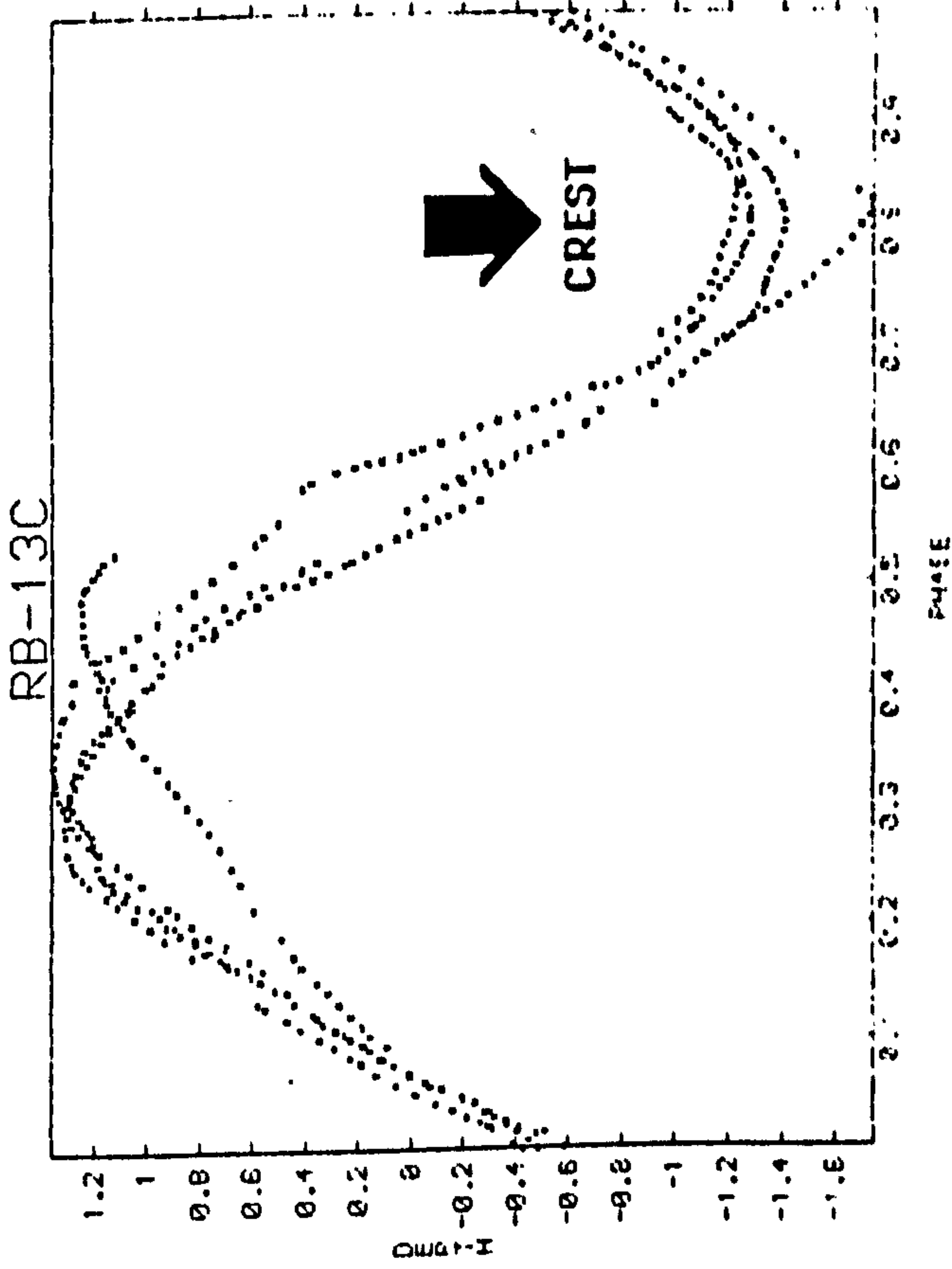
Study Code: RB-13c

Instrument: Telescope Eyepiece Set

Maker: Thomas Cooke (?)

Date: ca.1890

Ser./Acq. No.



	Filar
	Scale
	Bench
	Div. Eng.
	Adjust.
	Leveling
	Focus
	Eye P.
	Tube
	Tool
	Gauge
	Binding
	Misc.
	Thread for filter

Characteristics:

Screw ☐ Nut ☒

Leng: 0.156" / 0/219"

Diameter: 1.188"

Steel ☐ Brass ☒

Other:

Instrument Identification:

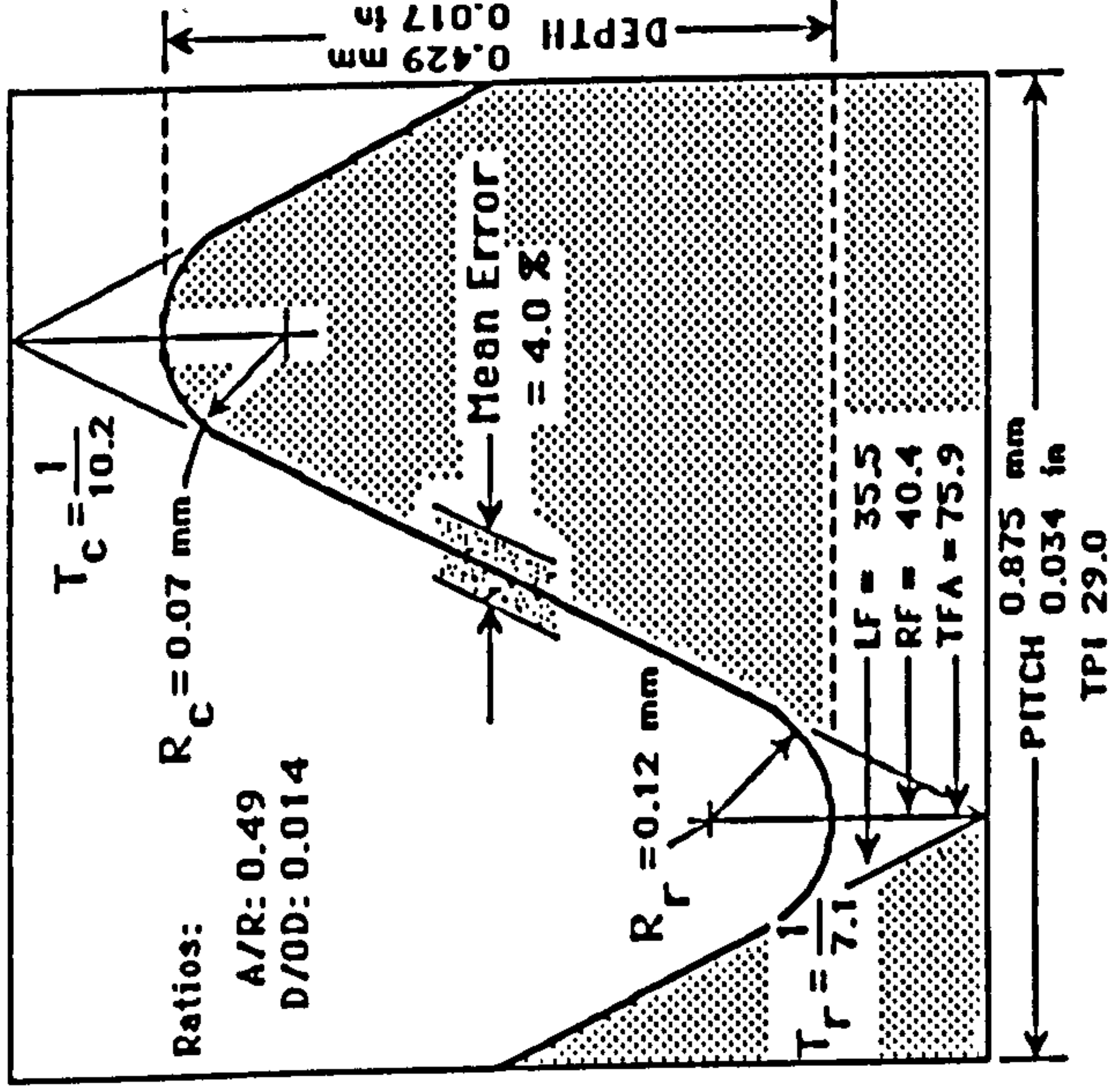
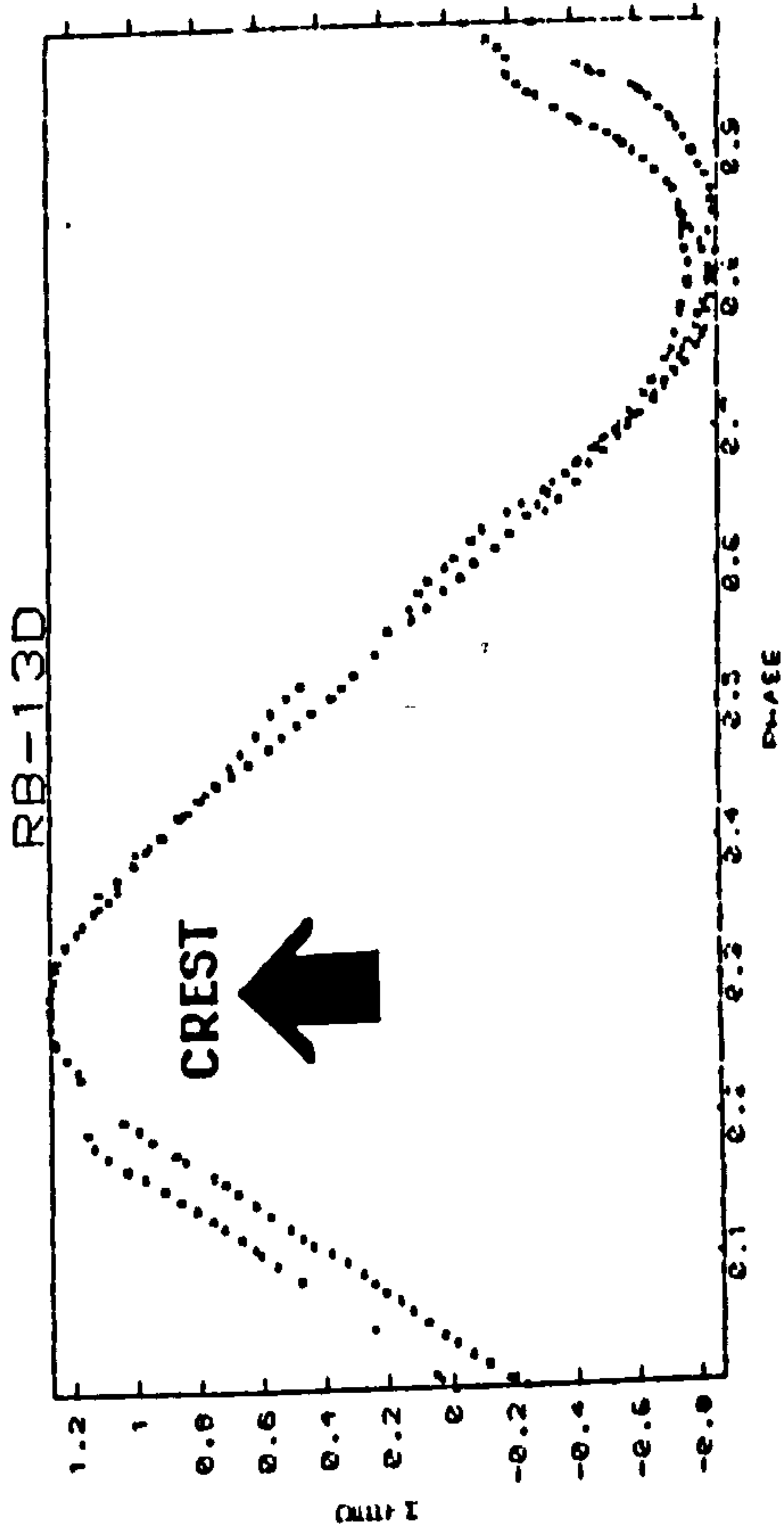
Study Code: RB-13d

Instrument: Telescope eyepiece set

Maker: Thomas Cooke (?)

Date: ca.1890

Ser./Acq. No.



Mu — [ Filar Scale Bench Div. Eng. Adjust. Leveling Focus Eye P. Tube Tool Gauge Binding Misc.

Thread on EP filter





Characteristics:

Screw

Nut

Leng: 0.25"

Diameter: 0.75"

Steel

Brass

Other:

Instrument Identification:

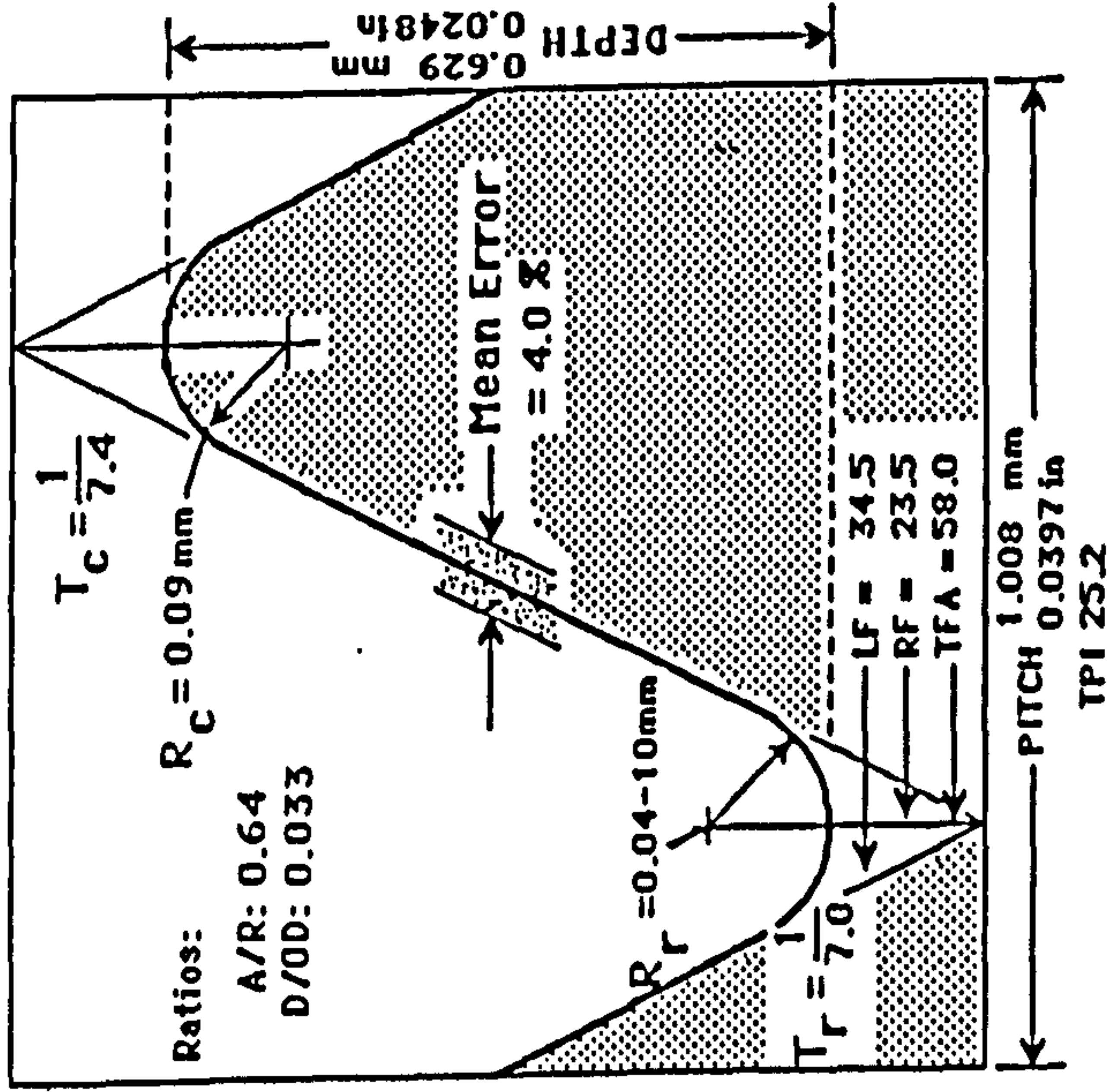
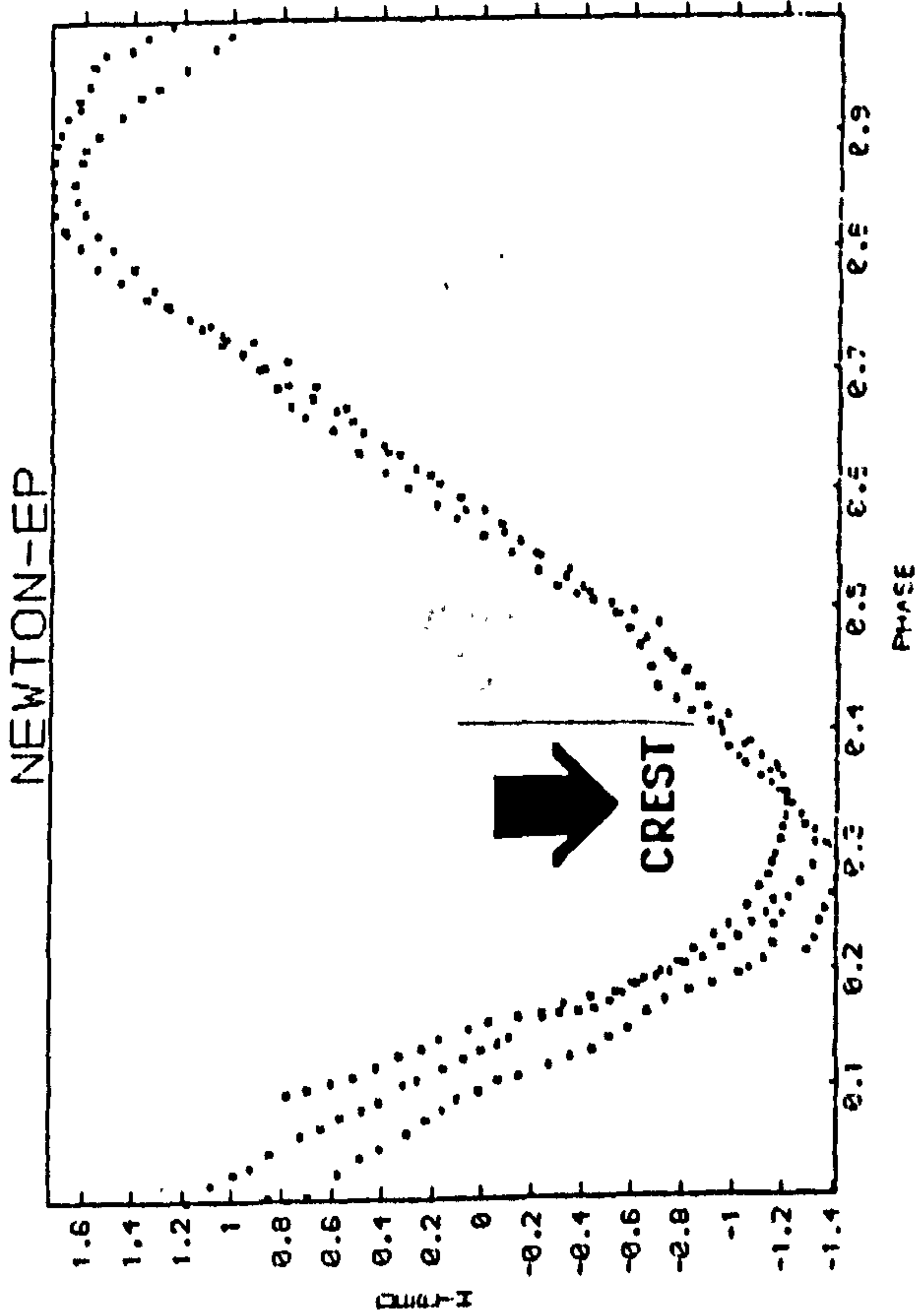
Study Code: RS-1d

Instrument: Newtonian Telescope

Maker: Isaac Newton/Heath & Wing

Date: 1671/ca.1760

Ser./Acq. No.



Mu	Filar
	Scale
	Bench
	Div. Eng.
	Adjust.
	Leveling
	Focus
	Eye P.
	Tube
	Tool
	Gauge
	Binding
	Misc.



Characteristics:

Screw

Nut

Leng: 0.188"

Diameter: 1.375"

Steel

Brass

Other: Lignum vitae

Instrument Identification:

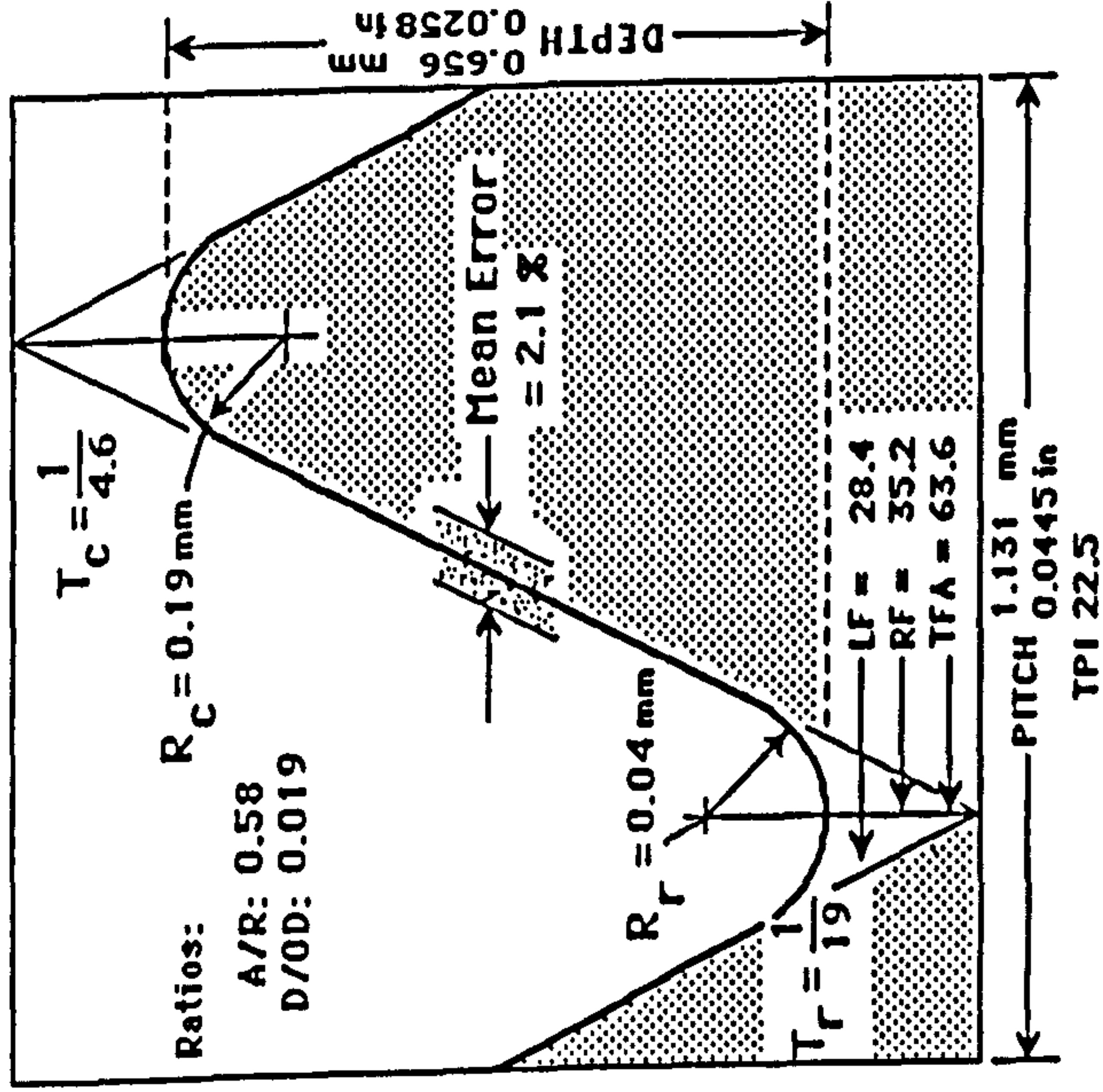
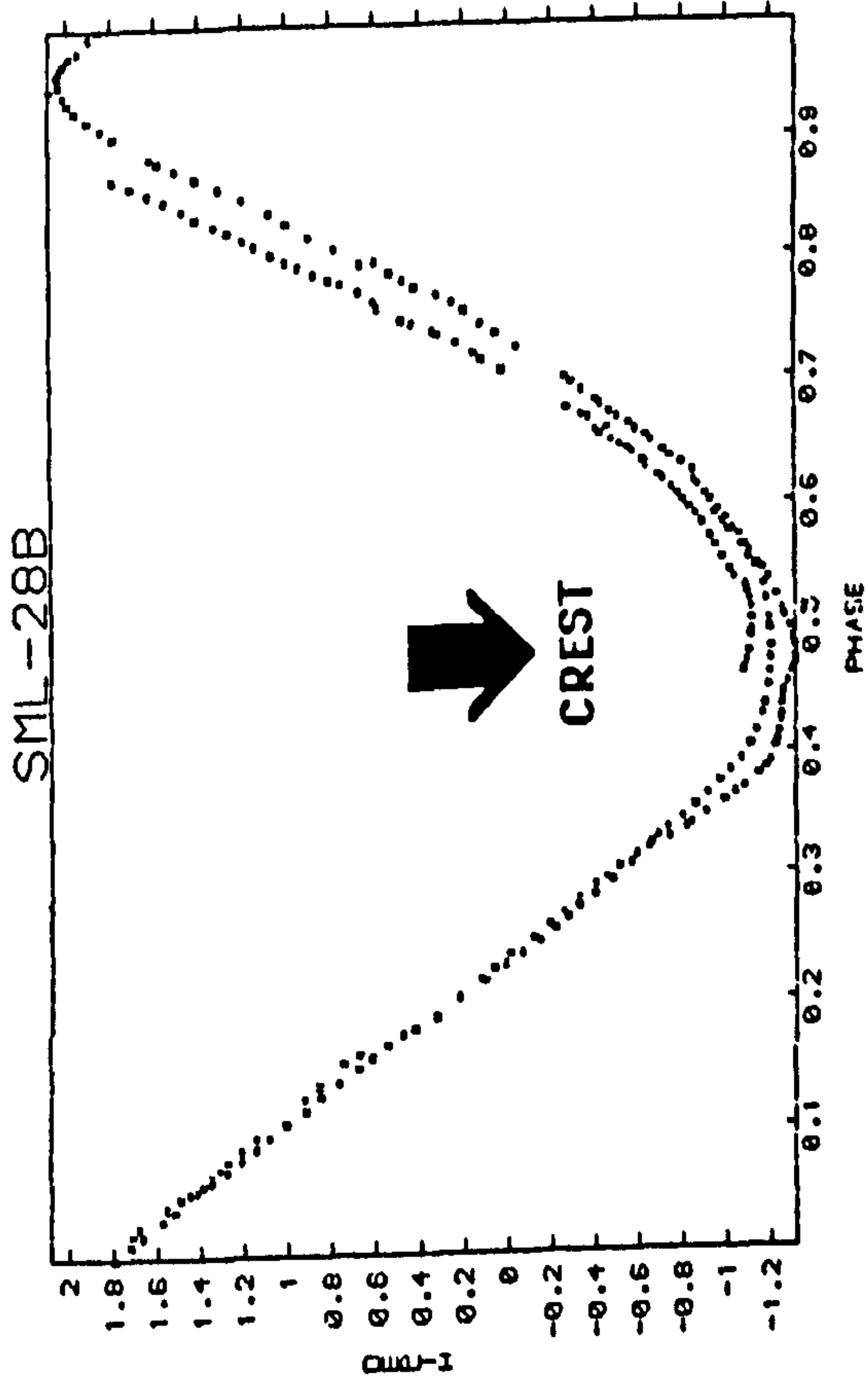
Study Code: SML-28b

Instrument: Eyepiece micrometer

Maker: Wm. or A. Herschel(?)

Date: Ca.1780

Ser./Acq. No. 1925-468 (E6)



Mu	Filar
	Scale
	Bench
	Div. Eng.
	Adjust.
	Leveling
	Focus
	Eye P.
	Tube
	Tool
	Gauge
	Binding
	Misc.

Characteristics:

Screw

Nut

Leng: 0.188"

Diameter: 1.375"

Steel

Brass

Other: Lignum Vitae

Instrument Identification:

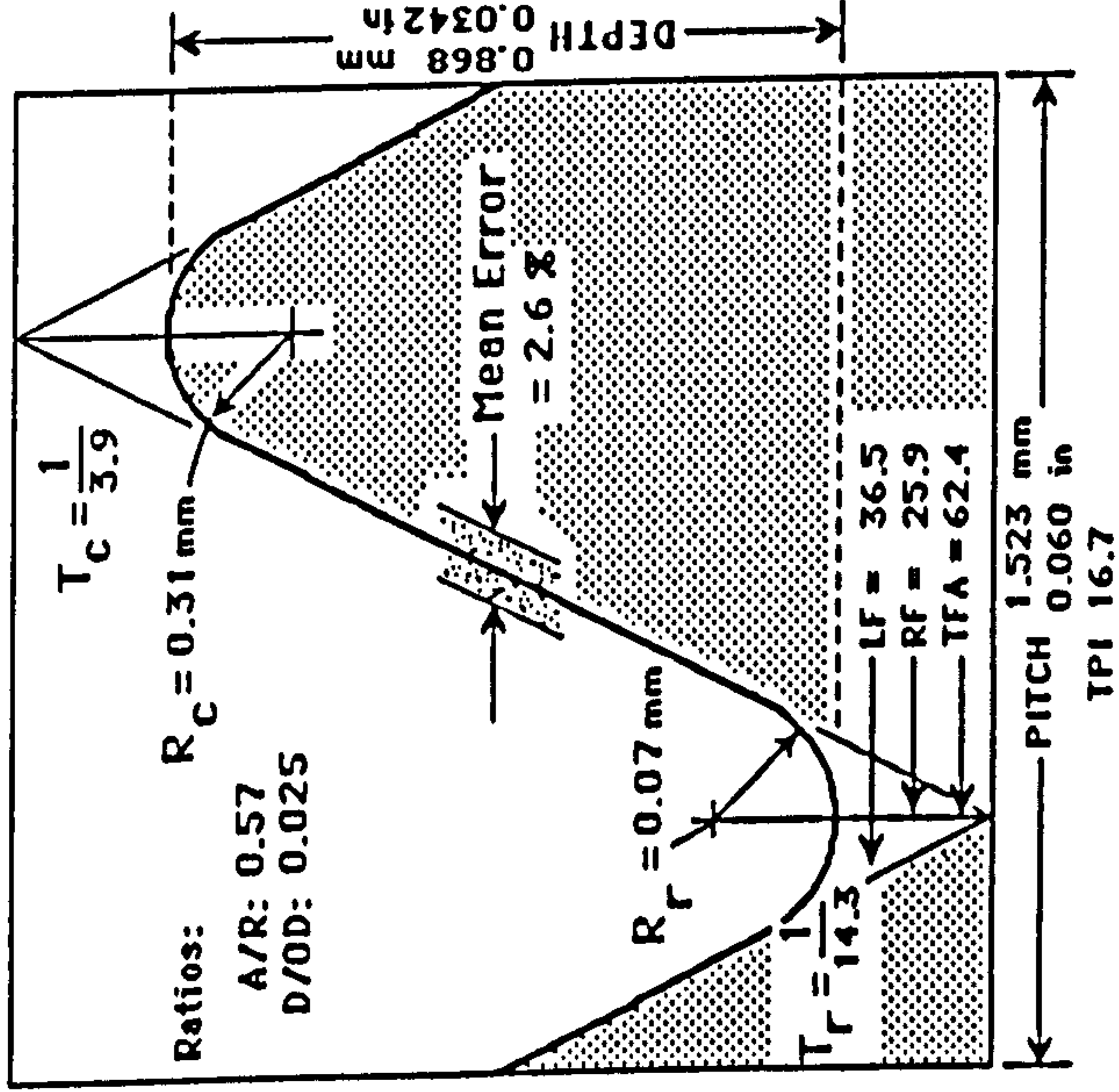
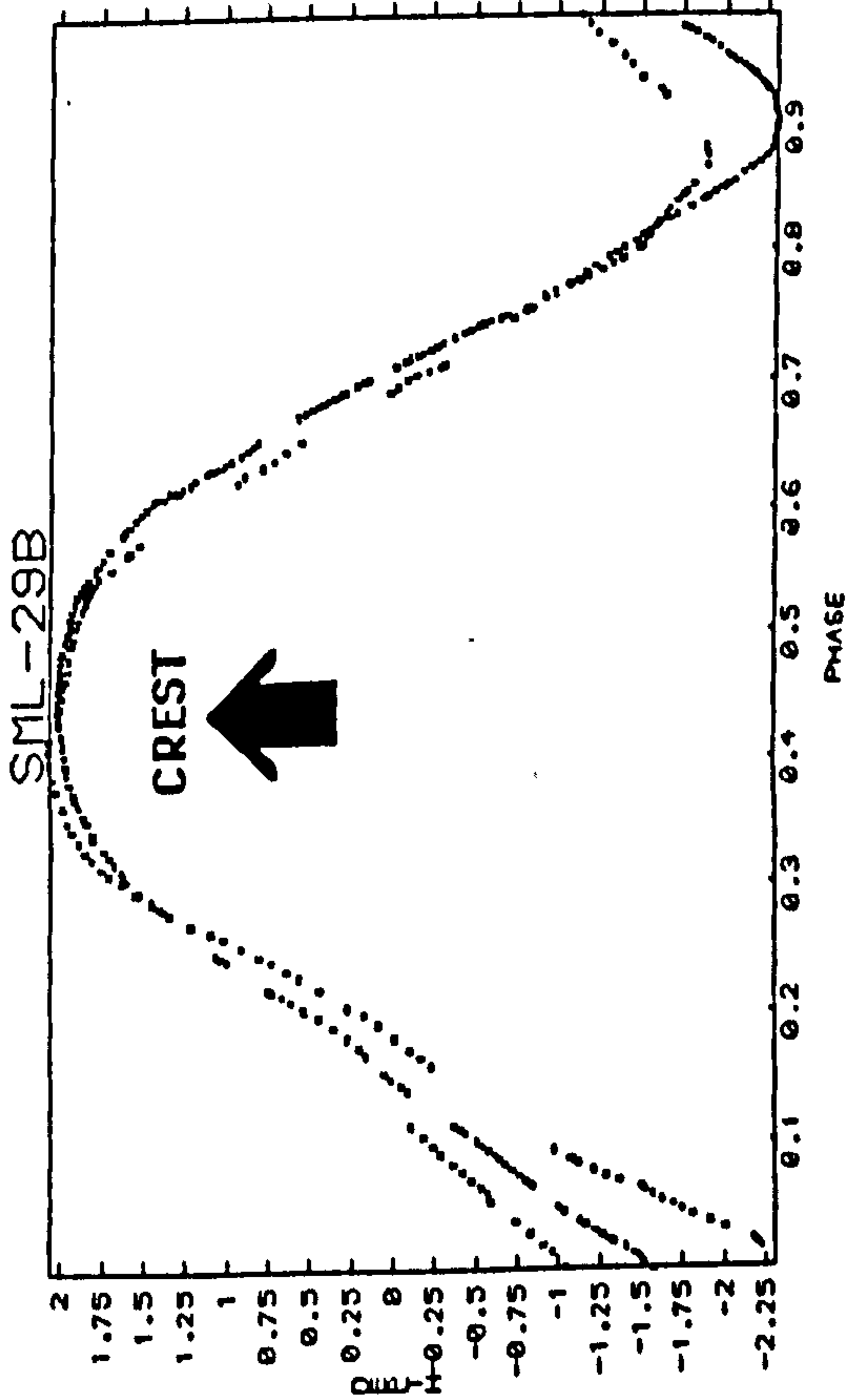
Study Code: SML-29b

Instrument: Eyepiece micrometer

Maker: Wm. or A. Herschel(?)

Date: ca.1780

Ser./Acq. No. 1925-469



MU	Filar
	Scale
	Bench
	Div. Eng.
	Adjust.
	Leveling
	Focus
	Eye P.
	Tube
	Tool
	Gauge
	Binding
	Misc.

Marked: E2 Foc 1."55 (154)

Characteristics:

Screw

Nut

Leng: 0.969"

Diameter: 0.3125"

Steel

Brass

Other: Lignum Vitae

Instrument Identification:

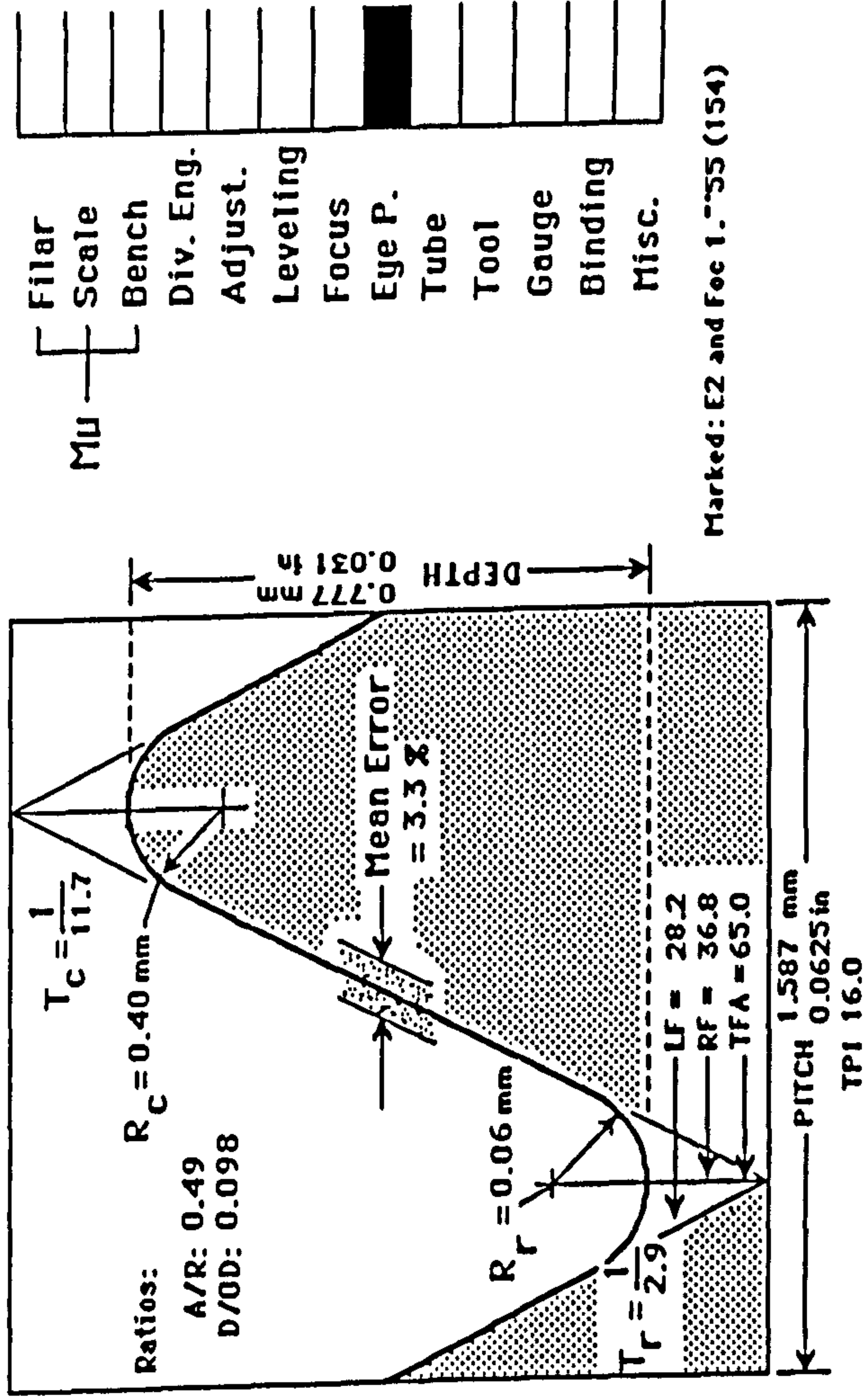
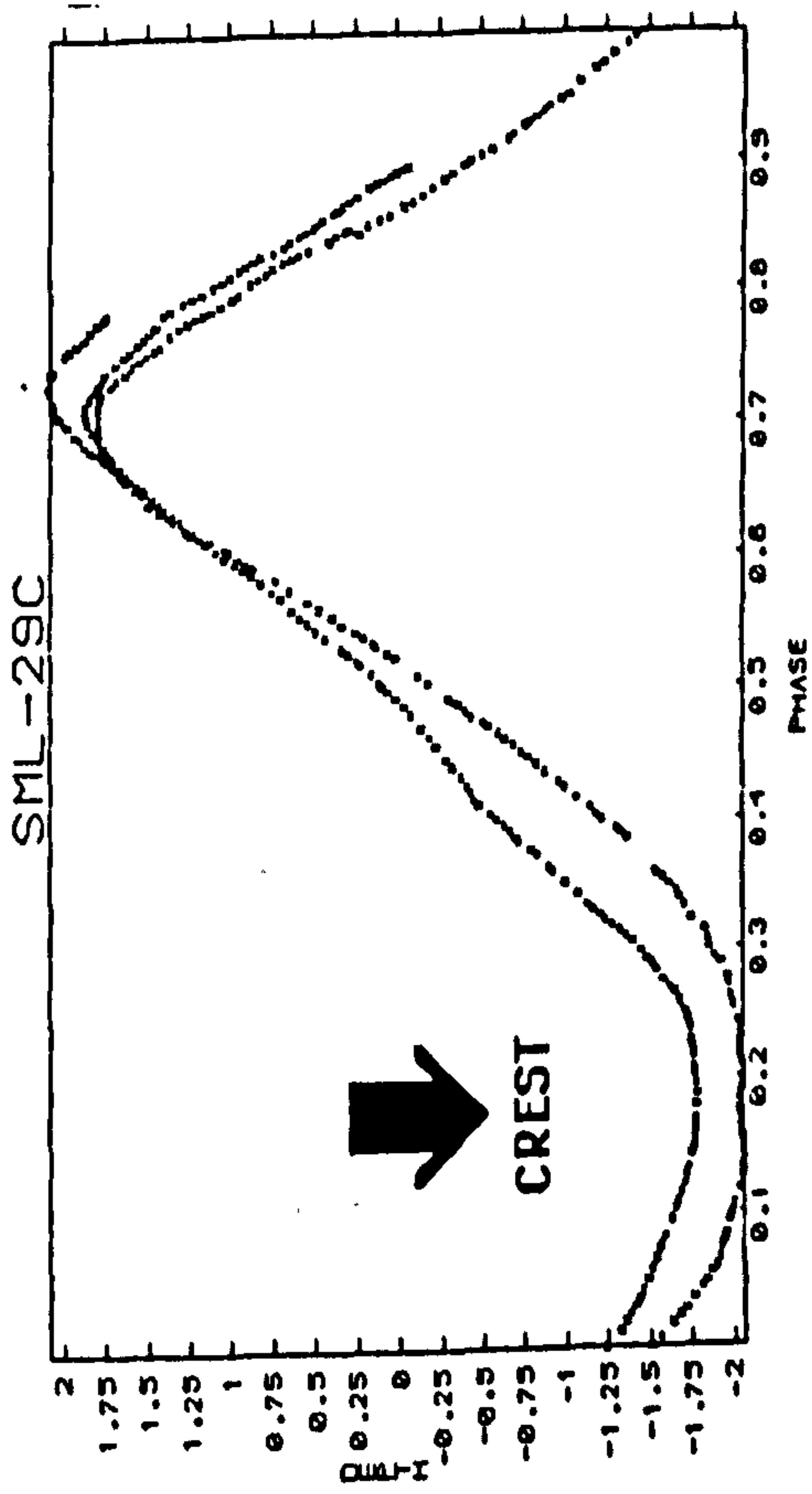
Study Code: SML-29c

Instrument: Eyepiece Micrometer

Maker: Wm. or A. Herschel(?)

Date: ca.1780

Ser./Acq. No. 1925-469



Marked: E2 and Foc 1.55 (154)



Characteristics:

Screw ☒ Nut ☐

Leng: 0.188" / 0.391"

Diameter: 0.9090"

Steel ☐ Brass ☒

Other:

Instrument Identification:

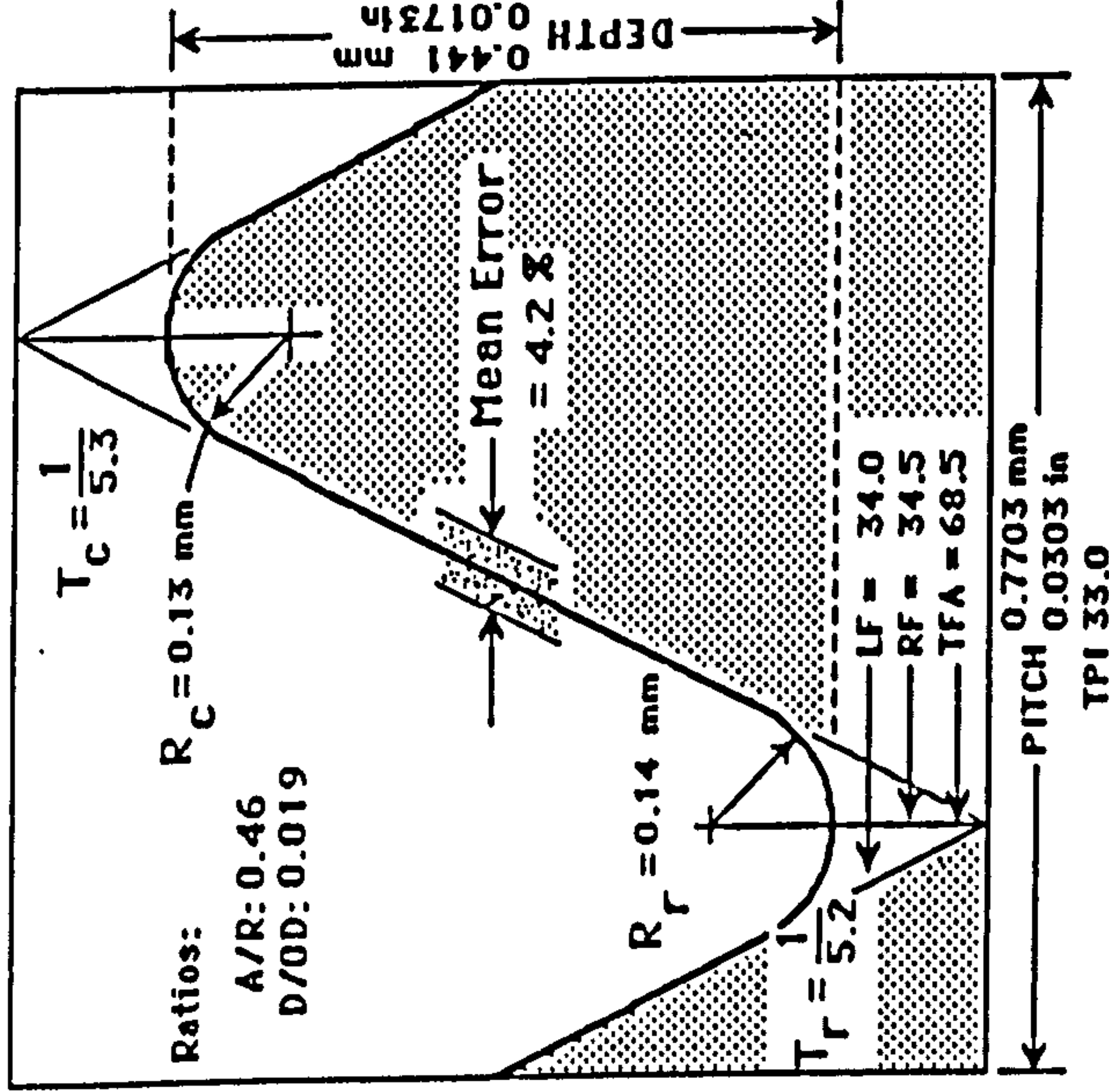
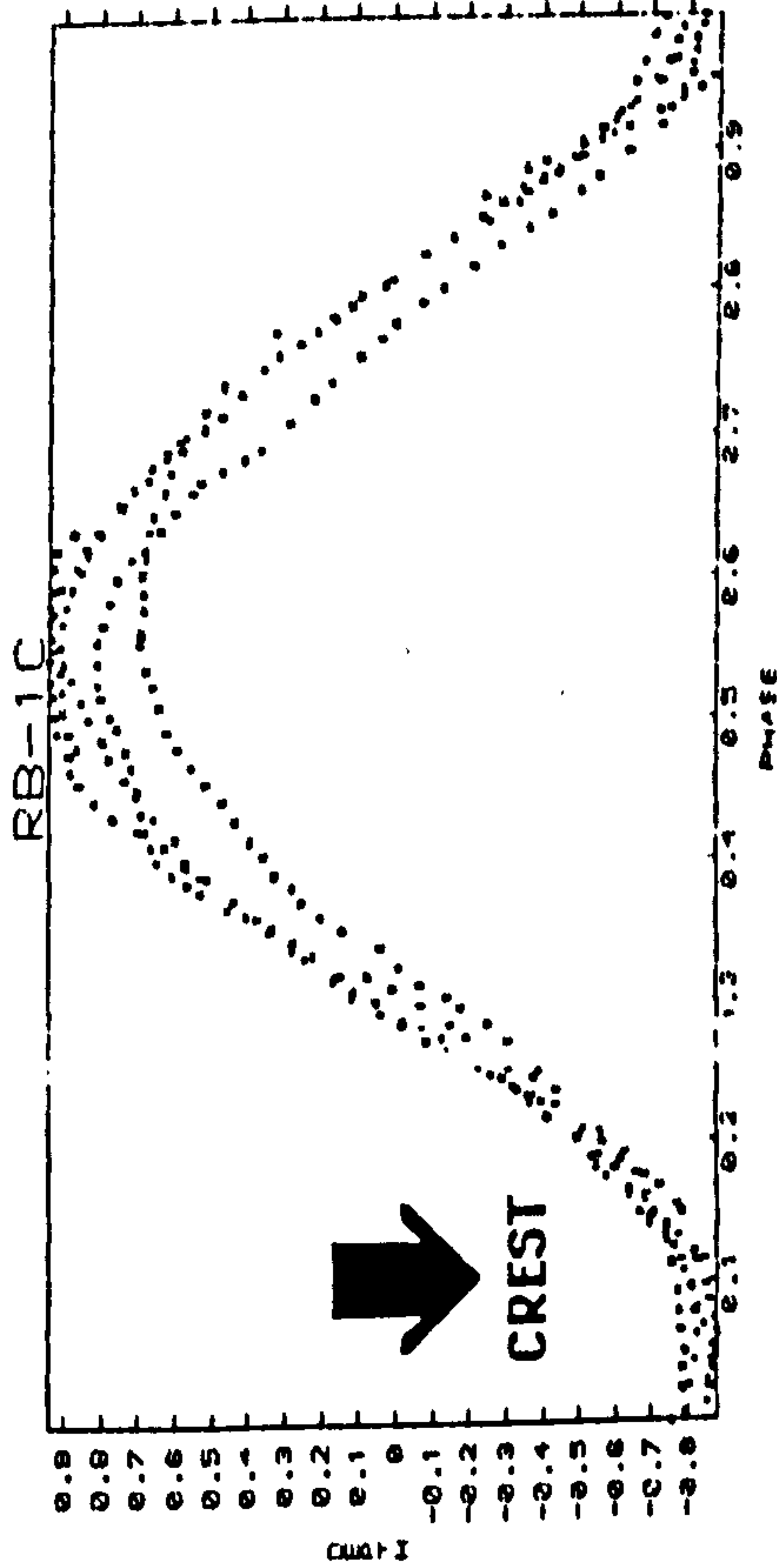
Study Code: RB-1c

Instrument: Sextant

Maker: Chas. P...S, Liverpool

Date: ca.1860

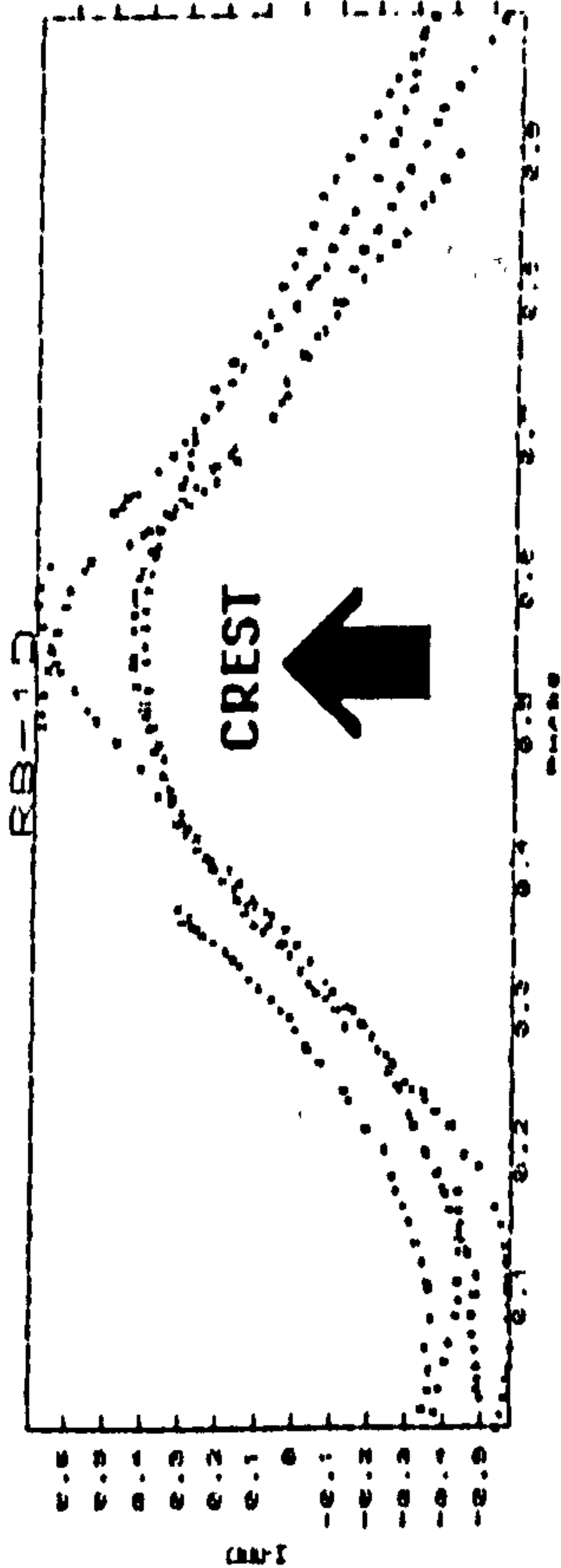
Ser./Acq. No.



Mu — [ Filar  
Scale  
Bench  
Div. Eng.  
Adjust.  
Leveling  
Focus  
Eye P.  
Tube  
Tool  
Gauge  
Binding  
Misc.

Telescope Mount





### Characteristics:

Screw ☐ Nut ☒

Leng: 0.188" / 0.391"

Diameter: 0.875"

Steel ☐ Brass ☒

Other:

### Instrument Identification:

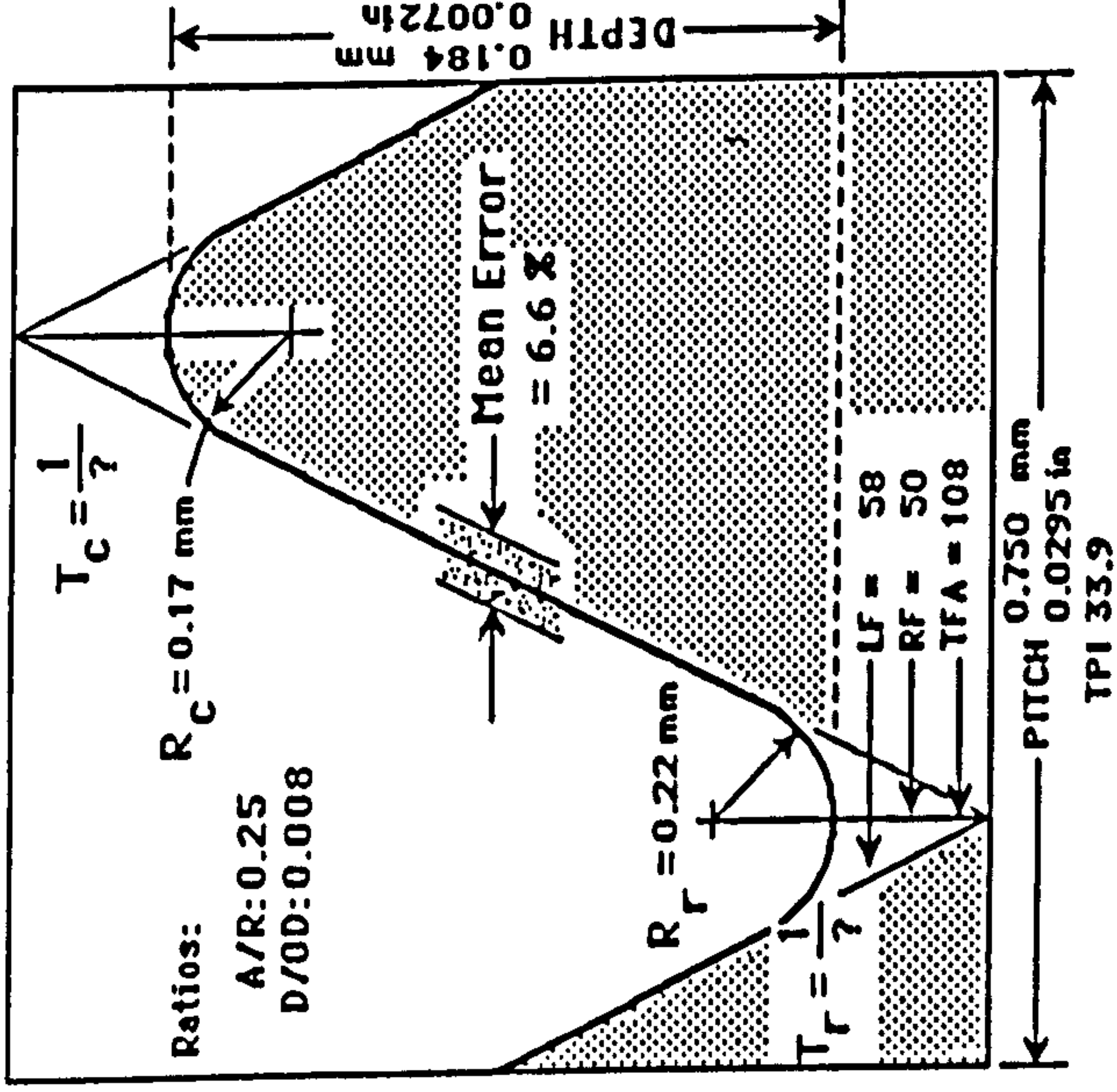
Study Code: RB-1d

Instrument: Sextant

Maker: Chas. P...s, Liverpool

Date: ca.1860

Ser./Acq. No.



Mu	Filar	
	Scale	
	Bench	
	Div. Eng.	
	Adjust.	
	Leveling	
	Focus	
	Eye P.	
	Tube	
	Tool	
	Gauge	
	Binding	
	Misc.	

Characteristics:

Screw

Nut

Leng: 0.172" / 0.156"

Diameter: 0.875"

Steel

Brass

Other:

Instrument Identification:

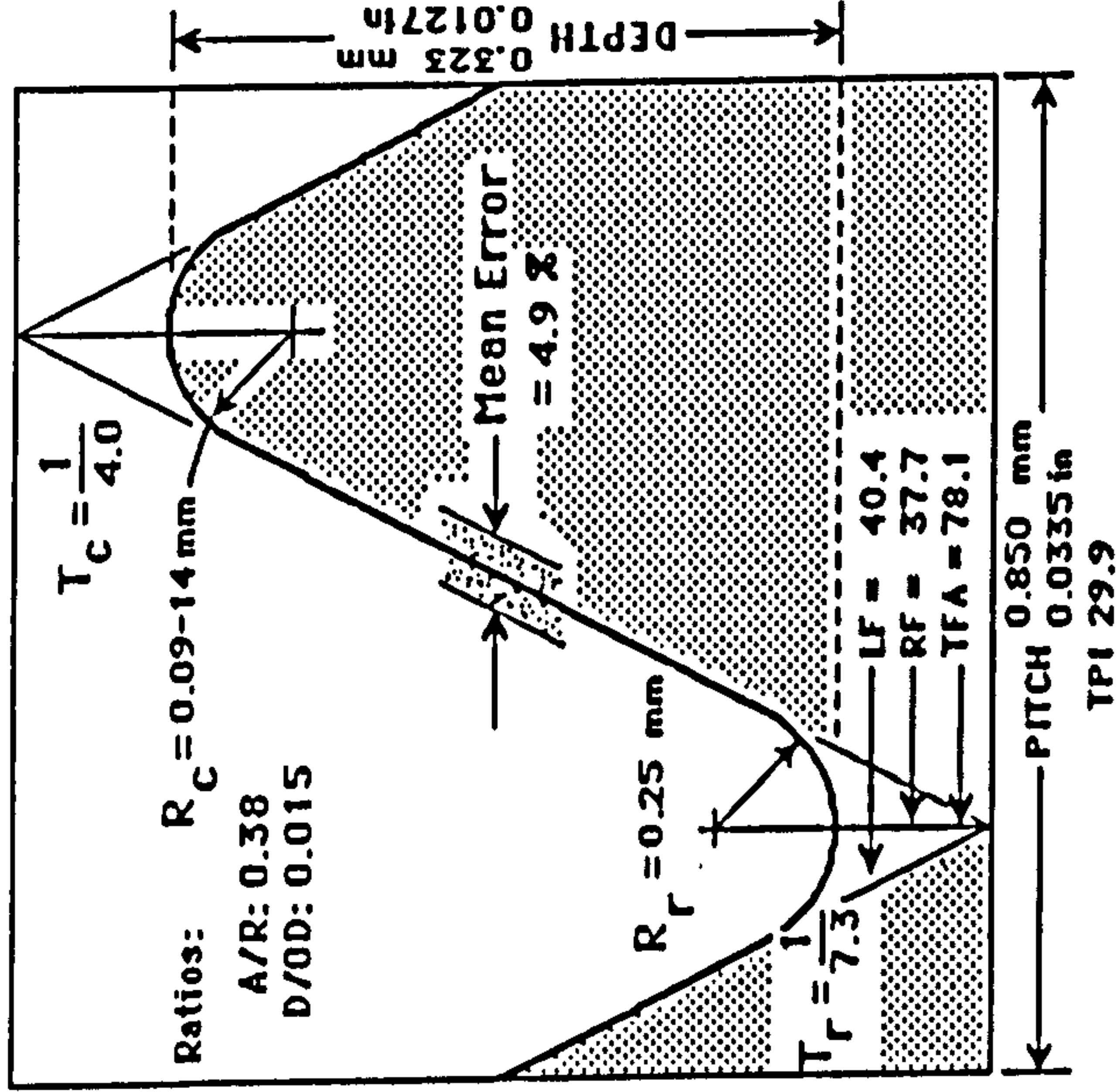
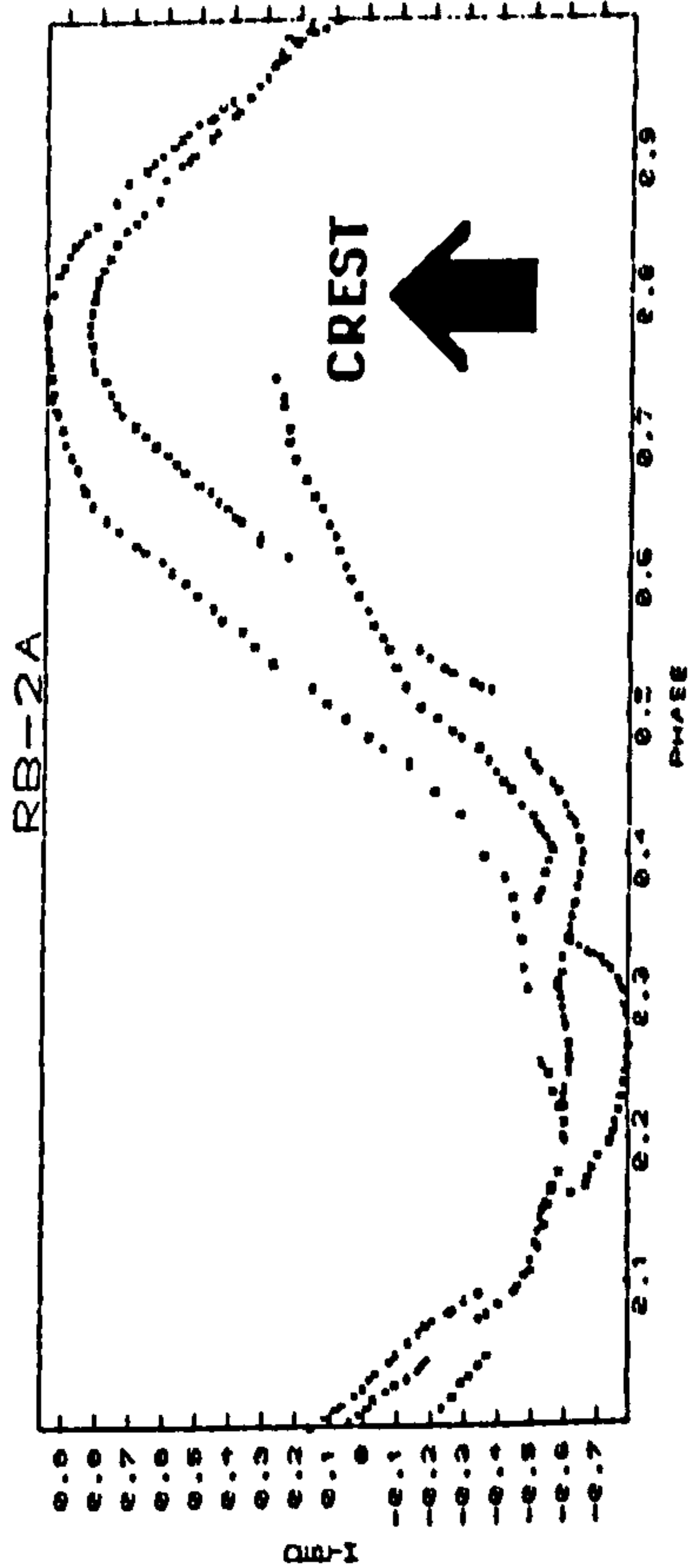
Study Code: RB-2a

Instrument: Octant

Maker: van der Voort

Date: ca.1860

Ser./Acq. No.



Mu	Filar	
	Scale	
	Bench	
	Div. Eng.	
	Adjust.	
	Leveling	
	Focus	
	Eye P.	
	Tube	
	Tool	
	Gauge	
	Binding	
	Misc.	

Telescope mounting  
for RB-2c

Characteristics:

Screw ☒ Nut ☐

Leng: 0.172" / 0.156"

Diameter: 0.875"

Steel ☐ Brass ☒

Other:

Instrument Identification:

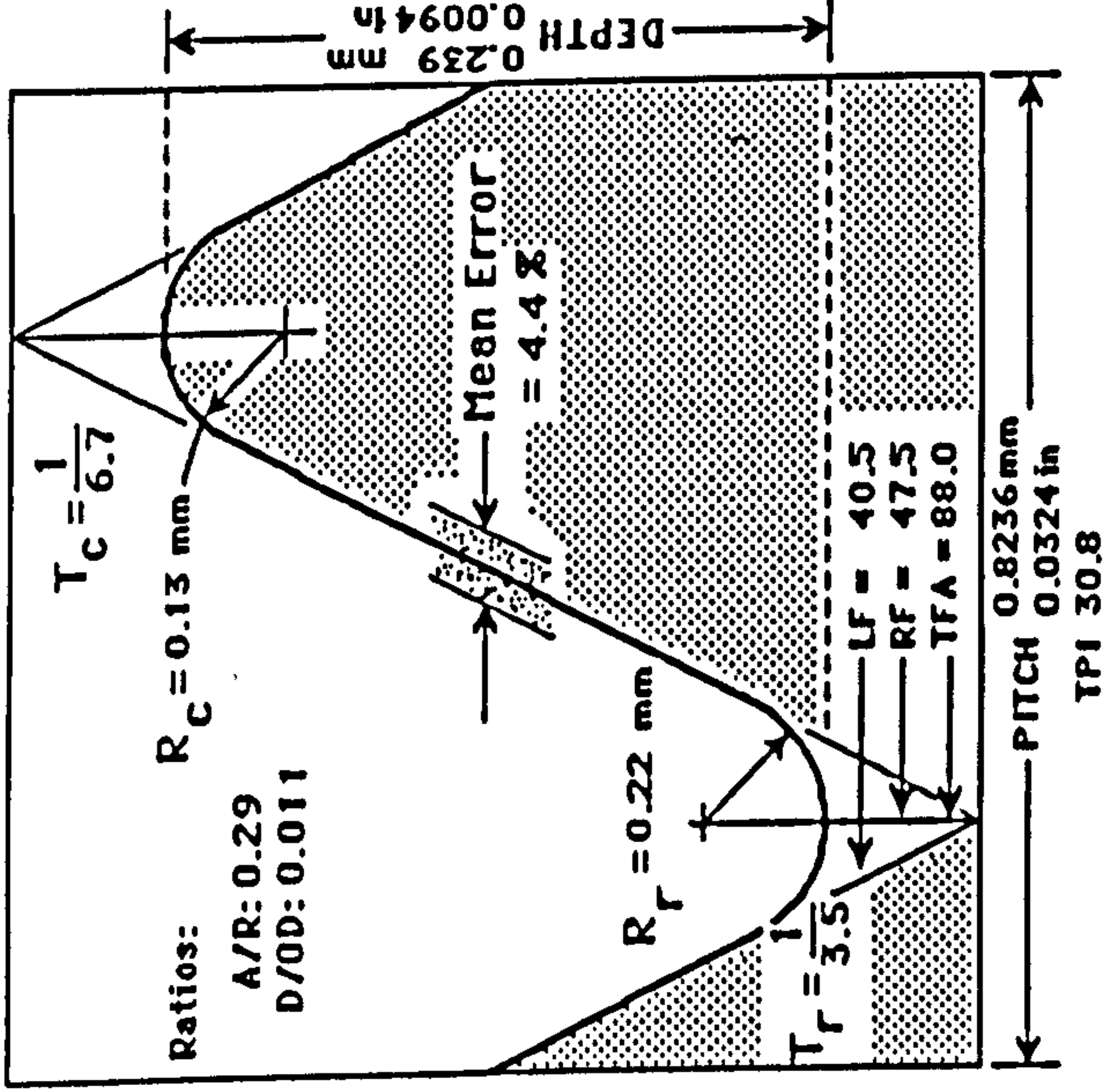
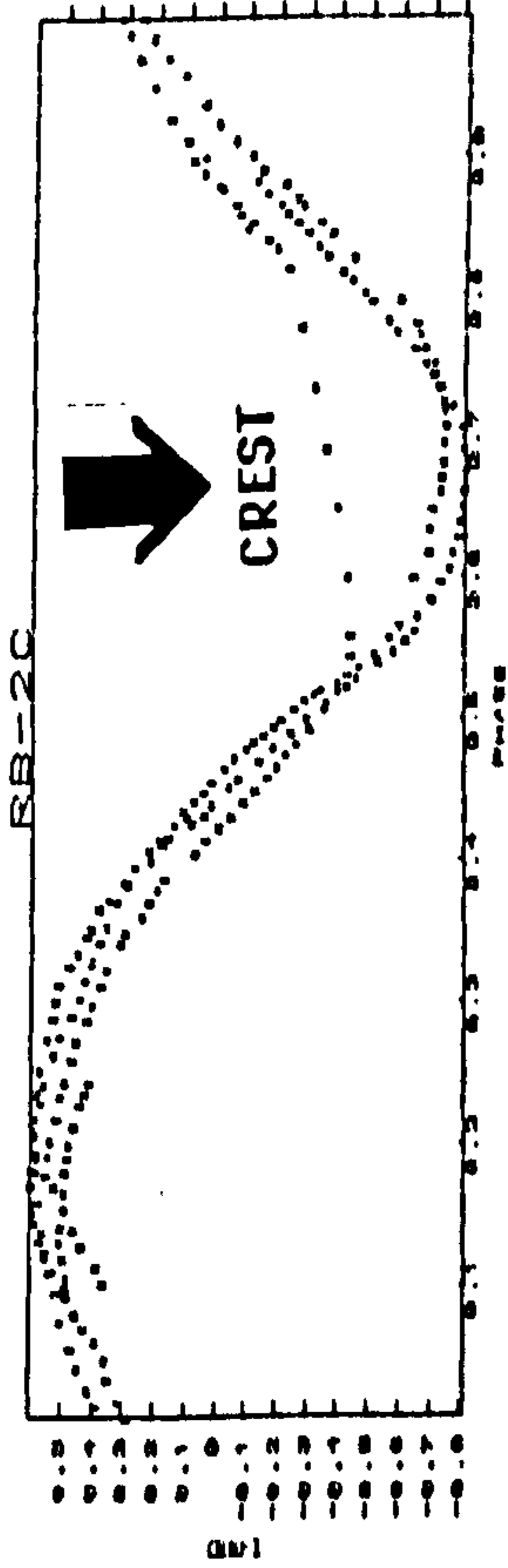
Study Code: RB-2c

Instrument: Octant

Maker: van der Voort

Date: ca.1860

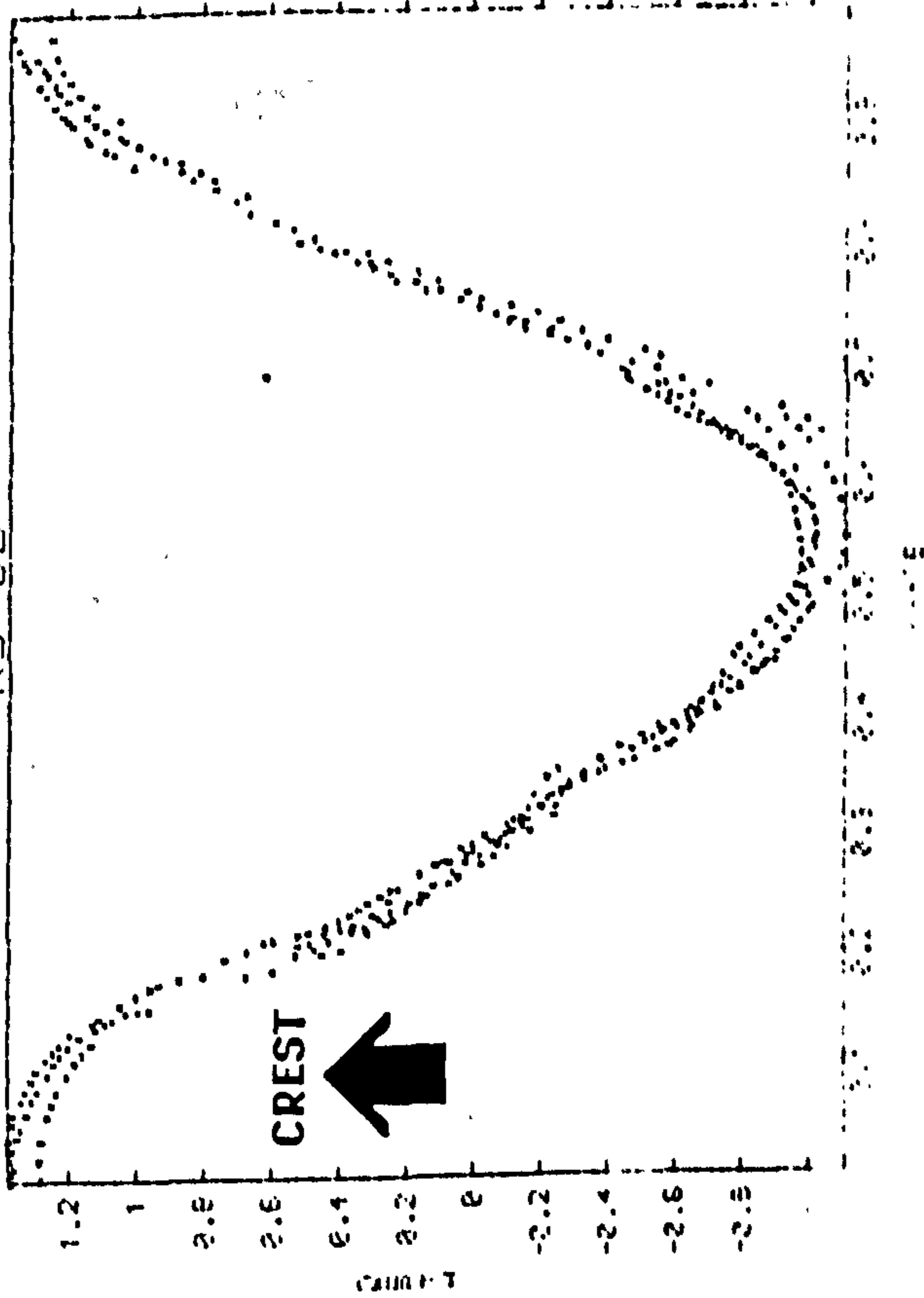
Ser./Acq. No.



Mu — [ Filar Scale Bench Div. Eng. Adjust. Leveling Focus Eye P. Tube Tool Gauge Binding Misc.

Telescope Mounting

RB-6B



Characteristics:

Screw ☐ Nut ☒

Leng: 0.219" / NA

Diameter: 0.752"

Steel ☐ Brass ☒

Other:

Instrument Identification:

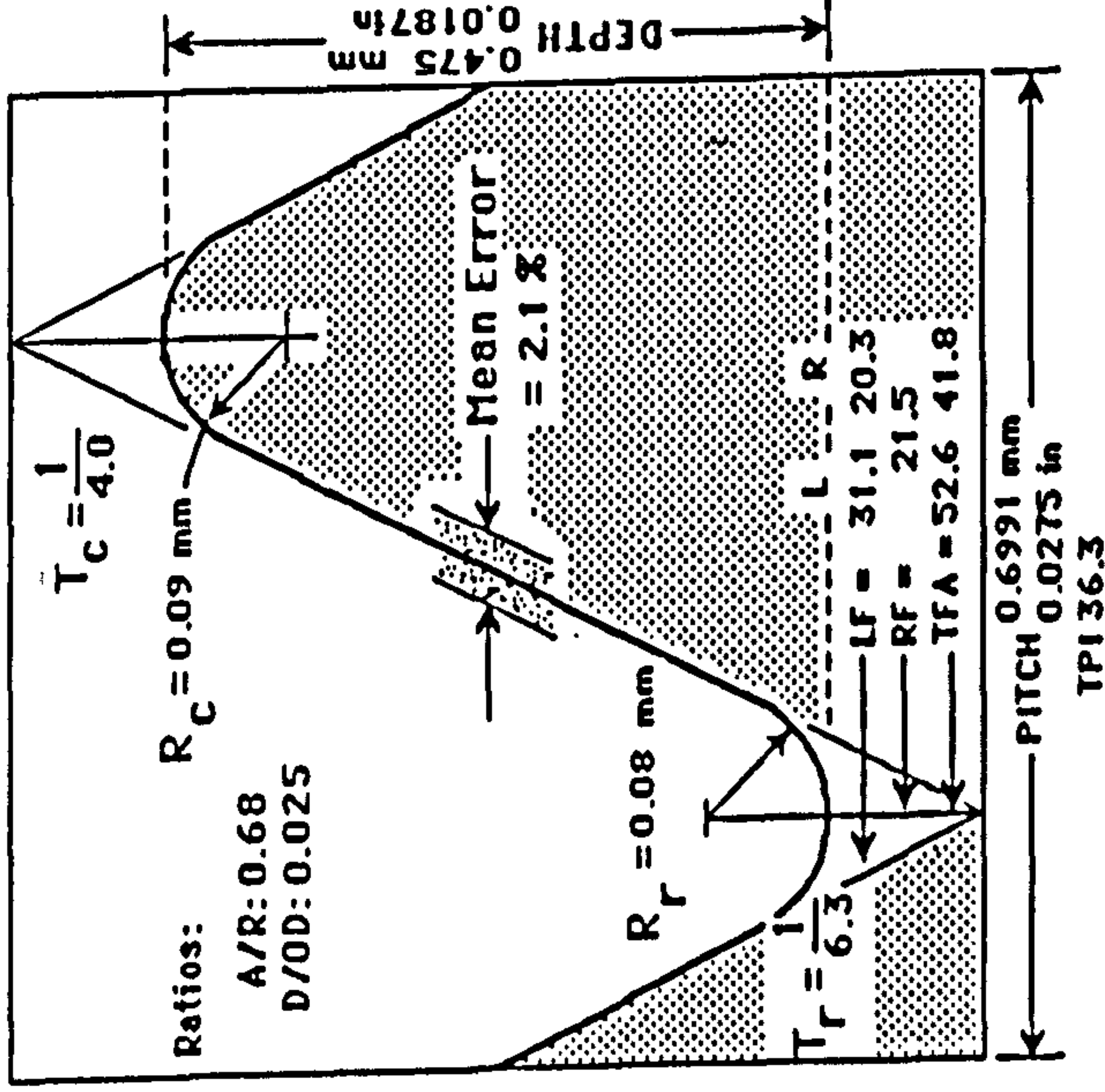
Study Code: RB-6b

Instrument: Bar-limb microscope

Maker: Hartnack

Date: 1892/3

Ser./Acq. No.



Mu	[	Filar	
		Scale	
[	]	Bench	
		Div. Eng.	
]	]	Adjust.	
		Leveling	
]	]	Focus	
		Eye P.	
]	]	Tube	
		Tool	
]	]	Gauge	
		Binding	
]	]	Misc.	

Objective mounting thread



Characteristics:

Screw

Nut

Leng: 0.125" / 0.219"

Diameter: 0.7995"

Steel

Brass

Other:

Instrument Identification:

Study Code: RB-7

Instrument: Microscope Objective

Maker: Leitz

Date: ca.1892/3

Ser./Acq. No.

RB-7

CREST

The graph shows a curve with a peak labeled CREST. The x-axis ranges from 2.1 to 2.9, and the y-axis ranges from -1.2 to 1.0. The curve starts at approximately (2.1, -1.0), rises to a peak of about 0.8 at x=2.3, and then falls to about -1.0 at x=2.9.

Technical drawing of a microscope objective showing various ratios and dimensions.

Ratios:

- $A/R: 0.65$
- $D/OD: 0.024$

Dimensions:

- $R_C = 0.13 \text{ mm}$
- $R_r = 0.11 \text{ mm}$
- $T_C = \frac{1}{5.4}$
- $T_r = \frac{1}{5.5}$
- $LF = 26.0$
- $RF = 25.5$
- $TFA = 51.5$
- PITCH  $0.752 \text{ mm}$
- TPI  $33.8$

Mean Error  $= 1.7 \%$

DEPTH  $0.489 \text{ mm}$

DEPTH  $0.0192 \text{ in}$

Mu	Filar
	Scale
	Bench
	Div. Eng.
	Adjust.
	Leveling
	Focus
	Eye P.
	Tube
	Tool
	Gauge
	Binding
	Misc.

Objective mount

Characteristics:

Screw

Nut

Leng: 0.188" / 0.313"

Diameter: 1.625"

Steel

Brass

Other:

Instrument Identification:

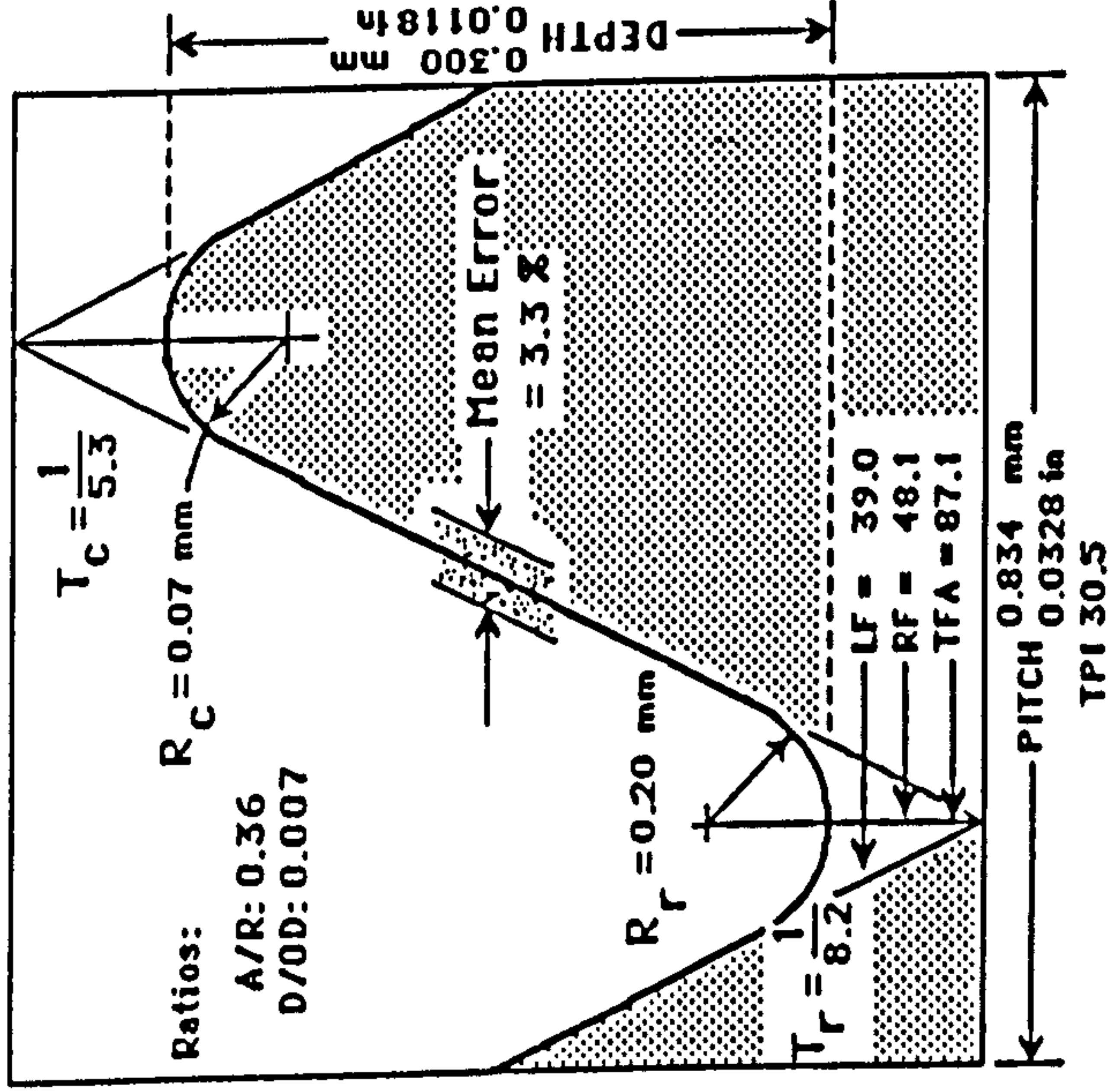
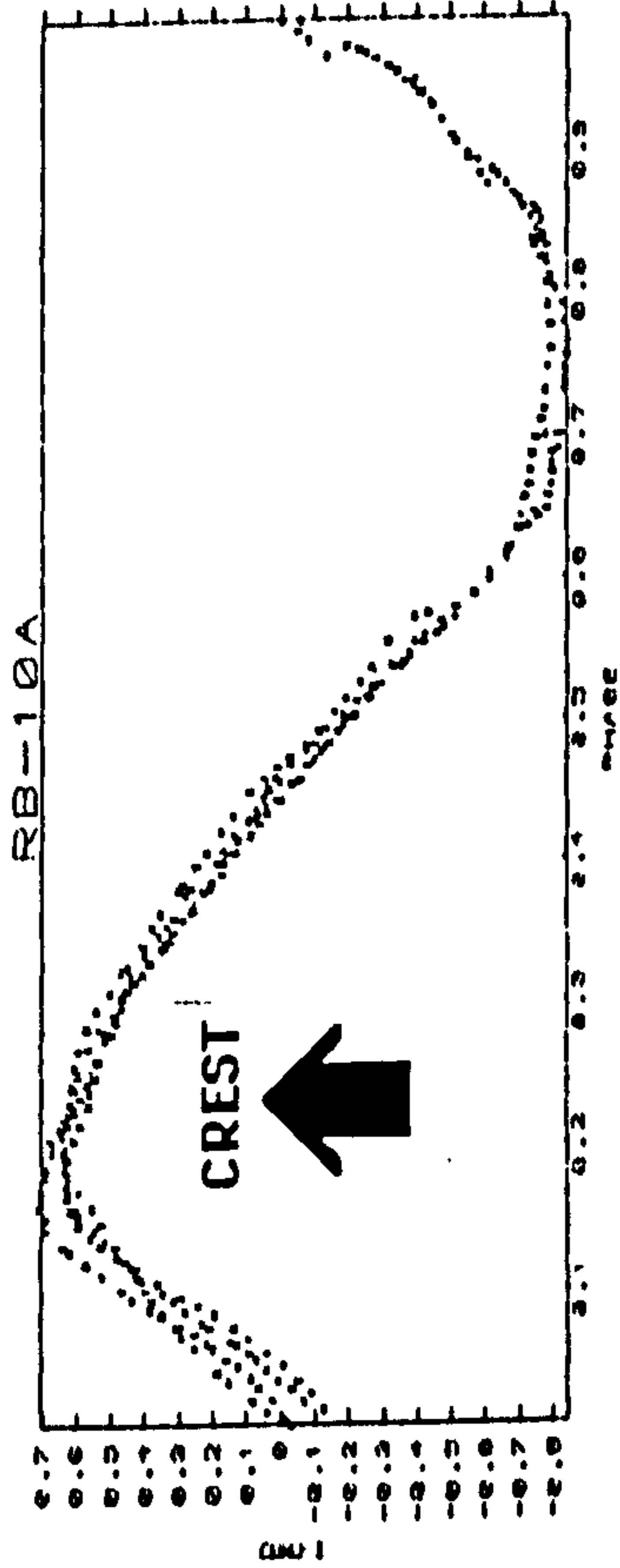
Study Code: RB-10a

Instrument: Spyglass

Maker: Omer (late Harris)

Date: 1848-50

Ser./Acq. No.



Mu	Filar	
	Scale	
	Bench	
	Div. Eng.	
	Adjust.	
	Leveling	
	Focus	
	Eye P.	
	Tube	
	Tool	
	Gauge	
	Binding	
	Misc.	

Joint in the tube

Characteristics:

Screw

Nut

Leng: 0.188" / 0.313"

Diameter: 1.641"

Steel

Brass

Other:

Instrument Identification:

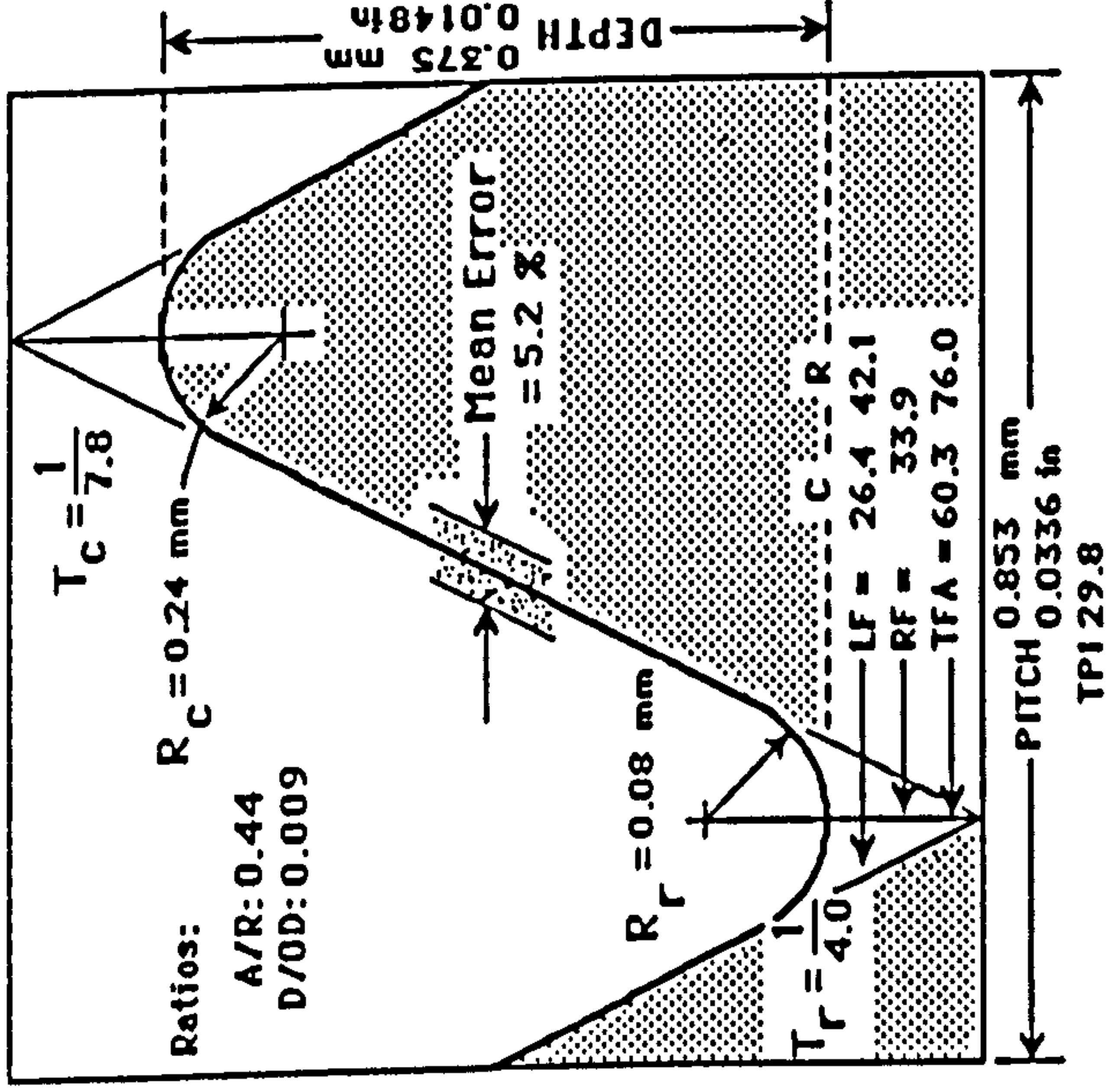
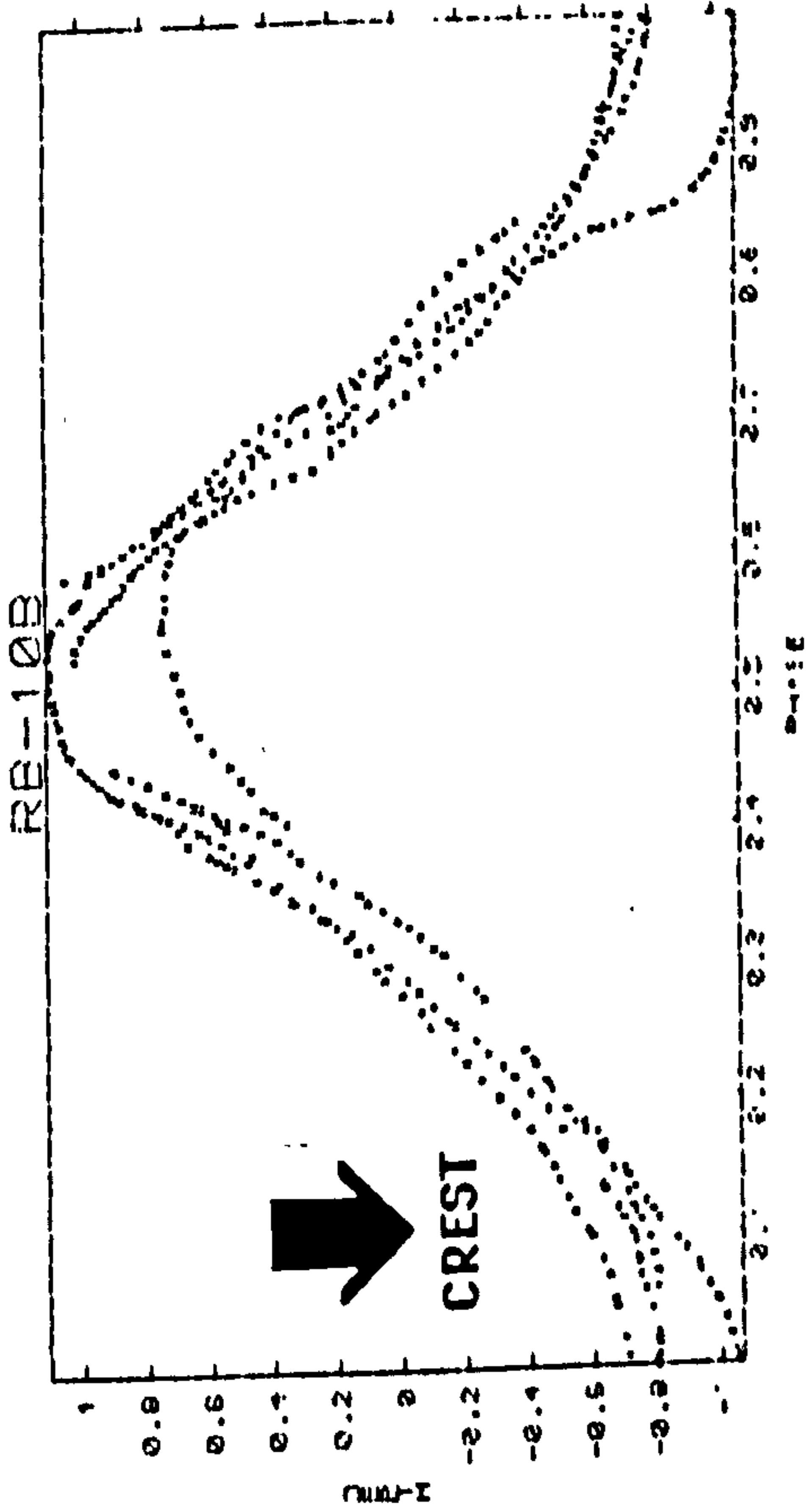
Study Code: RB-10b

Instrument: Spyglass

Maker: Omer (late Harris)

Date: 1848-50

Ser./Acq. No.



Mu	[	Filar	
		Scale	
		Bench	
		Div. Eng.	
		Adjust.	
		Leveling	
		Focus	
		Eye P.	
		Tube	
		Tool	
		Gauge	
		Binding	
		Misc.	

Tube Joint

Characteristics:

Screw

Nut

Leng: 0.156" / 0.375"

Diameter: 0.9498"

Steel

Brass

Other:

Instrument Identification:

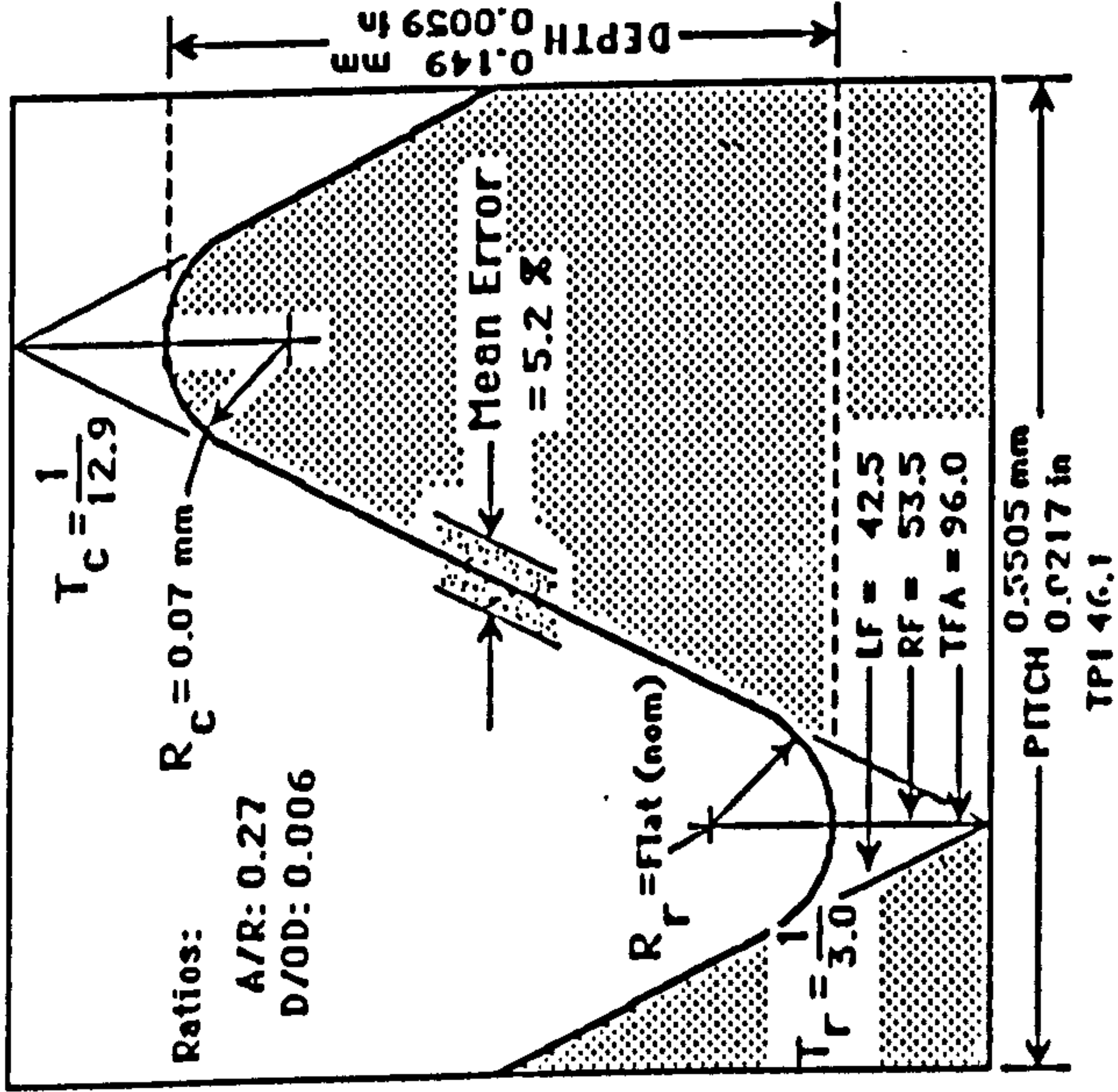
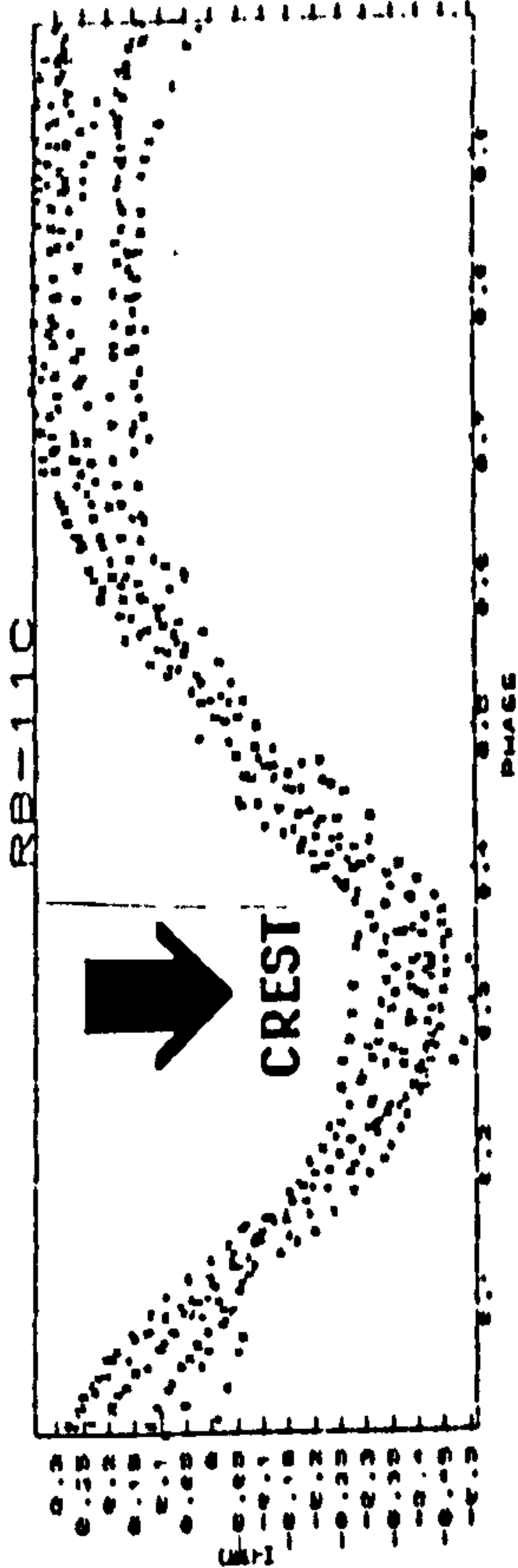
Study Code: RB-11c

Instrument: Spyglass

Maker: Not signed

Date: late 19th c

Ser./Acq. No.



Mu	[	Filar	
		Scale	
	]	Bench	
		Div. Eng.	
		Adjust.	
		Leveling	
		Focus	
		Eye P.	
		Tube	
		Tool	
		Gauge	
		Binding	
		Misc.	

Possibly of French manufacture  
1st draw joint



Characteristics:

Screw ☐ Nut ☒

Leng: 0.156" / 0.373"

Diameter: 0.938"

Steel ☐ Brass ☒

Other:

Instrument Identification:

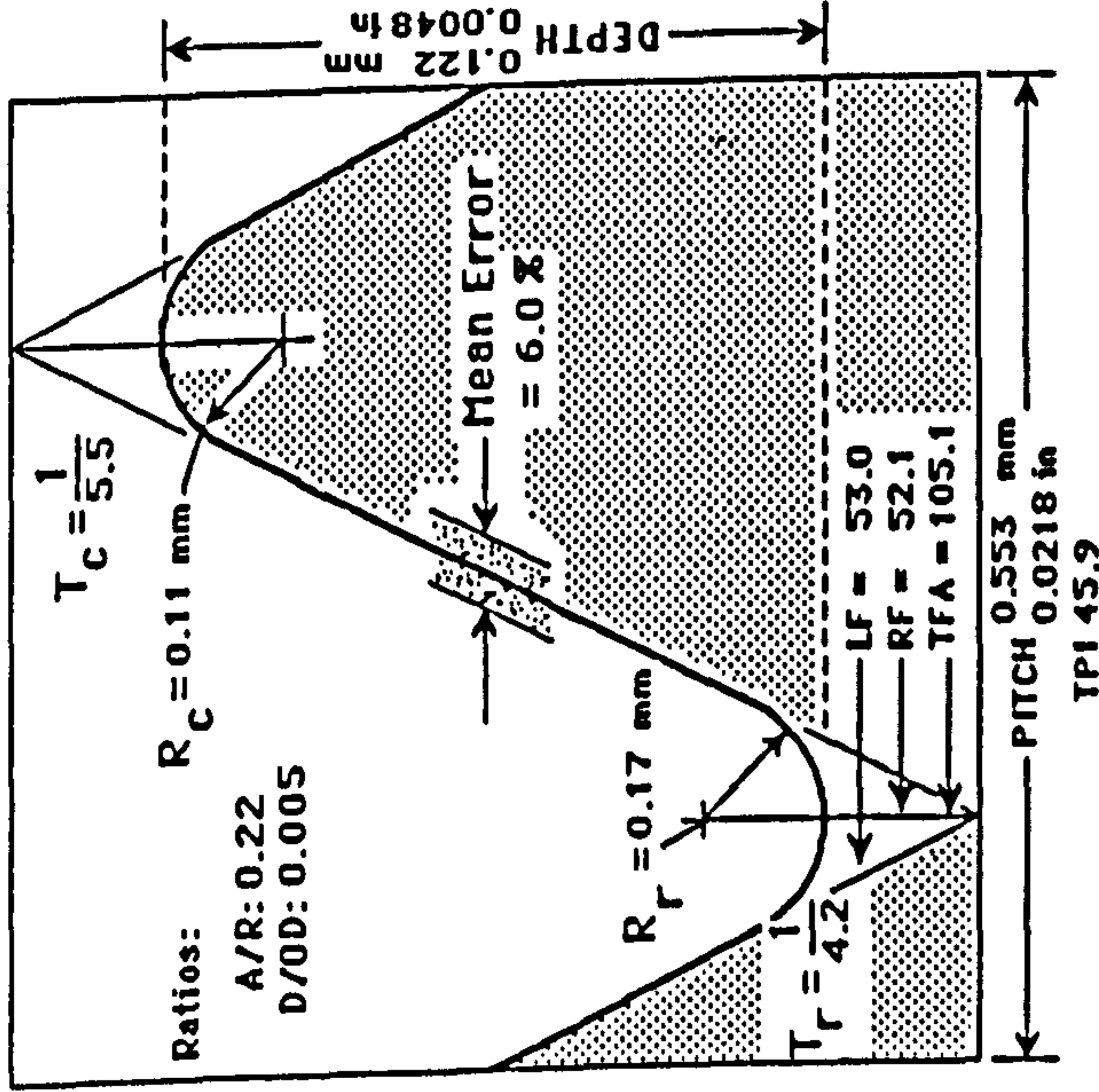
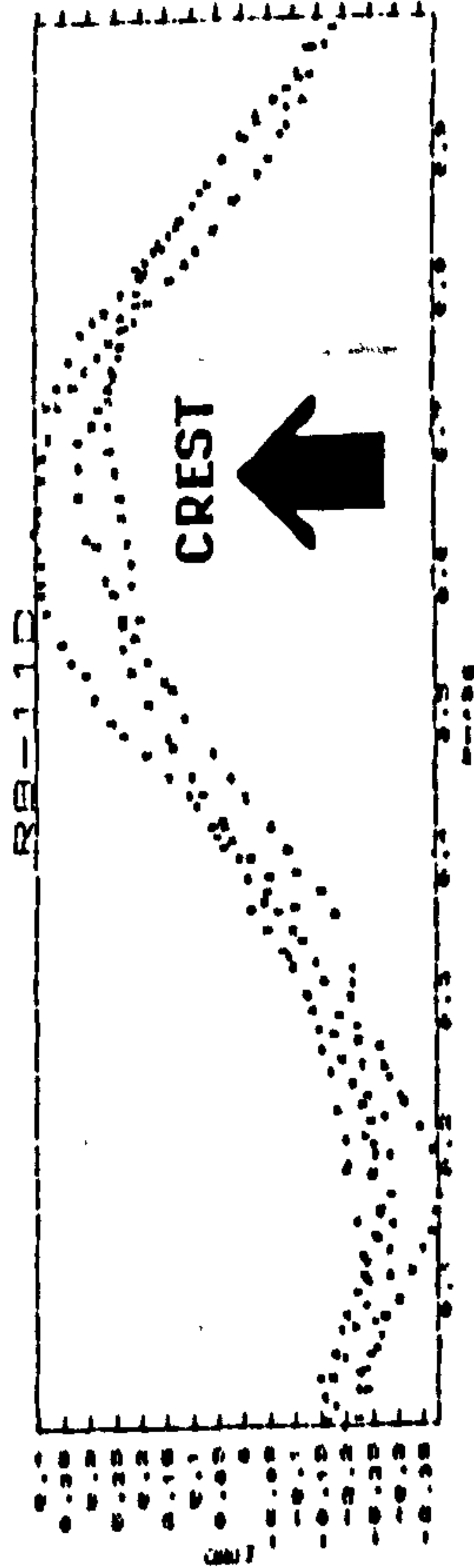
Study Code: RB-11d

Instrument: Spyglass

Maker: Not signed

Date: late 19th c

Ser./Acq. No.



Mu	[	Filar	
		Scale	
[	]	Bench	
		Div. Eng.	
]	]	Adjust.	
		Leveling	
]	]	Focus	
		Eye P.	
]	]	Tube	
		Tool	
]	]	Gauge	
		Binding	
]	]	Misc.	

1st draw joint mating with 11d

Possibly of French manufacture



Characteristics:

Screw

Nut

Leng: 0.188" / 0.281"

Diameter: 1.688"

Steel

Brass

Other:

Instrument Identification:

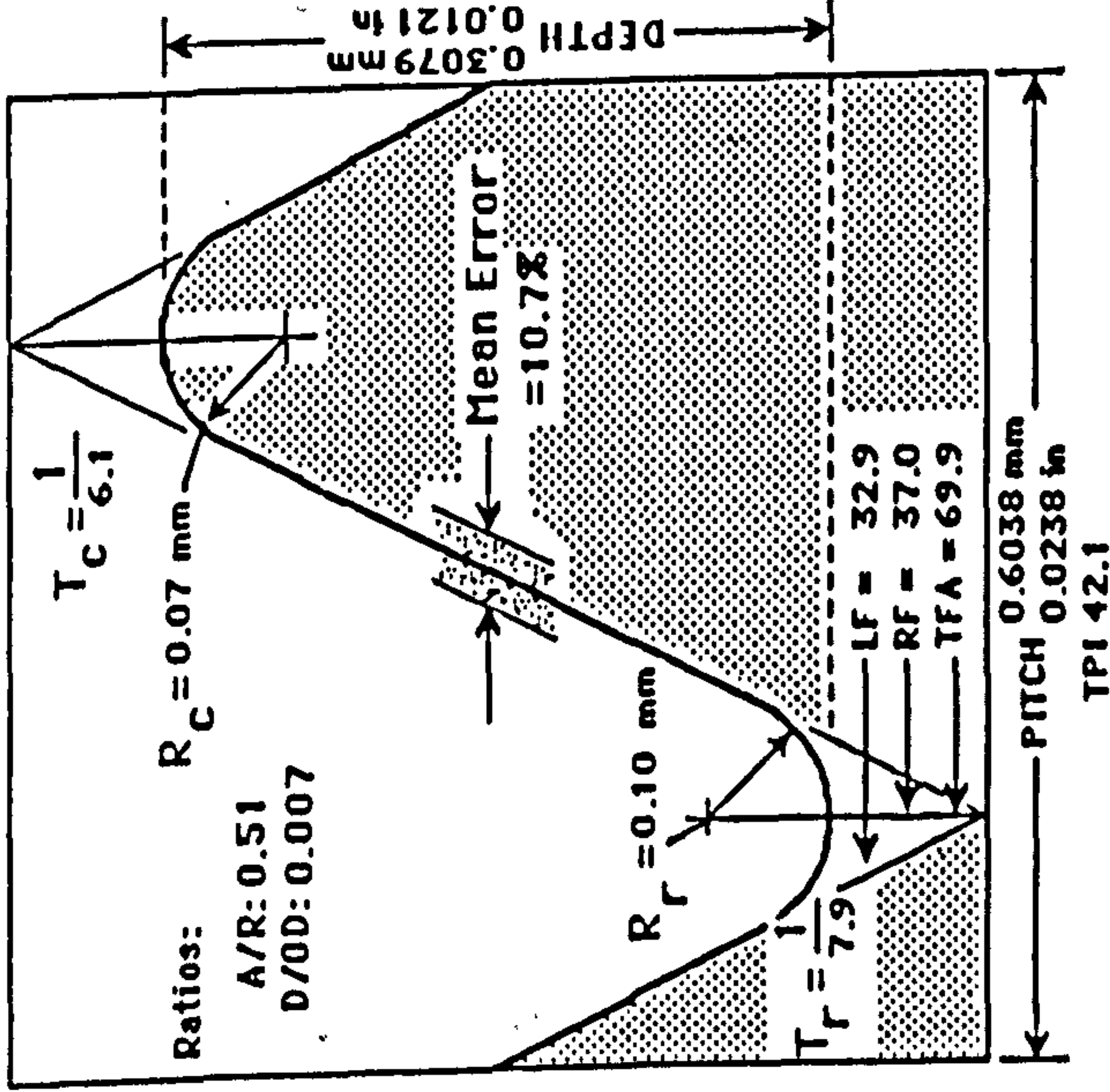
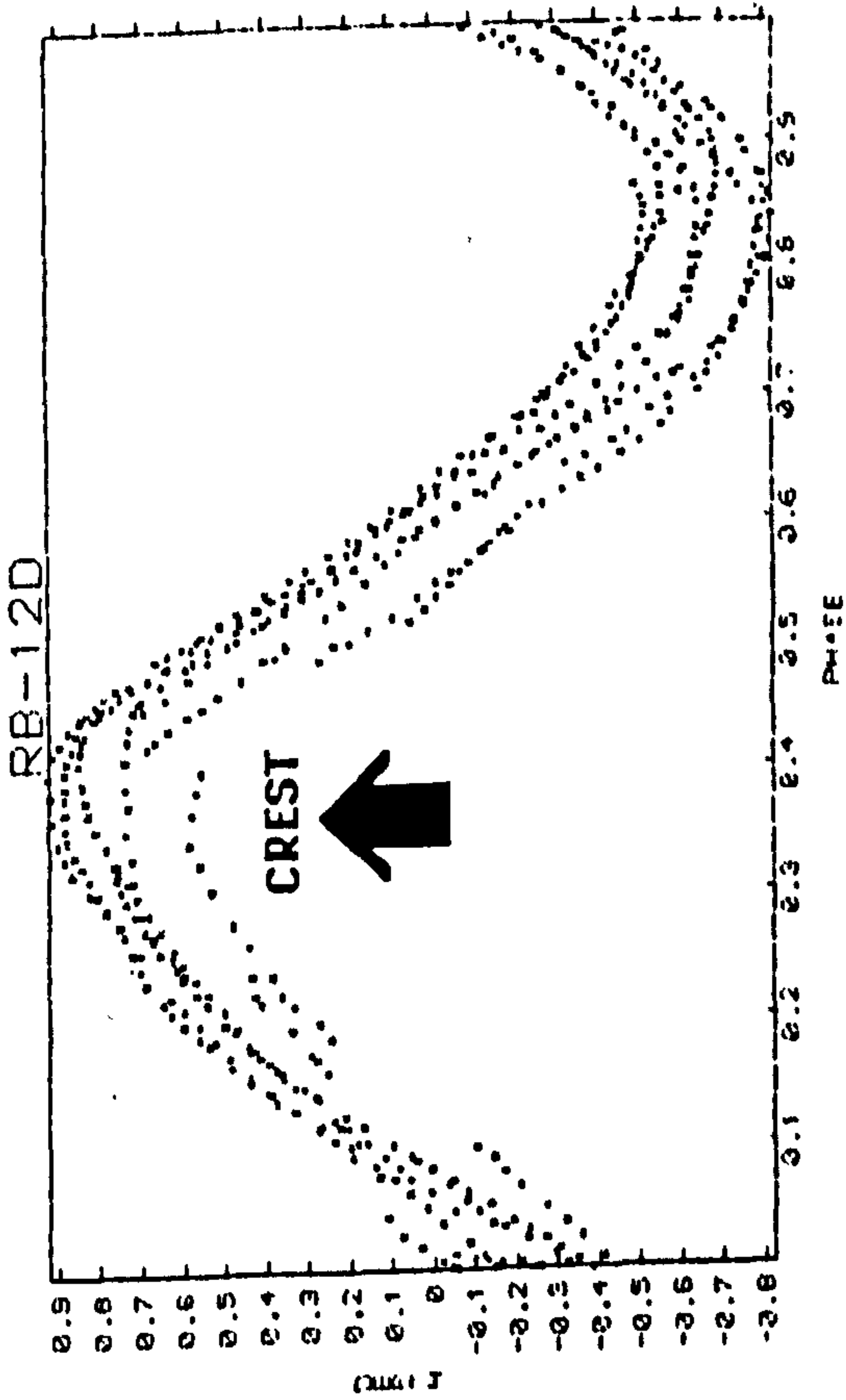
Study Code: RB-12d

Instrument: Spyglass

Maker: Harris & Co.

Date: ca.1840's

Ser./Acq. No.



Mu	Filar	
	Scale	
	Bench	
	Div. Eng.	
	Adjust.	
	Leveling	
	Focus	
	Eye P.	
	Tube	
	Tool	
	Gauge	
	Binding	
	Misc.	

1st-draw joint for RB-12c

Characteristics:

Screw

Nut

Leng: 1.125"

Diameter: 0.875"

Steel

Brass

Other: N/A

Instrument Identification:

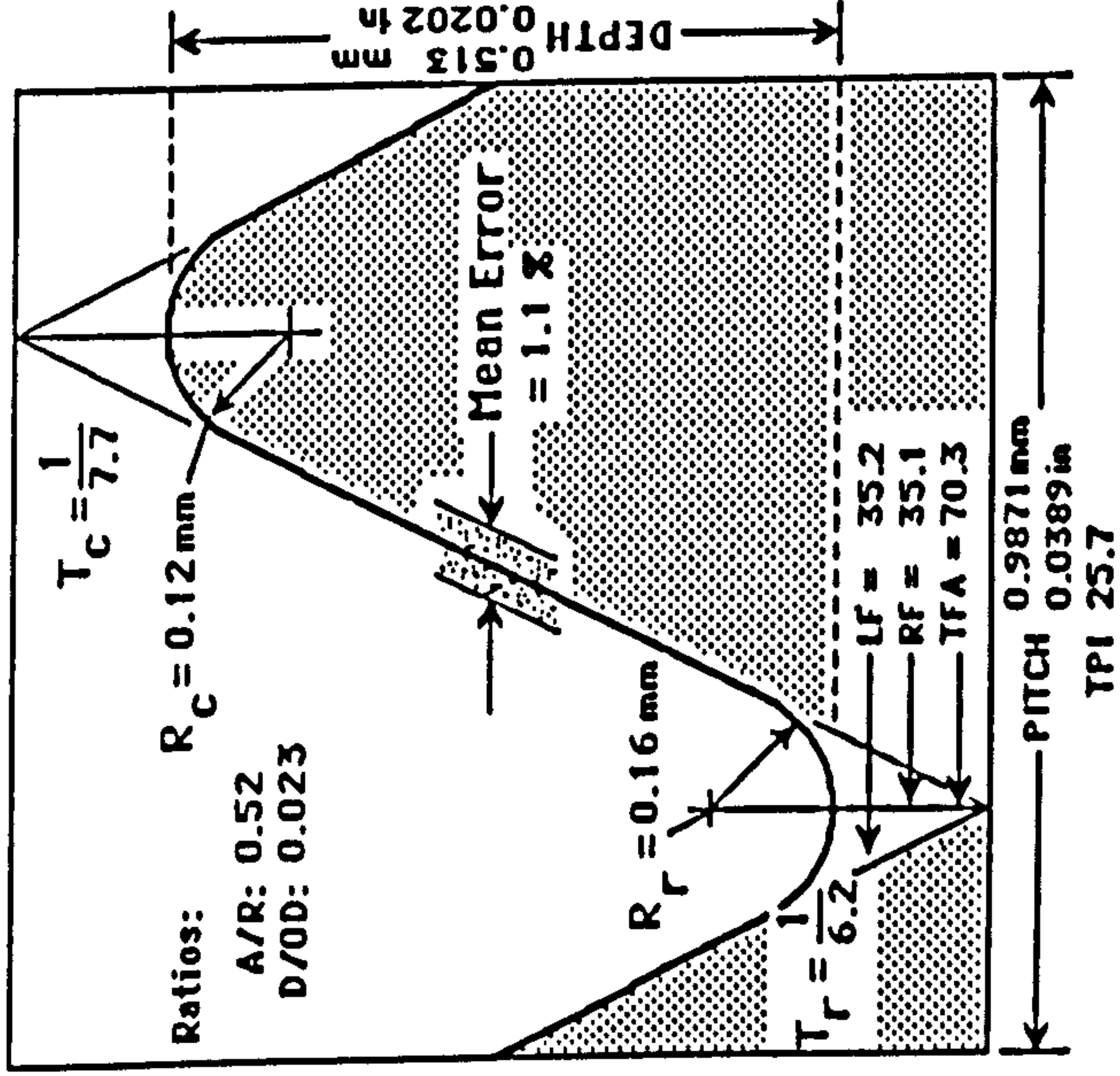
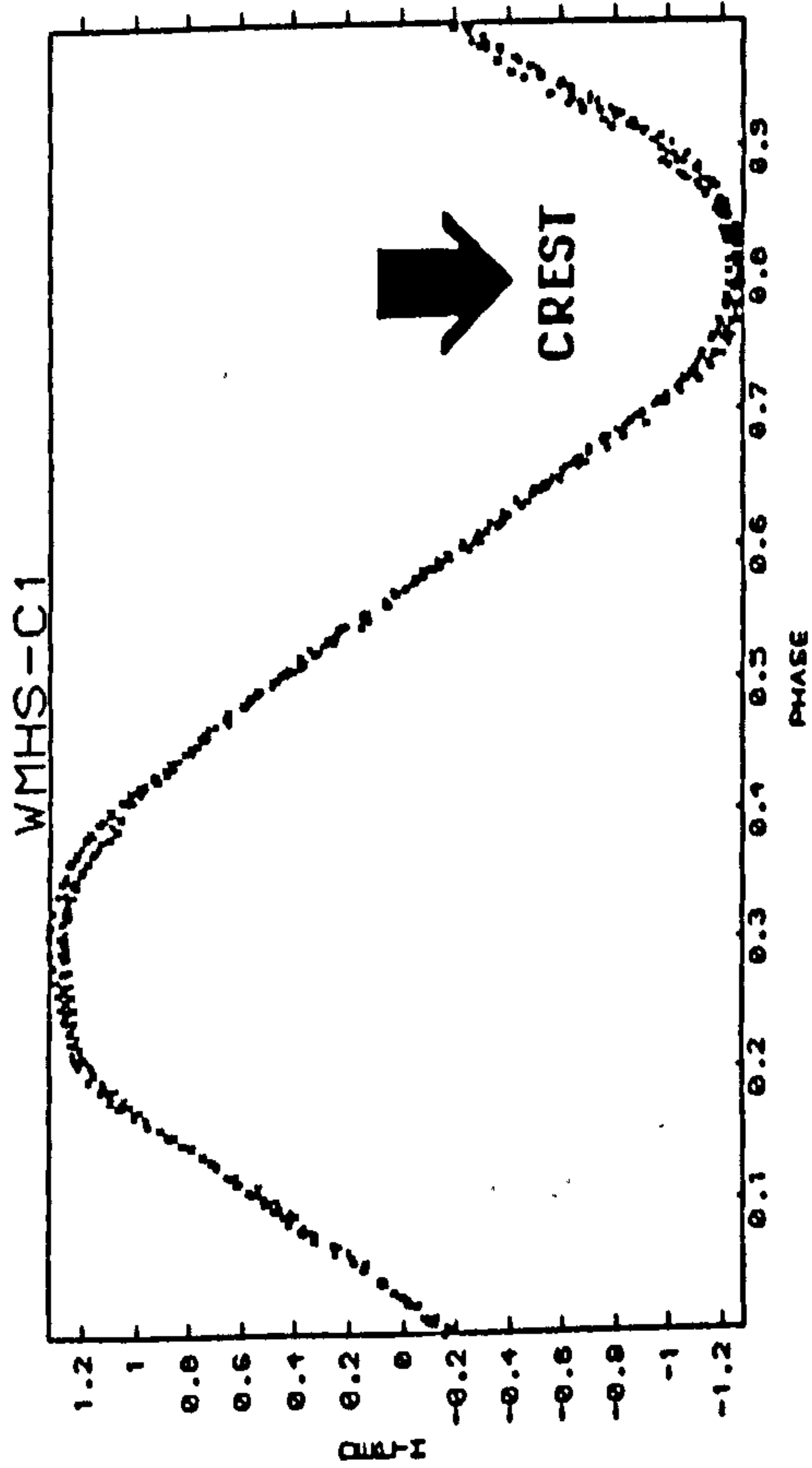
Study Code: WMHS-C1

Instrument: Wilson screw barrel microscope

Maker: N/A

Date: N/A

Ser./Acq. No. .



Mu

Filar

Scale

Bench

Div. Eng. Adjust.

Leveling

Focus

Eye P. Tube

Tool

Gauge

Binding

Misc.



Characteristics:

Screw

Nut

Leng: 1.125"

Diameter: 0.875"

Steel

Brass

Other: N/A

Instrument Identification:

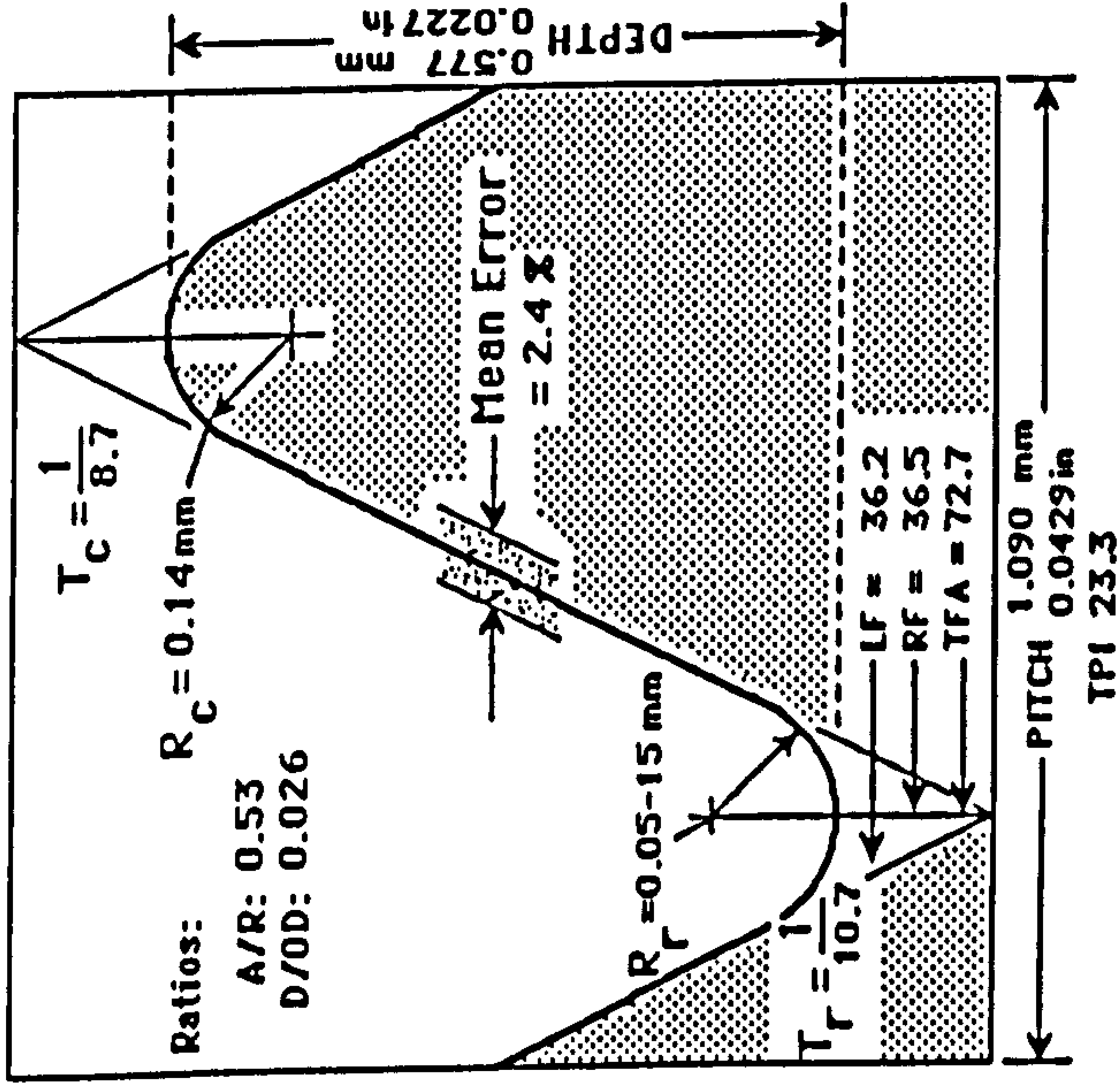
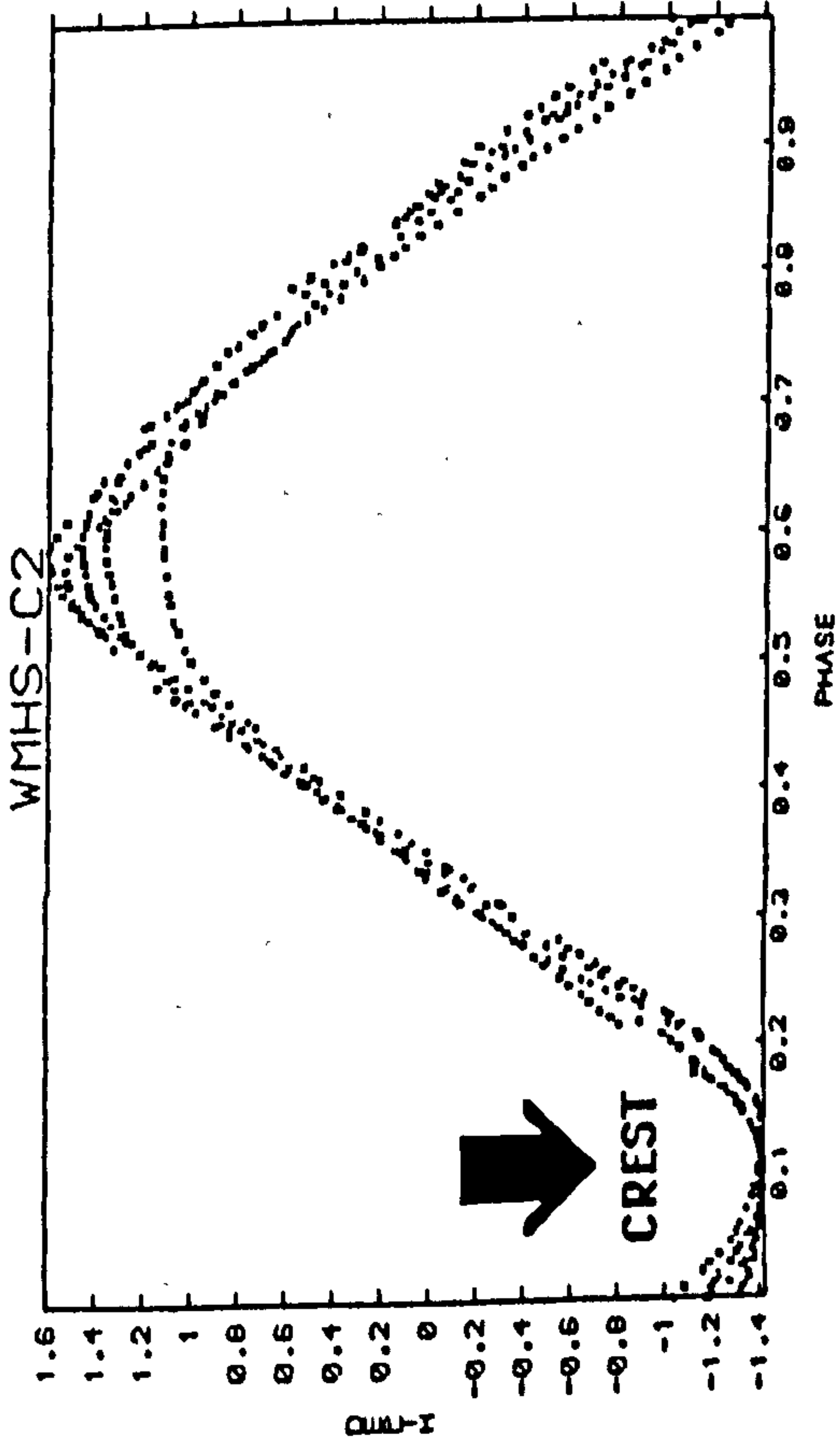
Study Code: WMHS-C2

Instrument: Wilson screw barrel microscope

Maker: N/A

Date: N/A

Ser./Acq. No. .



Mu	Filar	
	Scale	
Bench	Div. Eng.	
	Adjust.	
Leveling	Focus	
	Eye P.	
Tube	Tool	
	Gauge	
Binding	Misc.	

Characteristics:

Screw

Nut

Leng: 1.25"

Diameter: 0.75"

Steel

Brass

Other: N/A

Instrument Identification:

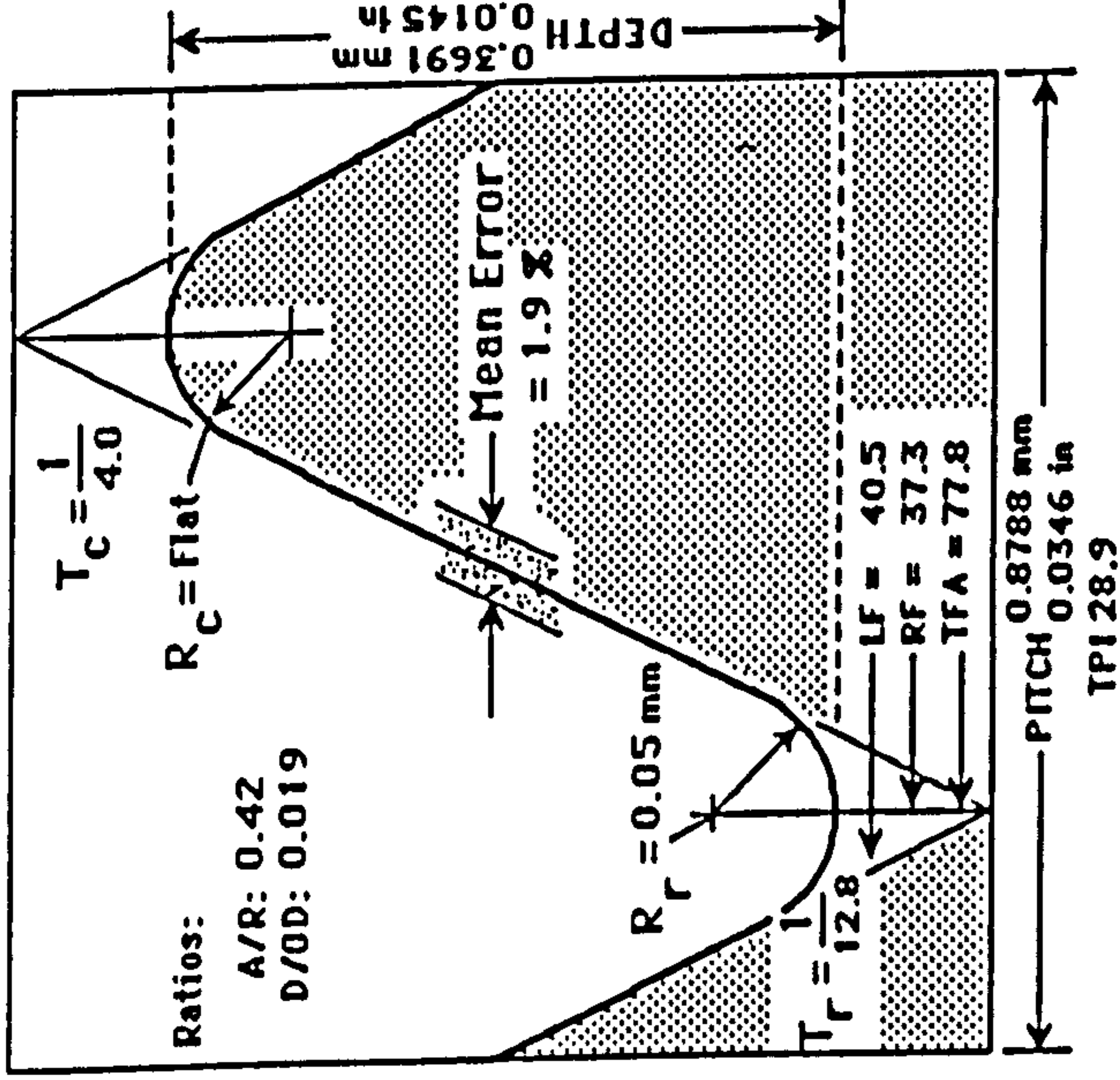
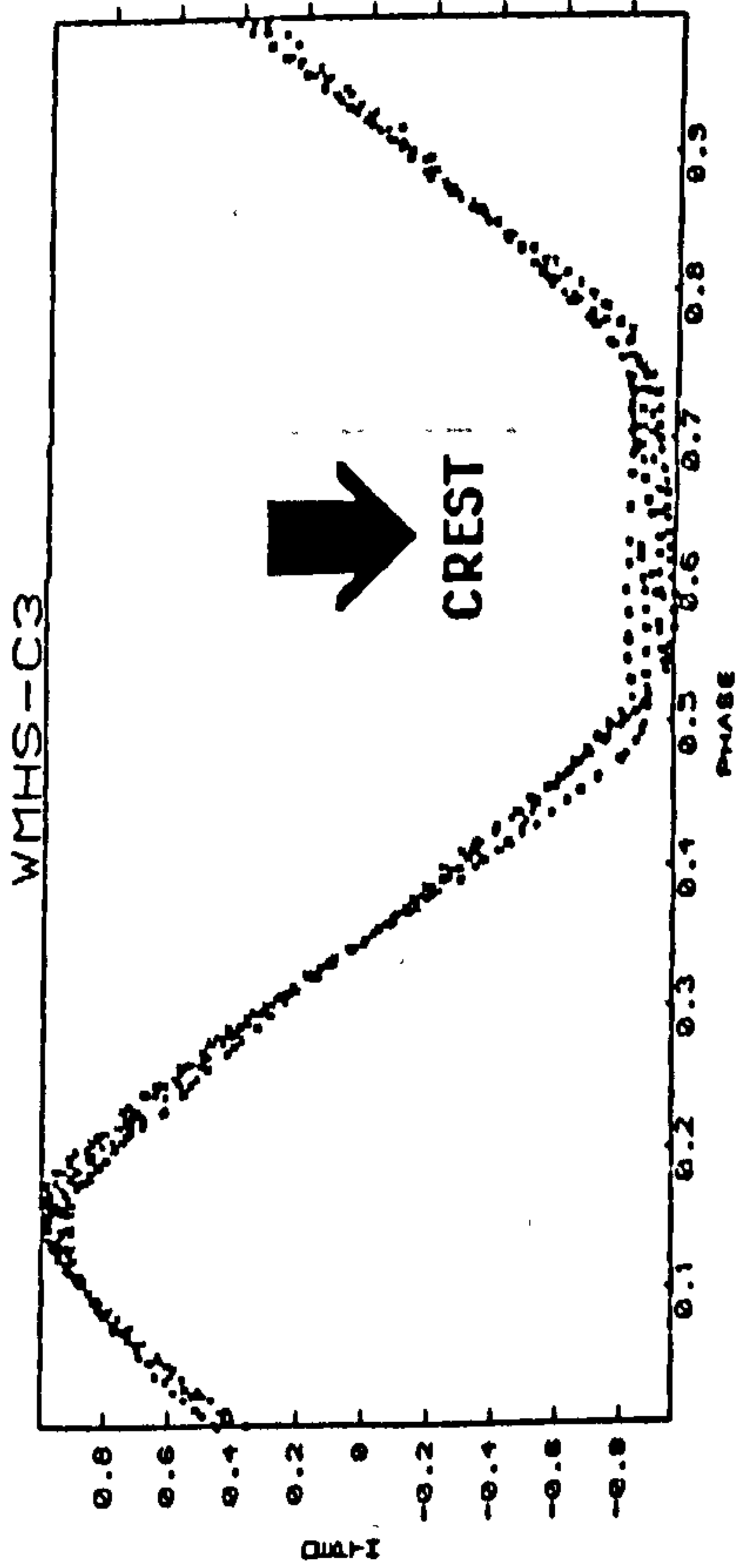
Study Code: WMHS-C3

Instrument: Wilson screw barrel microscope

Maker: N/A

Date: N/A

Ser./Acq. No. .



Mu

Filar

Scale

Bench

Div. Eng.

Adjust.

Leveling

Focus

Eye P.

Tube

Tool

Gauge

Binding

Misc.

Characteristics:

Screw

Nut

Leng: ~5.75"

Diameter: 0.353"

Steel

Brass

Other:

Instrument Identification:

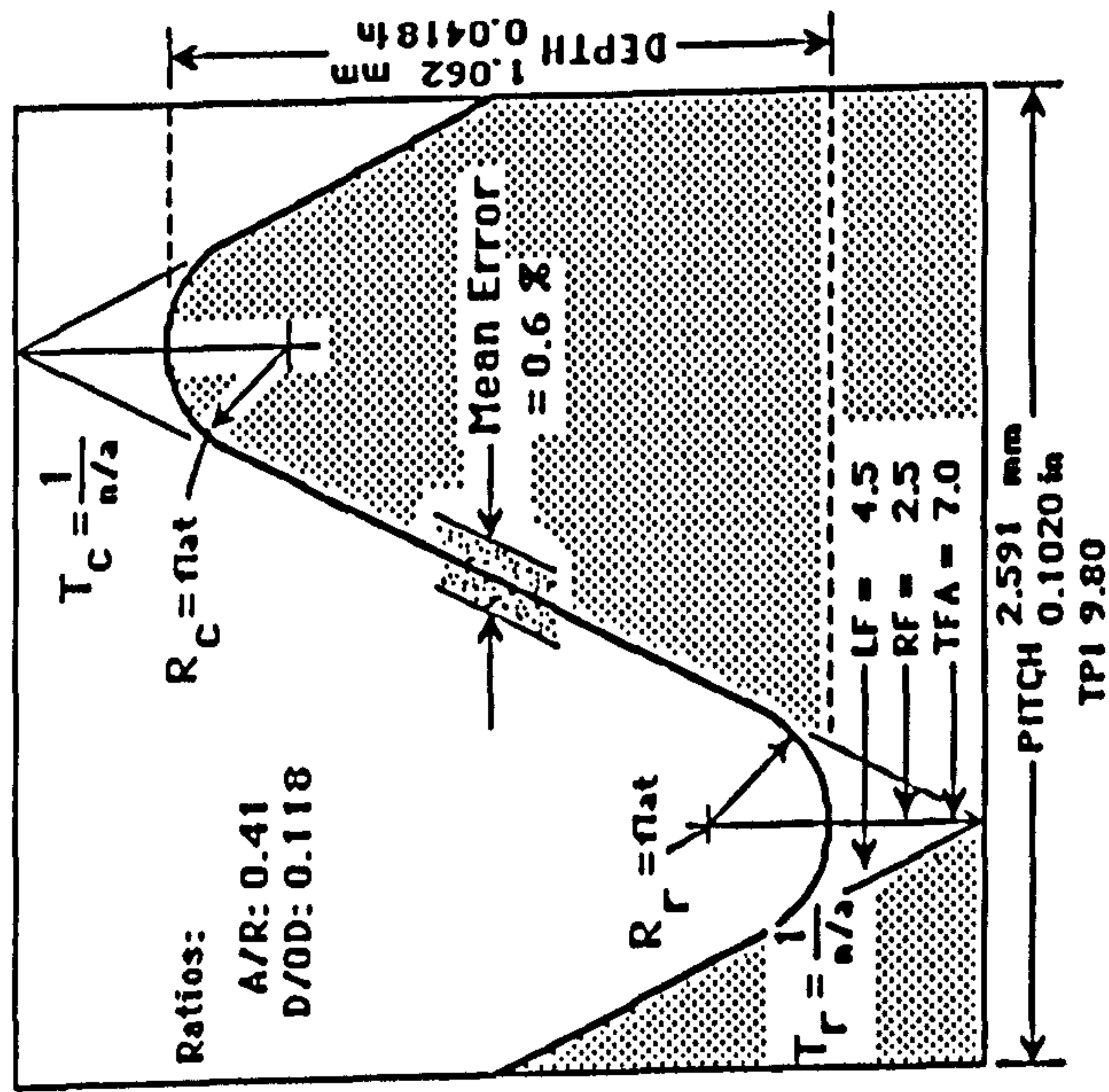
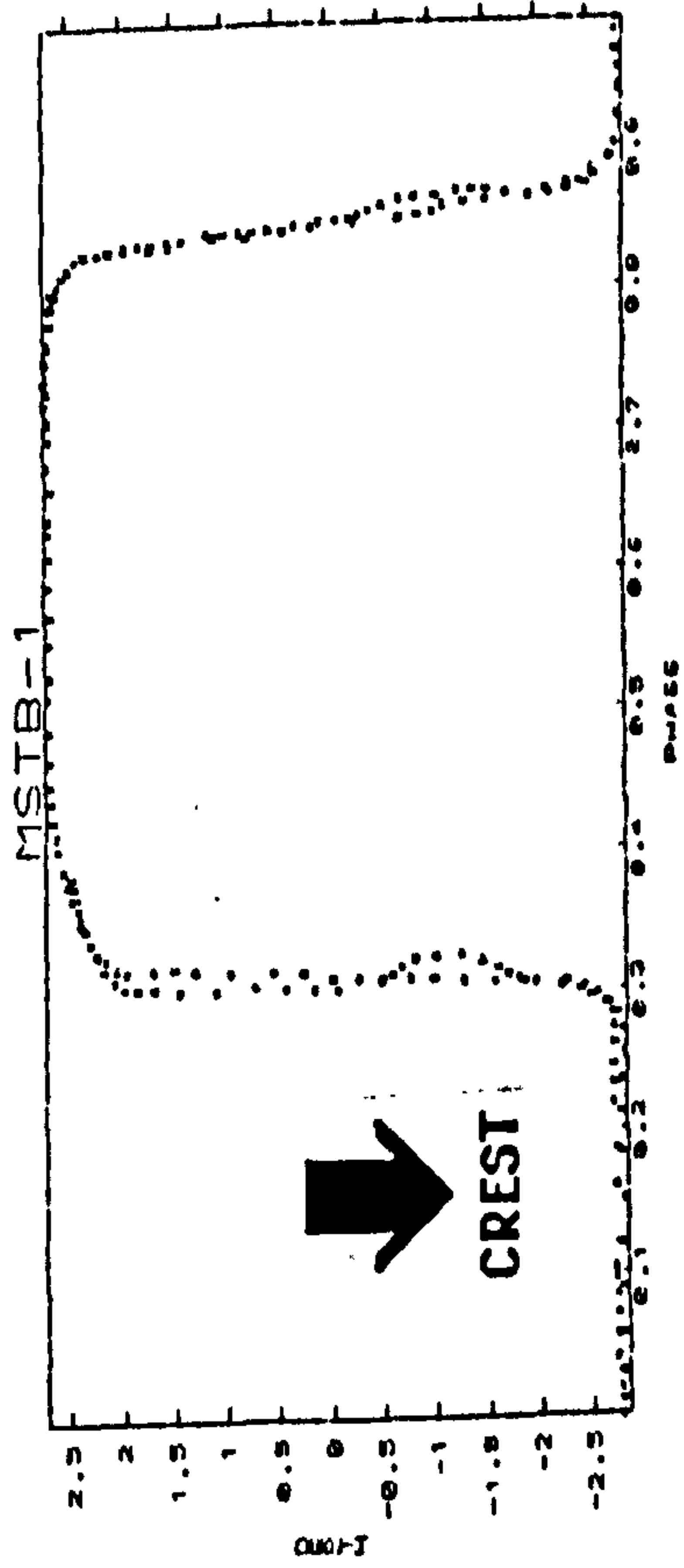
Study Code: MSTB-1

Instrument: Lathe

Maker: Maudslay

Date: ca.1800

Ser./Acq. No. 83-3662



- MU

Filar

Scale

Bench

Div. Eng.

Adjust.

Leveling

Focus

Eye P.

Tube

Tool

Gauge

Binding

Misc.

Cross slide screw

Characteristics:

Screw

Nut

Leng: 4.0"

Diameter: 0.262"

Steel

Brass

Other:

Instrument Identification:

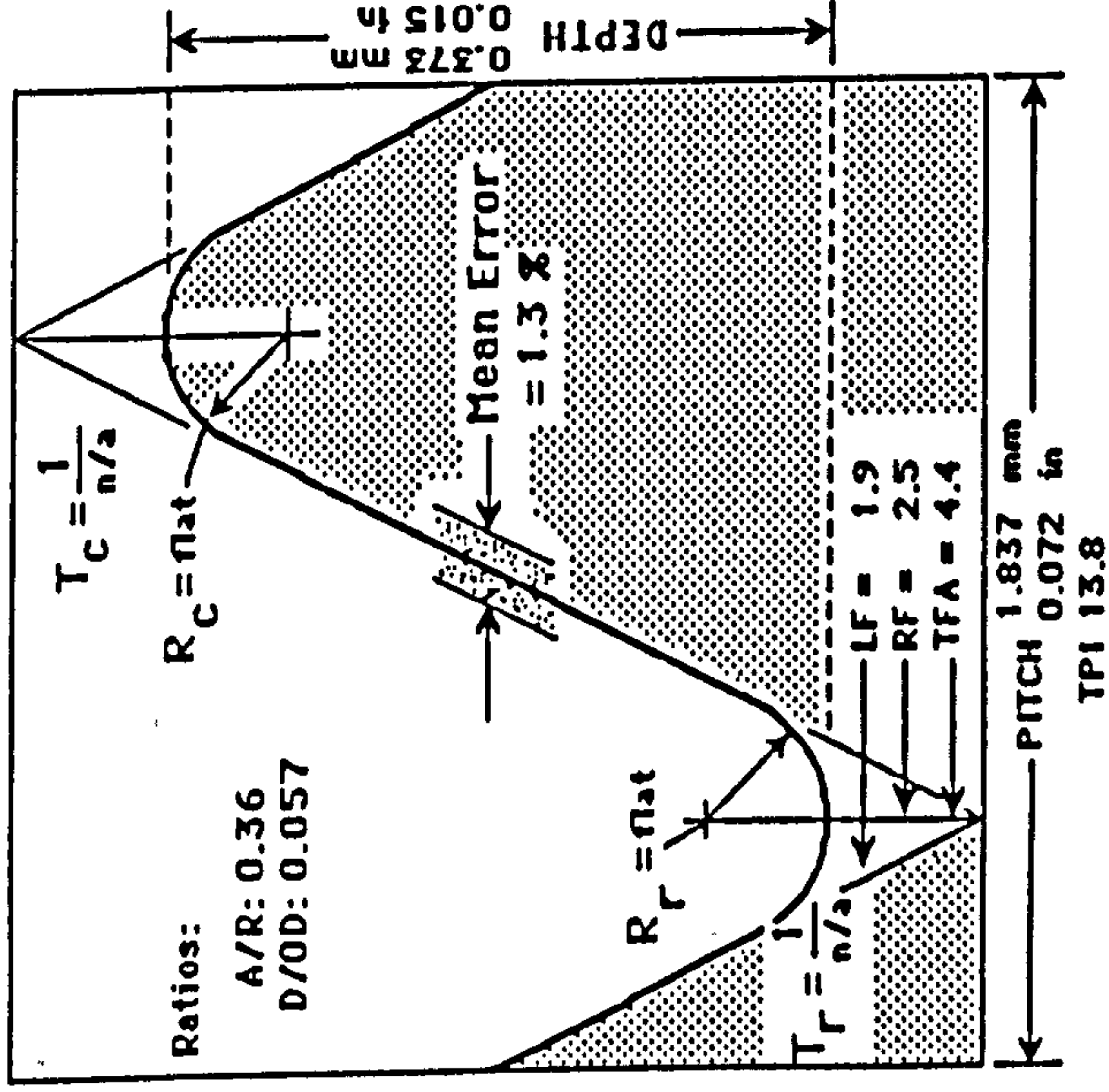
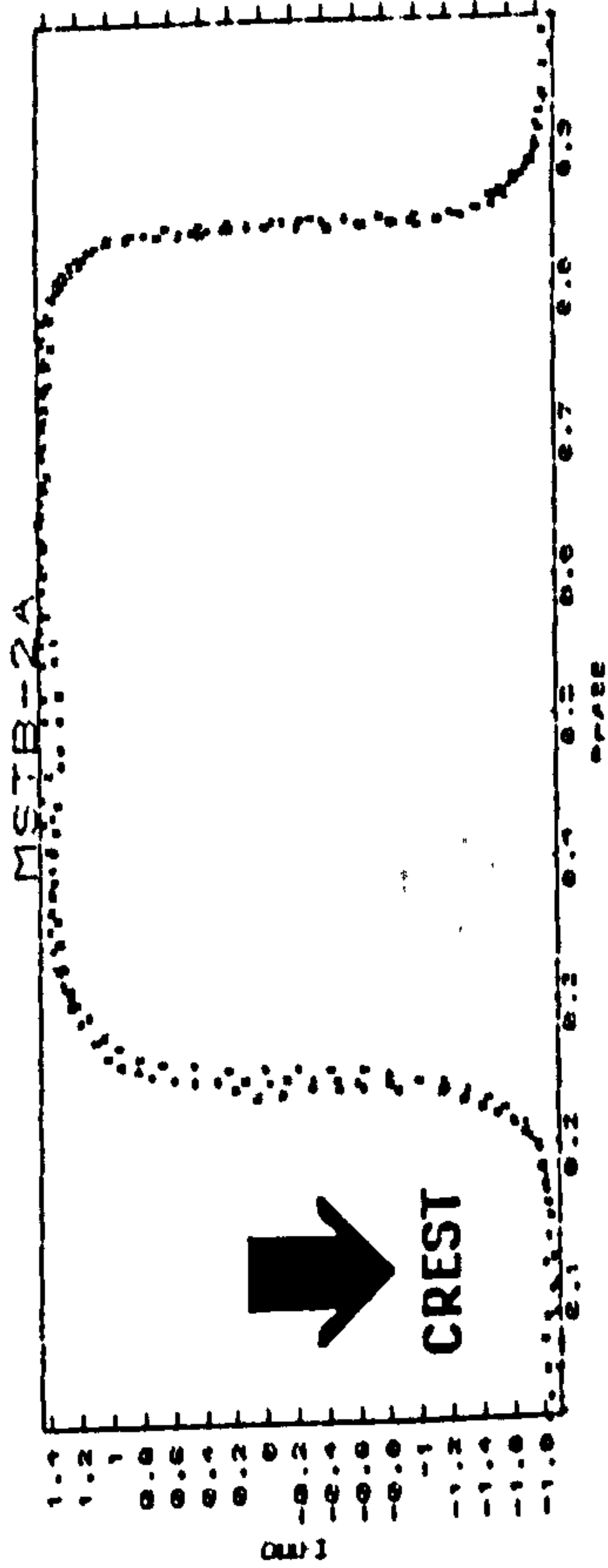
Study Code: MSTB-2a

Instrument: Lathe

Maker: Maudslay

Date: ca.1800

Ser./Acq. No. 83-3662



Mu

Filar  
Scale  
Bench  
Div. Eng.  
Adjust.  
Leveling  
Focus  
Eye P.  
Tube  
Tool  
Gauge  
Binding  
Misc.

Lead Screw



Characteristics:

Screw

Nut

Leng:

4.0"

Diameter:

0.375"

Steel

Brass

Other:

Instrument Identification:

Study Code:

MSTB-2b

Instrument:

Lathe

Maker:

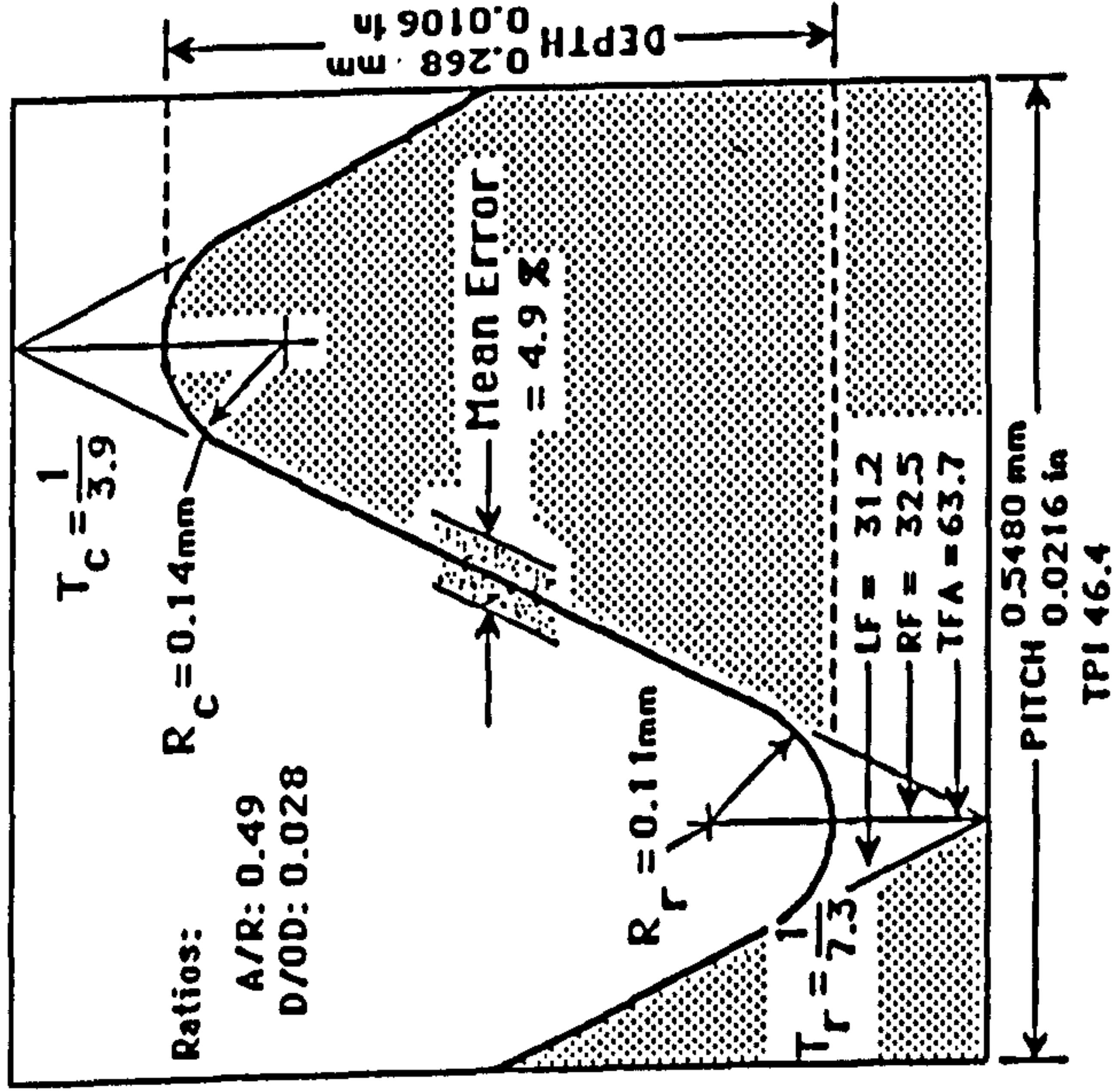
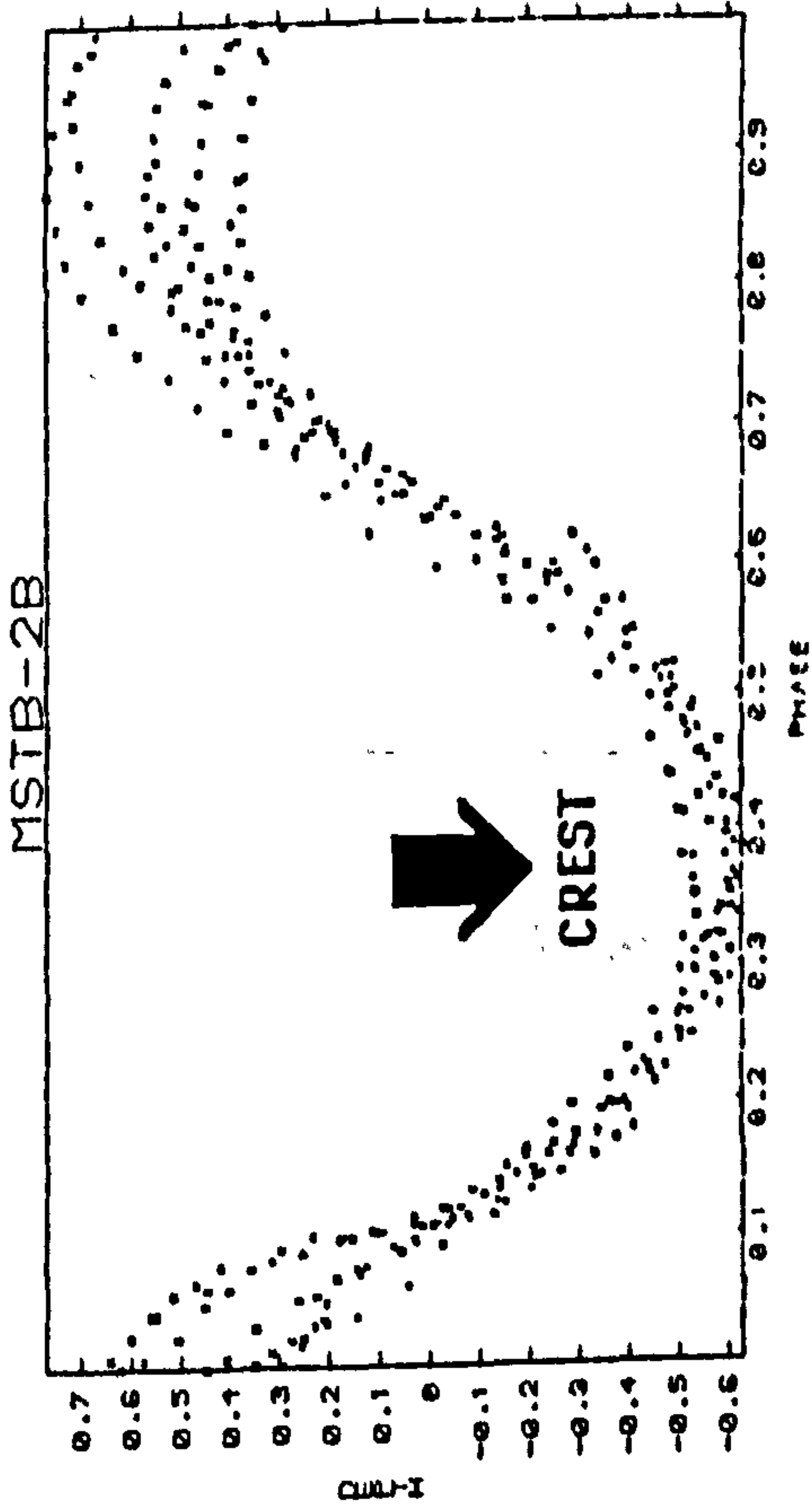
Maudslay

Date:

ca.1800

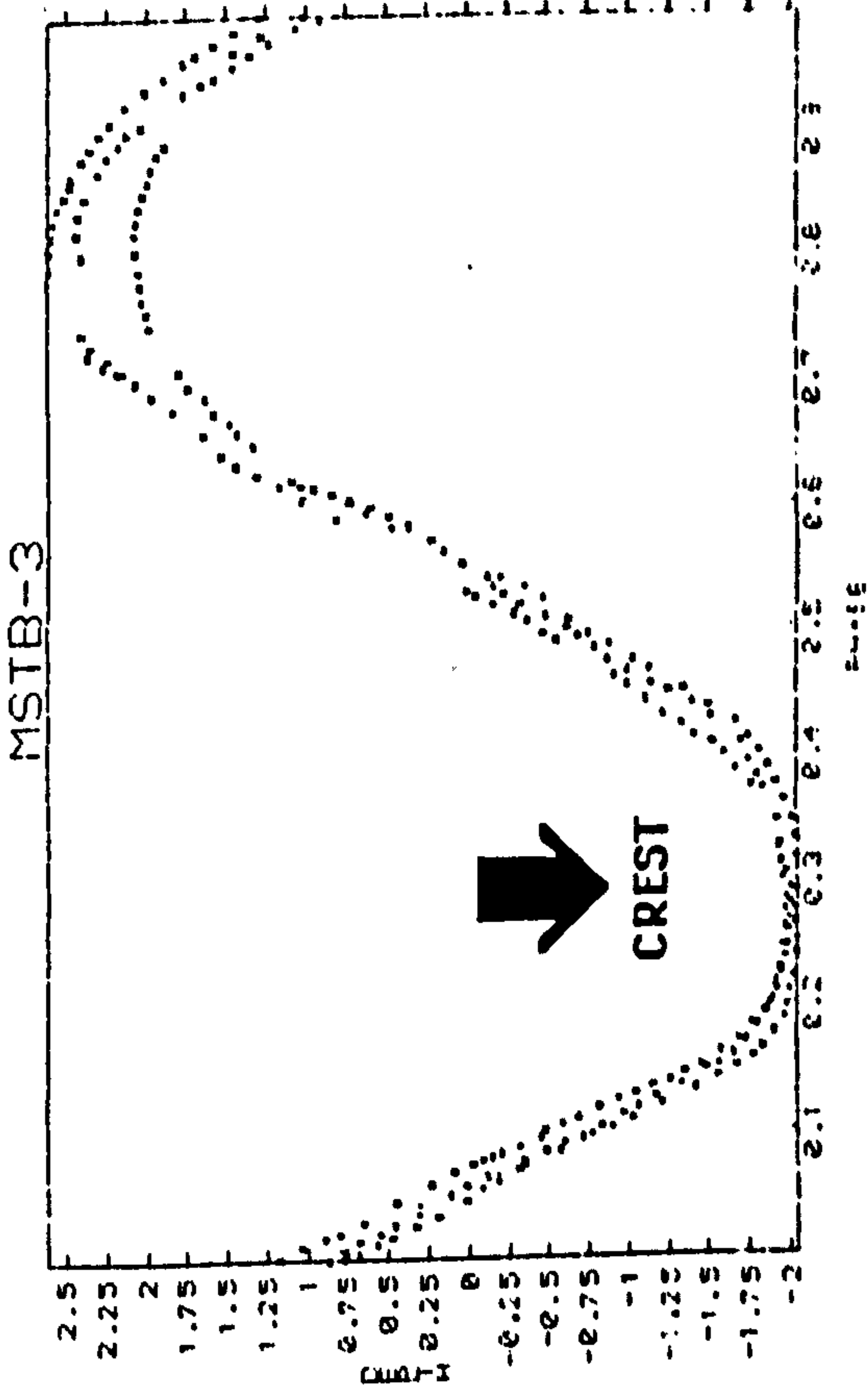
Ser./Acq. No.

83-3662



	Filar
	Scale
	Bench
	Div. Eng.
	Adjust.
	Leveling
	Focus
	Eye P.
	Tube
	Tool
	Gauge
	Binding
	Misc.

Screw on head stock and  
parallel to lead screw



Characteristics:

Screw ☒ Nut ☐

Leng: 1.50"

Diameter: 1.625"

Steel ☒ Brass ☐

Other:

Instrument Identification:

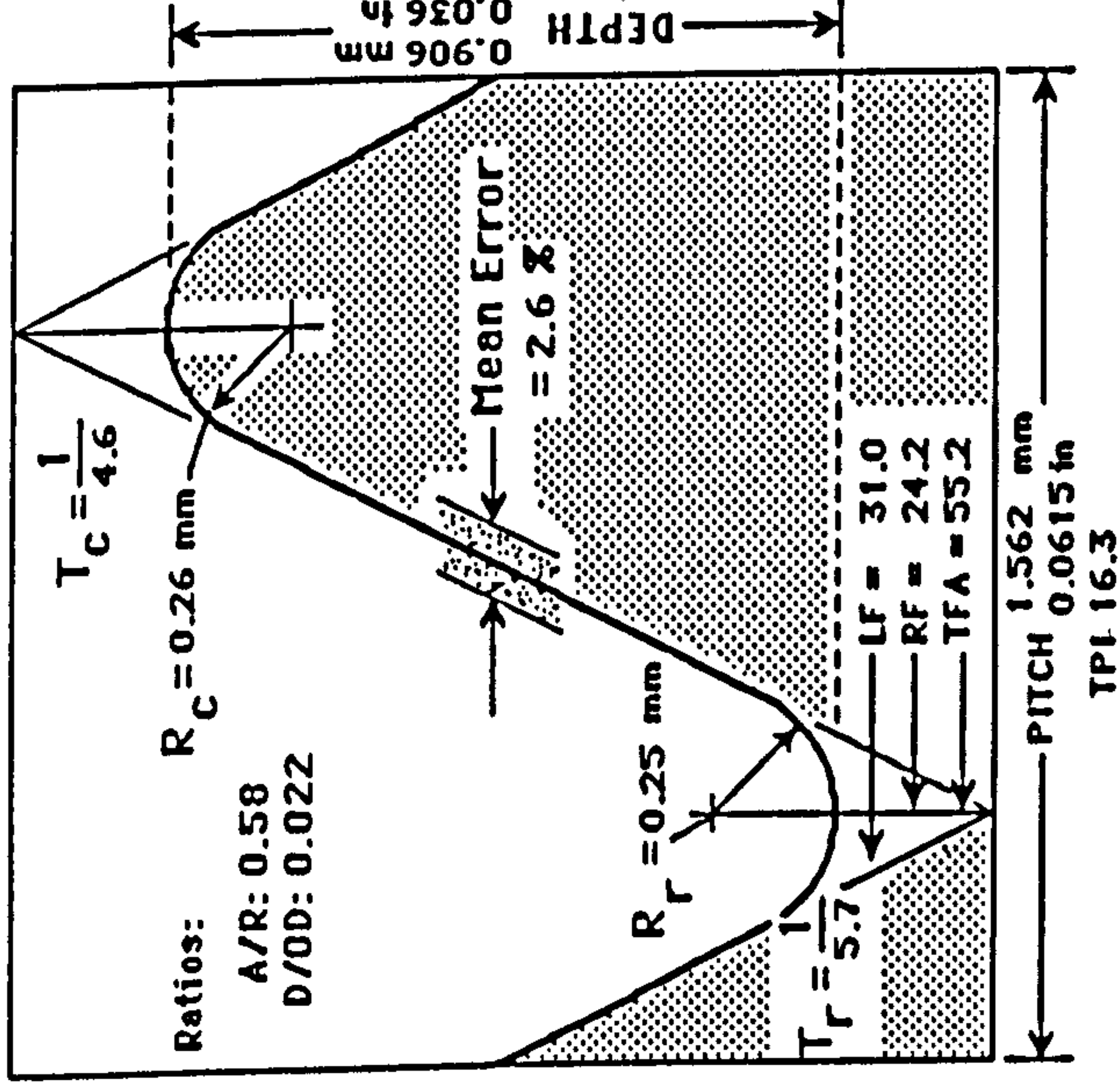
Study Code: MSTB-3

Instrument: Thread rolling machine

Maker: not signed

Date: ca.1878

Ser./Acq. No. 1878-9



Mu	Filar	
	Scale	
	Bench	
	Div. Eng.	
	Adjust.	
	Leveling	
	Focus	
	Eye P.	
	Tube	
	Tool	
	Gauge	
	Binding	
	Misc.	

Characteristics:

Screw

Nut

Leng: ~0.50" / 0.375"

Diameter: 0.250"

Steel

Brass

Other:

Study Code: NHM-5a

Instrument: Chuck with nut

Maker: not signed

Date: 19th c

Ser./Acq. No.

Instrument Identification:

Study Code: NHM-5a

Instrument: Chuck with nut

Maker: not signed

Date: 19th c

Ser./Acq. No.

NHM-5A

I-FFT

PHASE

CREST

The plot shows a peak labeled 'CREST' at a phase of approximately 0.4. The y-axis (I-FFT) ranges from -1.2 to 1.4, and the x-axis (PHASE) ranges from 0.1 to 0.5.

Technical drawing of a screw thread profile showing various geometric parameters:

- $T_C = \frac{1}{3.1}$
- $R_C = 0.25 \text{ mm}$
- $R_r = \text{flat V}$
- $T_r = \frac{1}{3.2}$
- Mean Error = 4.2 %
- DEPT H 0.515 mm
- DEPT H 0.0203 in
- LF = 18.7
- RF = 21.7
- TFA = 40.4
- PITCH 1.051 mm
- PITCH 0.0414 in
- TPI 24.2

Mu

Filar

Scale

Bench

Div. Eng.

Adjust.

Leveling

Focus

Eye P.

Tube

Tool

Gauge

Binding

Misc.



Characteristics:

Screw

Nut

Leng: ~0.50" / 0.375"

Diameter: 0.250"

Steel

Brass

Other:

Instrument Identification:

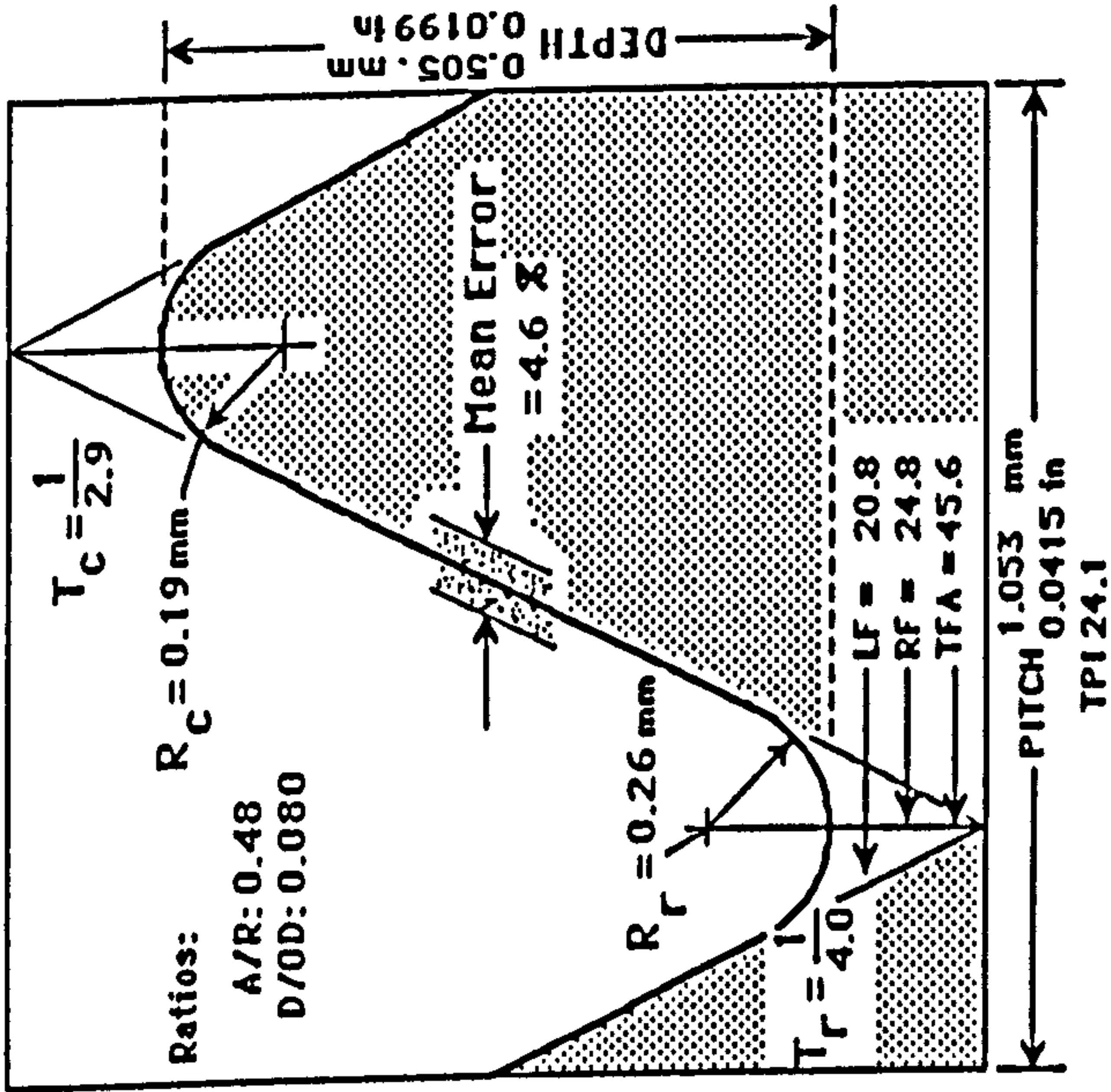
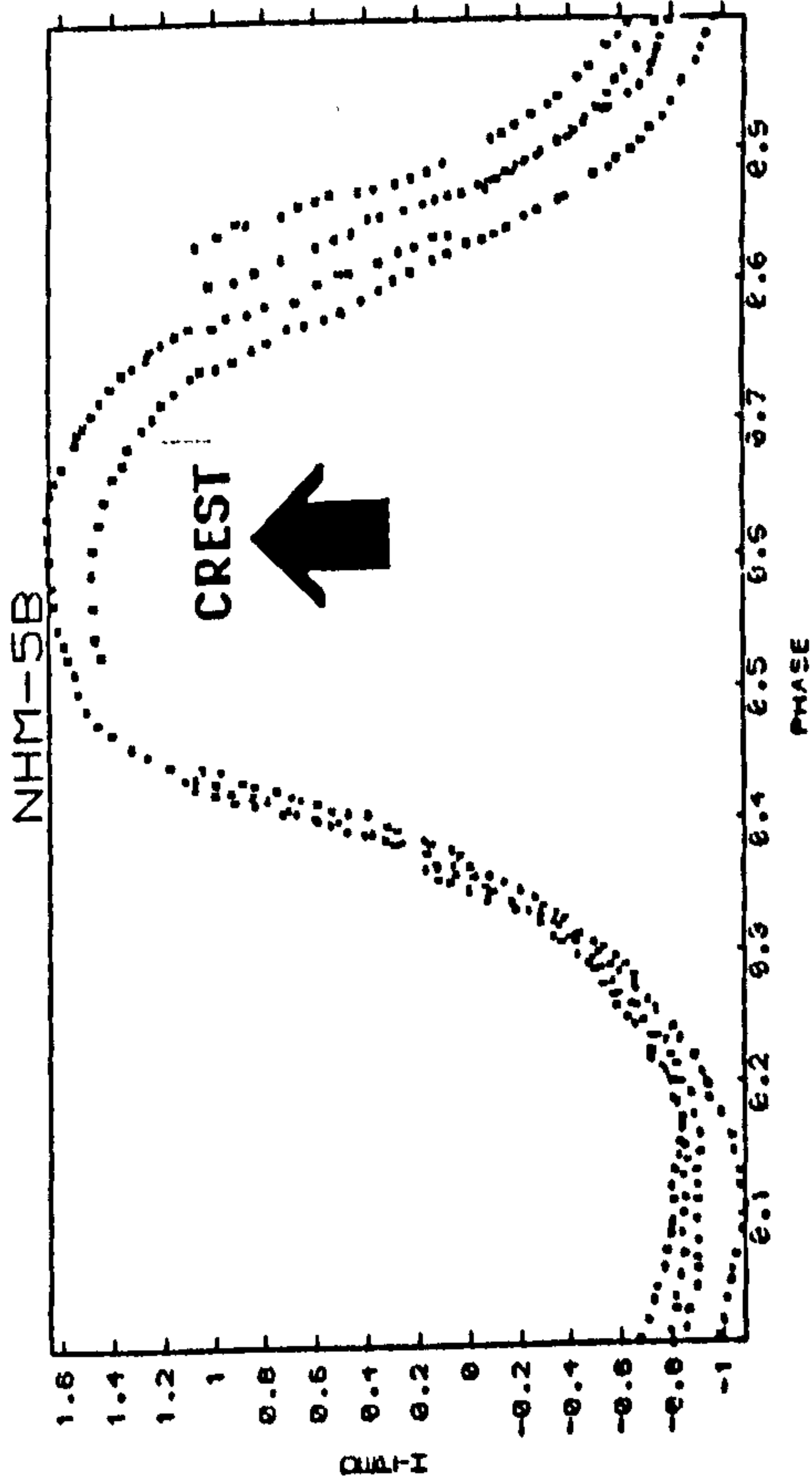
Study Code: NHM-5b

Instrument: Chuck with nut

Maker: not signed

Date: 19th c

Ser./Acq. No.



	Filar
	Scale
	Bench
	Div. Eng.
	Adjust.
	Leveling
	Focus
	Eye P.
	Tube
	Tool
	Gauge
	Binding
	Misc.



Characteristics:

Screw

Nut

Leng: ~0.968" / ~0.17"

Diameter: 0.1513"

Steel

Brass

Other:

Instrument Identification:

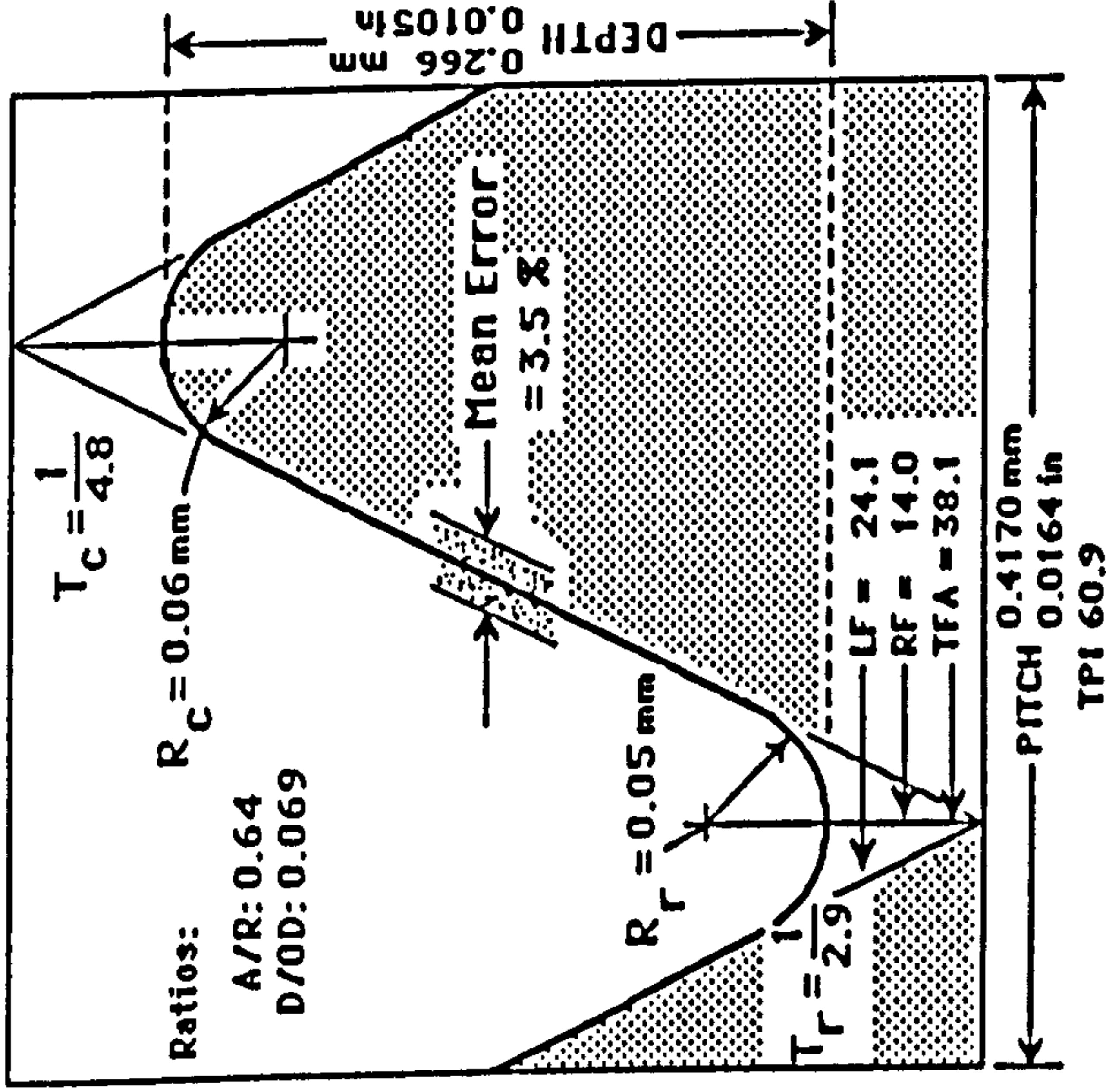
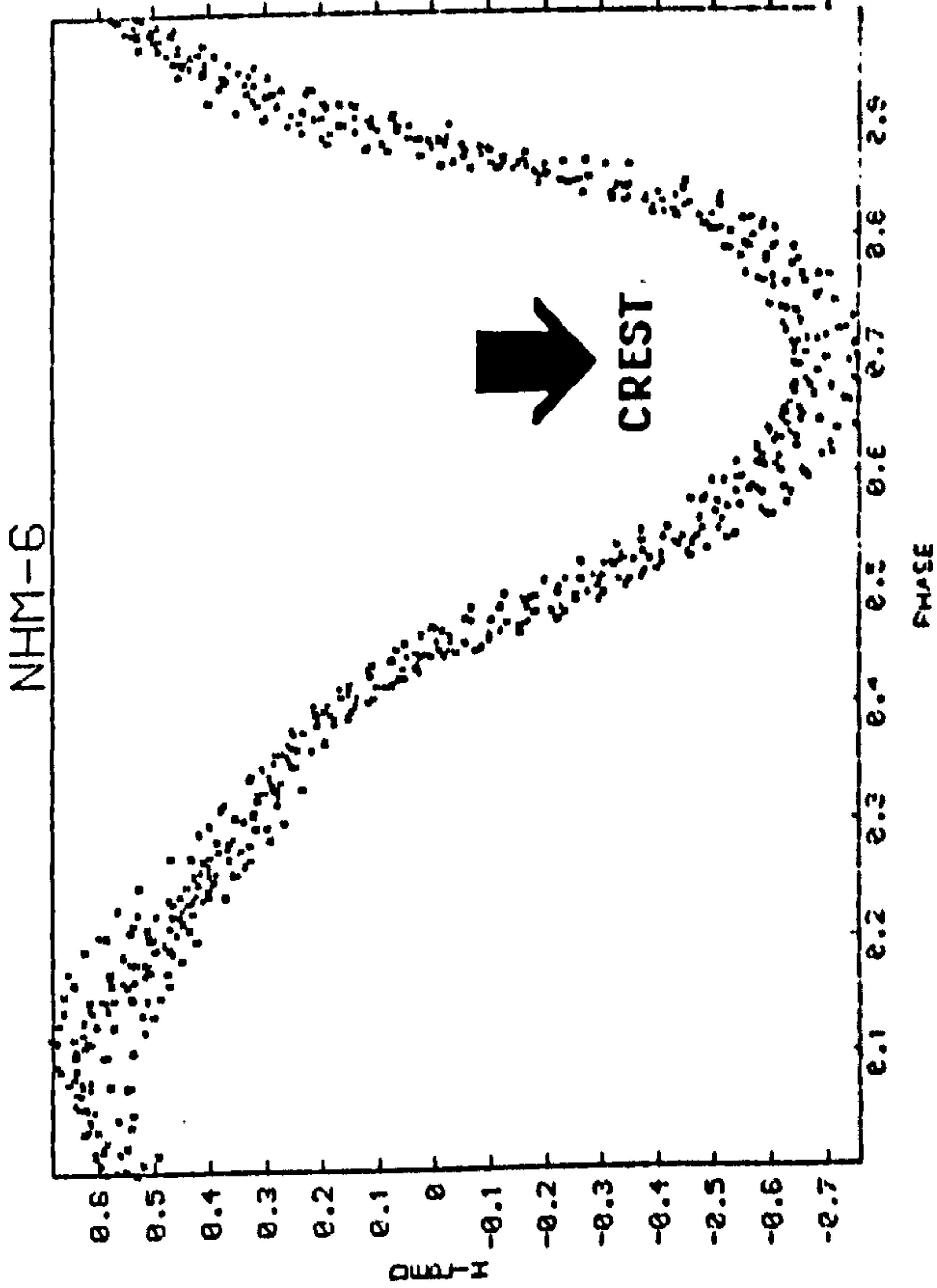
Study Code: NHM-6

Instrument: Screw stocks

Maker: J. Deacon

Date: 1st h 19th c

Ser./Acq. No. 1233.1951/24



Mu

Filar

Scale

Bench

Div. Eng.

Adjust.

Leveling

Focus

Eye P.

Tube

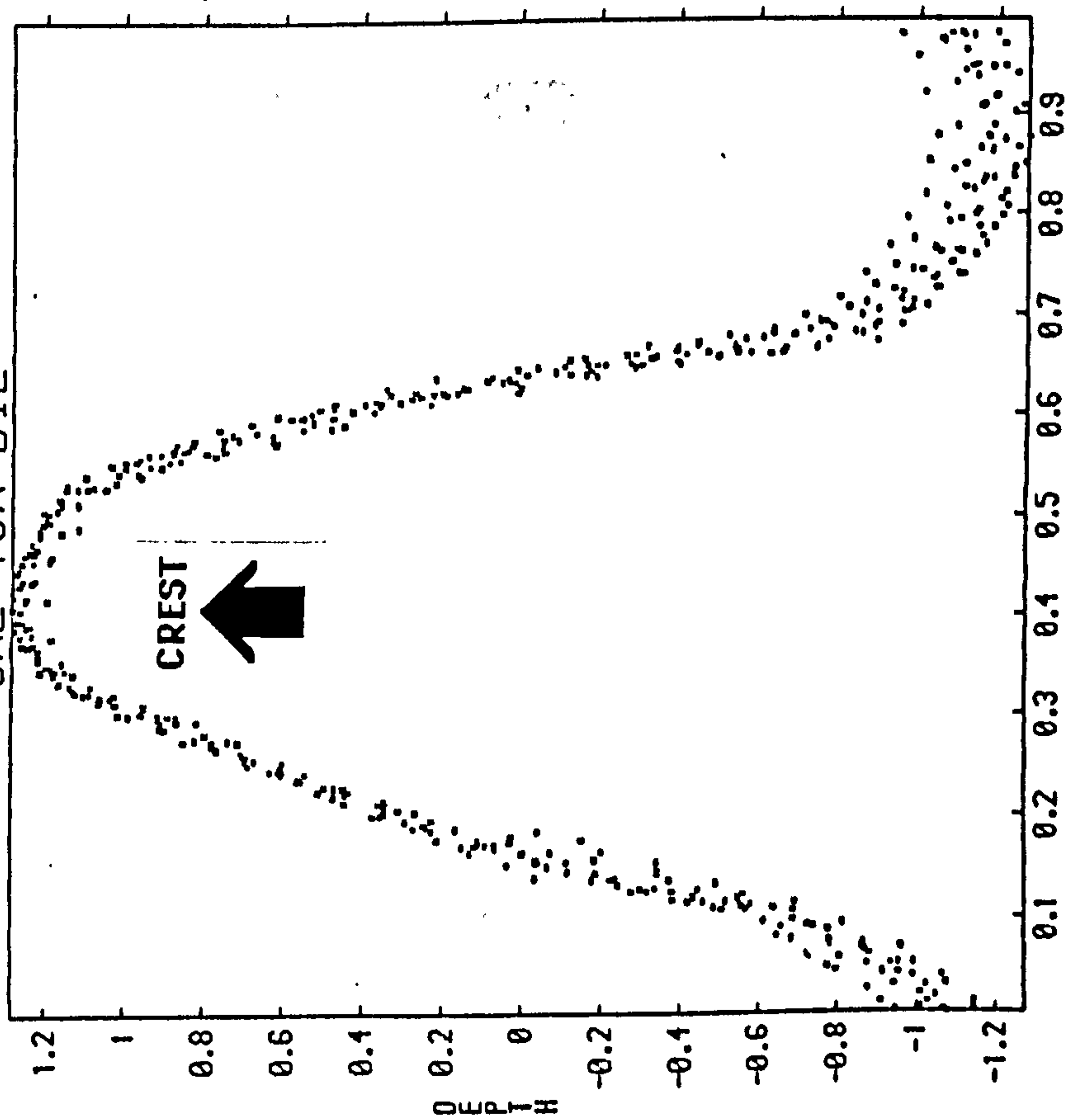
Tool

Gauge

Binding

Misc.

SML-15A DIE

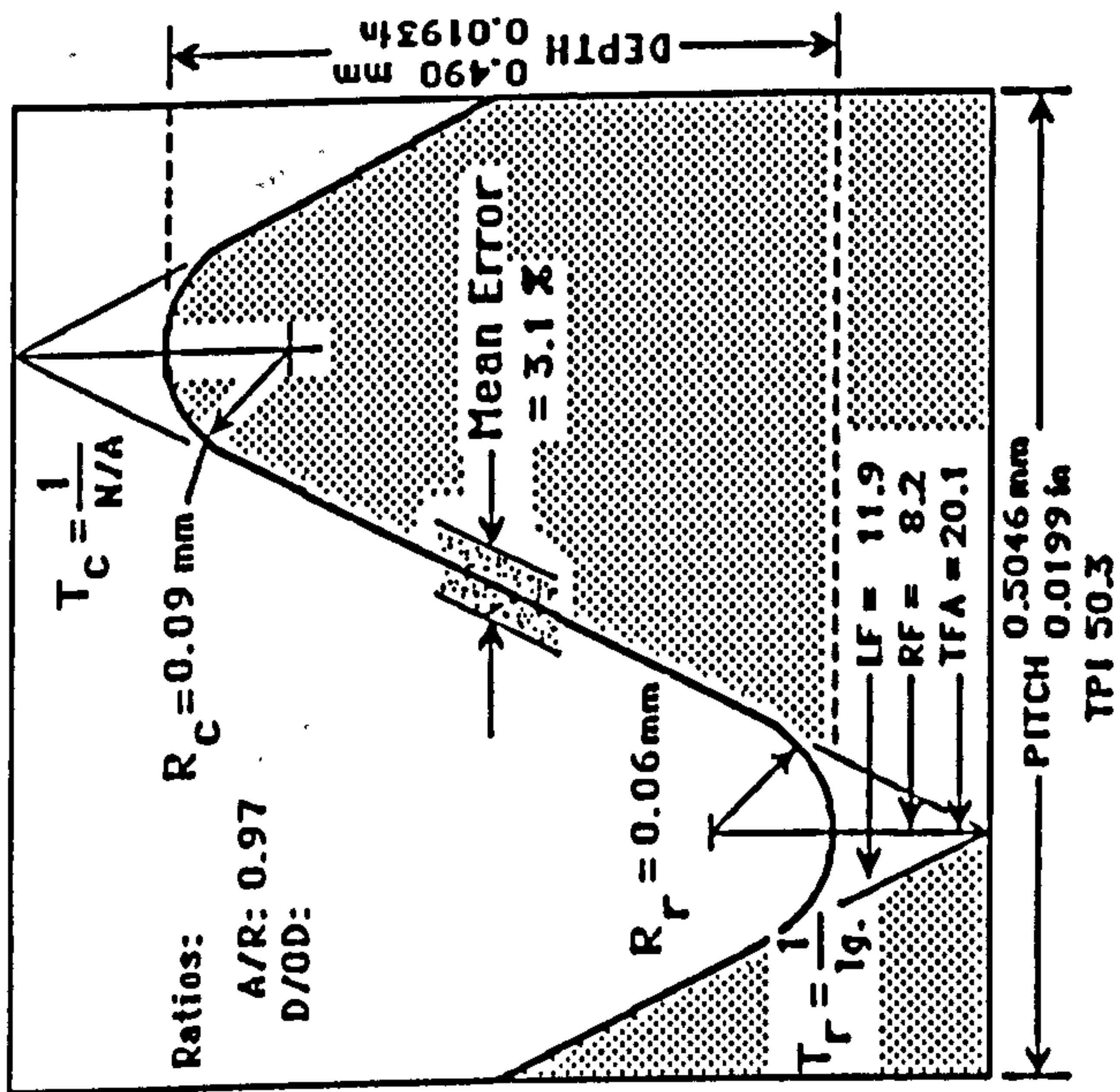


Characteristics:

- Screw ☒ Nut ☐
- Leng: N/A
- Diameter: ☒ Steel ☐ Brass ☐
- Other:

Instrument Identification:

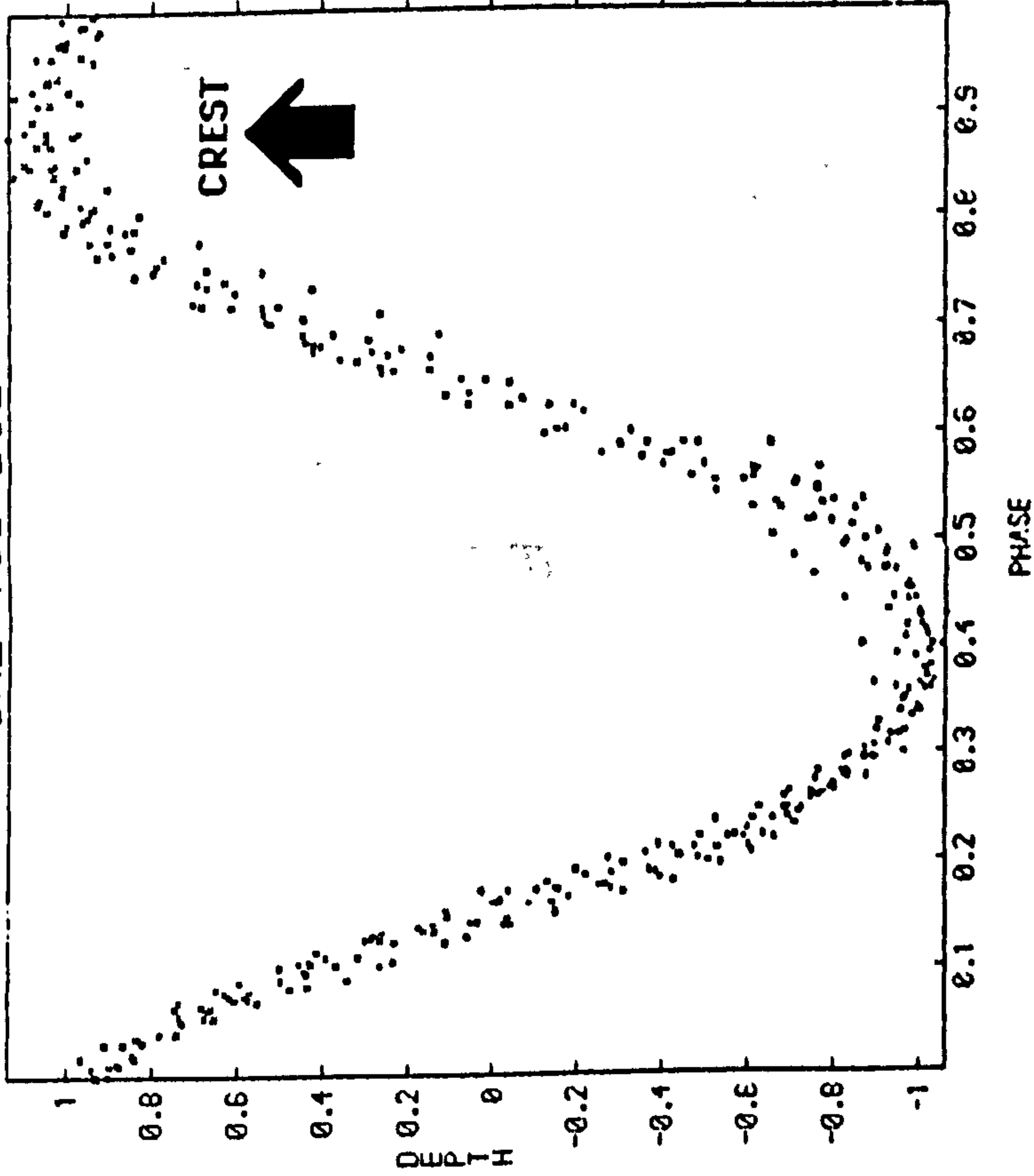
Study Code: SML-15a  
Instrument: Experimental die  
Maker: Henry Maudslay  
Date: e 19th c  
Ser./Acq. No. 1925-164



- Mu — [ Filar Scale Bench Div. Eng. Adjust. Leveling Focus Eye P. Tube. Tool Gauge Binding Misc. ]

(Experimental die  
—marked 50)

# SML-15B DIE

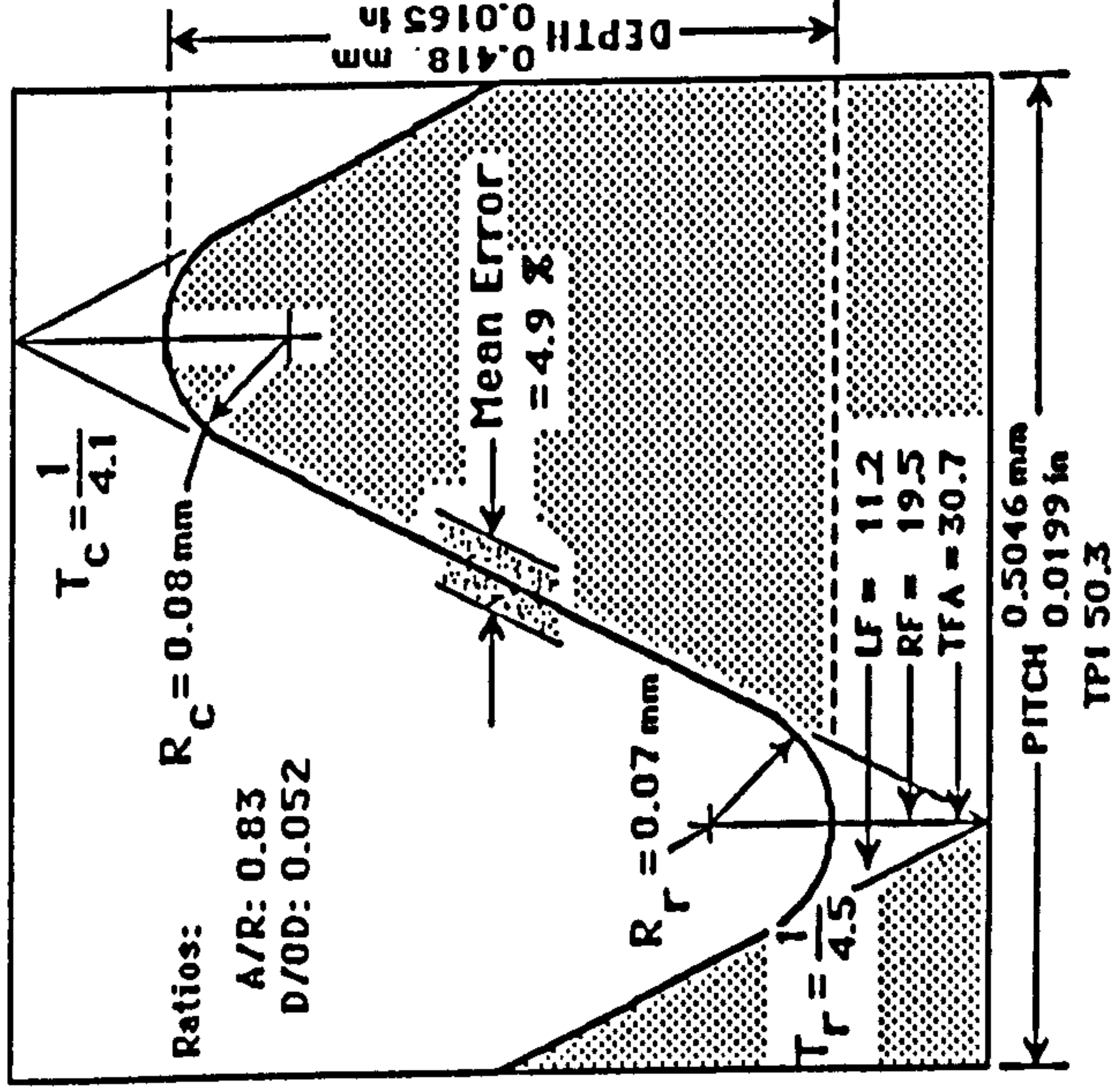


## Characteristics:

Screw ☐ Nut ☒  
Leng: N/A /  $\approx 0.37''$   
Diameter: 0.32" nom.  
Steel ☒ Brass ☐  
Other: ☐

## Instrument Identification:

Study Code: SML-15b die  
Instrument: Experimental die  
Maker: Maudslay  
Date: e 19th c  
Ser./Acq. No. 1925-164



MU	Filar
	Scale
	Bench
	Div. Eng.
	Adjust.
	Leveling
	Focus
	Eye P.
	Tube
	Tool
	Gauge
	Binding
	Misc.

Experimental die: 28TS #22

Characteristics:

Screw

Nut

Leng: N/A /  $\approx 0.37''$

Diameter: 0.32" nom.

Steel

Brass

Other:

Instrument Identification:

Study Code: SML-15C die

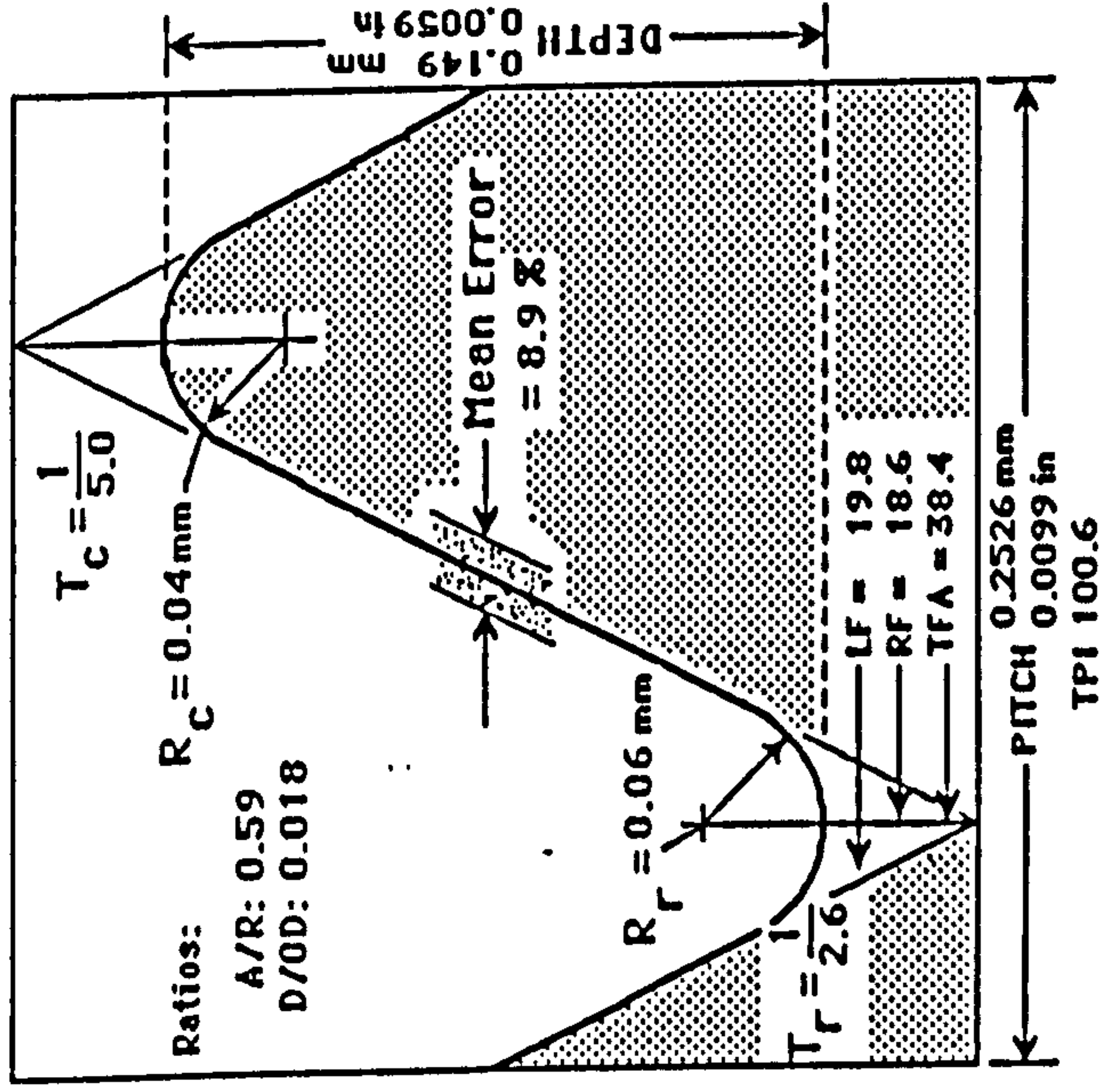
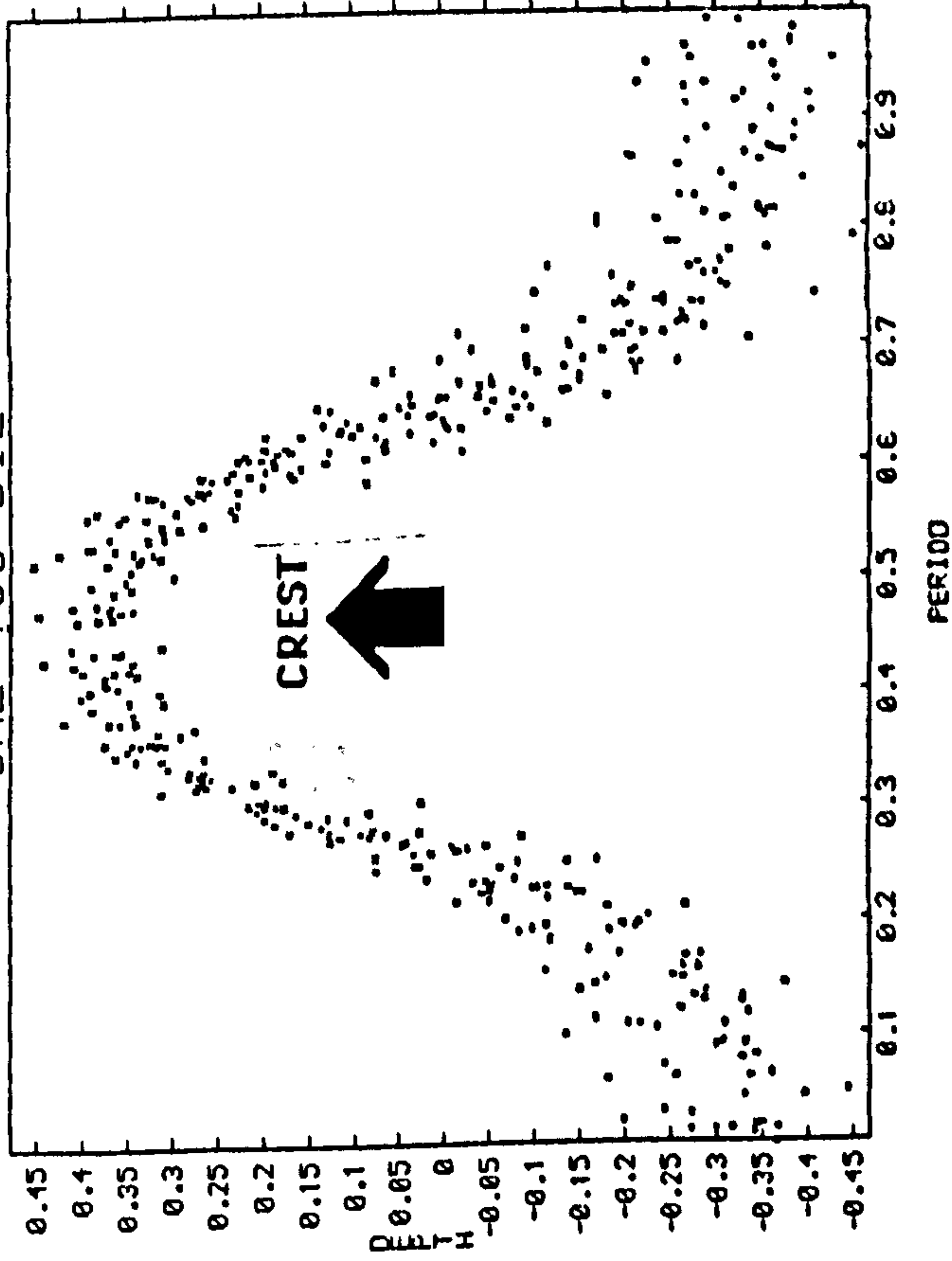
Instrument: Experimental die

Maker: Maudslay

Date: e19th c

Ser./Acq. No. 1925-164

SML-15C DIE



Mu

Filar

Scale

Bench

Div. Eng.

Adjust.

Leveling

Focus

Eye P.

Tube

Tool

Gauge

Binding

Misc.

Experimental die: "2"



Characteristics:

Screw
☐
Nut
☒

Leng: N/A / ~0.37"

Diameter: 0.32" nom.

Steel
☒
Brass
☐

Other:

Instrument Identification:

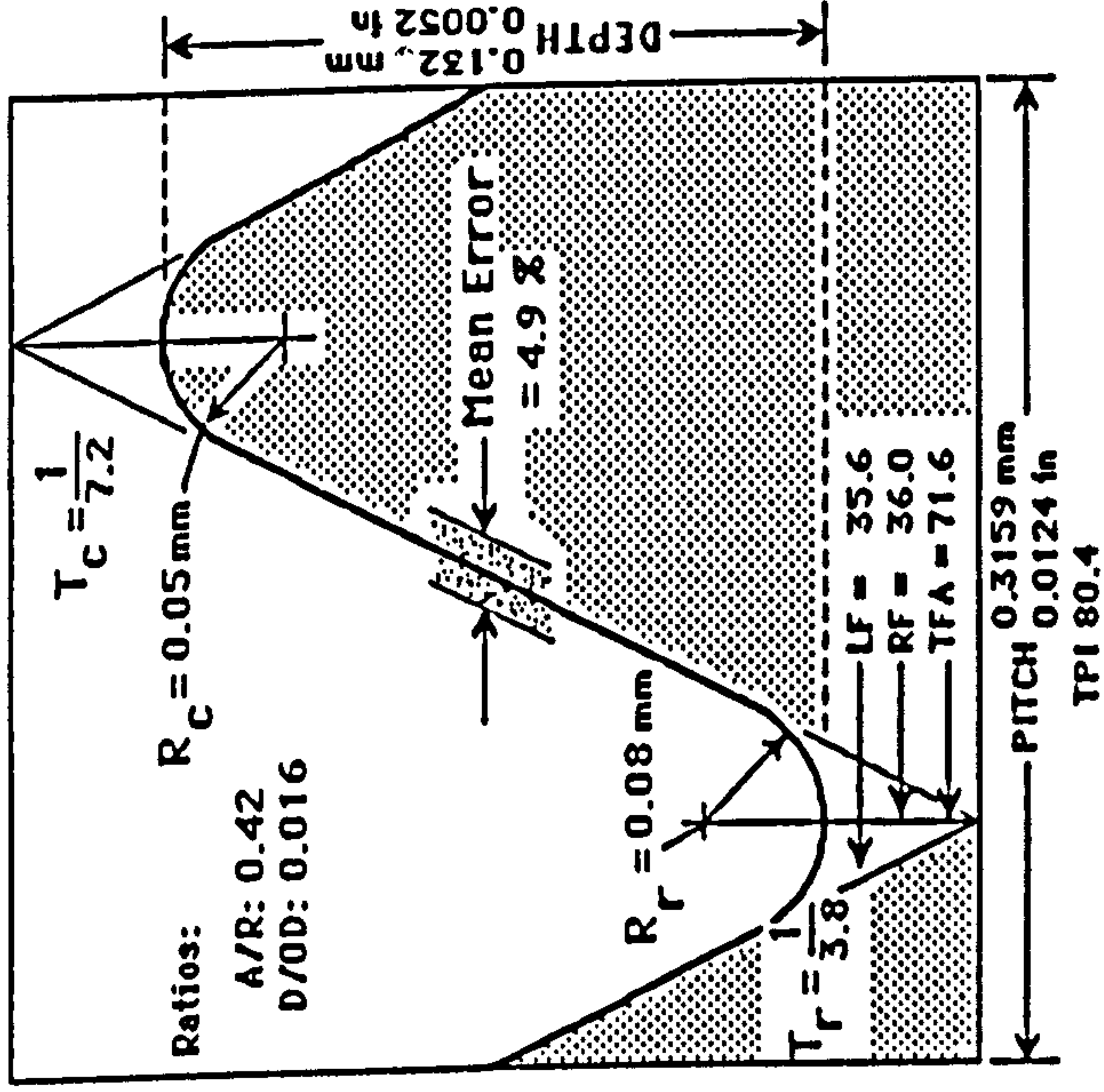
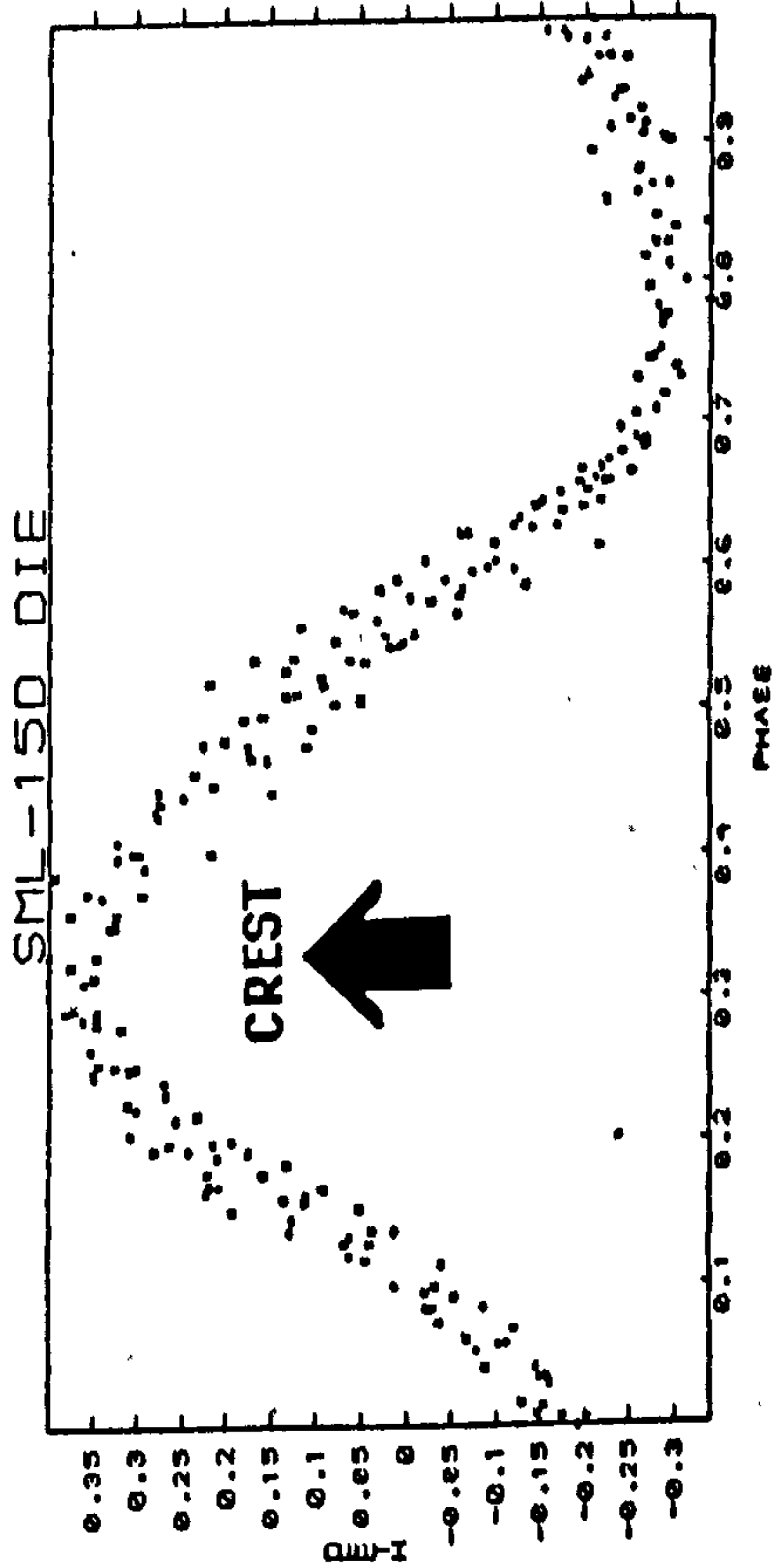
Study Code: SML-15d die

Instrument: Experimental die

Maker: Maudslay

Date: e 19th c

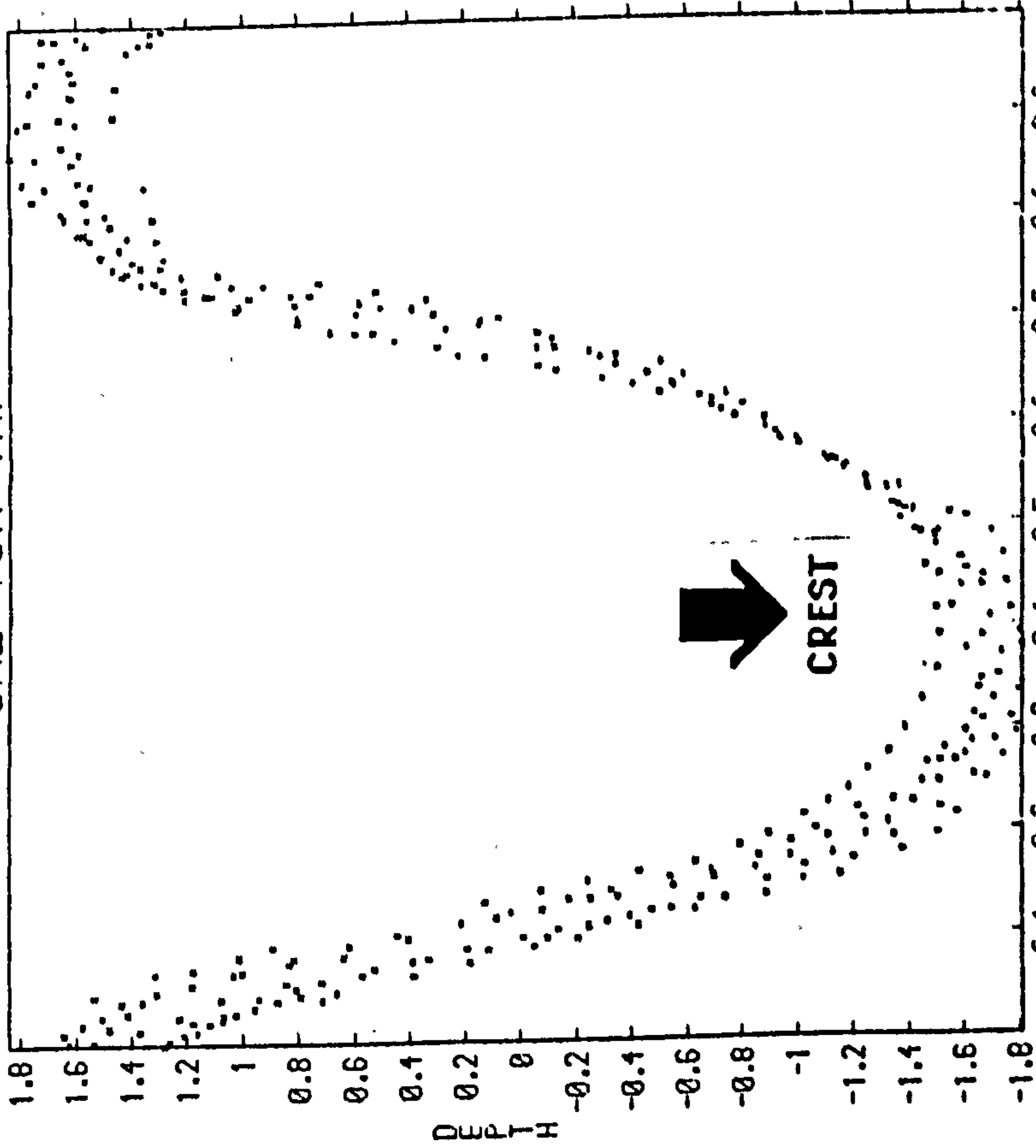
Ser./Acq. No. 1925-164



MU	Filar
	Scale
	Bench
	Div. Eng.
	Adjust.
	Leveling
	Focus
	Eye P.
	Tube
	Tool
	Gauge
	Binding
	Misc.

Experimental die: "11"

# SML-15A TAP



## Characteristics:

Screw ☒ Nut ☐

Leng: 1.41" / N/A

Diameter: 0.375"

Steel ☒ Brass ☐

Other:

## Instrument Identification:

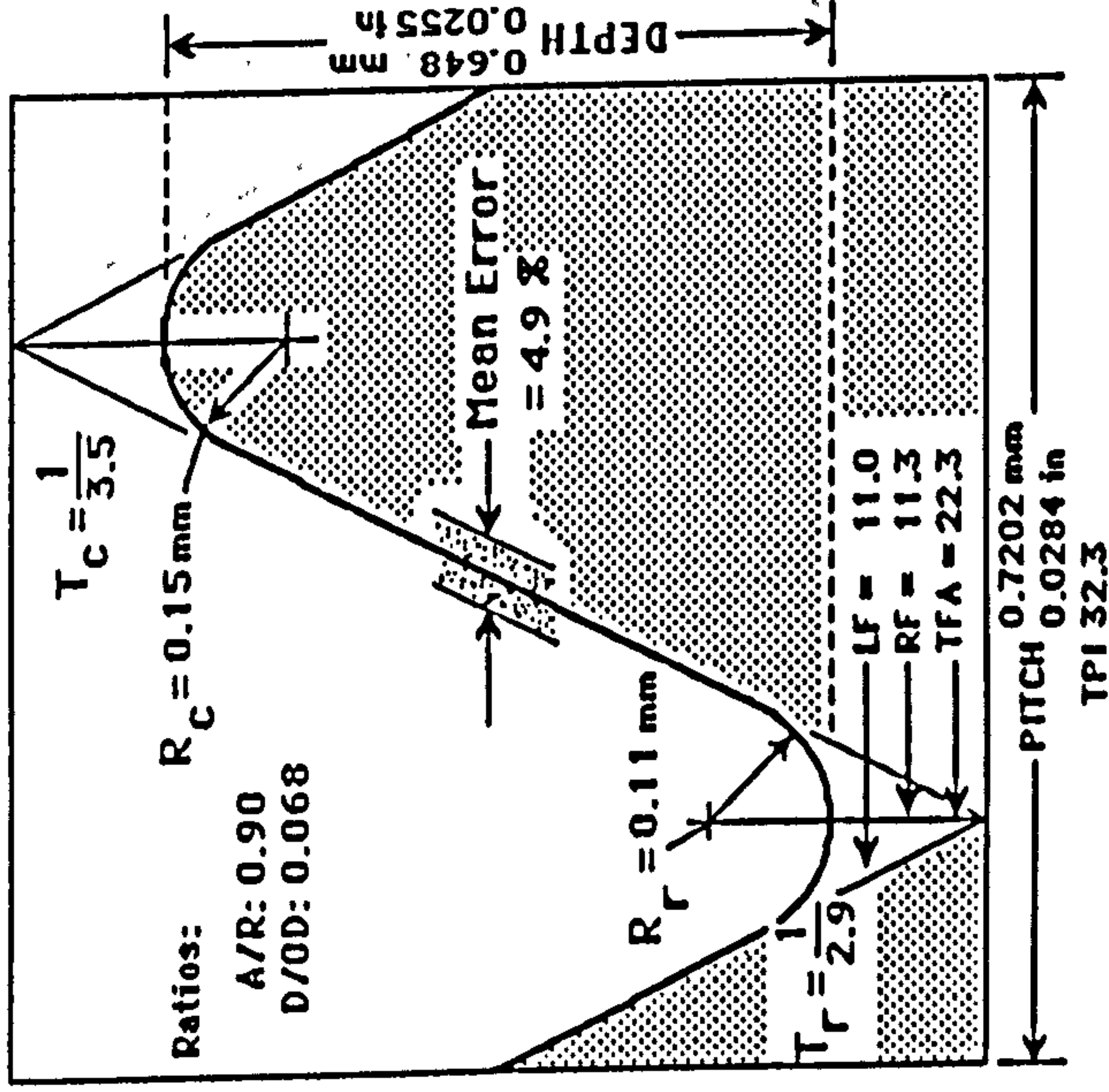
Study Code: SML-15a tap

Instrument: Screw tap

Maker: Maudslay

Date: e 19th c

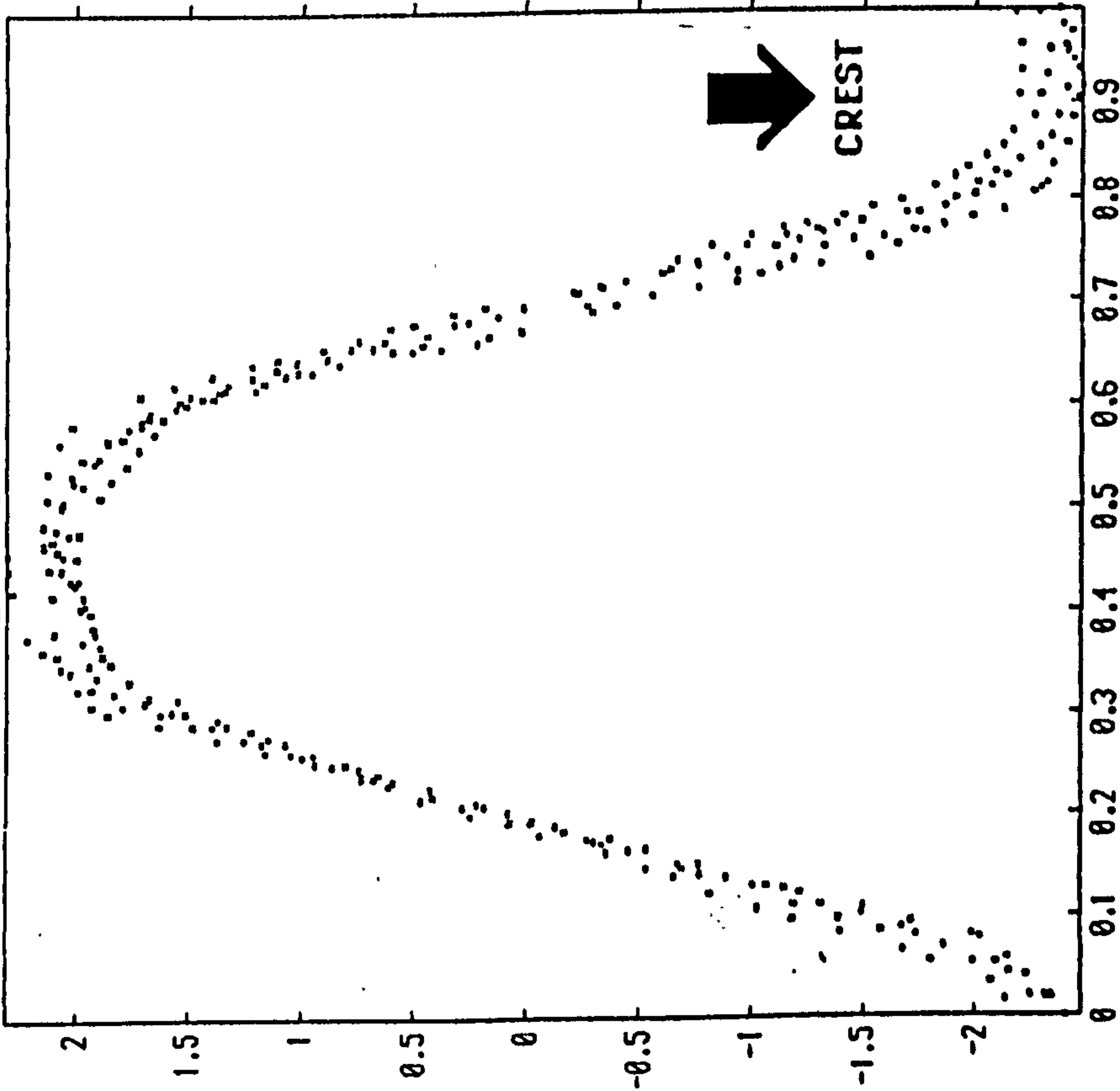
Ser./Acq. No. 1925-165



Mu	Filar	
	Scale	
	Bench	
	Div. Eng.	
	Adjust.	
	Leveling	
	Focus	
	Eye P.	
	Tube	
	Tool	
	Gauge	
	Binding	
	Misc.	

Experimental tap: 35-3/8"

# SML-15B TAP



## Characteristics:

Screw ☒ Nut ☐

Leng: 2.09"

Diameter: 0.438"

Steel ☒ Brass ☐

Other:

## Instrument Identification:

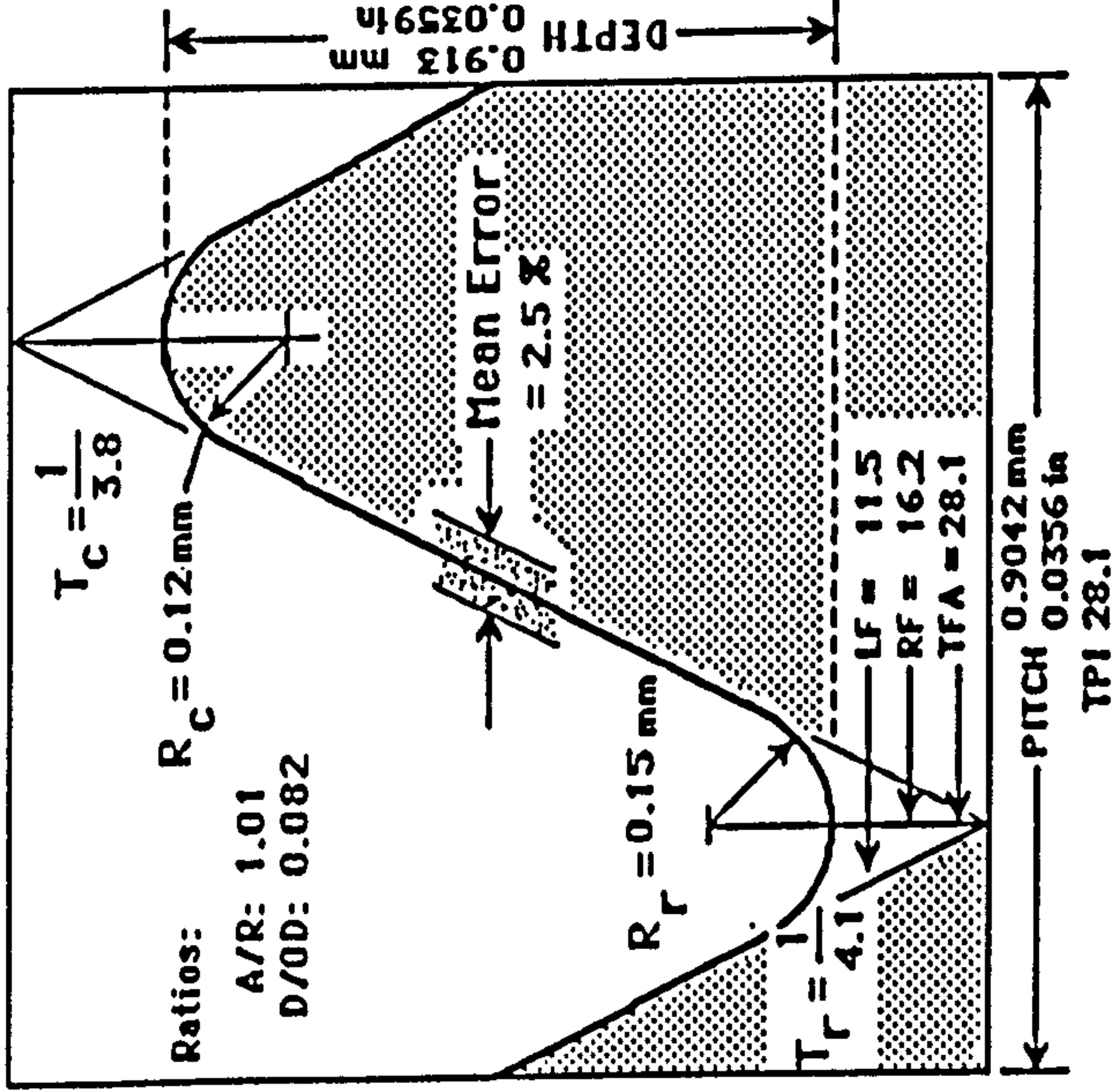
Study Code: SML-15bTap

Instrument: Experimental tap

Maker: Henry Maudslay

Date: e19th c

Ser./Acq. No. 1925-165

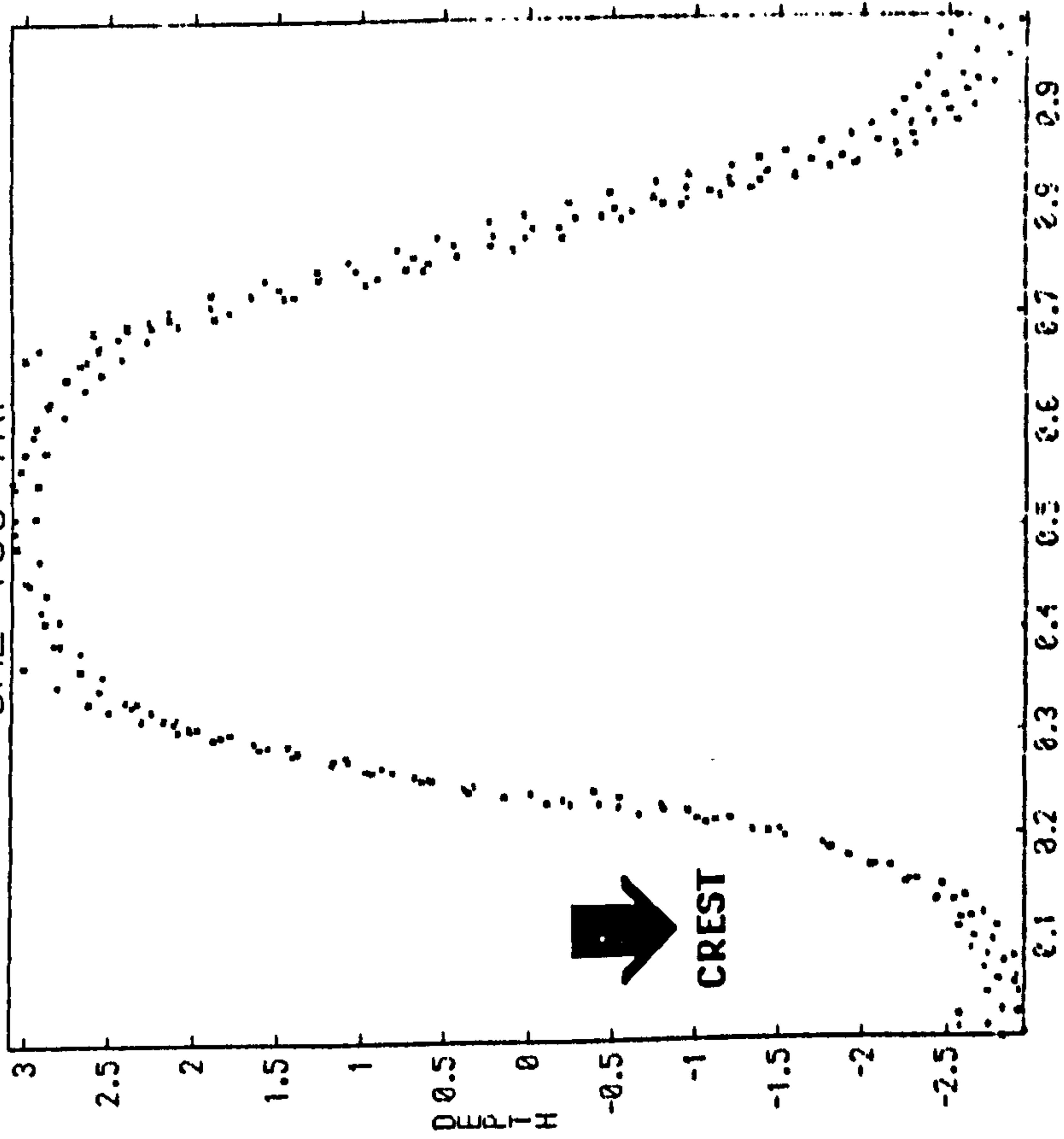


Mu	Filar	
	Scale	
	Bench	
	Div. Eng.	
	Adjust.	
	Leveling	
	Focus	
	Eye P.	
	Tube	
	Tool	
	Gauge	
	Binding	
	Misc.	

(Experimental tap  
marked 50-7/16")



SML-15C TAP

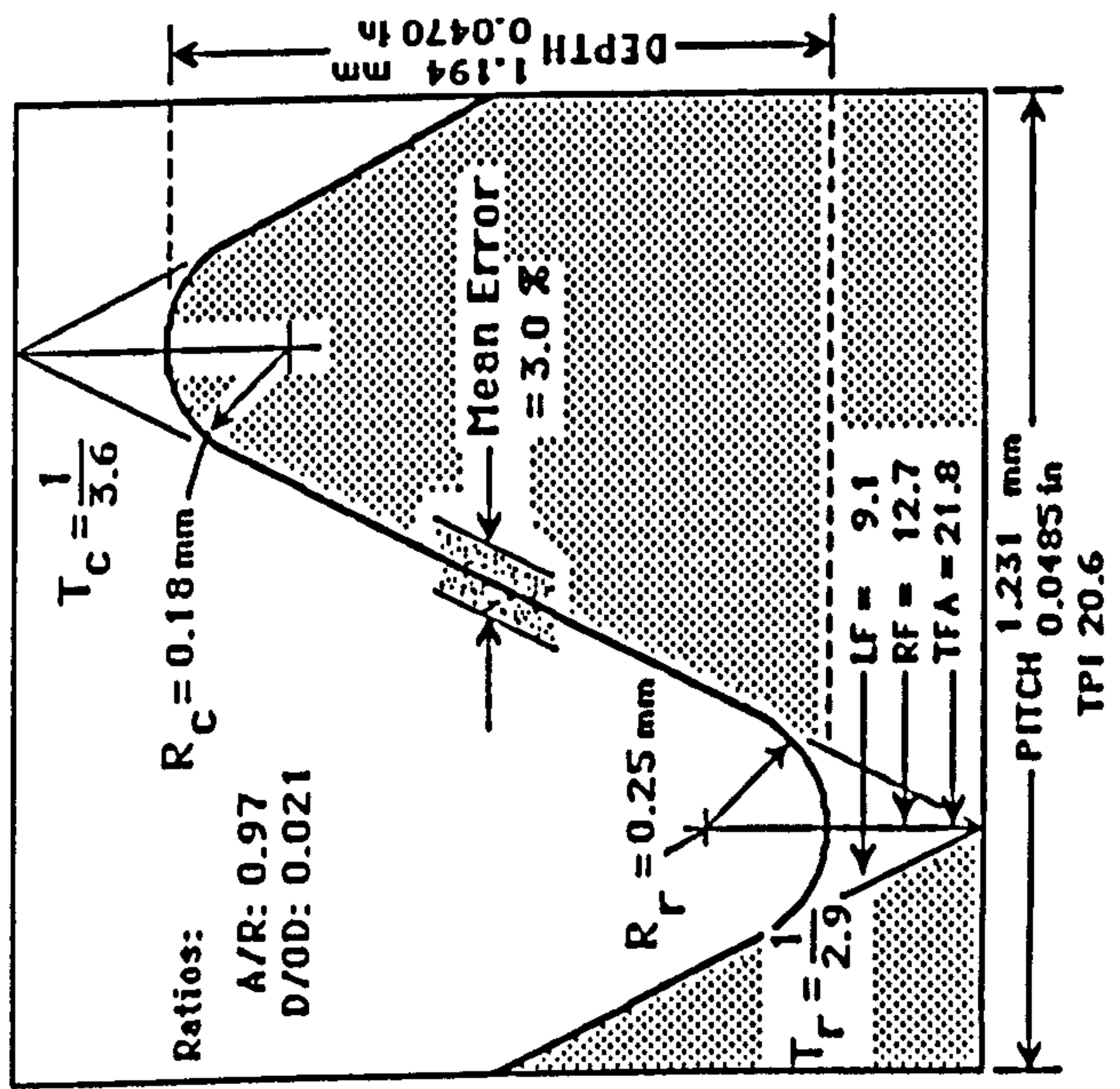


Characteristics:

- Screw ☒ Nut ☐  
Leng: 1.59" / N/A  
Diameter: 0.438"  
Steel ☒ Brass ☐  
Other: ☐

Instrument Identification:

Study Code: SML-15c tap  
Instrument: Experimental tap  
Maker: Maudslay  
Date: e 19th c  
Ser./Acq. No. 1925-165



- Mu — [ Filar  
Scale  
Bench  
Div. Eng.  
Adjust.  
Leveling  
Focus  
Eye P.  
Tube  
Tool  
Gauge  
Binding  
Misc.

Experimental tap: 3/8 #25



Characteristics:

Screw

Nut

Leng: 1.21" / N/A

Diameter: 0.25"

Steel

Brass

Other:

Instrument Identification:

Study Code: SML-15d tap

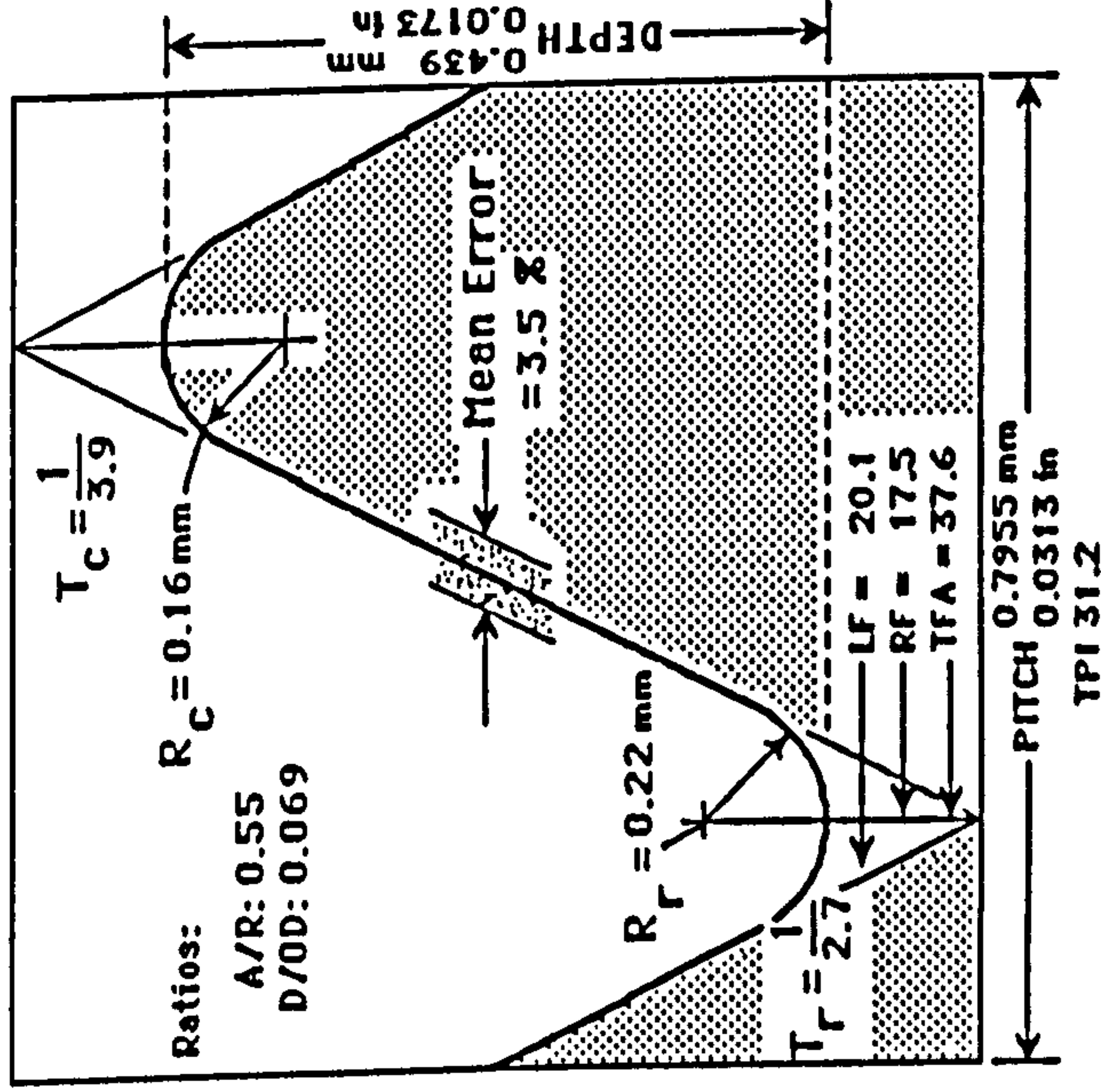
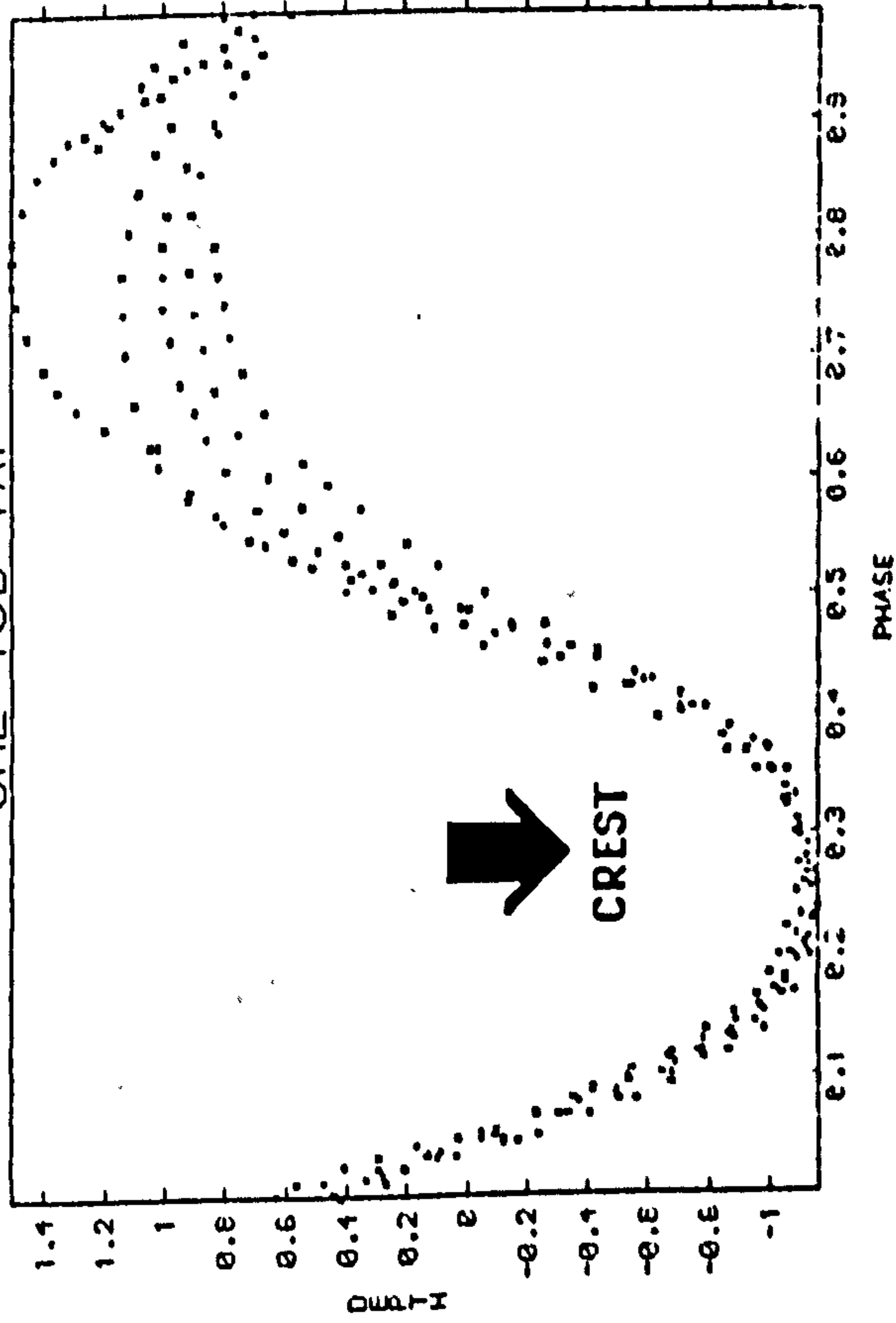
Instrument: Screw tap

Maker: Maudslay

Date: e 19th c

Ser./Acq. No. 1925-165

SML-15D TAP



Mu

Filar

Scale

Bench

Div. Eng.

Adjust.

Leveling

Focus

Eye P.

Tube

Tool

Gauge

Binding

Misc.

Experimental tap: 20-1/4

Characteristics:

Screw

Nut

Leng: 1.95" / N/A

Diameter: 0.625"

Steel

Brass

Other:

Instrument Identification:

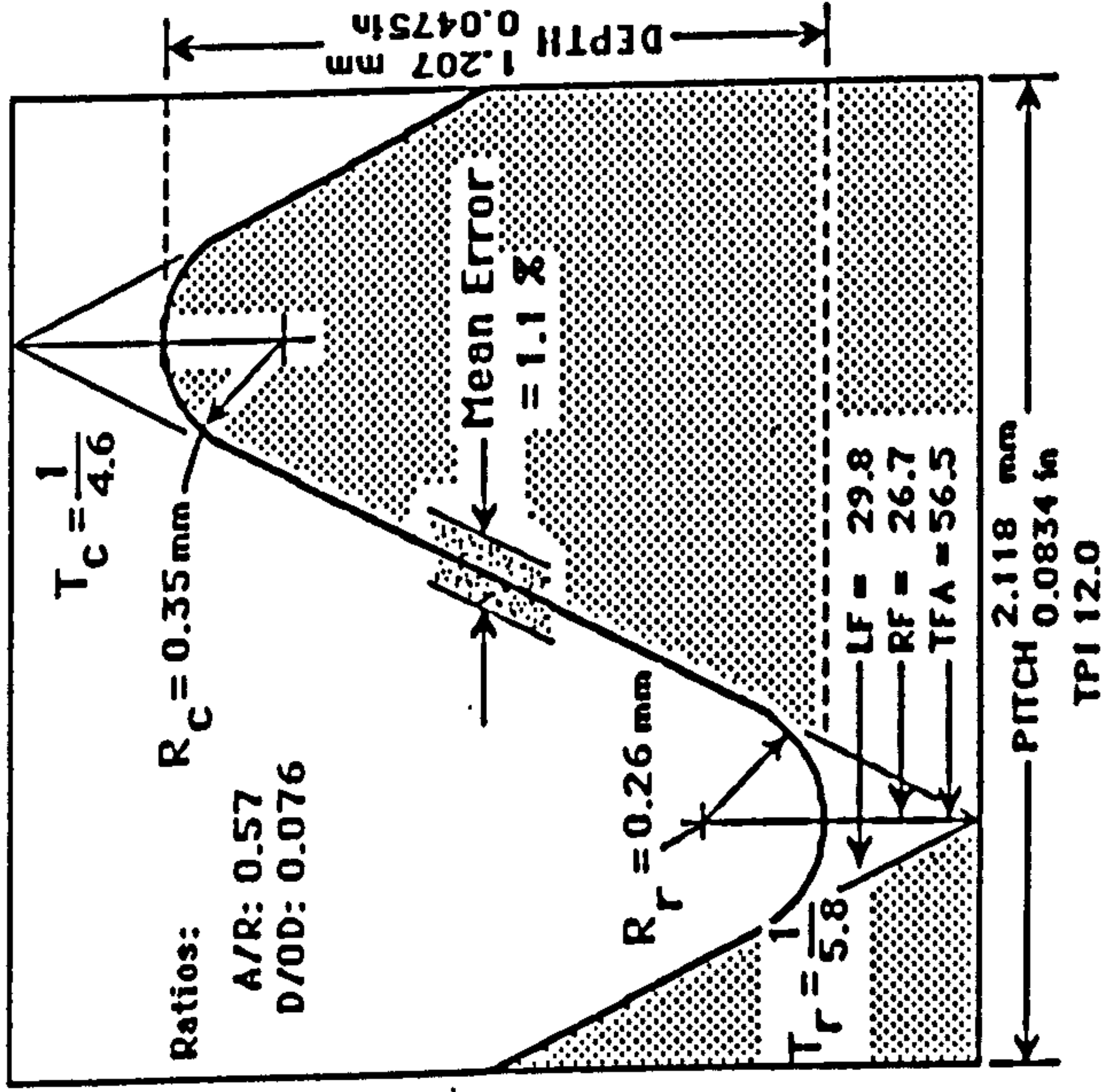
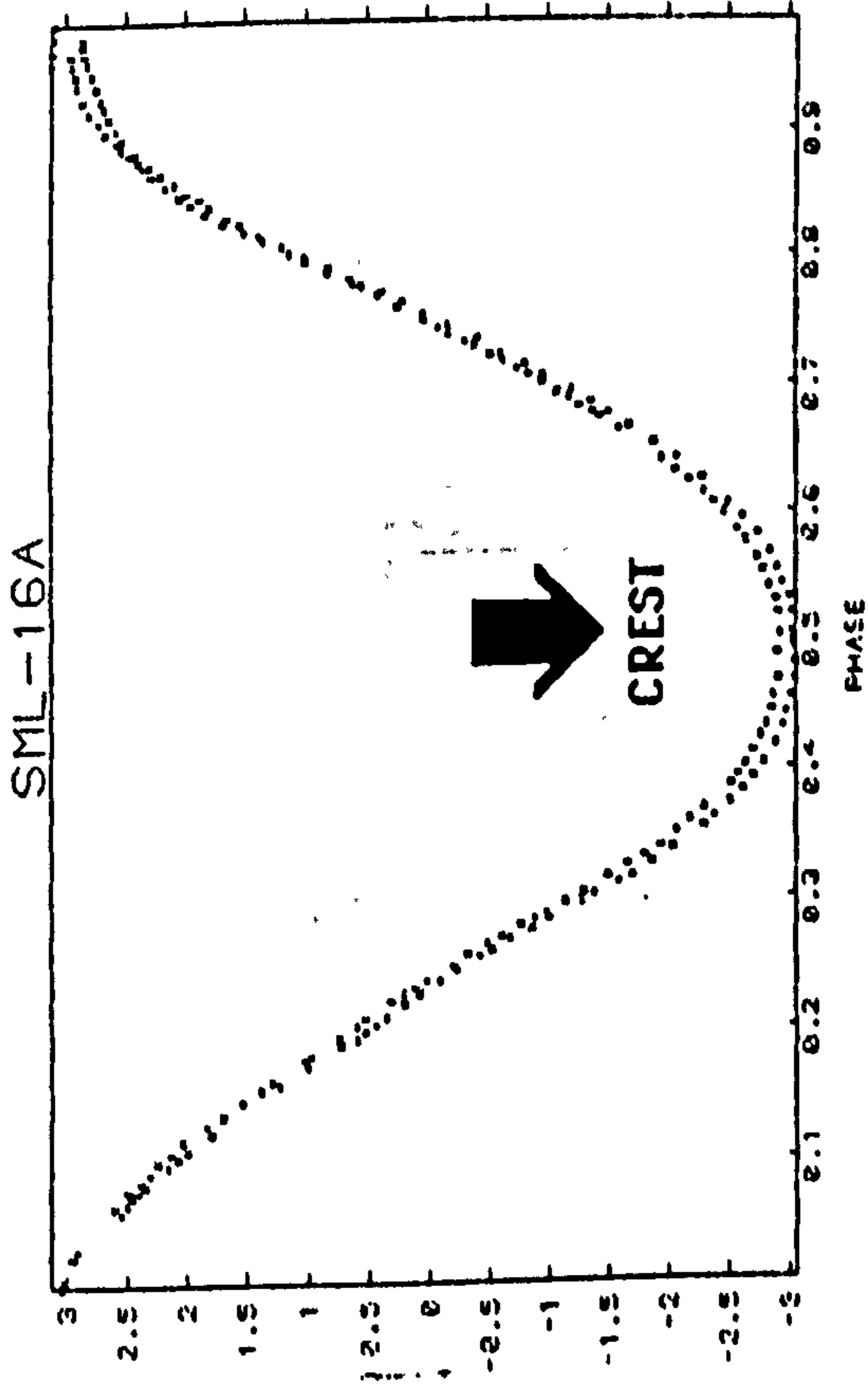
Study Code: SML-16a

Instrument: Screw tap

Maker: Whitworth

Date: ca.1857

Ser./Acq. No. 1857-8



Mu

Filar

Scale

Bench

Div. Eng.

Adjust.

Leveling

Focus

Eye P.

Tube

Tool

Gauge

Binding

Misc.

3-groove tap: 11-5/8"

Characteristics:

Screw

Nut

Leng: 1.65" / N/A

Diameter: ~0.625"

Steel

Brass

Other:

Instrument Identification:

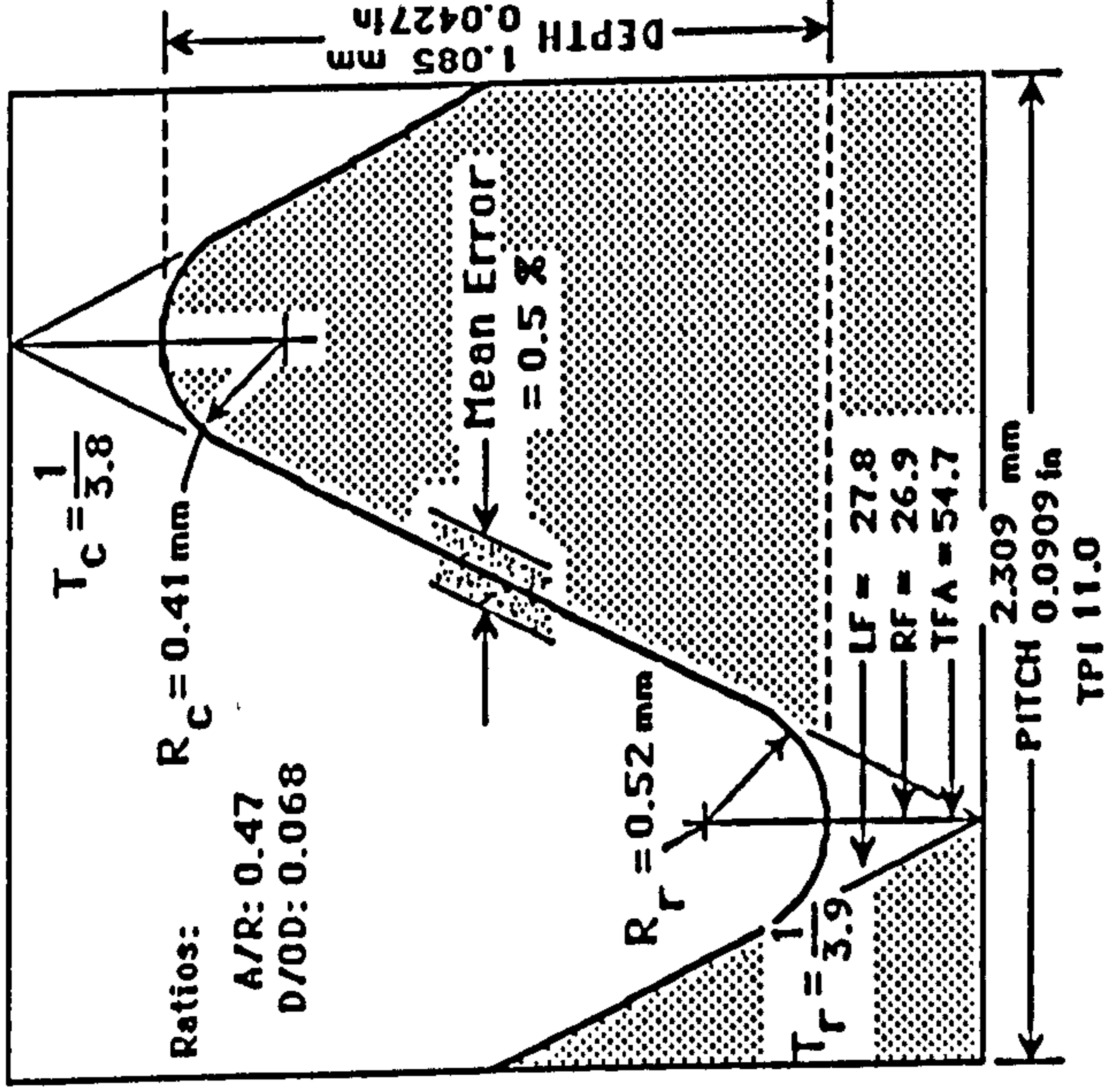
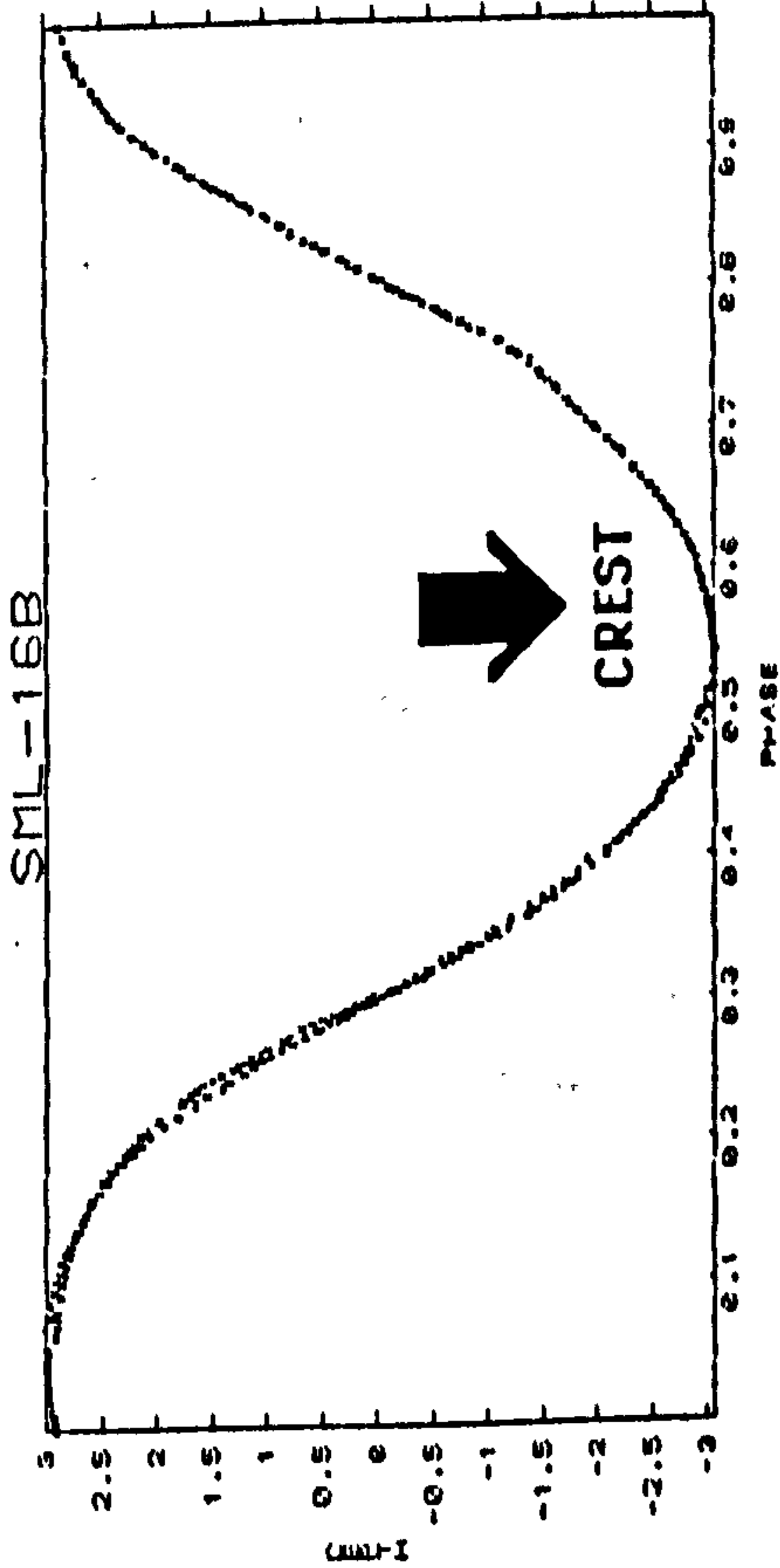
Study Code: SML-16b

Instrument: Screw tap

Maker: Whitworth

Date: ca.1857

Ser./Acq. No. 1857-8



Mu

Filar

Scale

Bench

Div. Eng.

Adjust.

Leveling

Focus

Eye P.

Tube

Tool

Gauge

Binding

Misc.

8-groove tap: 11-5/8"



Characteristics:

Screw

☒

Nut

☐

Leng: 1.85"

/

N/A

Diameter: 0.50"

Steel

☒

Brass

☐

Other:

Instrument Identification:

Study Code:

SML-16d

Instrument:

Screw tap

Maker:

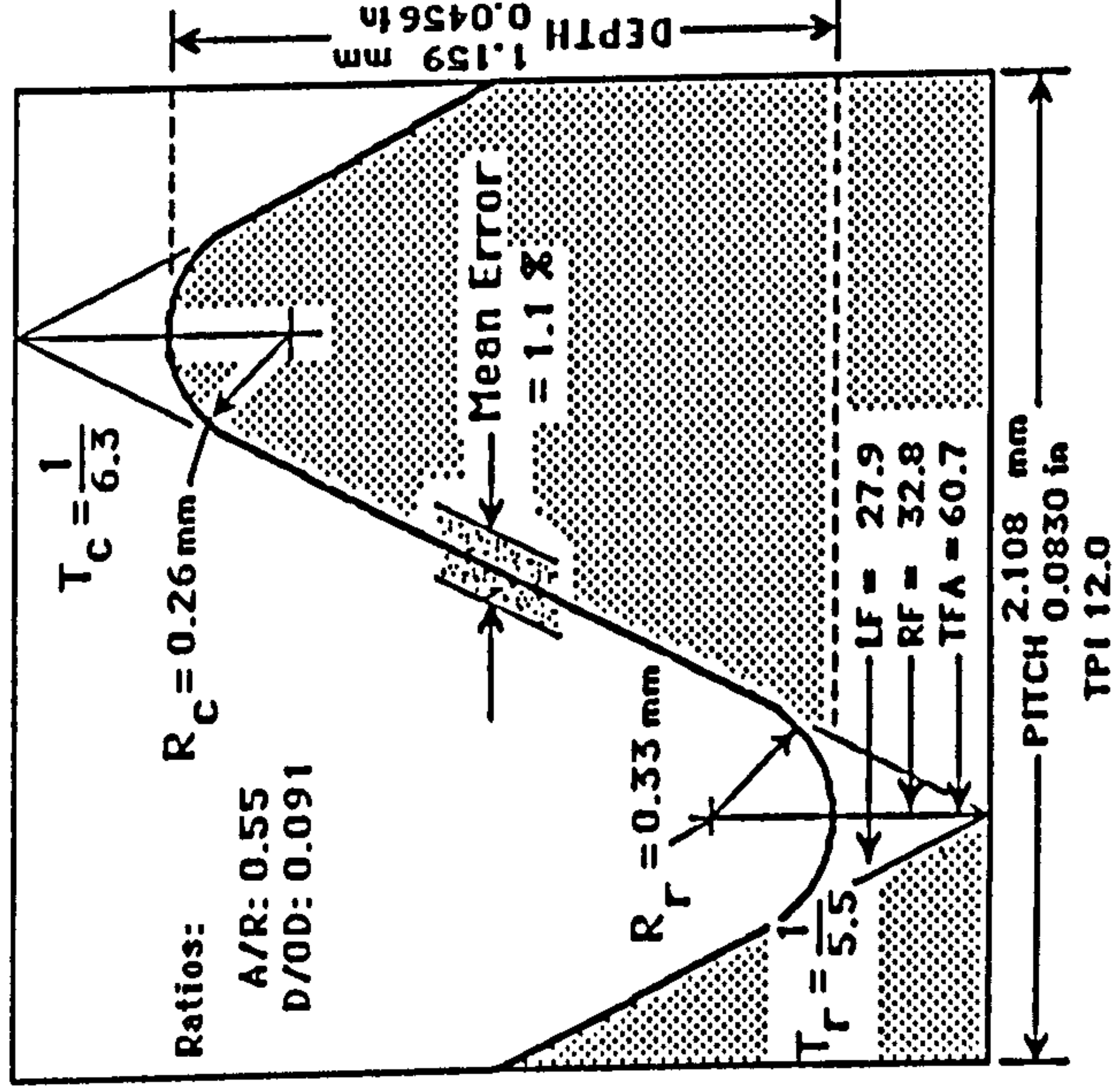
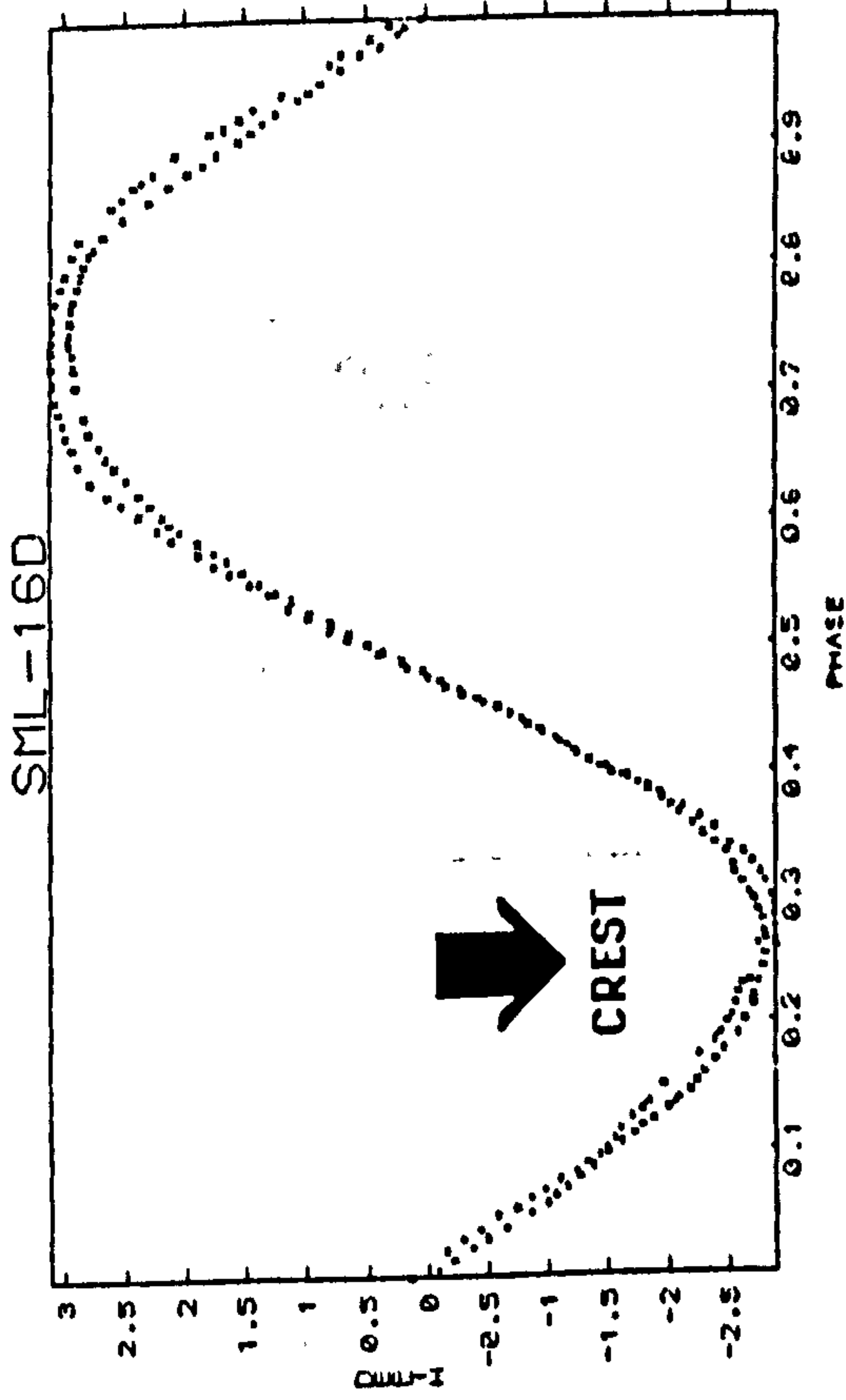
Maudslay

Date:

ca.1857

Ser./Acq. No.

1857-8



Mu

Filar

Scale

Bench

Div. Eng.

Adjust.

Leveling

Focus

Eye P.

Tube

Tool

Gauge

Binding

Misc.

3-groove tap: 12-1/2"



Characteristics:

Screw

Nut

Leng: N/A /

~0.185"

Diameter: 0.094"

nom.

Steel

Brass

Other:

Instrument Identification:

Study Code:

SML-17b

Instrument:

Clamp style die

Maker:

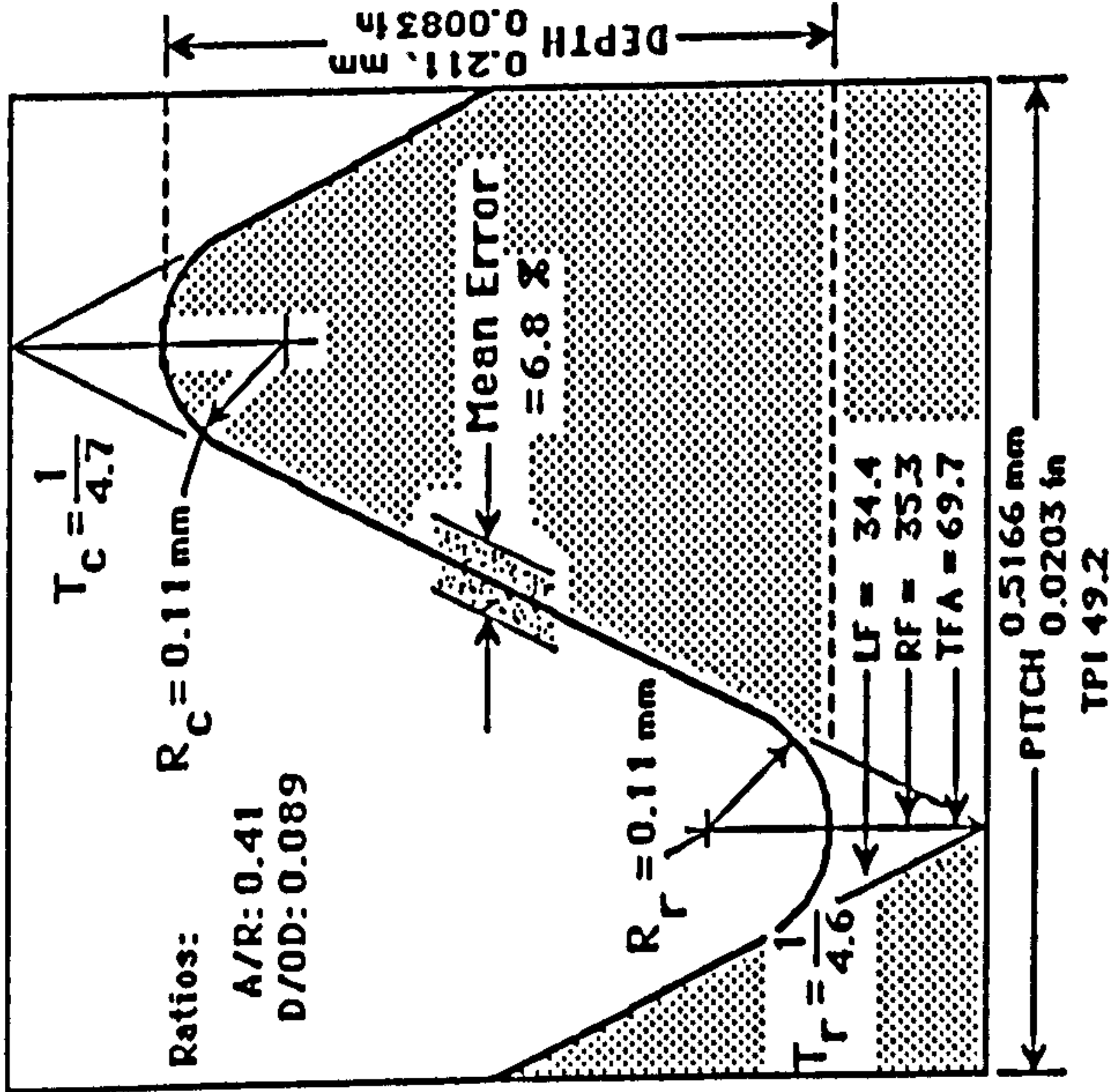
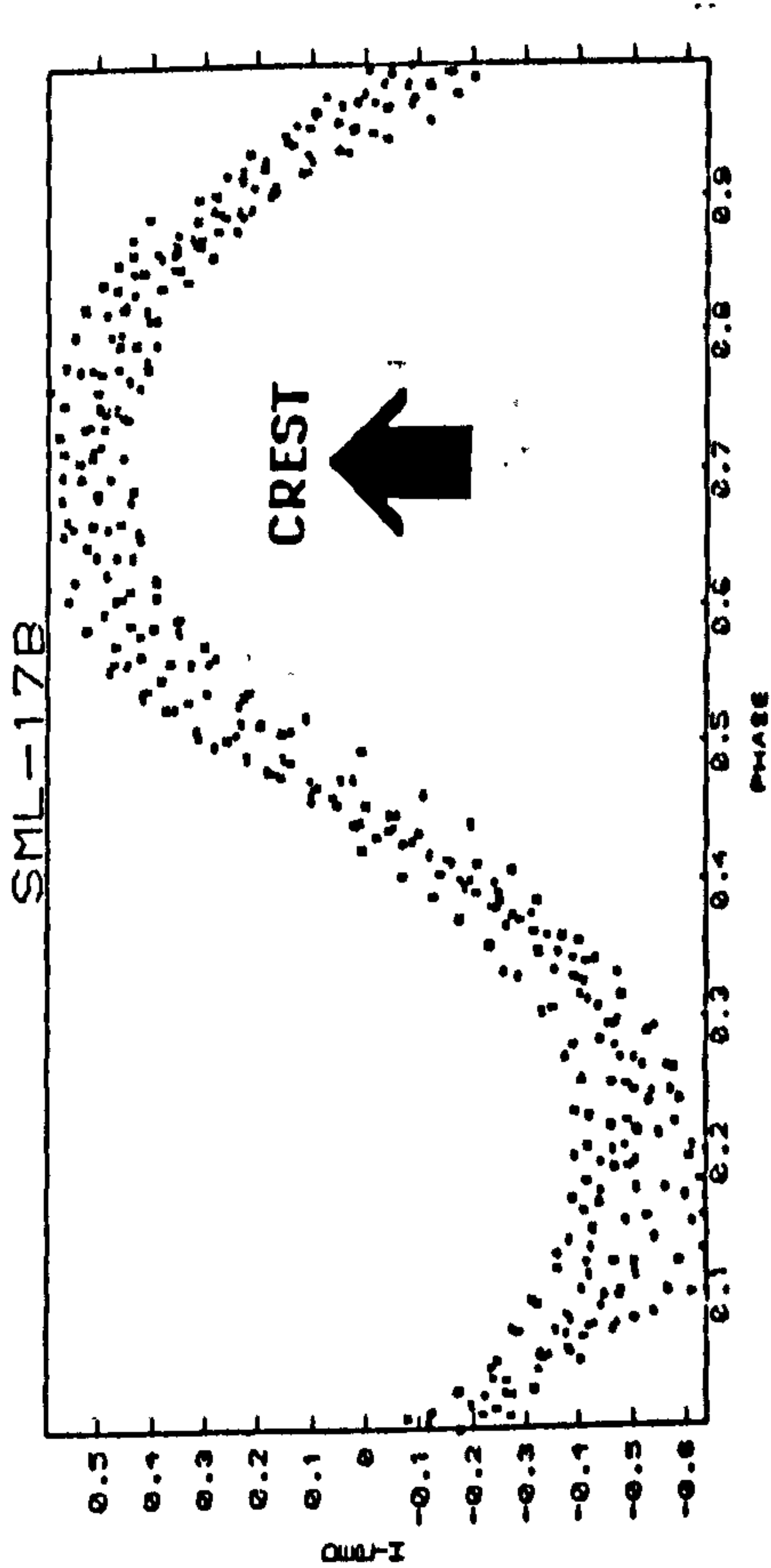
Whitworth

Date:

m 19th c

Ser./Acq. No.

1938-529



Mu	[	Filar	
		Scale	
		Bench	
		Div. Eng.	
		Adjust.	
		Leveling	
		Focus	
		Eye P.	
		Tube	
		Tool	
		Gauge	
		Binding	
		Misc.	

Marked: 48-3/32"

Characteristics:

Screw

☐

Nut

☒

Leng: N/A /  $\approx 0.185"$

Diameter:  $0.125"$  nom.

Steel

☒

Brass

☐

Other:

Instrument Identification:

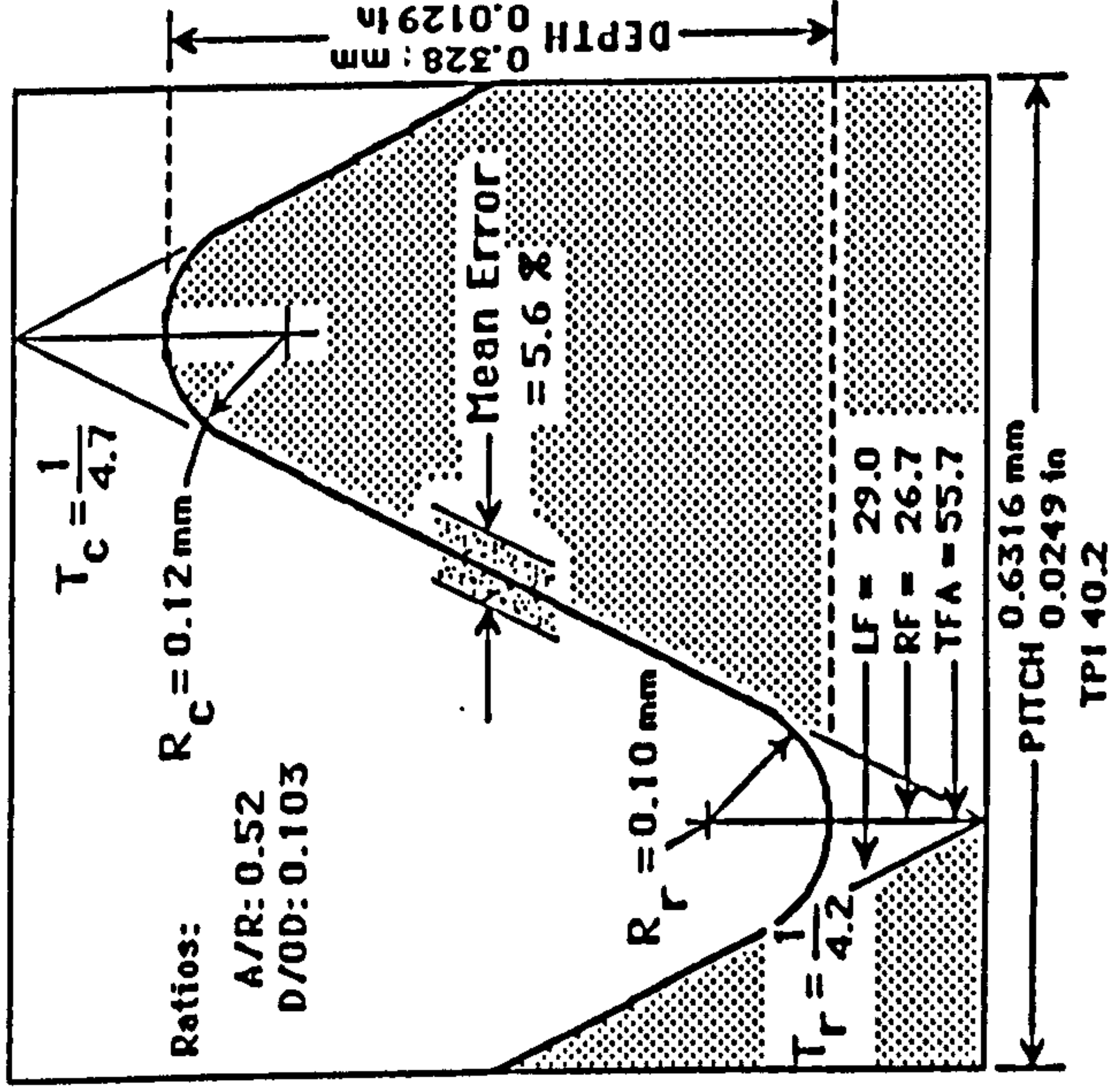
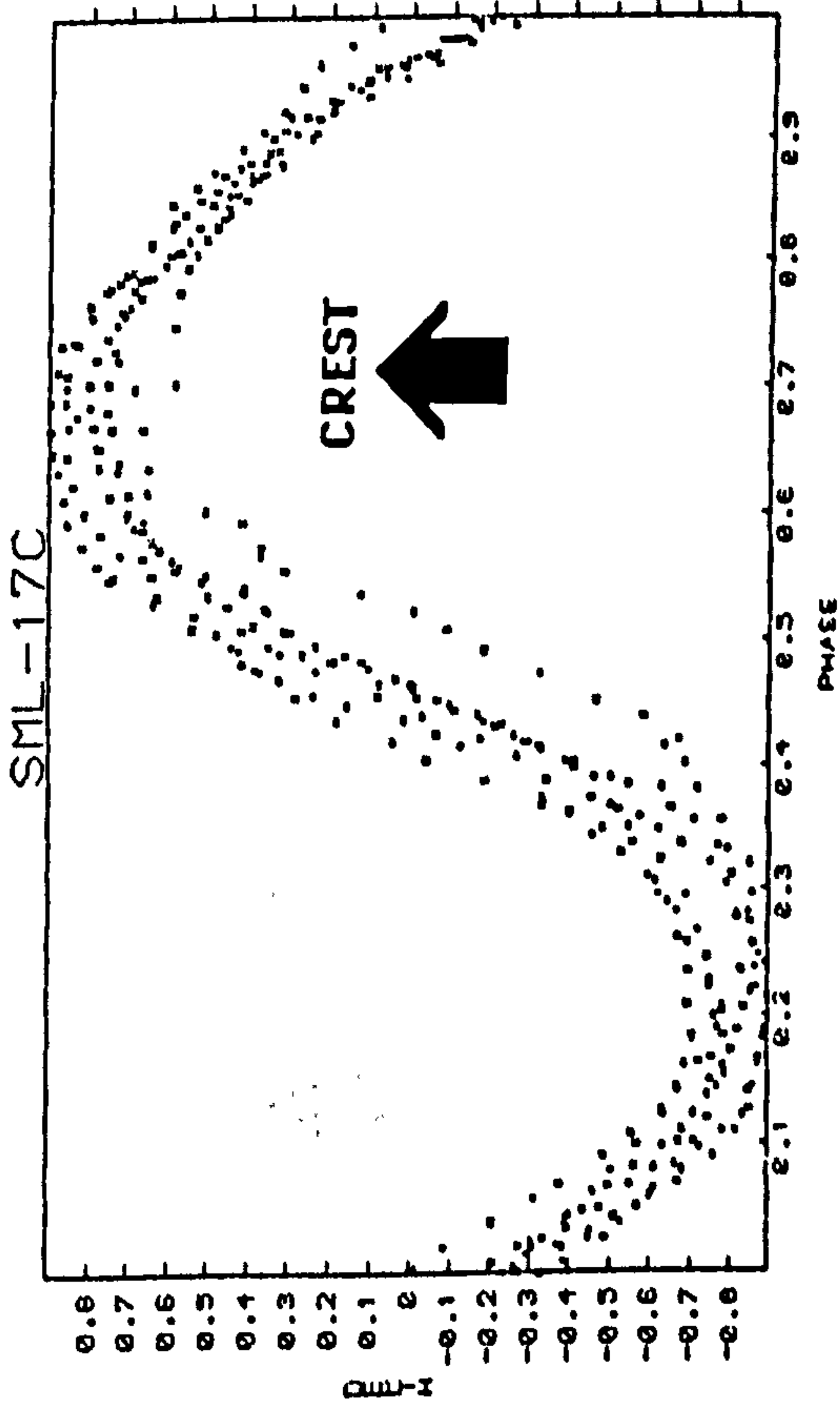
Study Code: SML-17C

Instrument: Clamp style dies

Maker: Whitworth

Date: m 19th c

Ser./Acq. No. 1938-529



Mu

Filar

☐

Scale

☐

Bench

☐

Div. Eng.

☐

Adjust.

☐

Leveling

☐

Focus

☐

Eye P.

☐

Tube

☐

Tool

☒

Gauge

☐

Binding

☐

Misc.

☐

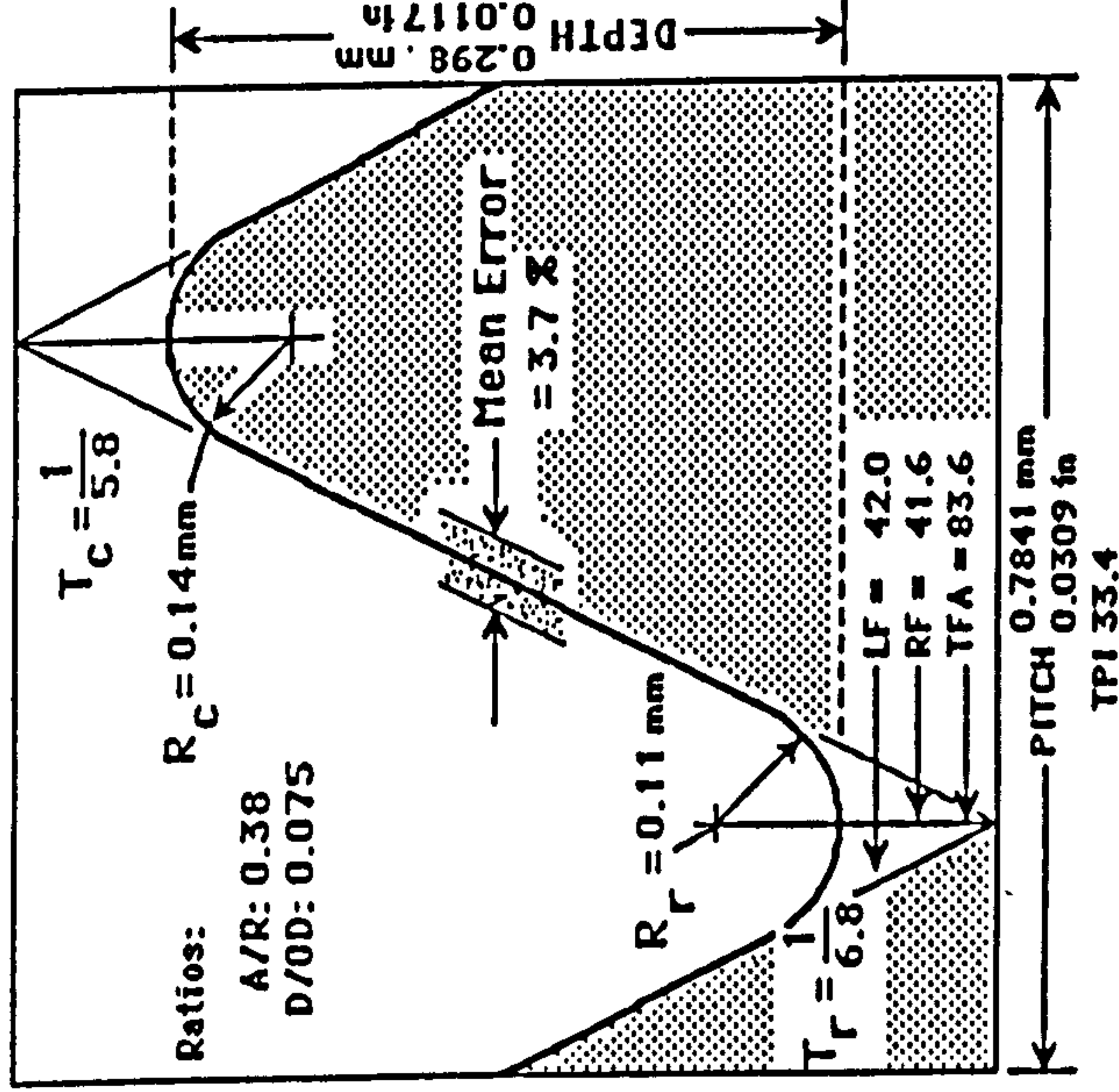
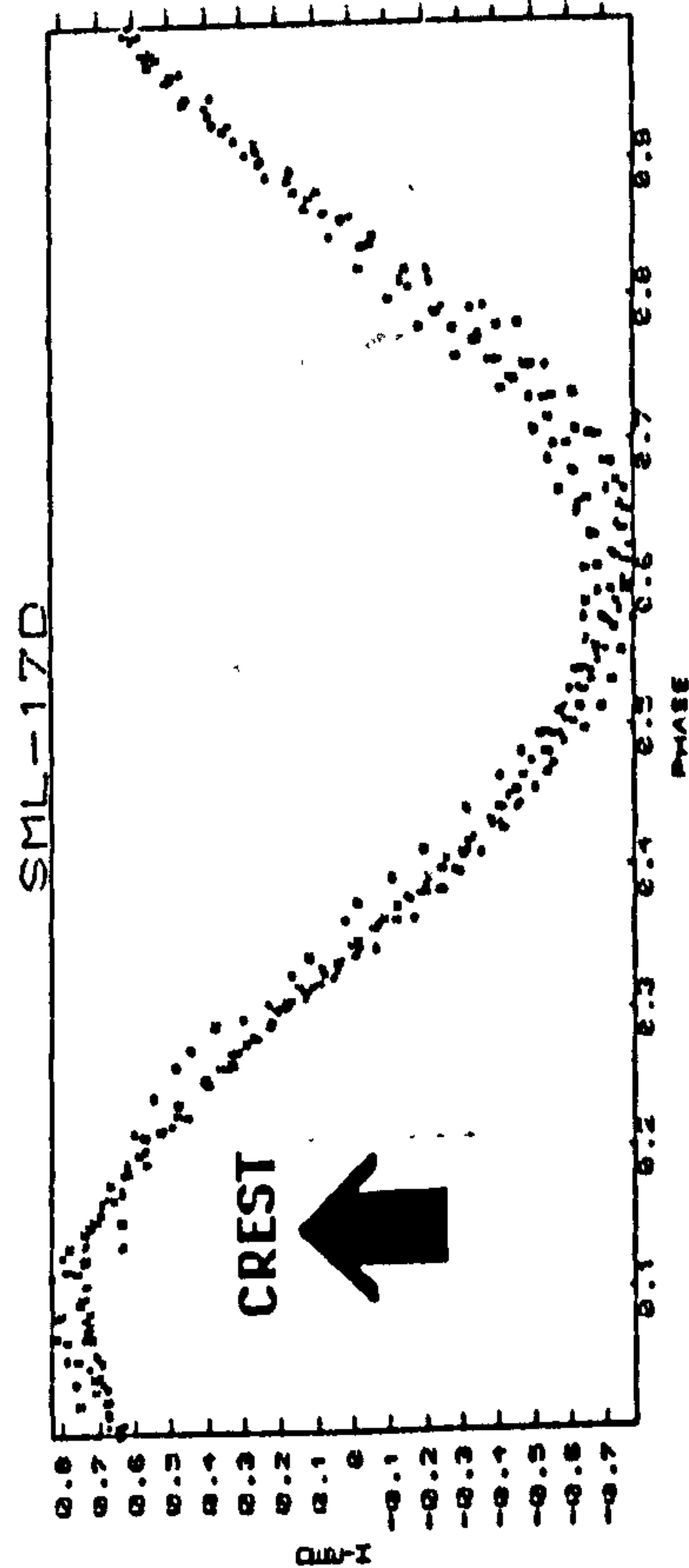
Marked: 40-1/8"

Characteristics:

Screw ☐ Nut ☒  
Leng: N/A / ~0.185"  
Diameter: 0.156" nom.  
Steel ☒ Brass ☐  
Other:

Instrument Identification:

Study Code: SML-17d  
Instrument: Clamp style dies  
Maker: Whitworth  
Date: m 19th c  
Ser./Acq. No. 1938-529



Mu	Filar	
		Scale
Bench	Div. Eng.	
		Adjust.
Leveling	Focus	
		Eye P.
Tube	Tool	
		Gauge
Binding	Misc.	

Marked: 32-5/32"



Characteristics:

Screw

Nut

Leng: N/A / ~0.185"

Diameter: 0.188" nom.

Steel

Brass

Other:

Instrument Identification:

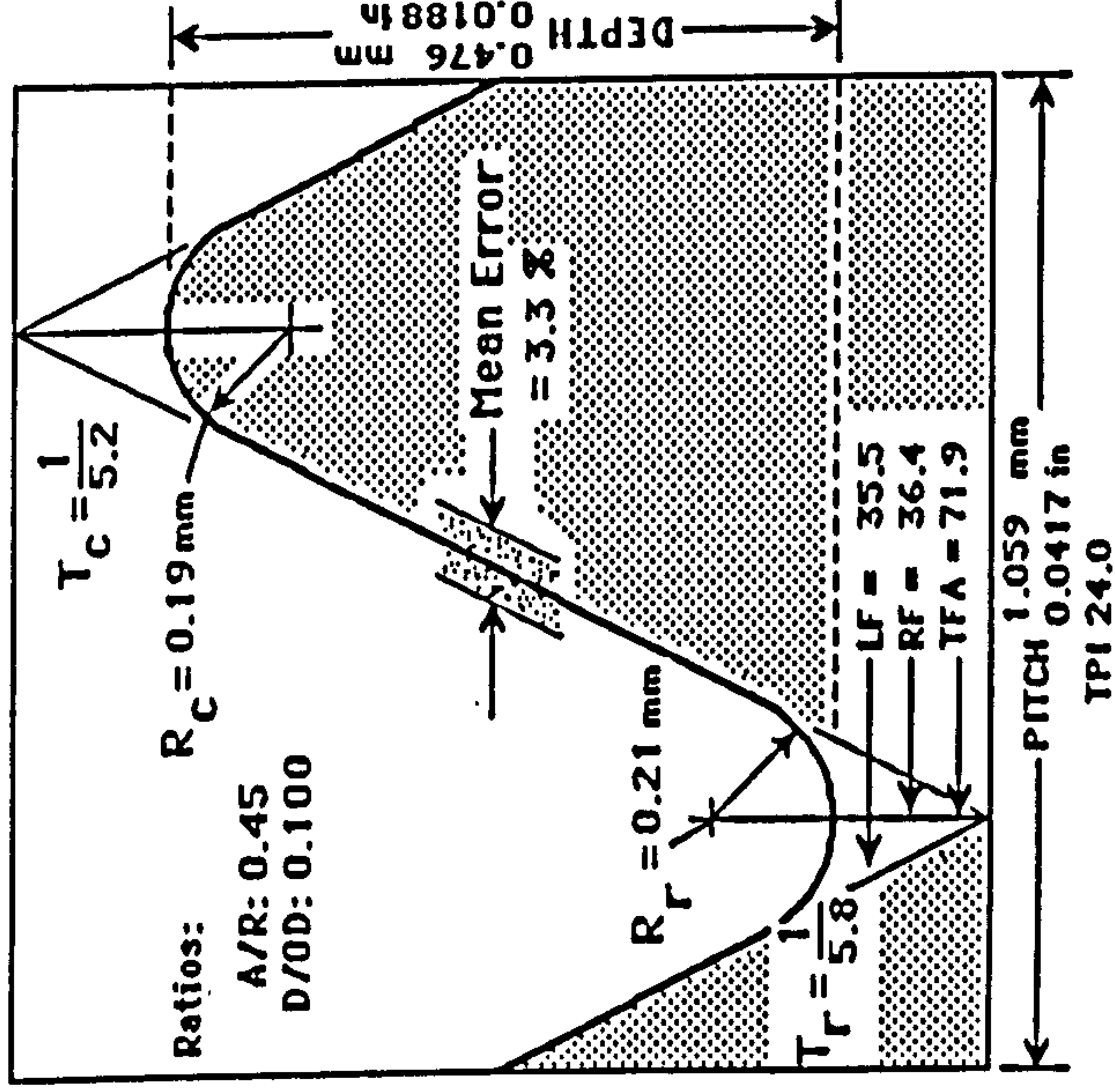
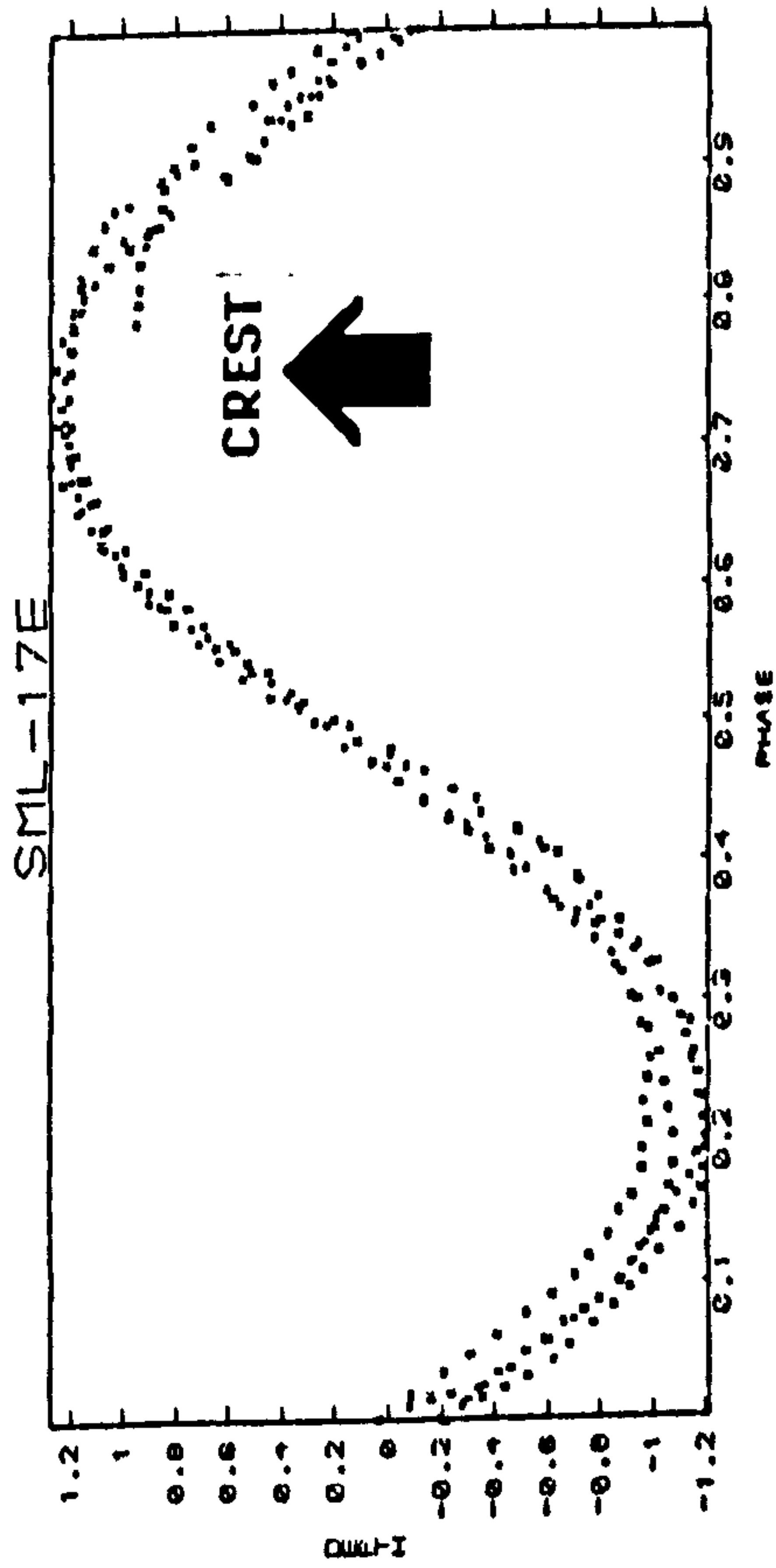
Study Code: SML-17e

Instrument: Clamp style dies

Maker: Whitworth

Date: m 19th c

Ser./Acq. No. 1938-529



MU

Filar

Scale

Bench

Div. Eng.

Adjust.

Leveling

Focus

Eye P.

Tube

Tool

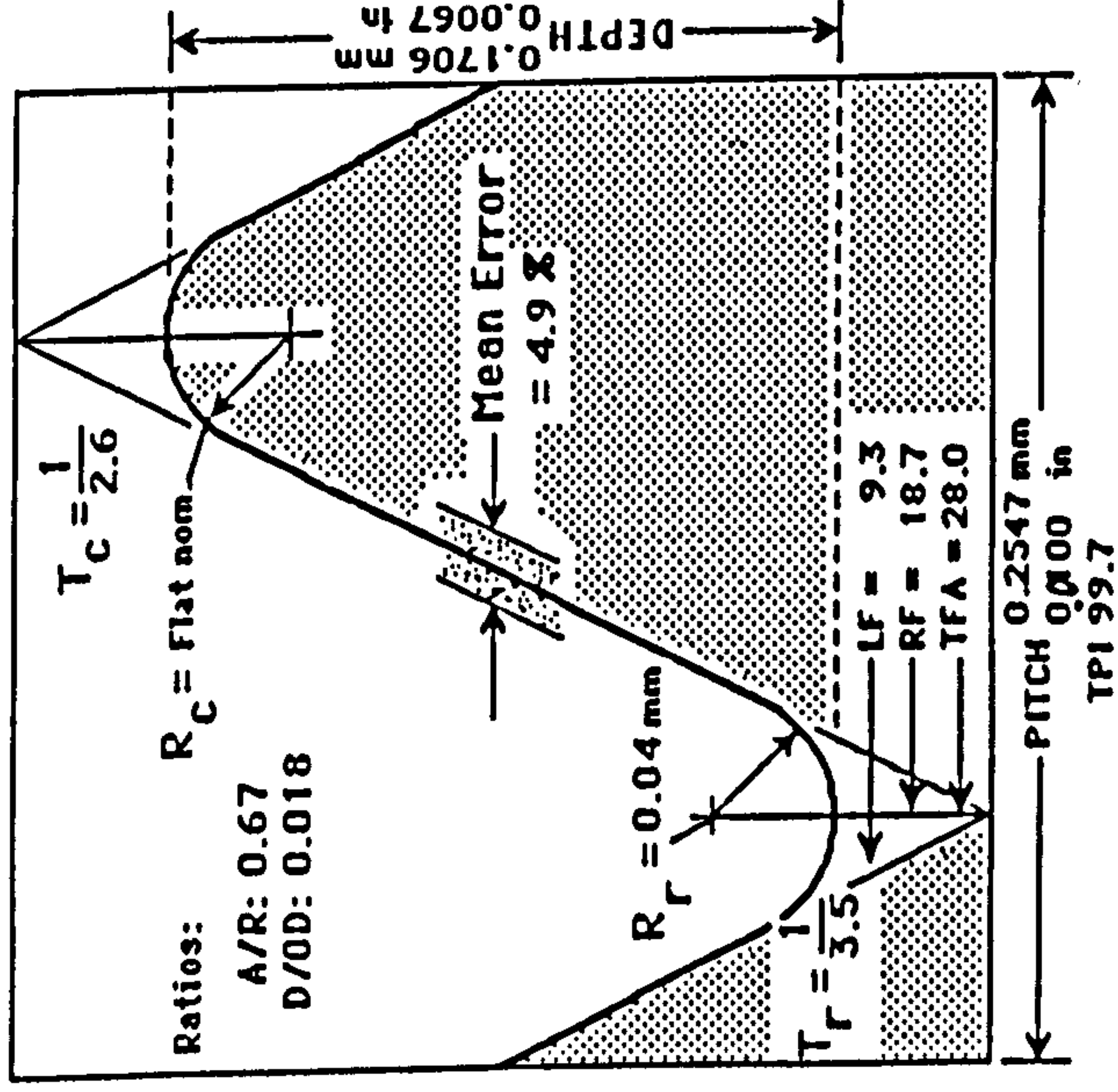
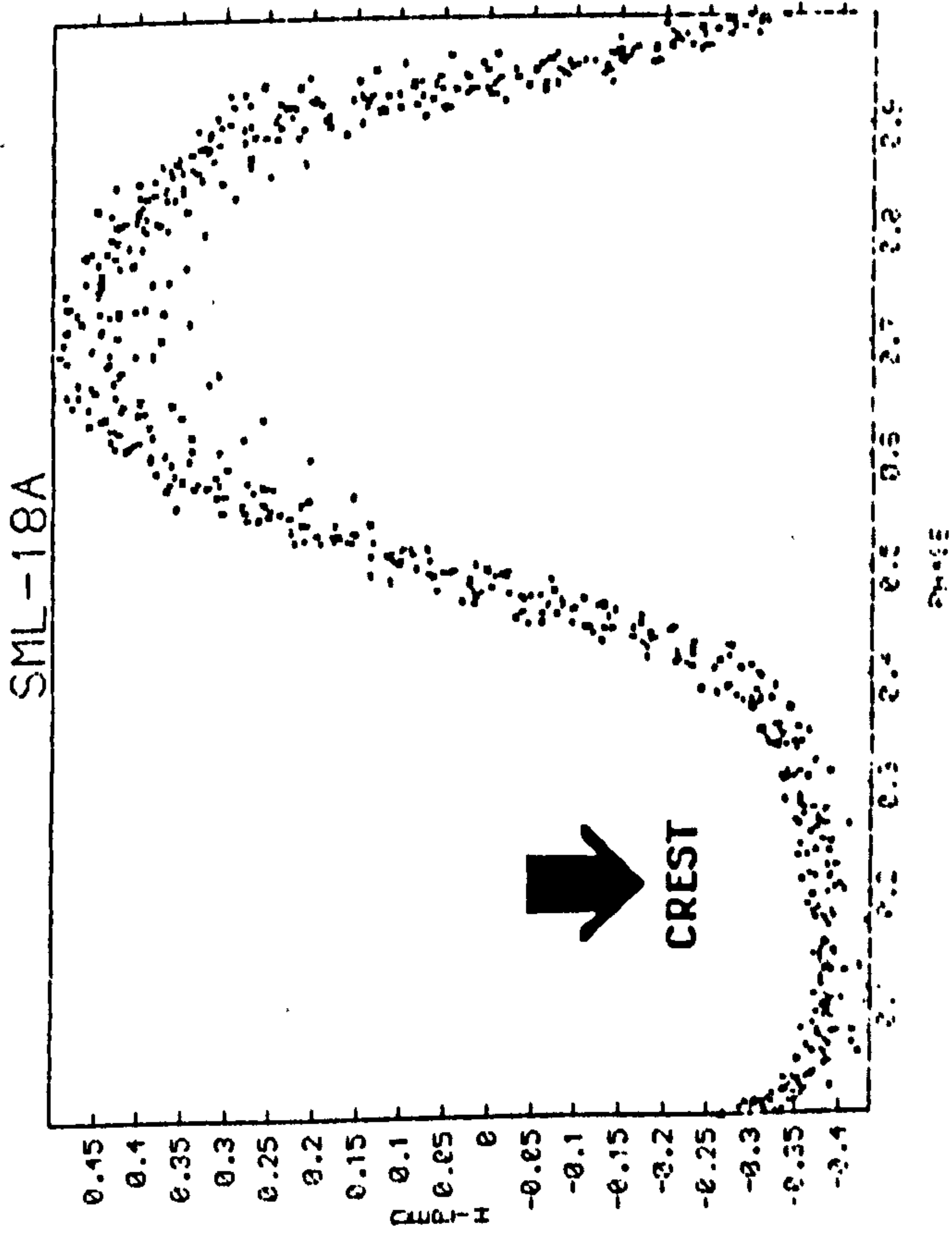
Gauge

Binding

Misc.


Marked: 24-3/16"





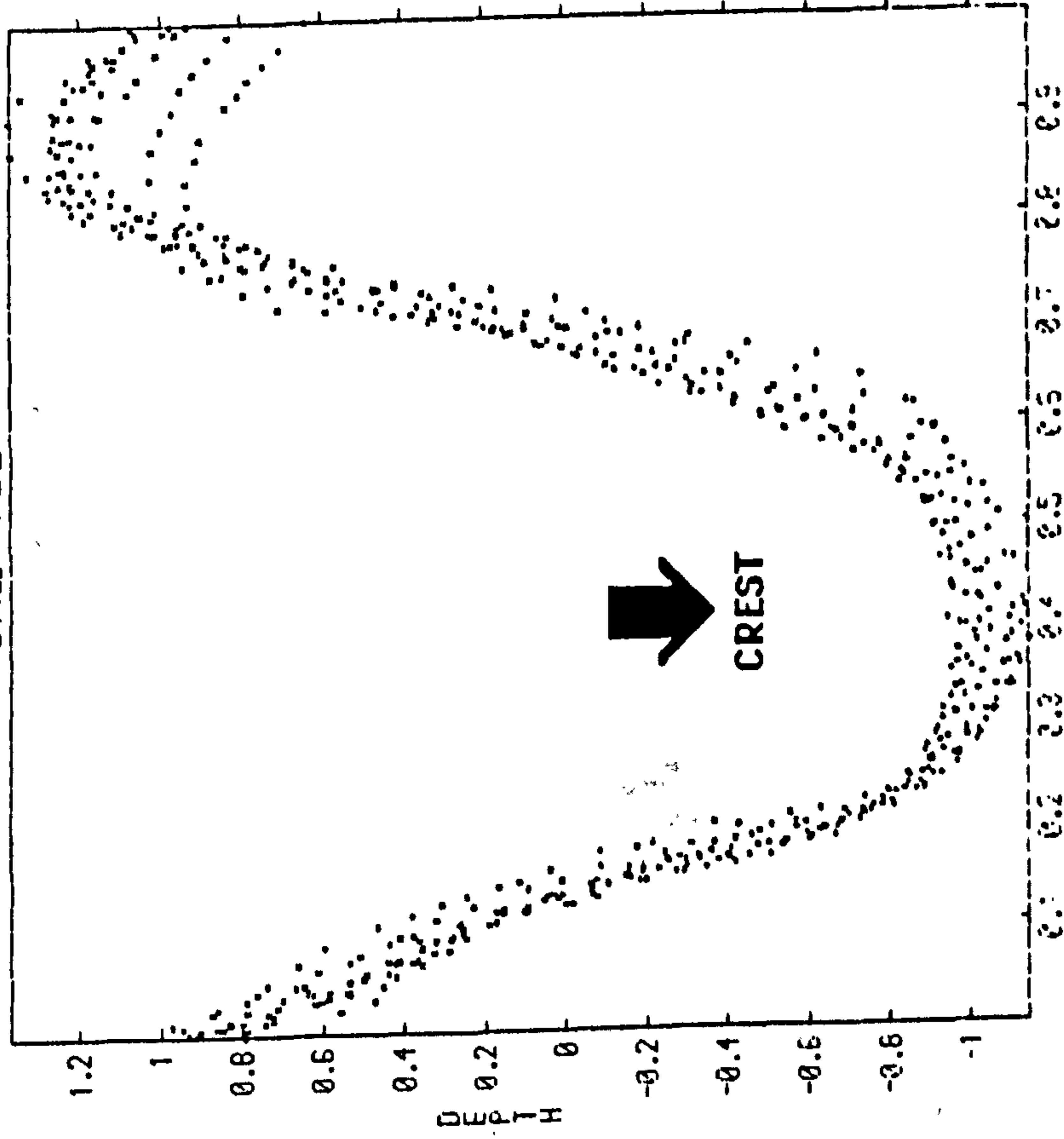
Mu — [	Filar	
	Scale	
	Bench	
	Div. Eng.	
	Adjust.	
	Leveling	
	Focus	
	Eye P.	
	Tube	
	Tool	
Gauge		
Binding		
Misc.		

**Characteristics:**

<b>Screw</b>		<b>Nut</b>	<input type="checkbox"/>
<b>Length: ~8.5" / 0.0958"</b>			
<b>Diameter: 0.375"</b>			
<b>Steel</b>	<input type="checkbox"/>	<b>Brass</b>	<input type="checkbox"/>
<b>Other: Copper</b>			

Instrument Identification:	
Study Code:	SML-18a
Instrument:	Instrument lathe
Maker:	Maudslay
Date:	1800
Ser./Acq. No.	1900-19

SML-18B



Characteristics:

Screw ☒ Nut ☐

Leng: ~8.45" / 0.958"

Diameter: 0.375"

Steel ☐ Brass ☒

Other:

Instrument Identification:

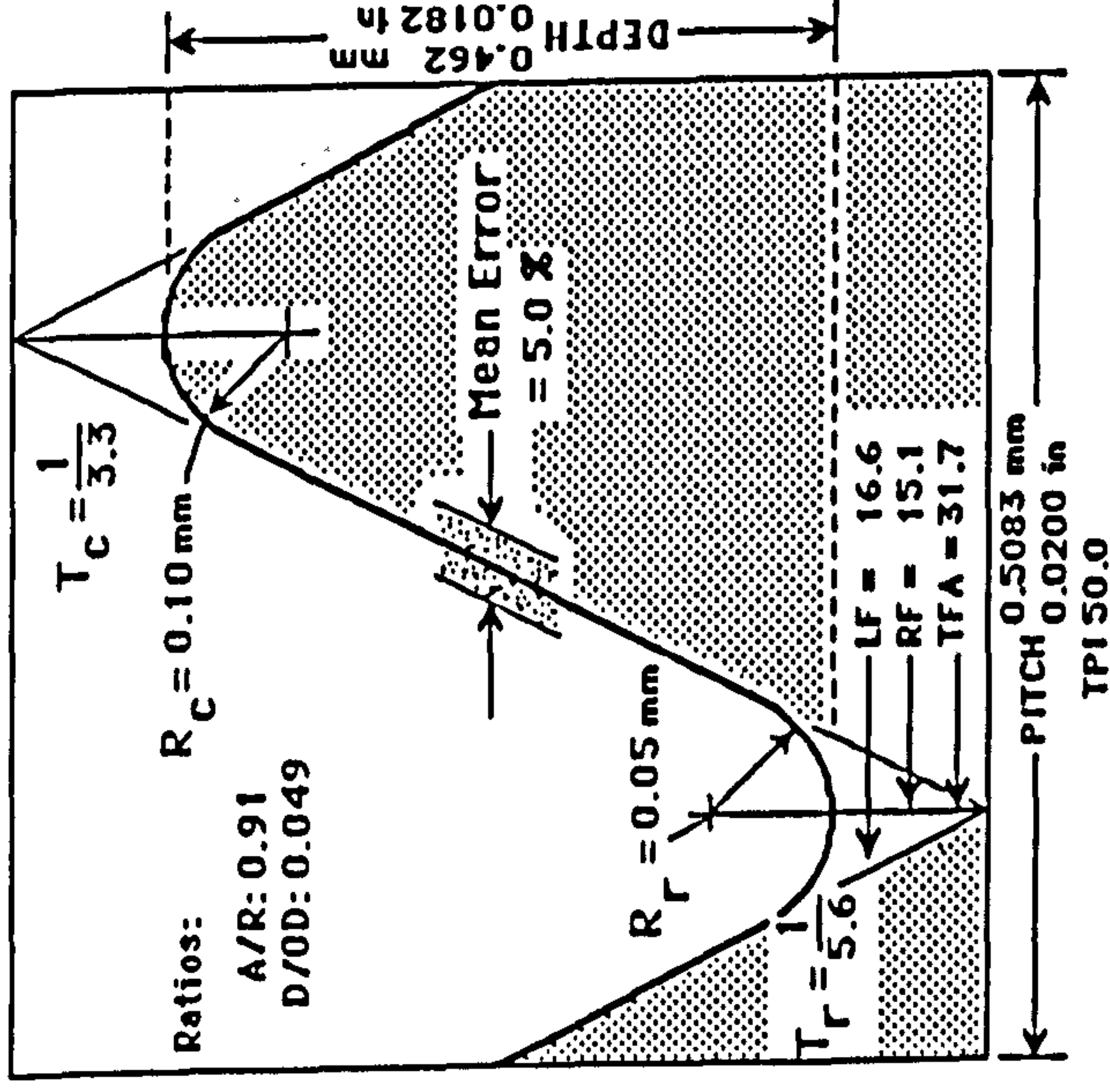
Study Code: SML-18b

Instrument: Instrument lathe

Maker: Maudslay

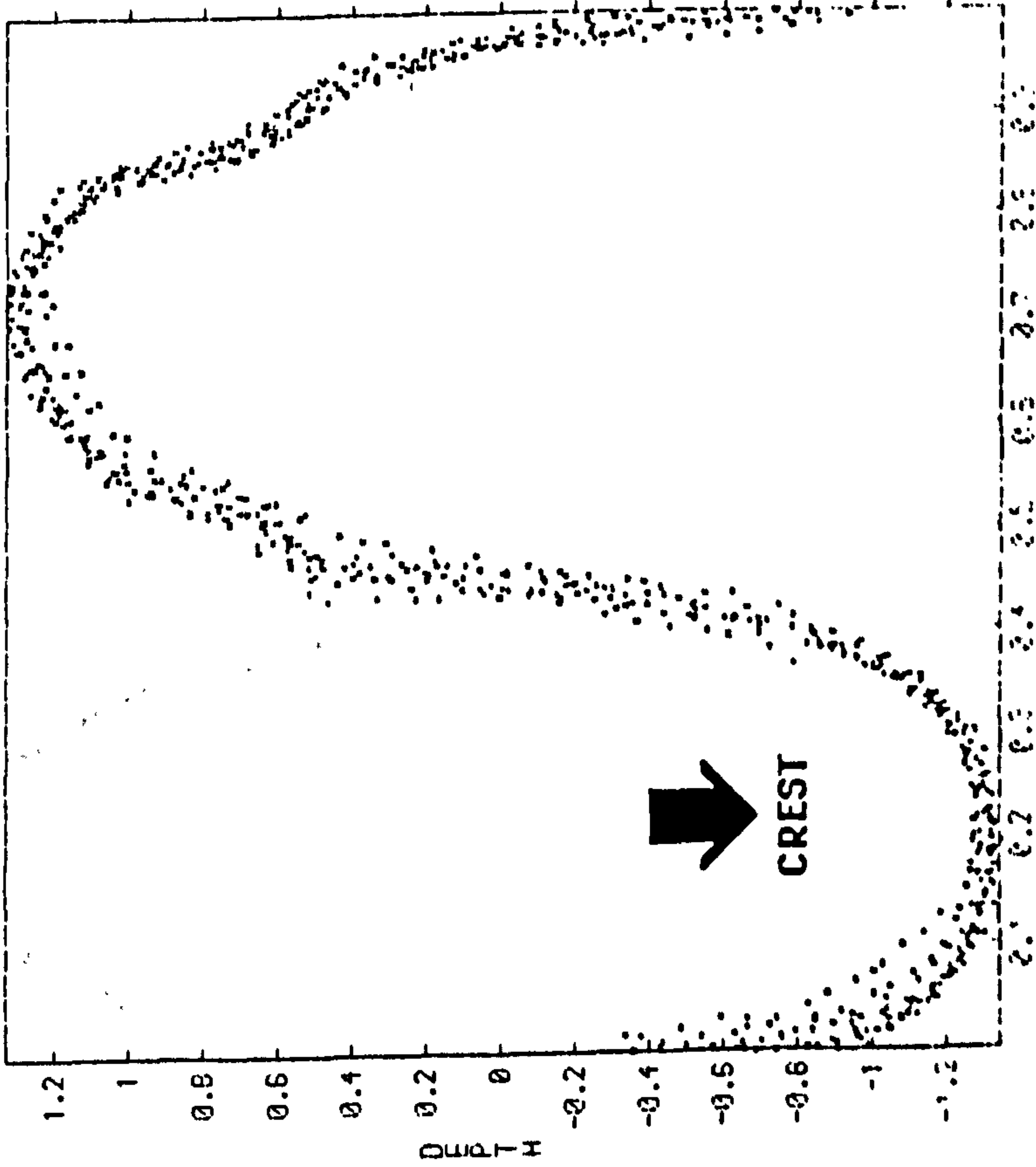
Date: 1800

Ser./Acq. No. 1900-19



Mu — [ Filar Scale Bench Div. Eng. Adjust. Leveling Focus Eye P. Tube Tool Gauge Binding Misc. ]

SML-18C



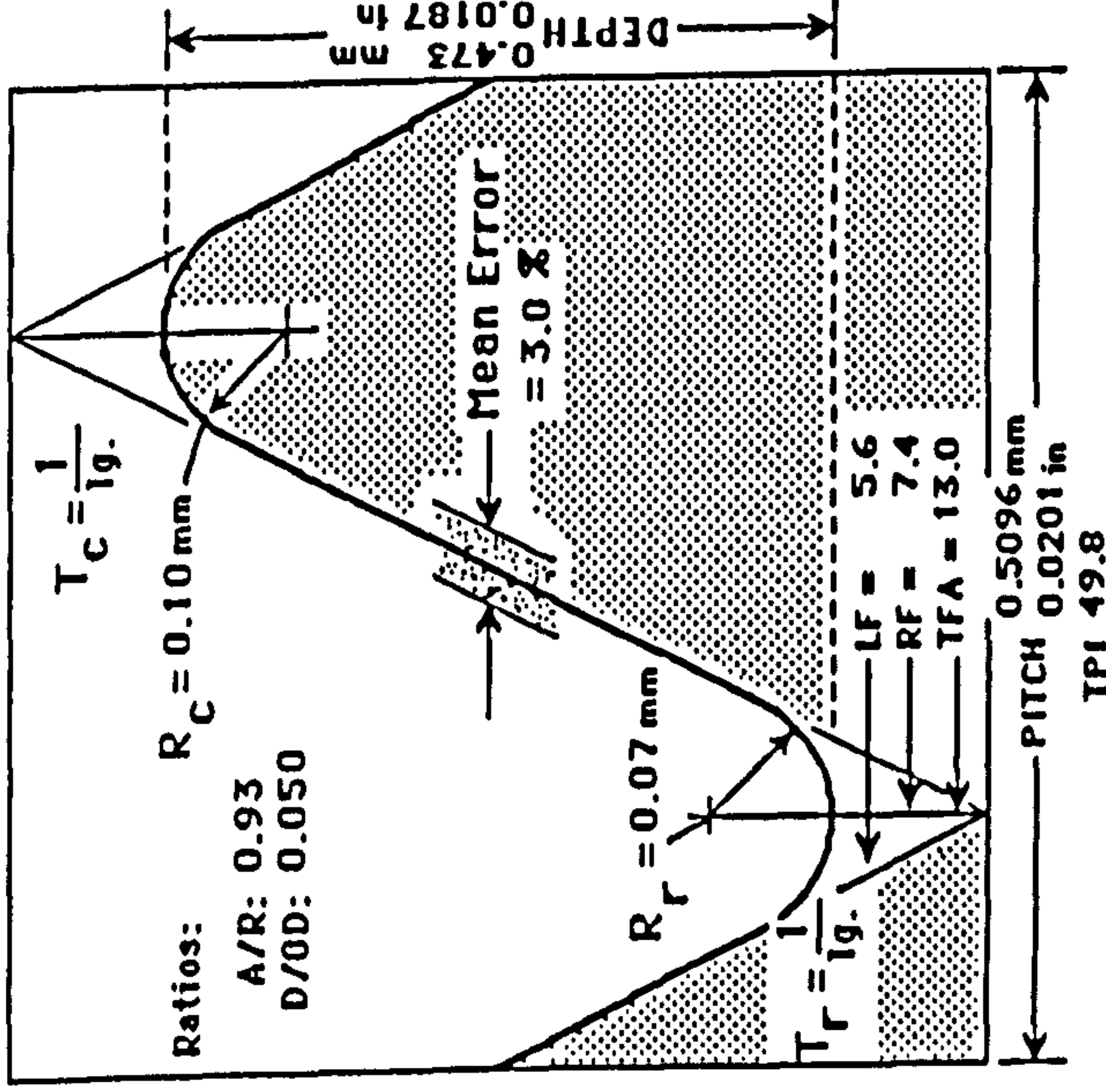
PAGE

Characteristics:

Screw ☒ Nut ☐  
Leng: ~8.5" / 0.958"  
Diameter: 0.375"  
Steel ☐ Brass ☒  
Other:

Instrument Identification:

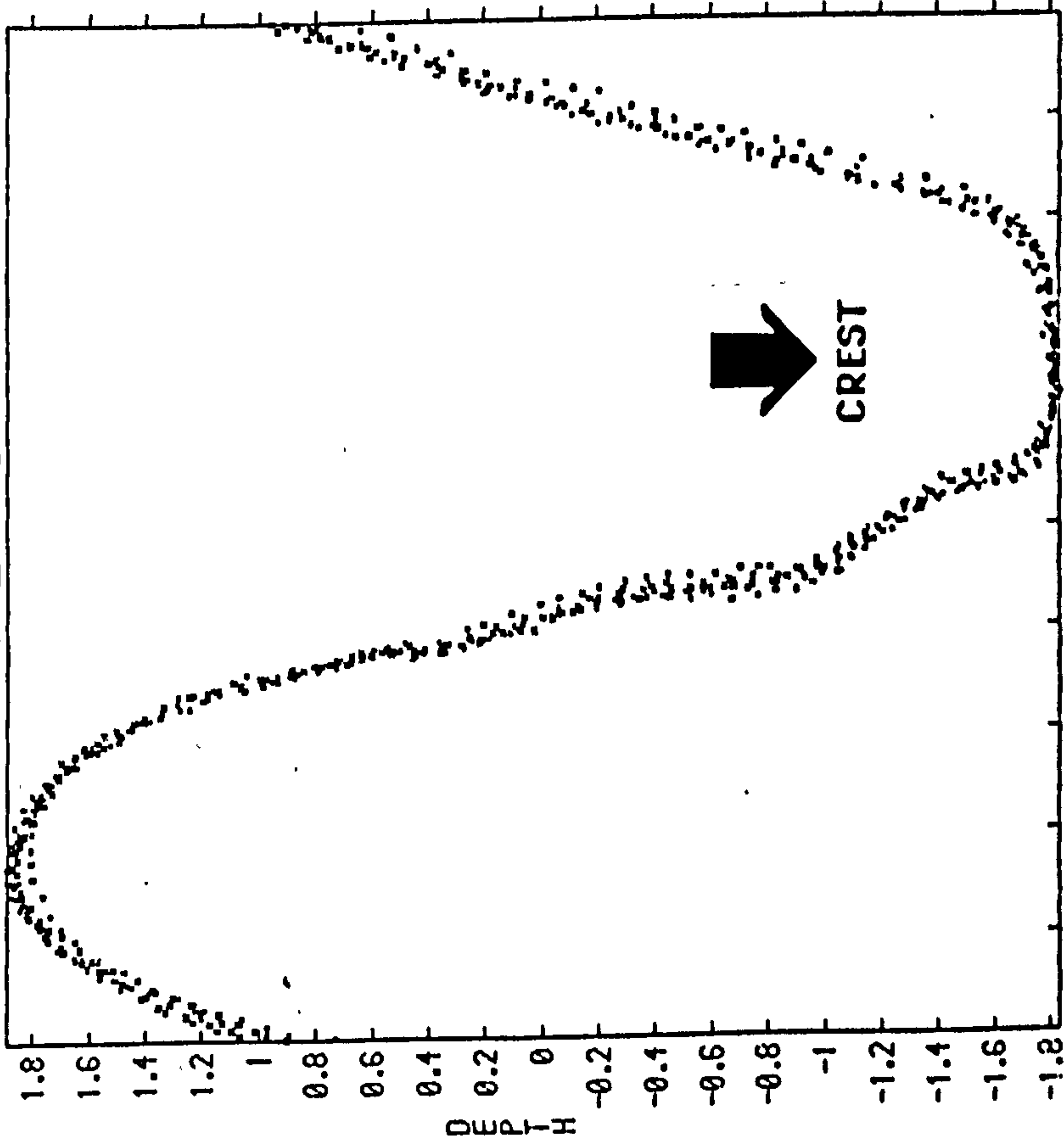
Study Code: SML-18C  
Instrument: Instrument lathe  
Maker: Maudslay  
Date: 1800  
Ser./Acq. No. 1900-19



Mu — [ Filar Scale Bench Div. Eng. Adjust. Leveling Focus Eye P. Tube Tool Gauge Binding Misc.



SML-180



Characteristics:

Screw ☒ Nut ☐

Leng:  $\approx 8.5"$  / 0.958"

Diameter: 0.375"

Steel ☐ Brass ☐

Other: Copper

Instrument Identification:

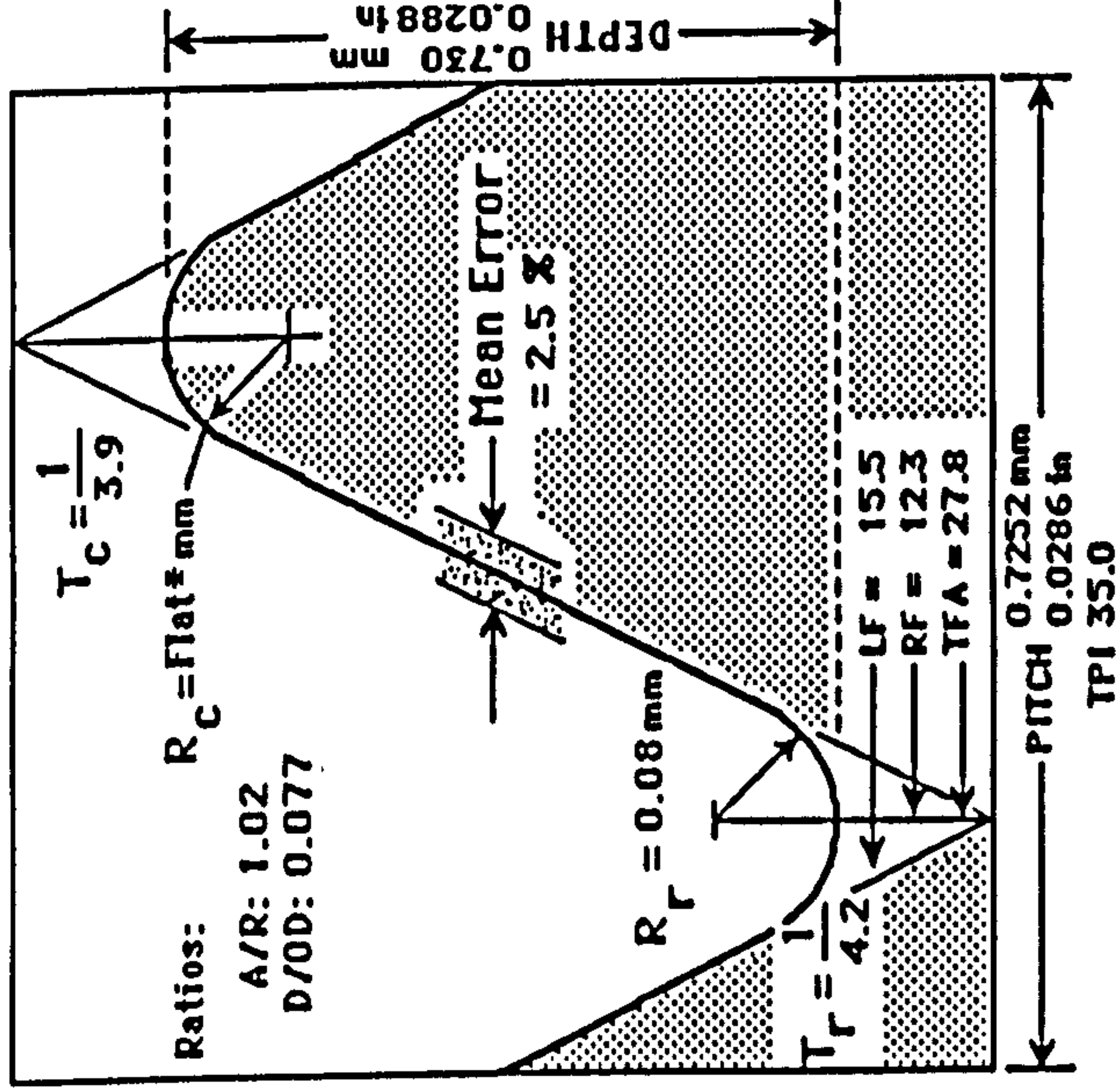
Study Code: SML-18d

Instrument: Screw lathe

Maker: Henry Maudslay

Date: 1800

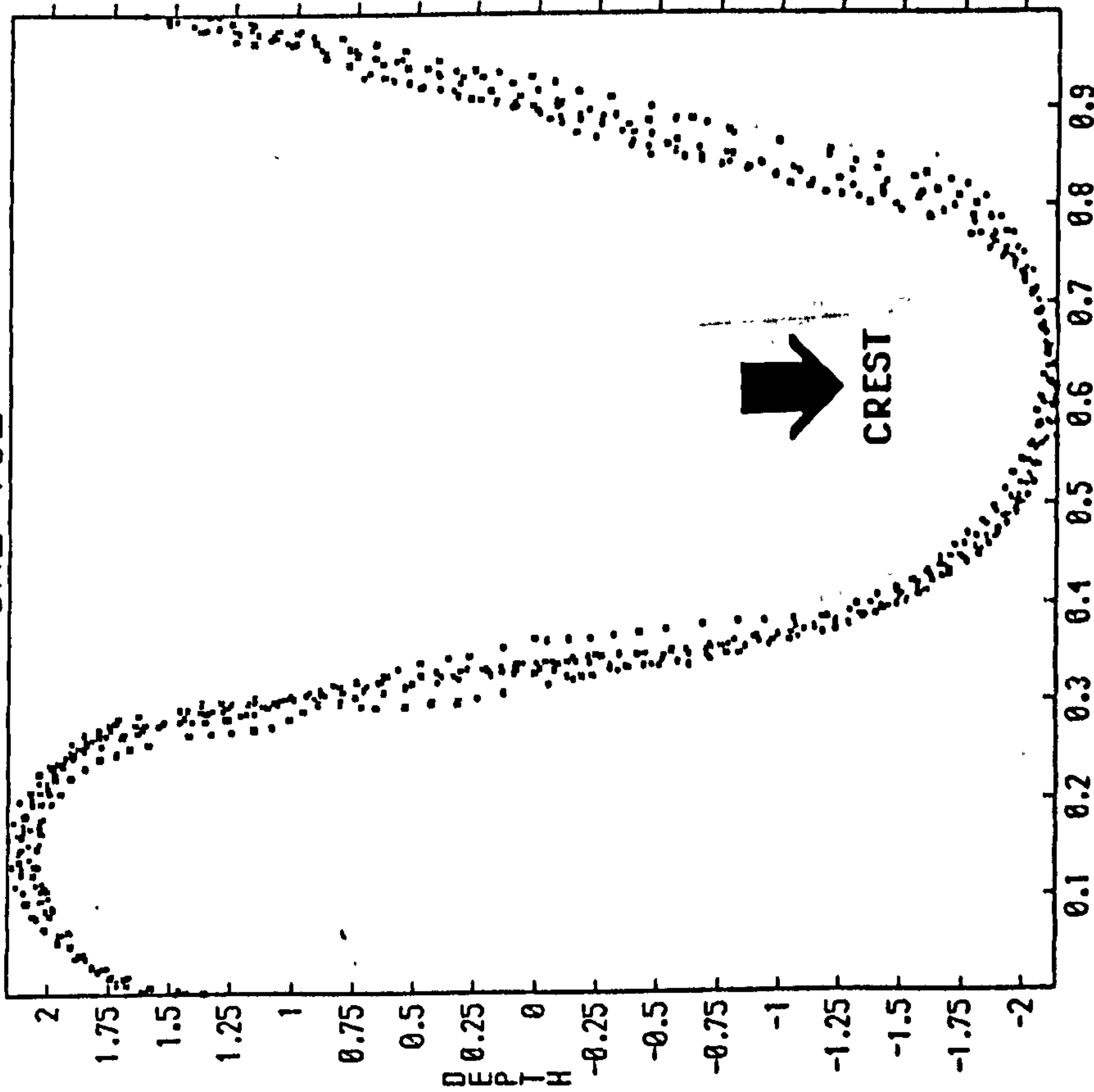
Ser./Acq. No. 1900-19



MU	[	Filar
		Scale
[	]	Bench
		Div. Eng.
[	]	Adjust.
		Leveling
[	]	Focus
		Eye P.
[	]	Tube
		Tool
[	]	Gauge
		Binding
[	]	Misc.



SML-18E



**Characteristics:**

Screw ☒ Nut ☐

Leng: ~8.5" / 0.958"

Diameter: 0.375"

Steel ☐ Brass ☐

Other: Copper

**Instrument Identification:**

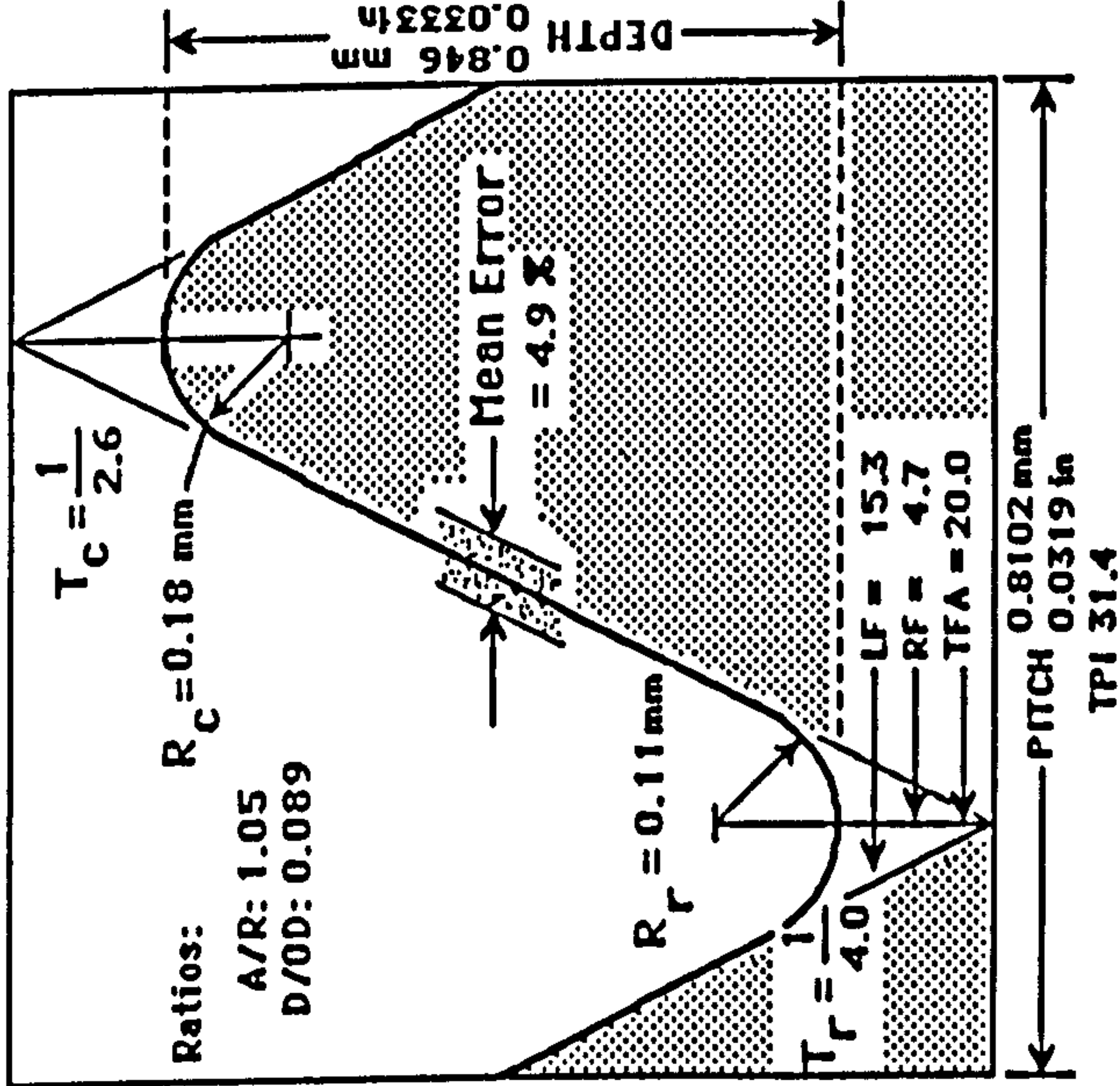
Study Code: SML-18e

Instrument: Screw lathe

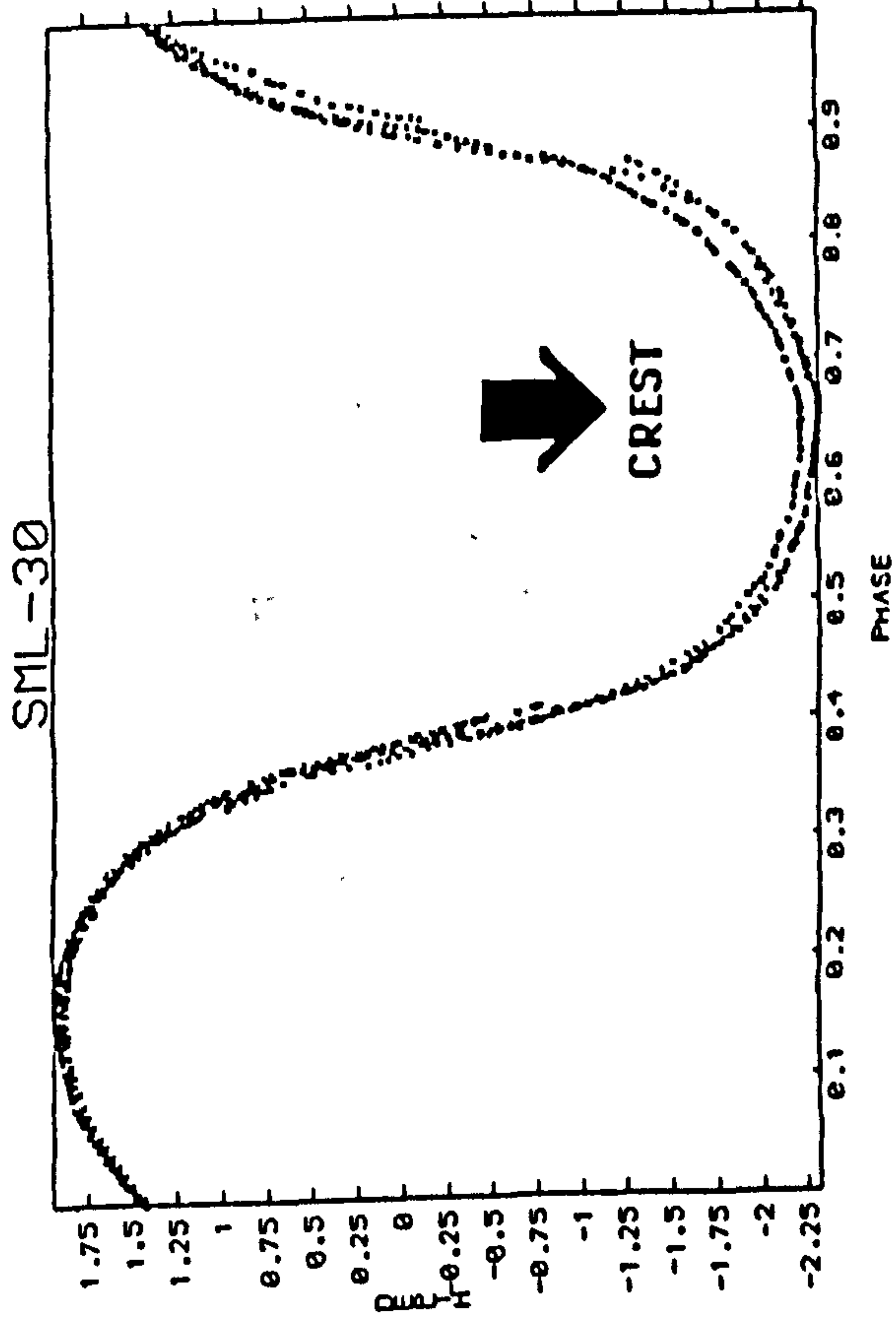
Maker: Henry Madsaly

Date: 1800

Ser./Acq. No. 1900-19



Mu — [ Filar Scale Bench Div. Eng. Adjust. Leveling Focus Eye P. Tube Tool Gauge Binding Misc. ]



### Characteristics:

**Screw**  **Nut** 

Leng: ~2.0" / 0.813"

Diameter: 0.3329"

### Instrument Identification:

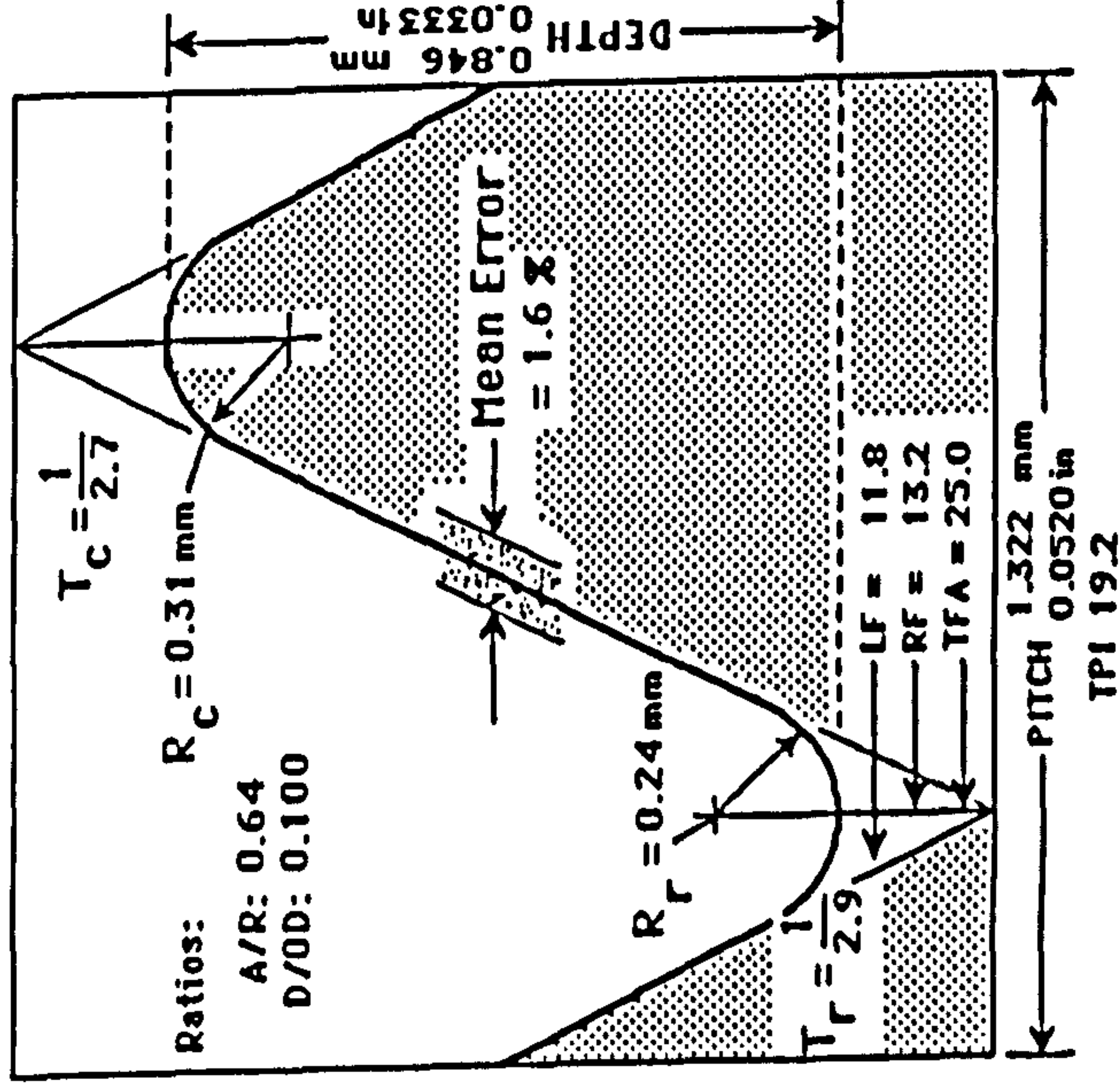
**Study Code: SML-30**

**Instrument:** Fusee Engine

**Maker:** not signed

Date: 2nd h 18th c

**Ser./Acq. No. 1963-20**



## Filar

**Mu — scale**

## Bench

Div. Eng.

**Adjust.**

## Leveling

## Focus

पू

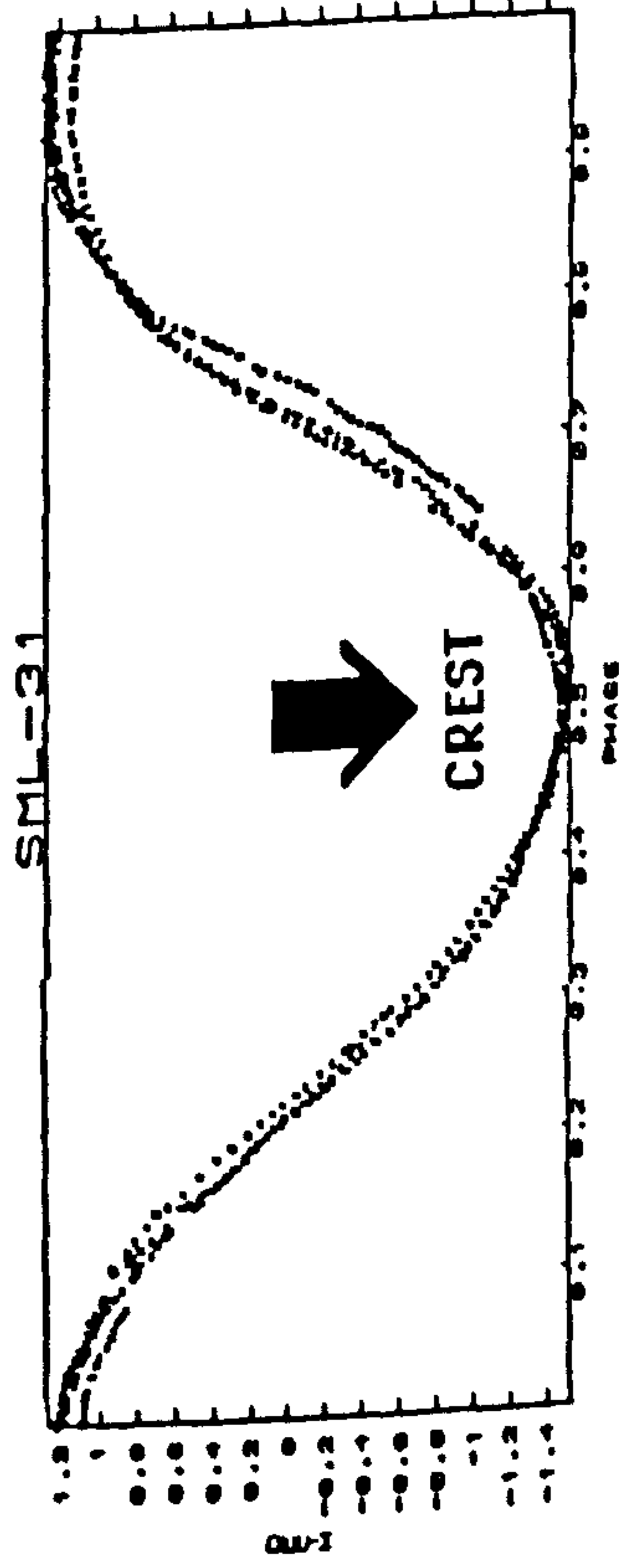
## Tube

# Tool

## Gauge

## Binding

## Misc



### Characteristics:

**Screw**  **Nut** 

**Leng: 2.375" / 0.75"**

**Diameter: 0.3025"**

**Steel**  **Brass** 

**Other:**

**Instrument Identification:**

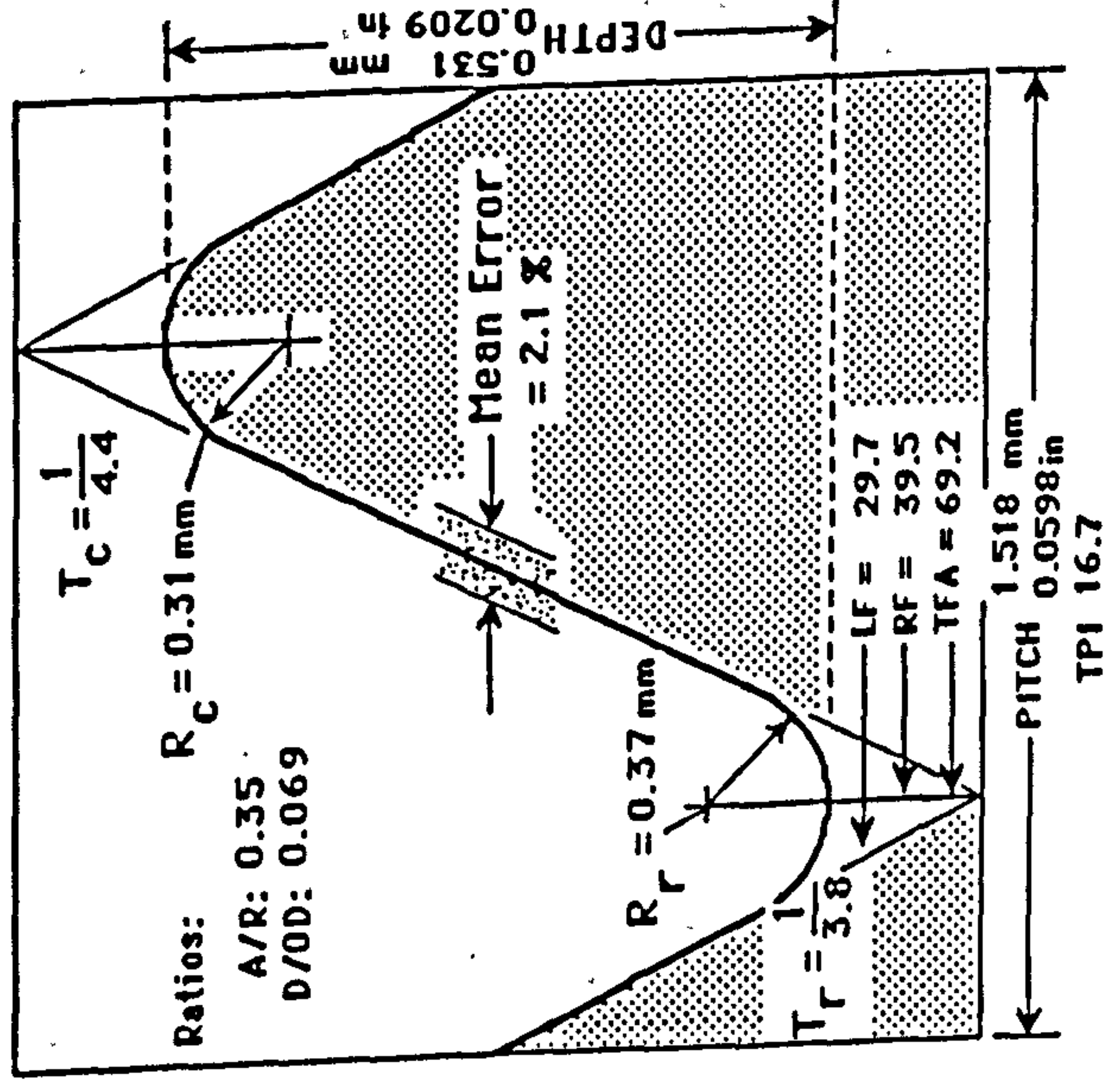
Study Code: SML-31

**Instrument:** Fusee engine

**Maker:** Not signed

Date: ca.1800

**Ser./Acq. No. 1938-15**



**Filar**

## Scale

## Bench

Div. Eng.

**Adjust.**

## Leveling

## Focus

**Eye P.**

**Tube**

## Tool

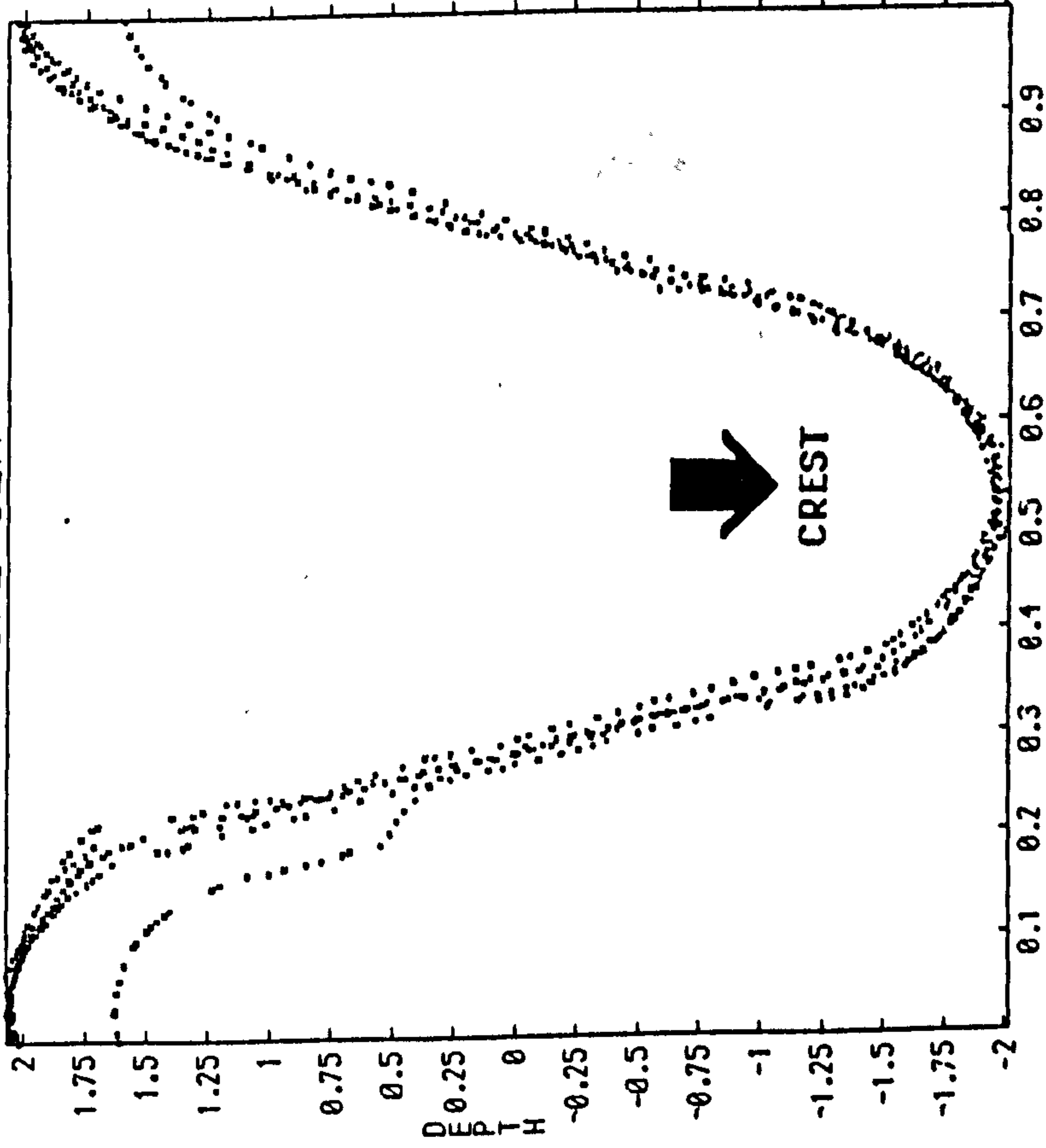
## Gauge

## Binding

531



SML-32A



Characteristics:

Screw ☒ Nut ☐

Leng: 0.875" / 0.406"

Diameter: 0.3166"

Steel ☒ Brass ☐

Other:

Instrument Identification:

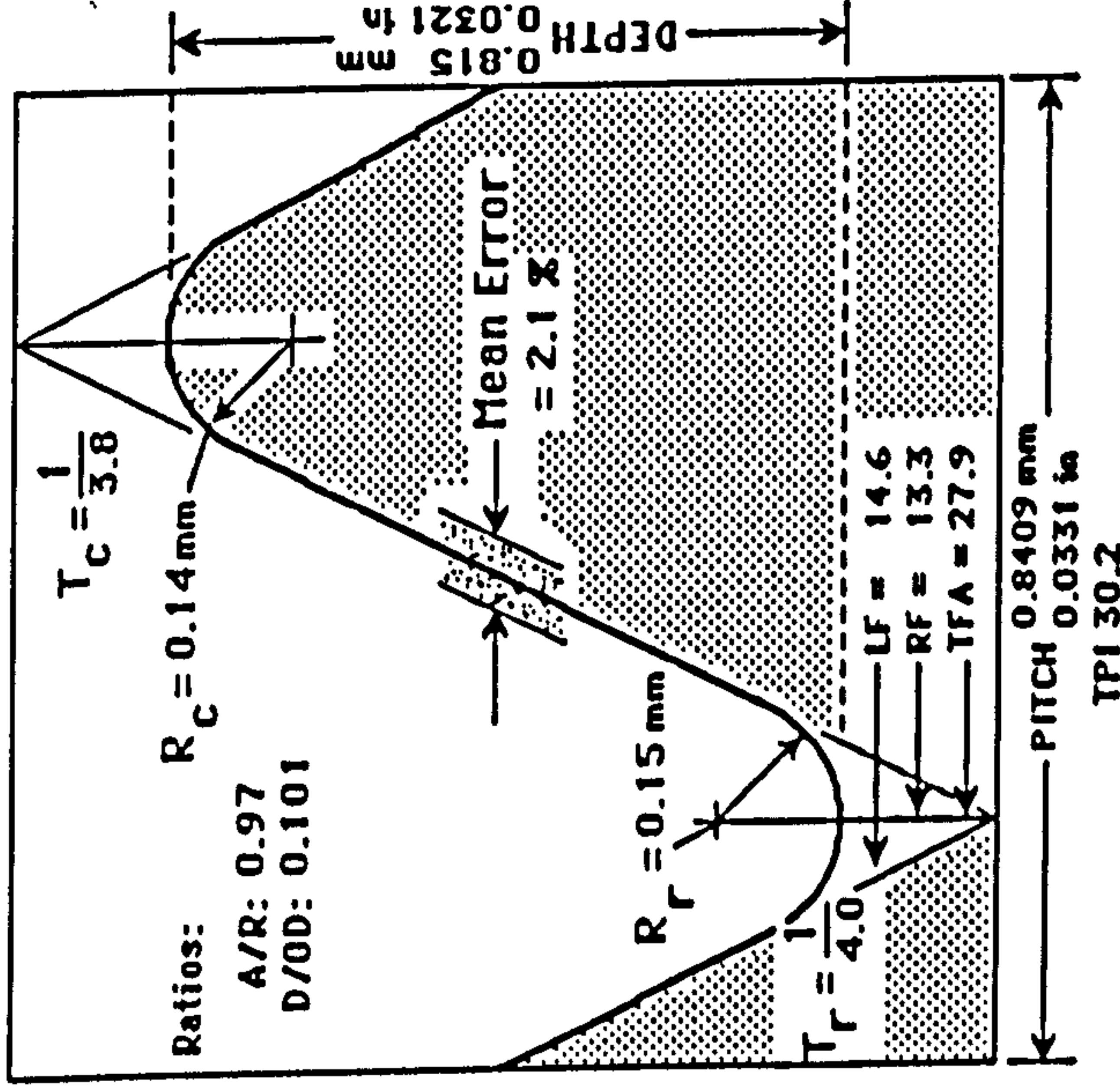
Study Code: SML-32a

Instrument: Screw originating machine

Maker: Maudslay

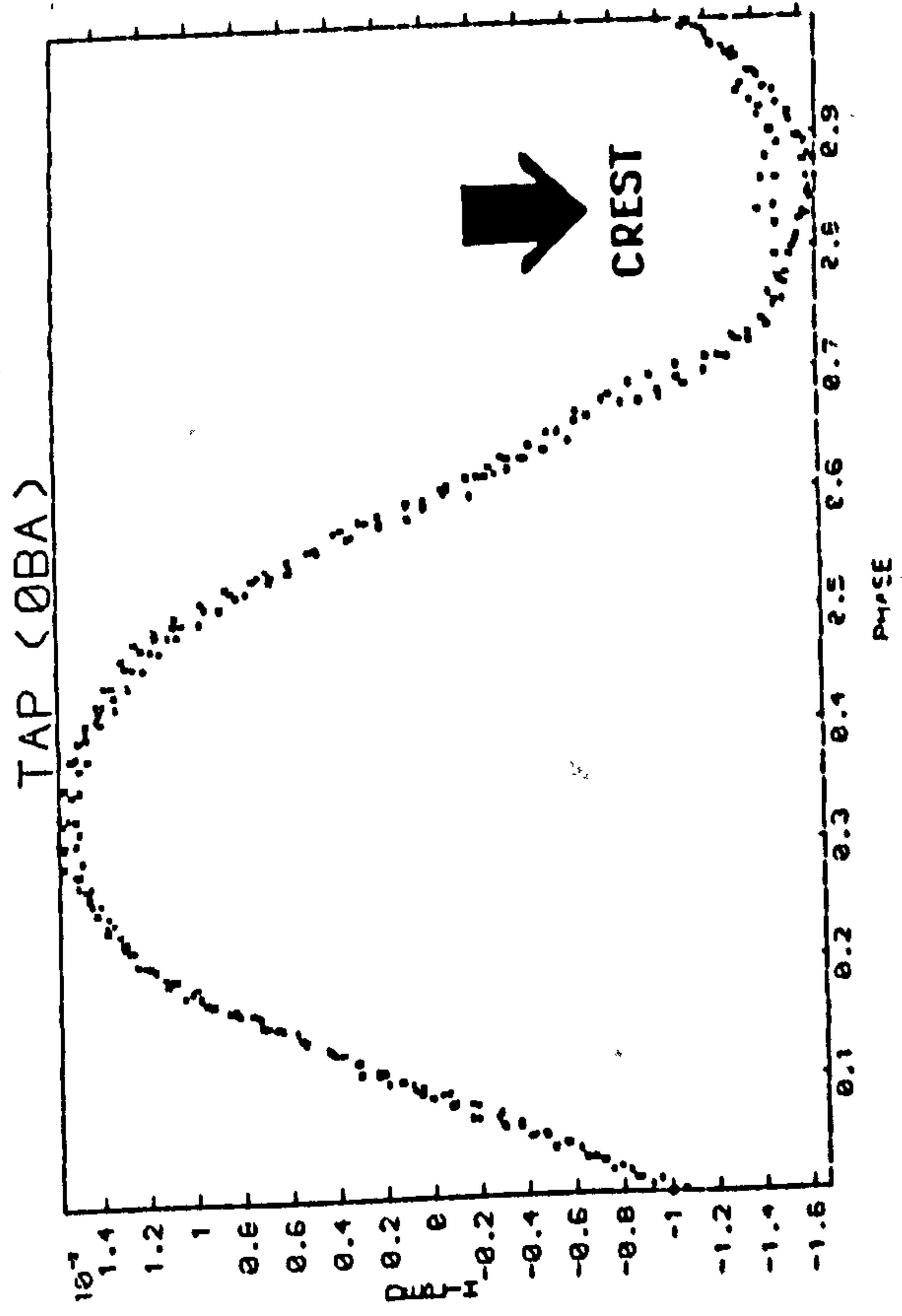
Date: ca.1800

Ser./Acq. No. 1900-21



MU	Filar	
		Scale
MU	Bench	
		Div. Eng.
MU	Adjust.	
		Leveling
MU	Focus	
		Eye P.
MU	Tube	
		Tool
MU	Gauge	
		Binding
MU	Misc.	





Characteristics:

Screw

Nut

Leng: 0.875" nom.

Diameter: 0.185" nom.

Steel

Brass

Other:

Instrument Identification:

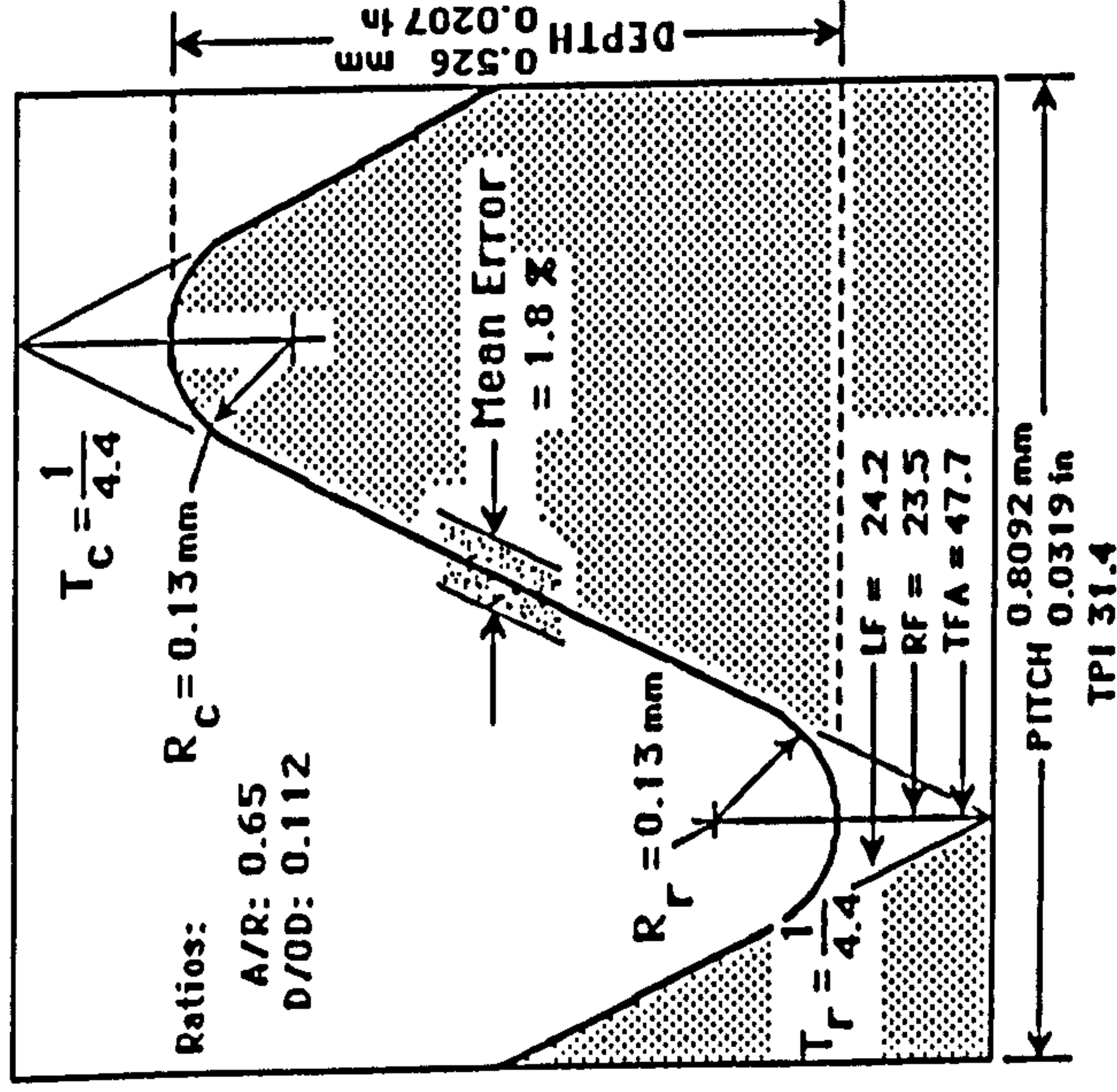
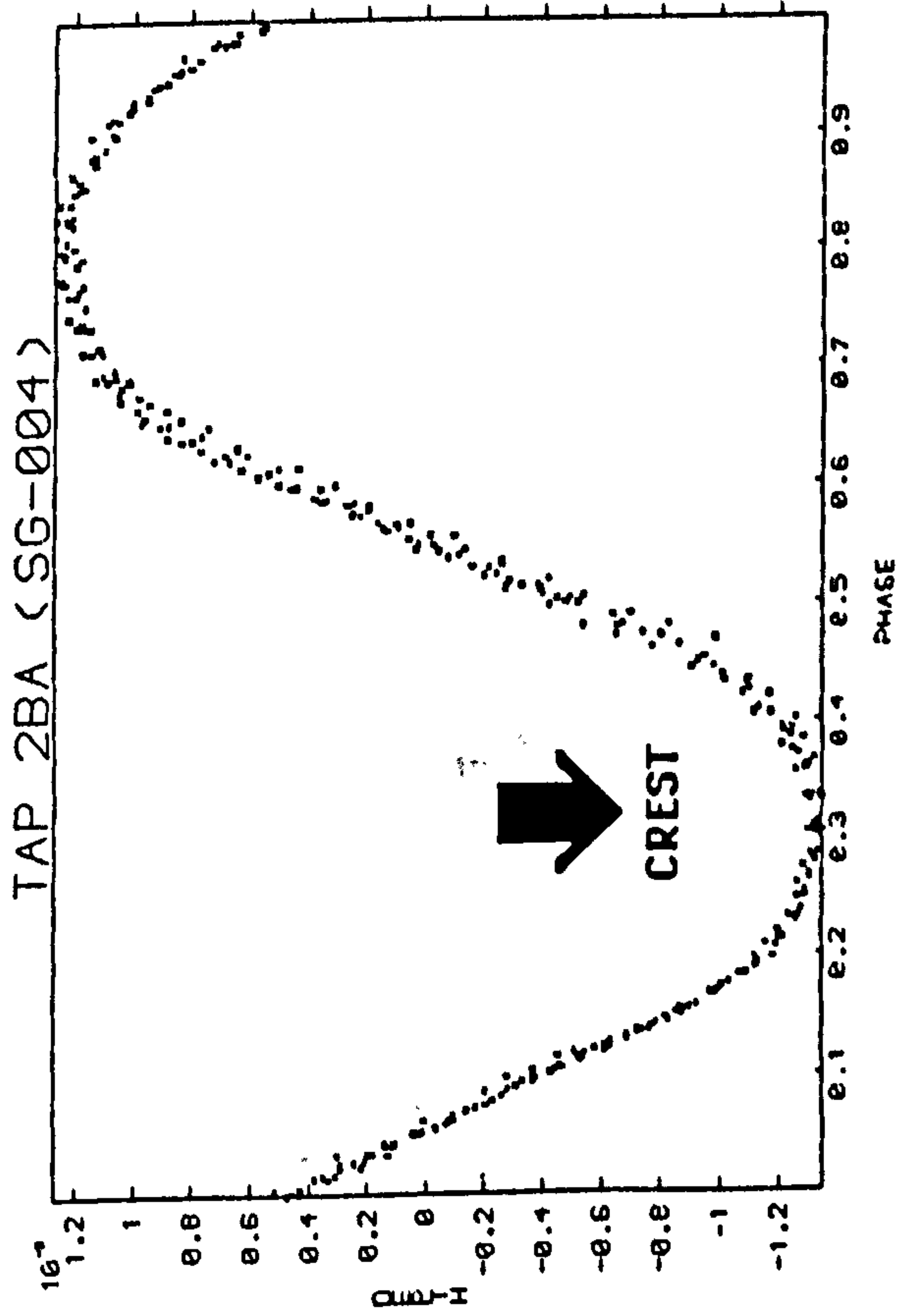
Study Code: Tap-2BA

Instrument: Screw tap

Maker: N/S

Date: 3rd q 20th c

Ser./Acq. No. .



Mu

Filar

Scale

Bench

Div. Eng.

Adjust.

Leveling

Focus

Eye P.

Tube

Tool

Gauge

Binding

Misc.

Original screw used for shadowgraph

Characteristics:

Screw

Nut

Leng: 0.875" nom.

Diameter: 4.70mm nom.

Steel

Brass

Other:

Instrument Identification:

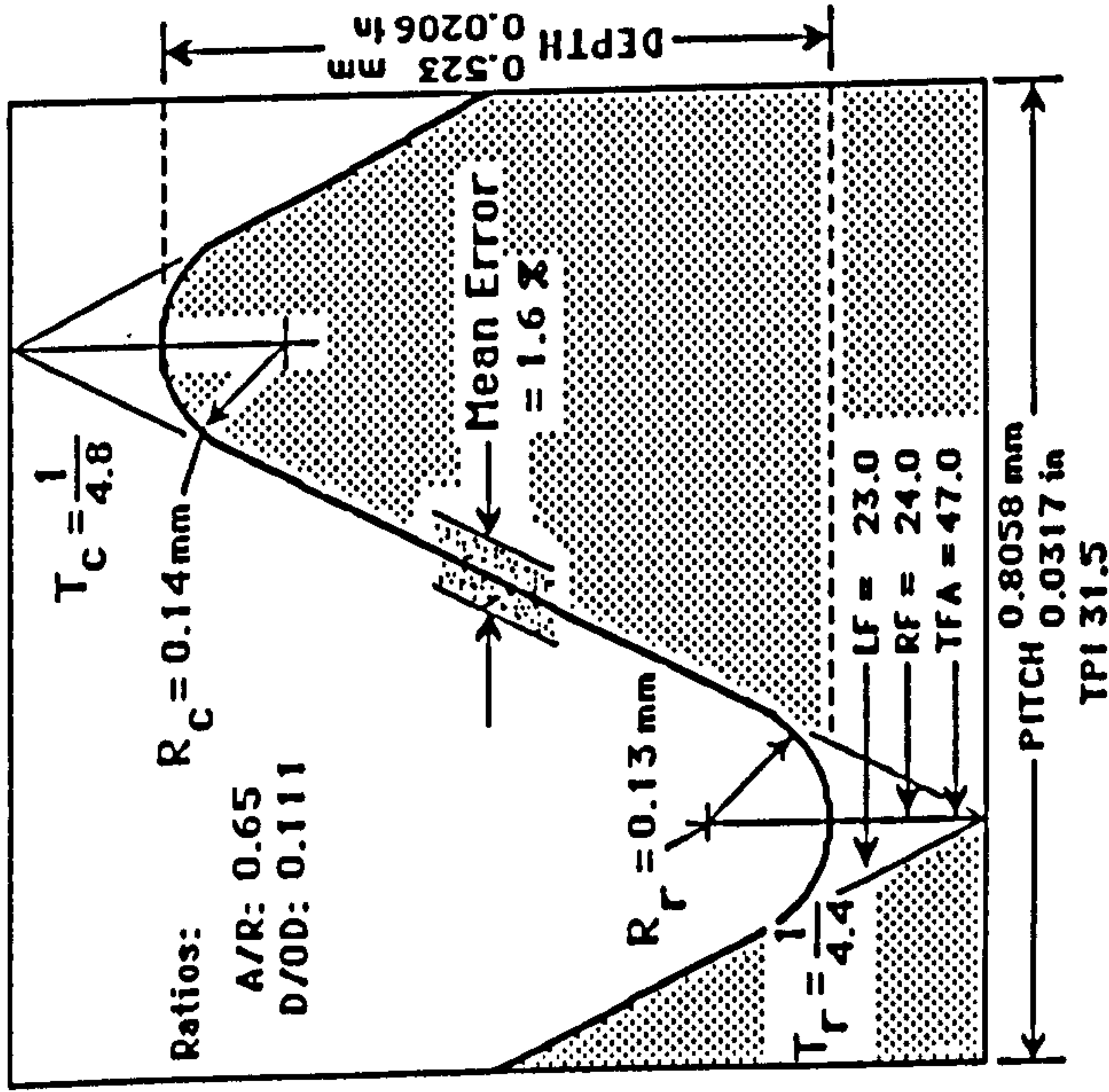
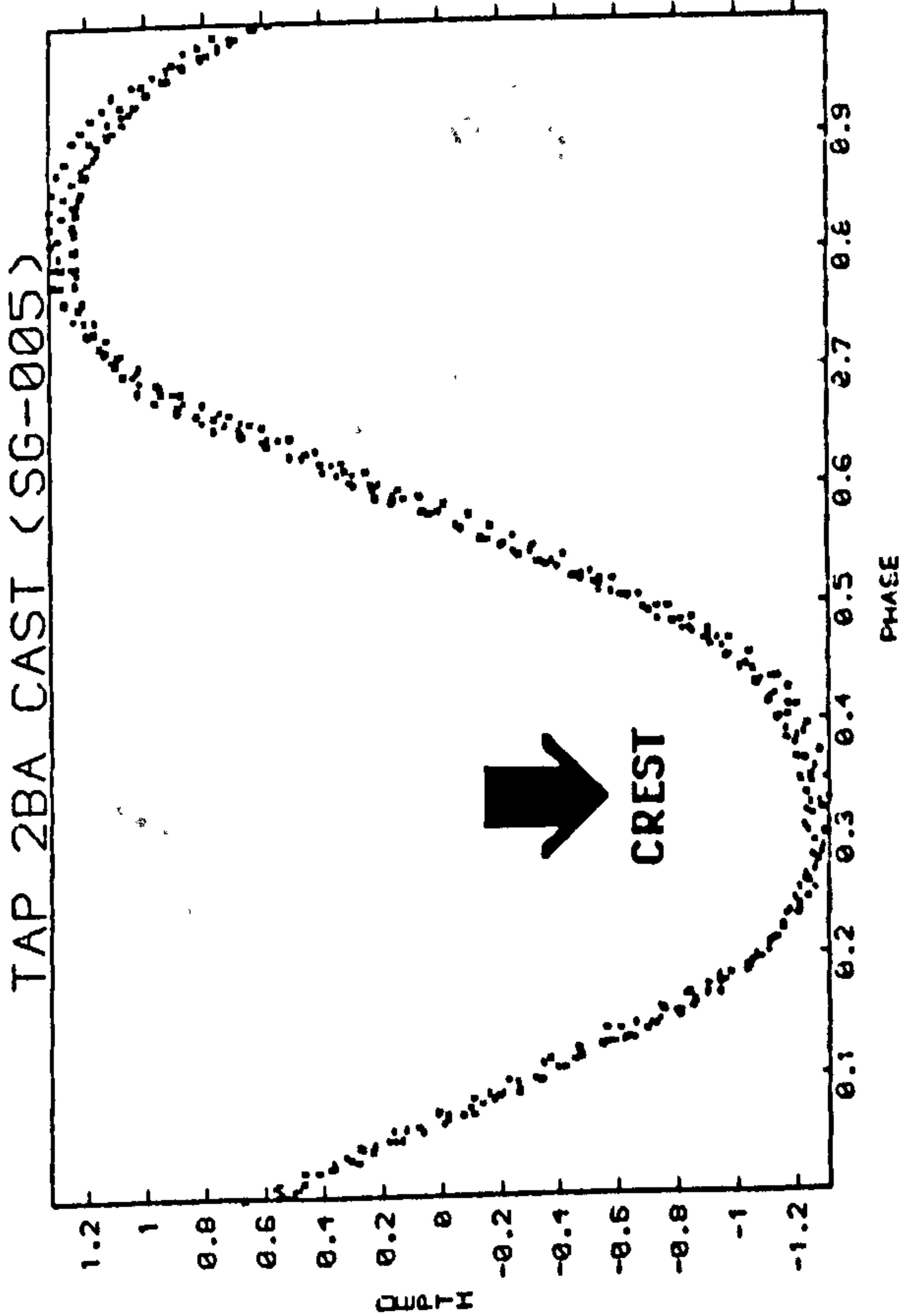
Study Code: Tap-2BA

Instrument: Screw tap

Maker: N/S

Date: 3rd q 20th c

Ser./Acq. No. .



Mu

Filar

Scale

Bench

Div. Eng.

Adjust.

Leveling

Focus

Eye P.

Tube

Tool

Gauge

Binding

Misc.

Shadowgraph made from cast



Characteristics:

Screw

Nut

Leng: 0.75" nom.

Diameter: 4.10mm nom.

Steel

Brass

Other:

Instrument Identification:

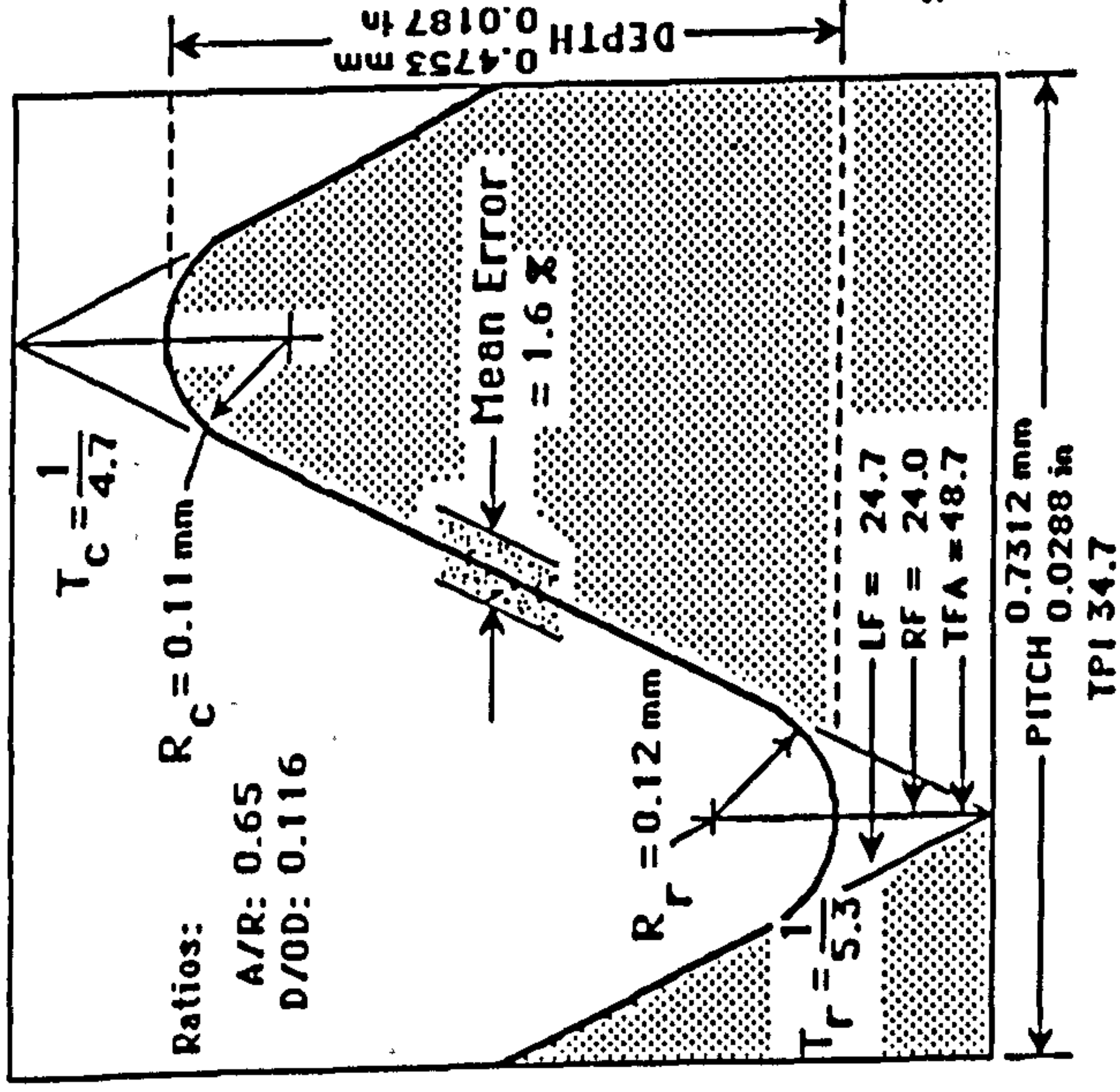
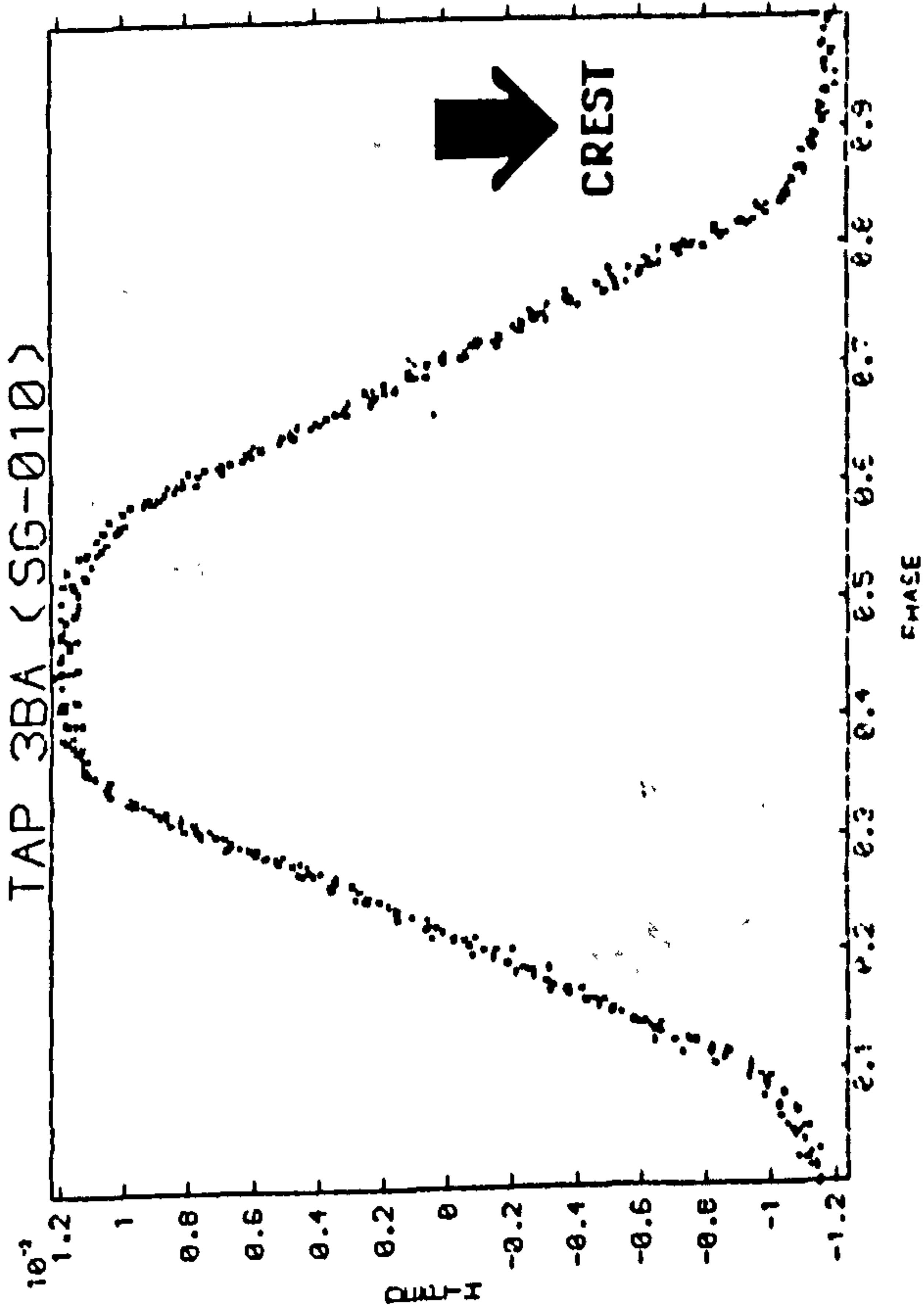
Study Code: Tap 3BA

Instrument: Screw tap

Maker: N/S

Date: 3rd q 20th c

Ser./Acq. No. .



Mu	Filar
	Scale
	Bench
	Div. Eng.
	Adjust.
	Leveling
	Focus
	Eye P.
	Tube
	Tool
	Gauge
	Binding
	Misc.

Shadowgraph made from original tap



Characteristics:

Screw

Nut

Leng: 0.75" nom.

Diameter: 3.60mm nom.

Steel

Brass

Other:

Instrument Identification:

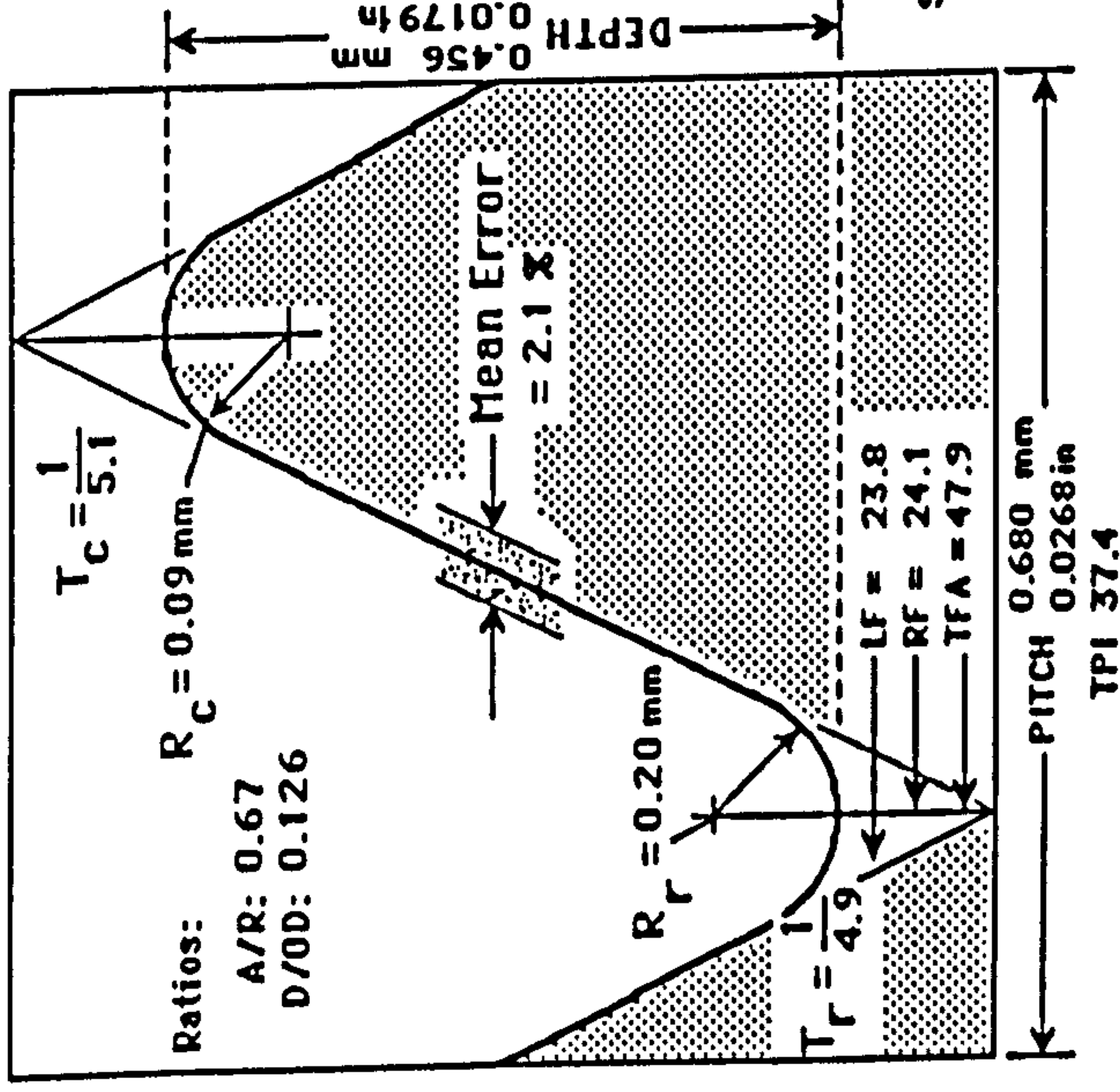
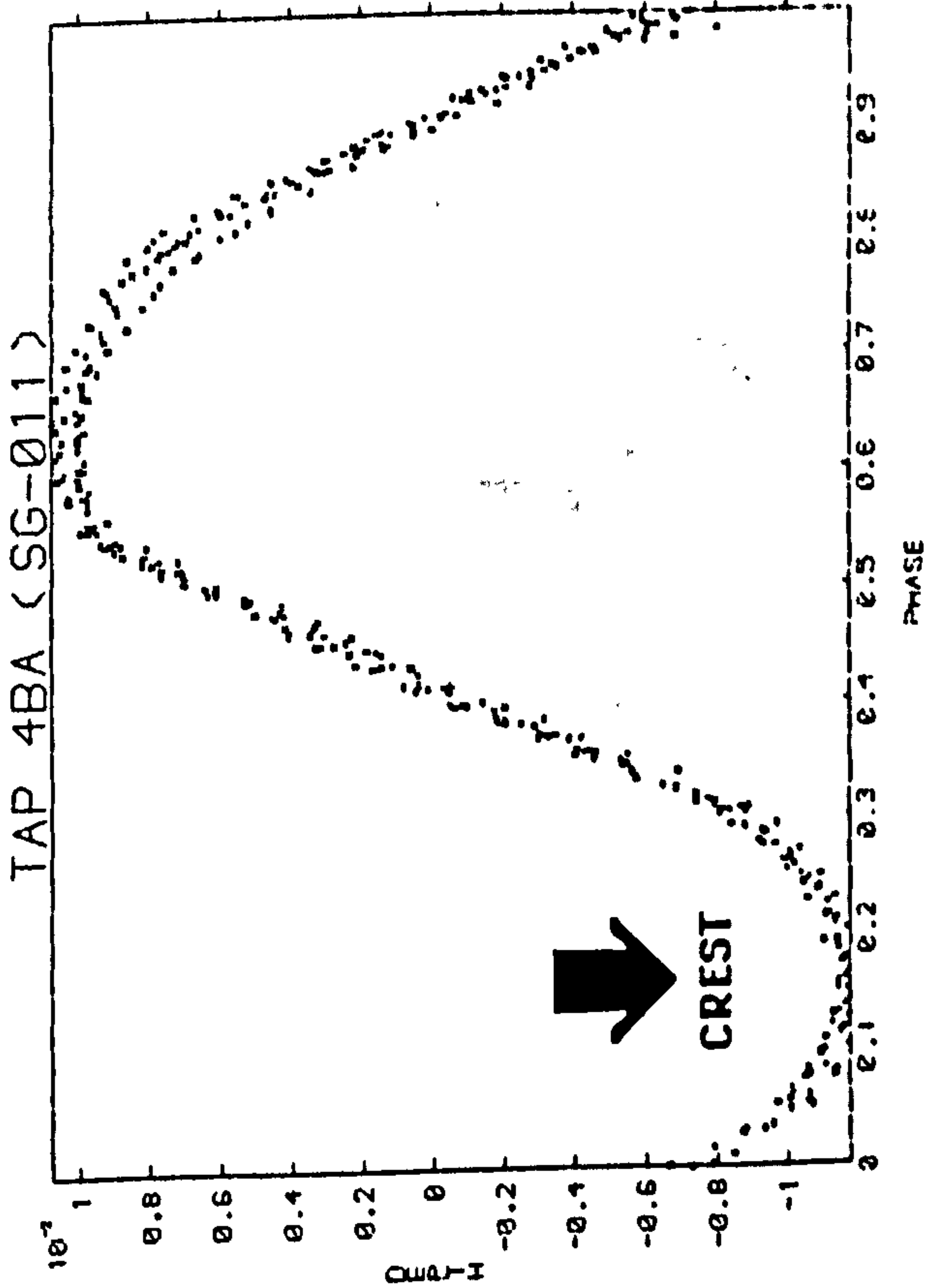
Study Code: Tap 4BA

Instrument: Screw tap

Maker: N/S

Date: 3rd q 20th c

Ser./Acq. No. .



MU	Filar	
	Scale	
	Bench	
	Div. Eng.	
	Adjust.	
	Leveling	
	Focus	
	Eye P.	
	Tube	
	Tool	
	Gauge	
	Binding	
	Misc.	

Shadowgraph made from original tap

Characteristics:

Screw

Nut

Leng: 0.75" nom.

Diameter: 2.80mm nom.

Steel

Brass

Other:

Instrument Identification:

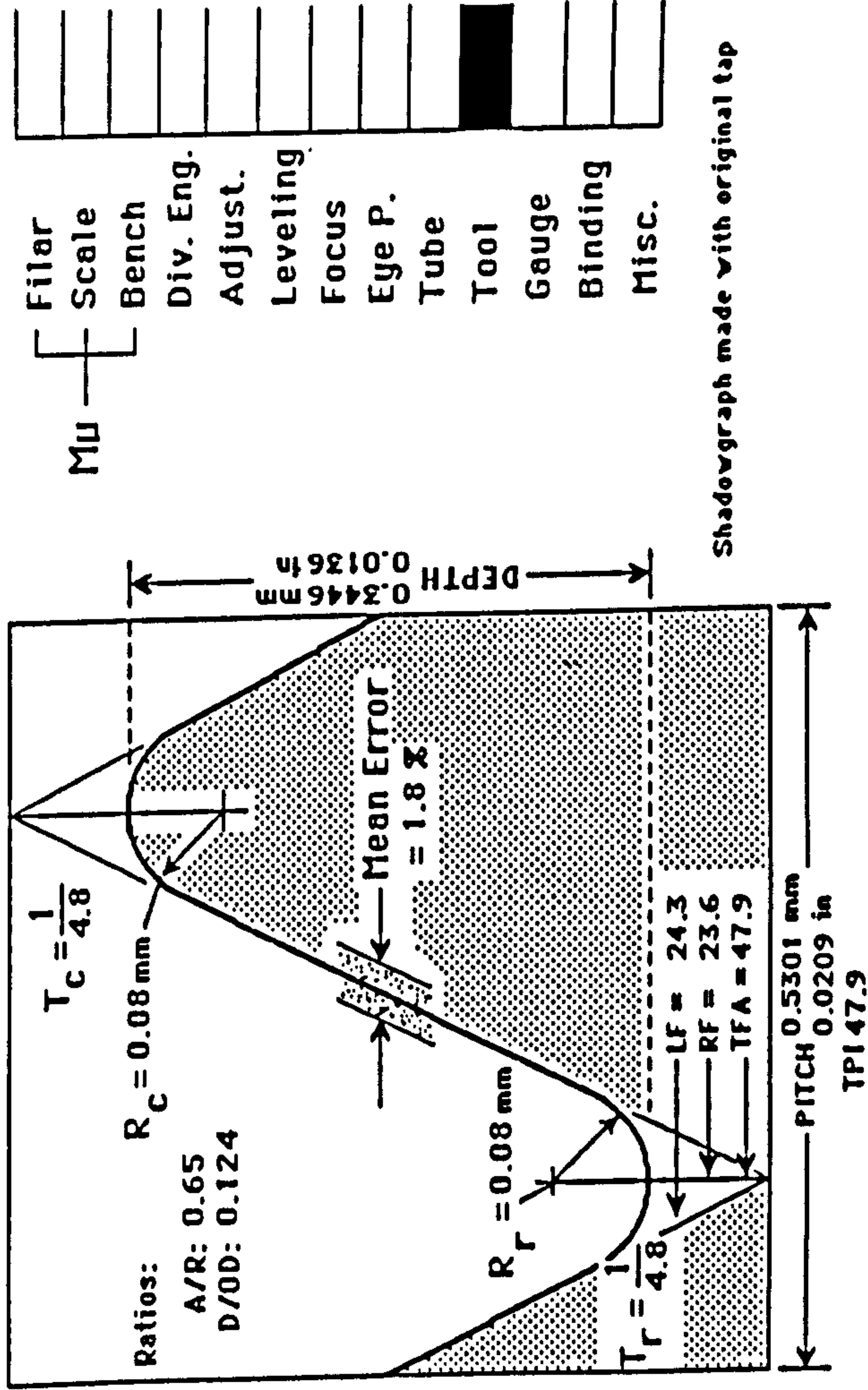
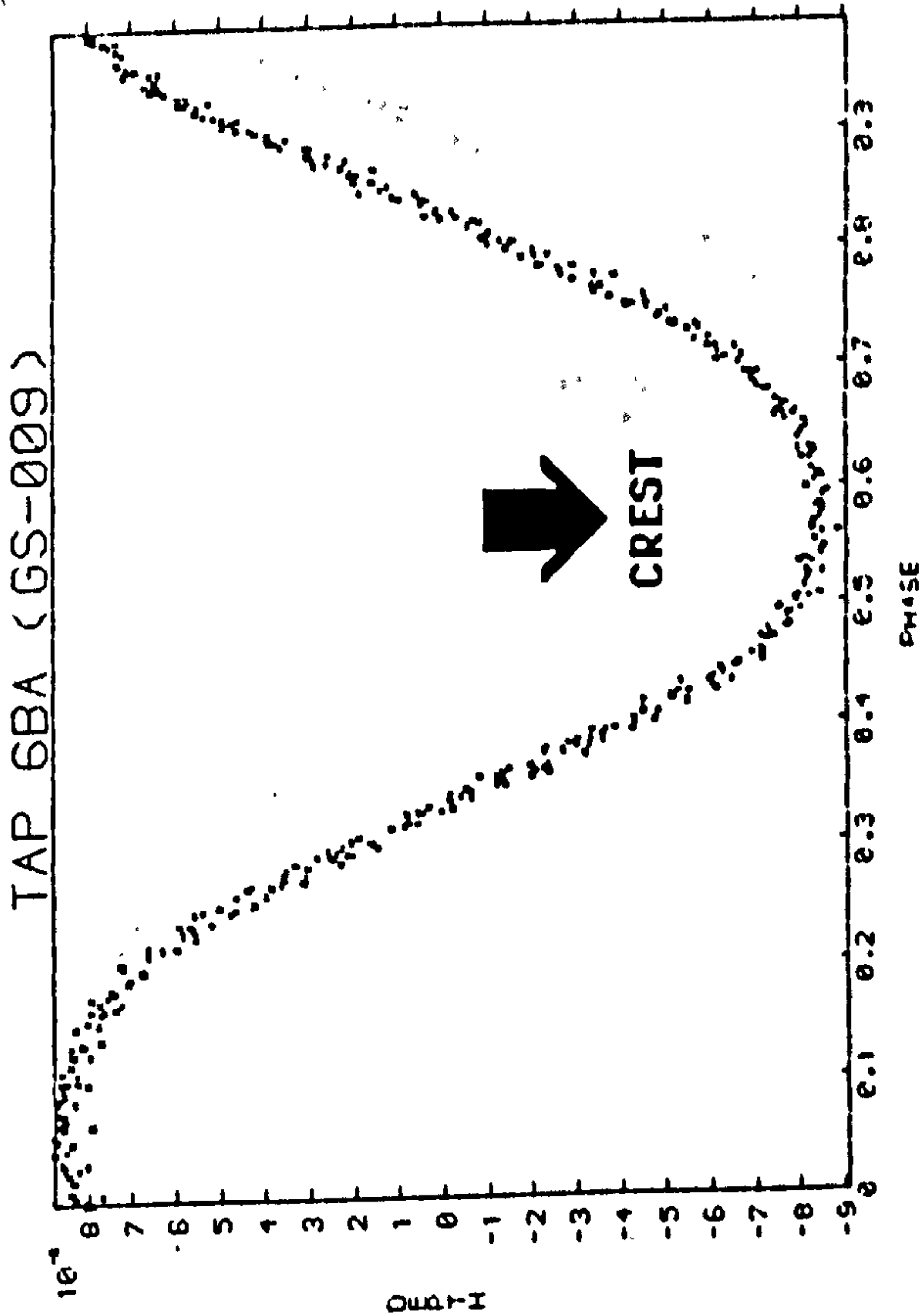
Study Code: Tap 6BA

Instrument: Screw tap

Maker: N/S

Date: 3rd q 20th c

Ser./Acq. No. .



Characteristics:

Screw

Nut

Leng: 0.625" nom.

Diameter: 2.20mm nom.

Steel

Brass

Other:

Instrument Identification:

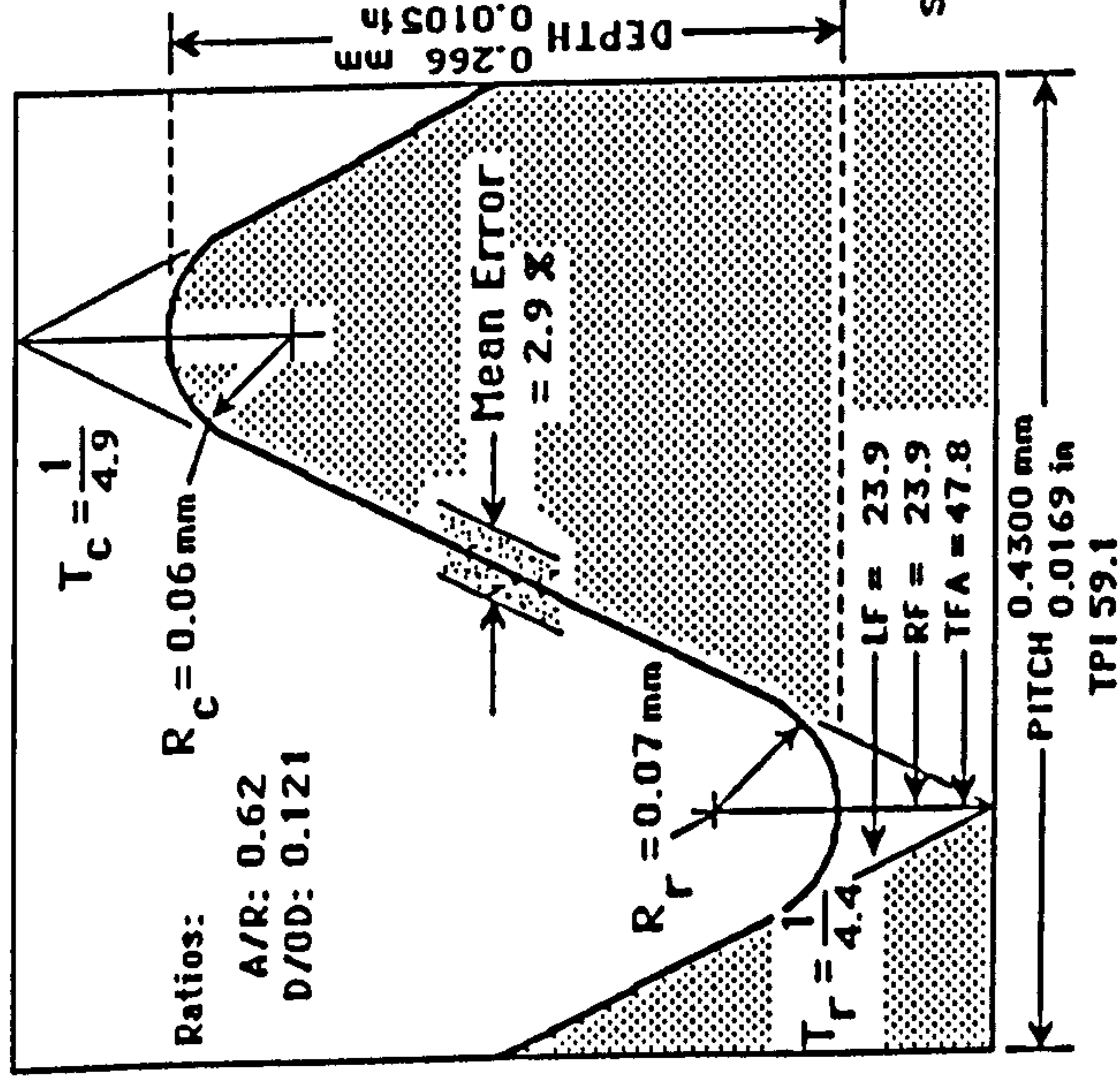
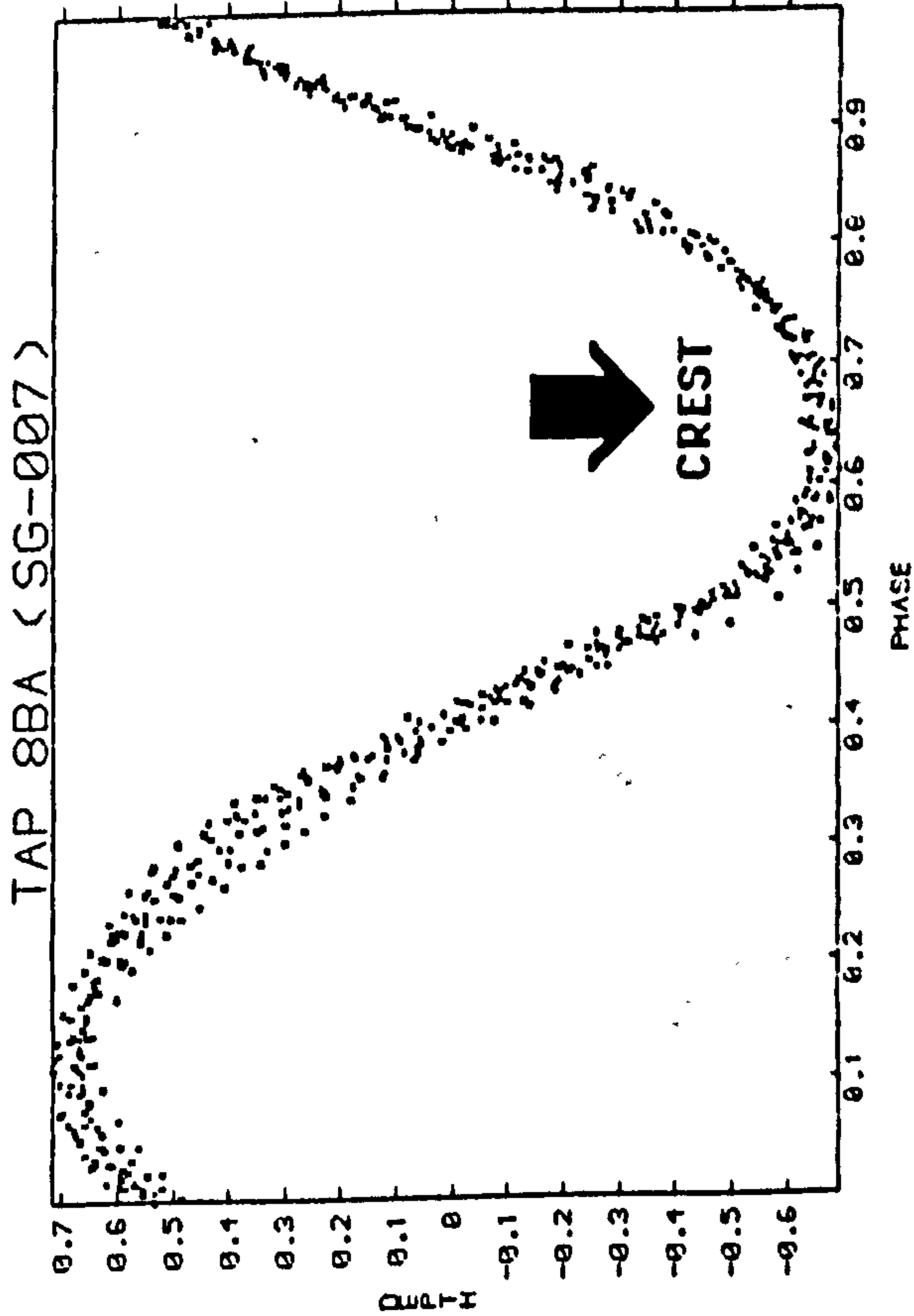
Study Code: Tap 8BA

Instrument: Screw tap

Maker: N/S

Date: 3rd q 20th c

Ser./Acq. No. .



Shadowgraph made from original tap

Mu

Filar

Scale

Bench

Div. Eng.

Adjust.

Leveling

Focus

Eye P.

Tube

Tool

Gauge

Binding

Misc.



Characteristics:

Screw

Nut

Leng: 0.625" nom

Diameter: 2.20mm nom.

Steel

Brass

Other:

Instrument Identification:

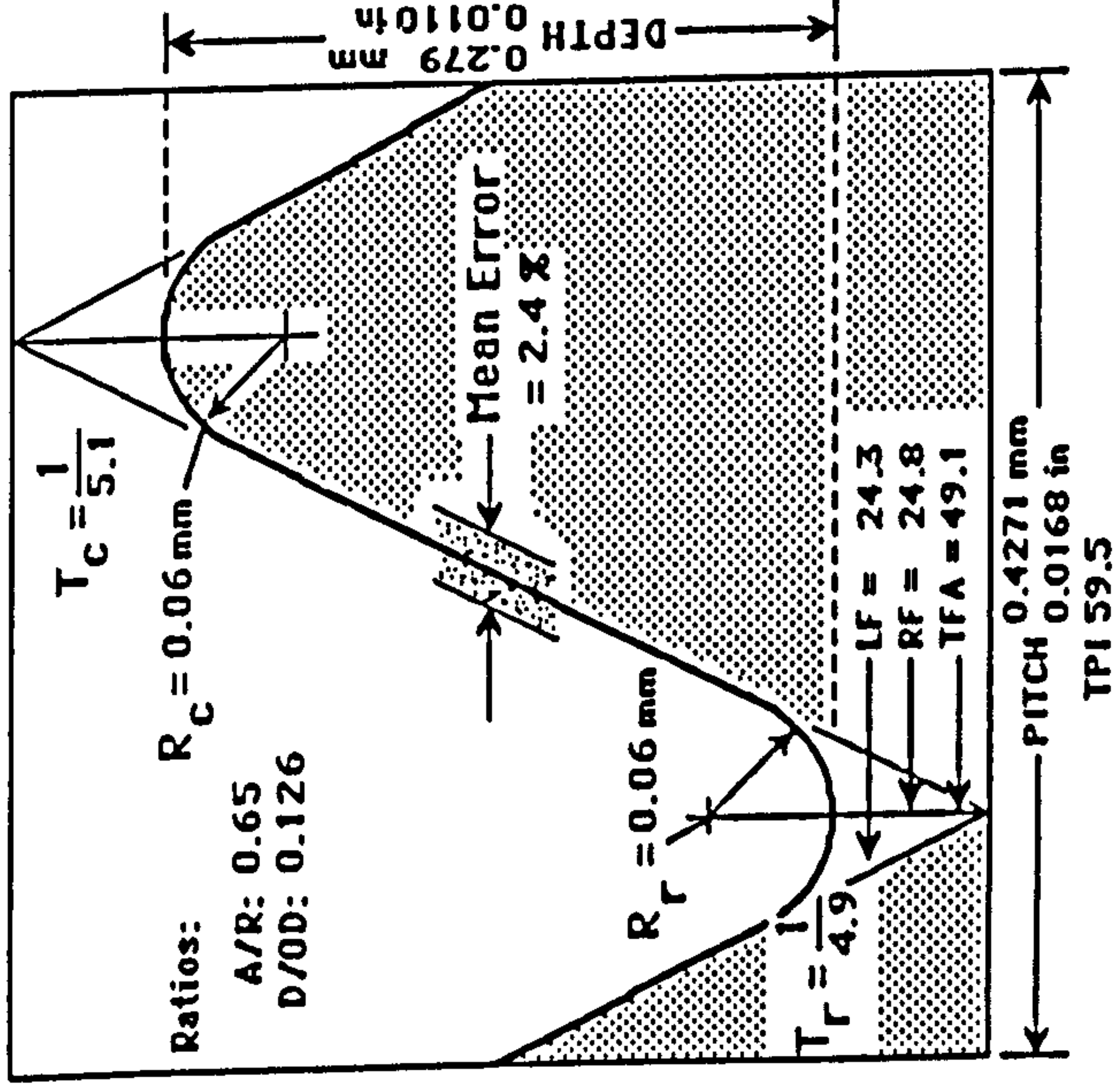
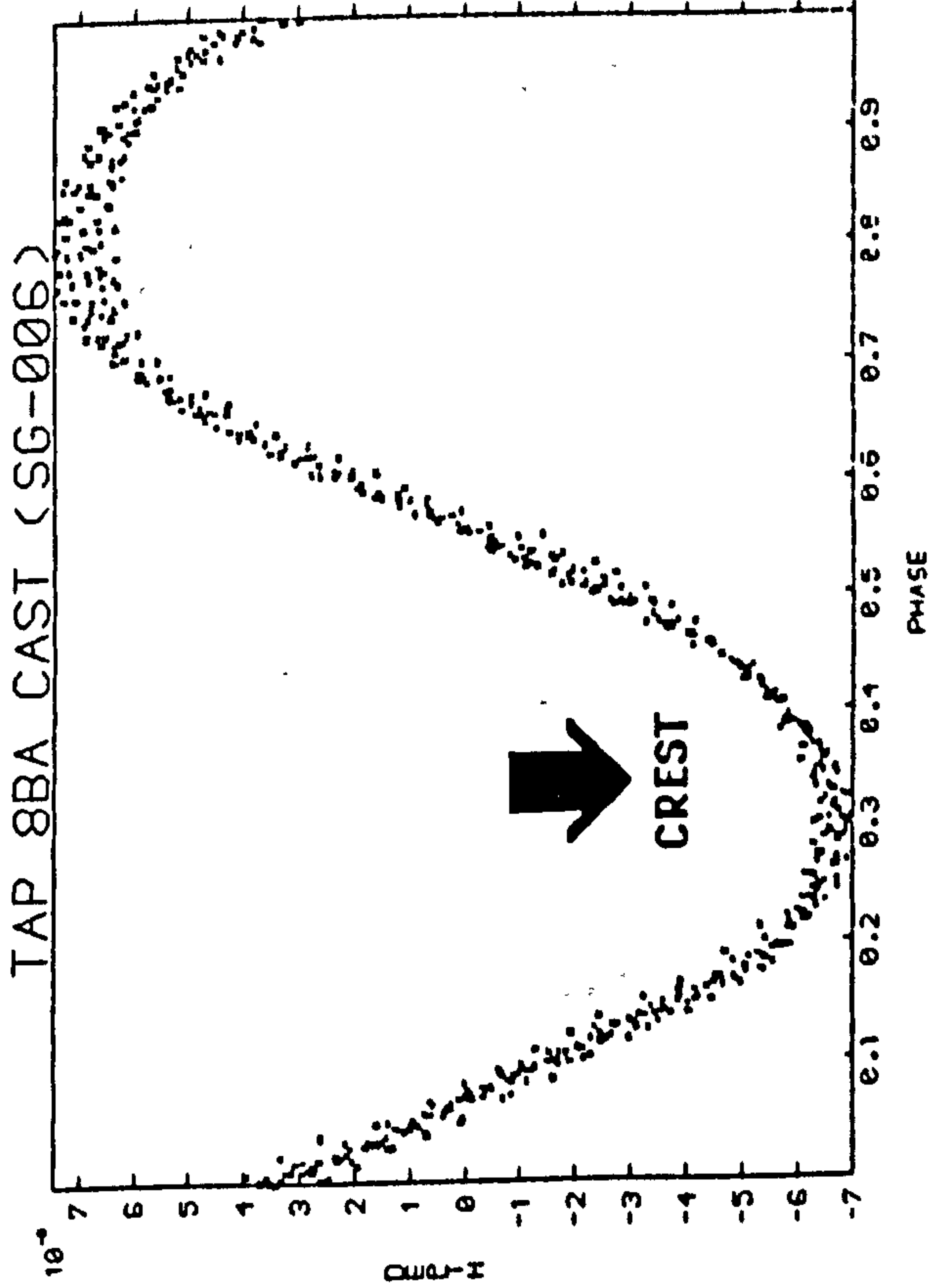
Study Code: Tap 8BA

Instrument: Screw tap

Maker: N/S

Date: 3rd q 20th c

Ser./Acq. No. .



Mu

Filar

Scale

Bench

Div. Eng.

Adjust.

Leveling

Focus

Eye P.

Tube

Tool

Gauge

Binding

Misc.

Shadowgraph made from cast



Characteristics:

Screw

Nut

Leng: 0.625" nom.

Diameter: 1.70mm nom.

Steel

Brass

Other:

Instrument Identification:

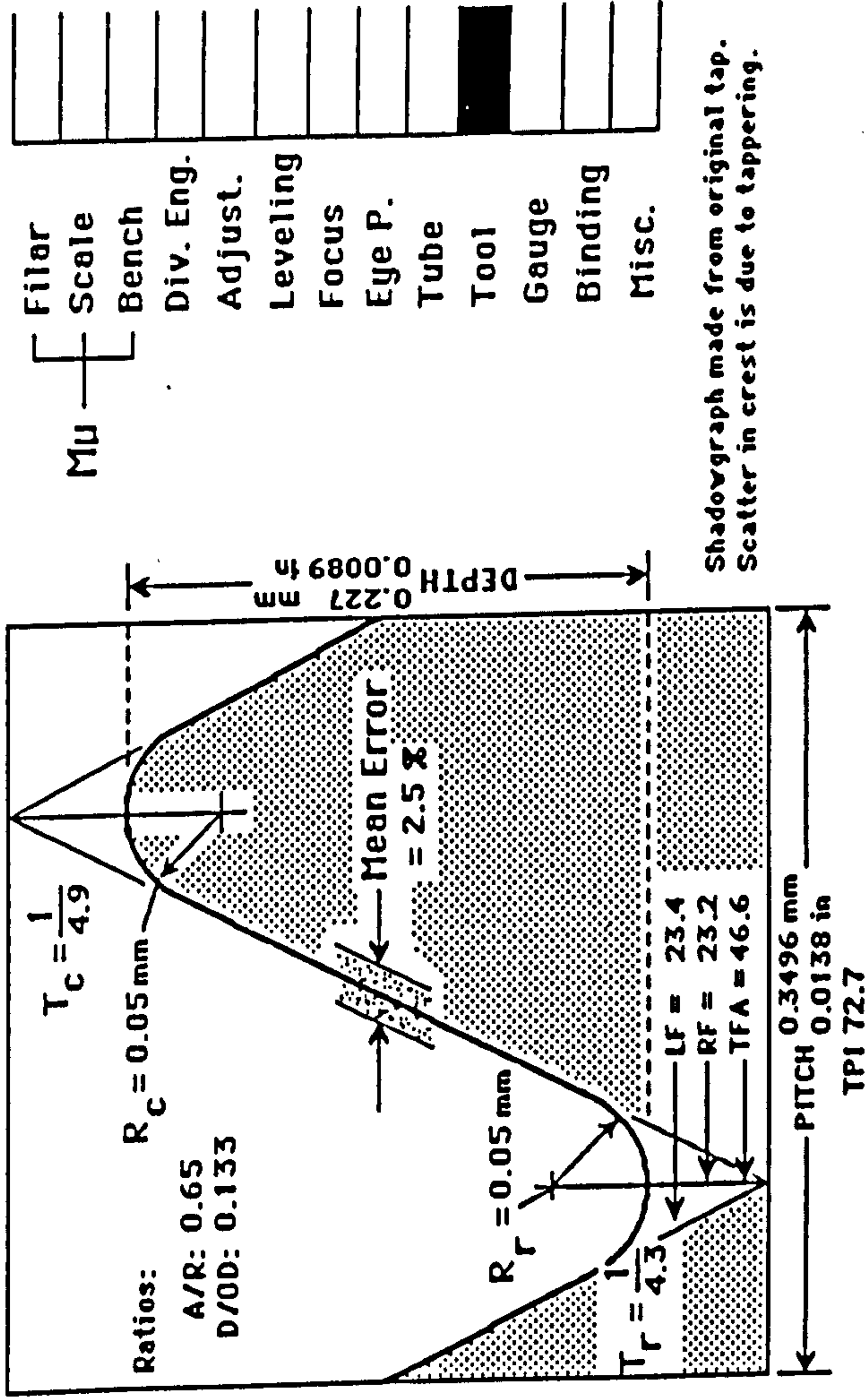
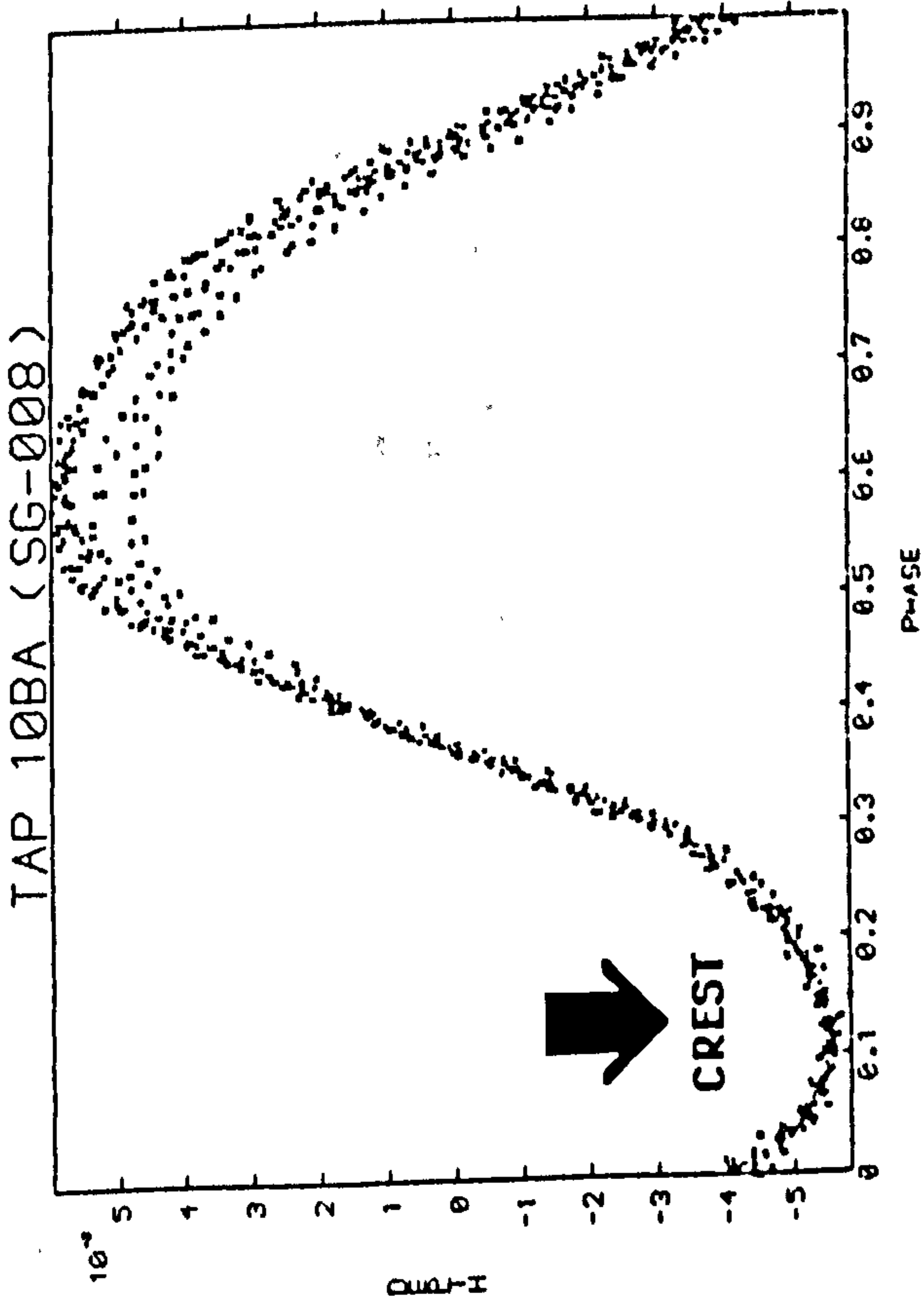
Study Code: Tap 10BA

Instrument: Screw tap

Maker: N/S

Date: 3rd q 20th c

Ser./Acq. No. .



Characteristics:

Screw

Nut

Leng: ~0.70"

Diameter: 0.063"

Steel

Brass

Other:

Instrument Identification:

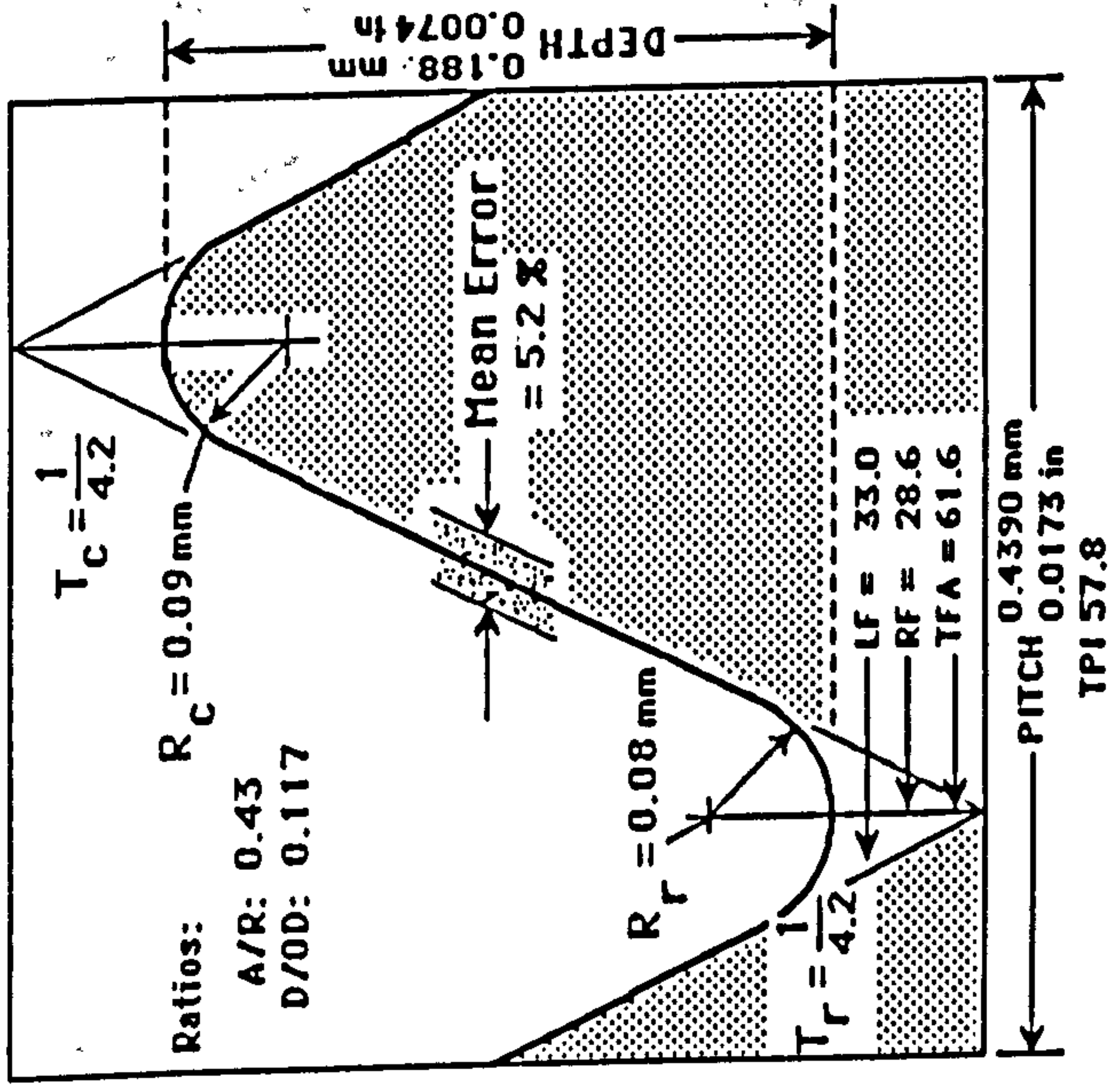
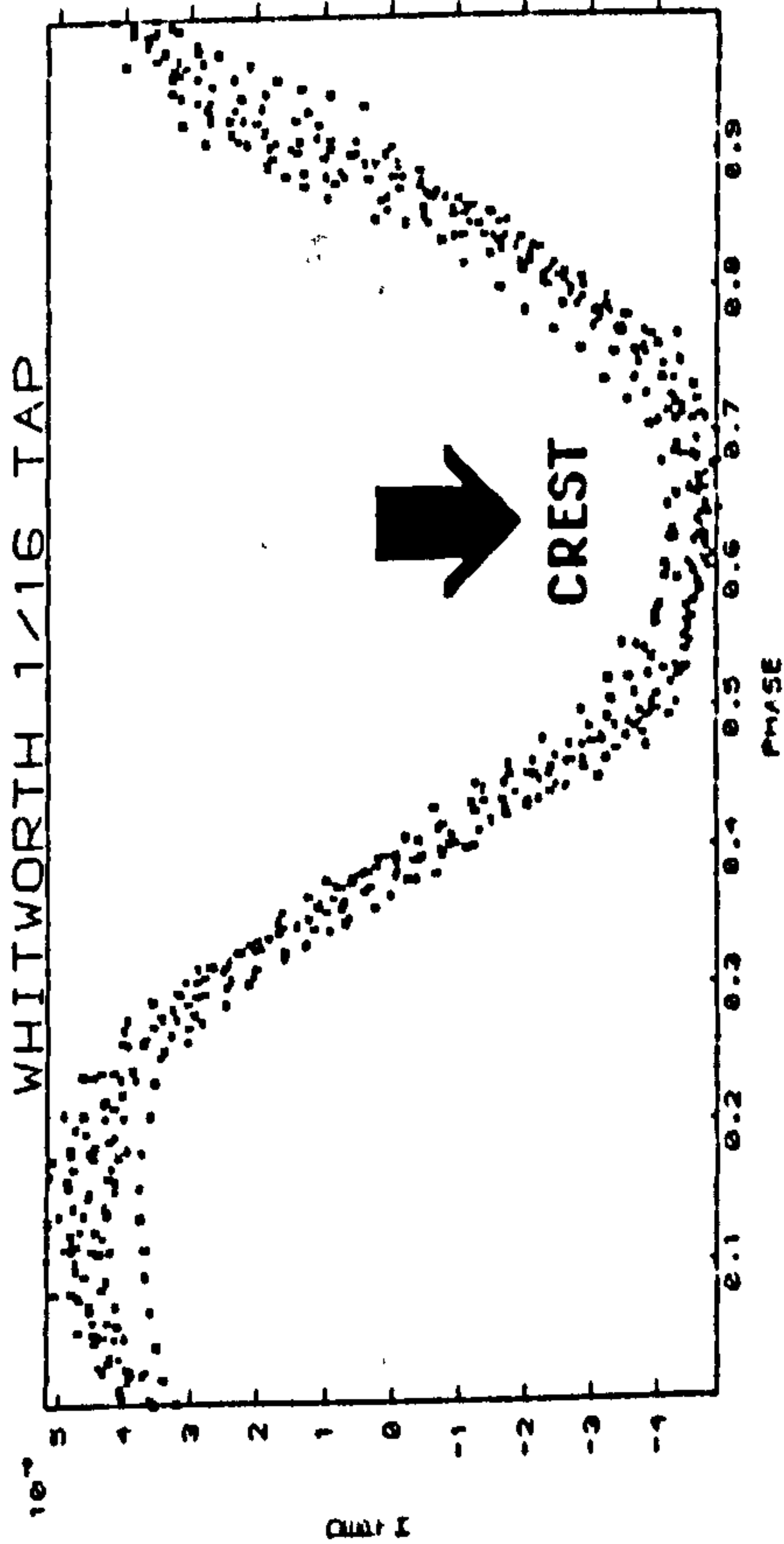
Study Code: Tap 1/16

Instrument: Screw tap

Maker: N/S

Date: 3rd q 20th c

Ser./Acq. No.:



Mu

Filar

Scale

Bench

Div. Eng.

Adjust.

Leveling

Focus

Eye P.

Tube

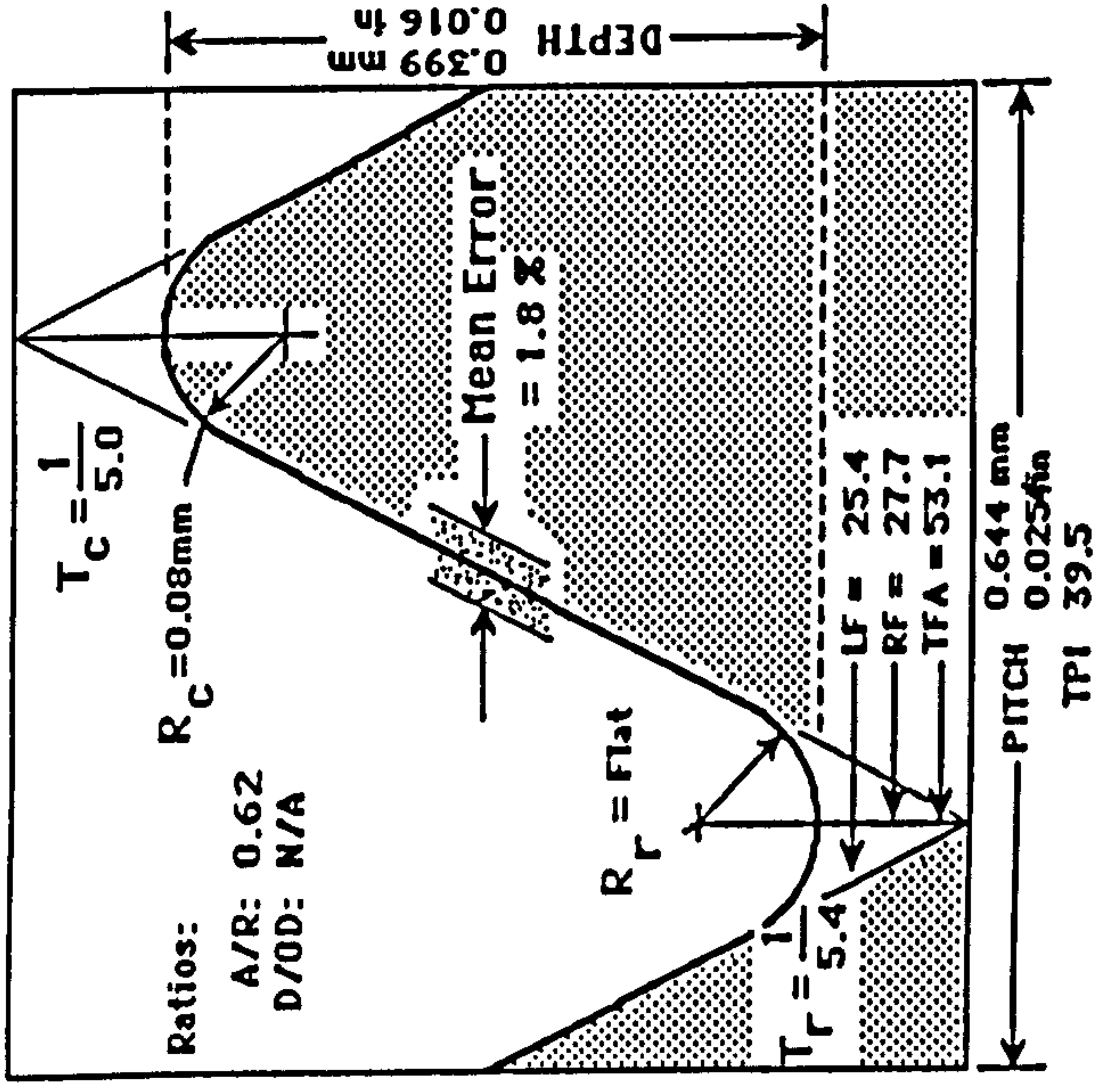
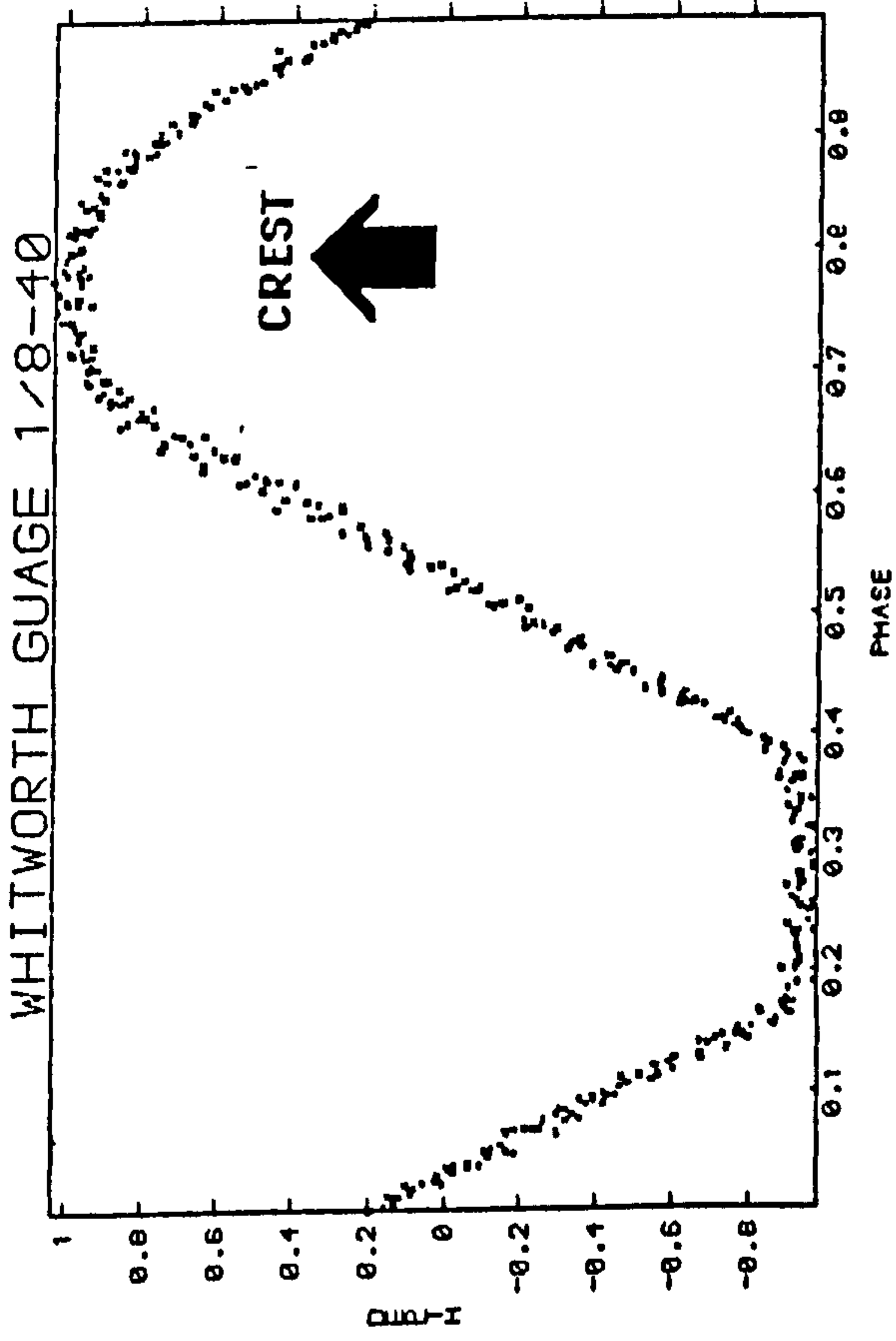
Tool

Gauge

Binding

Misc.

An apparently heavily worn tap where both the form and pitch have been altered. The form now most closely resembles the Cycle Engineers Inst. thread though the pitch is near 88A (0.43mm).



### Characteristics:

☐ Screw ☐ Nut

**Leng: 0.5- / N/A**

**Diameter: N/A**

	<b>Steel</b>
	<b>Brass</b>

**Other:**

**Instrument Identification:**

Study Code: None

**Instrument:** Whitworth gauge

**Maker:** Moore & Wright

**Date:** ca.1970

**Ser./Acq. No.**

Filar  
Mu — F Scale

[illegible]



Characteristics:

Screw ☒ Nut ☐

Leng: N/A / N/A

Diameter: N/A

Steel ☒ Brass ☐

Other:

Instrument Identification:

Study Code: BAAS-3

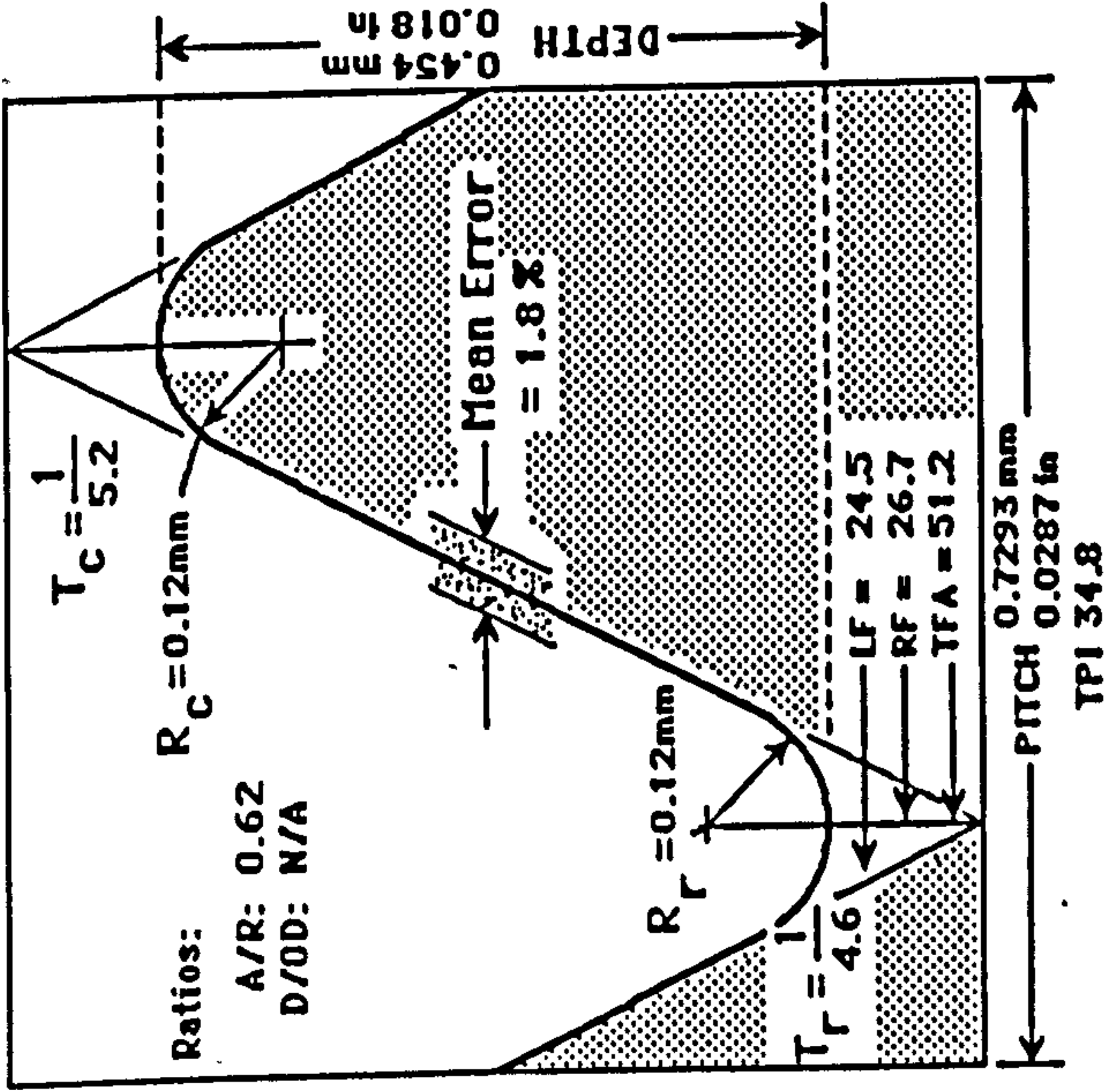
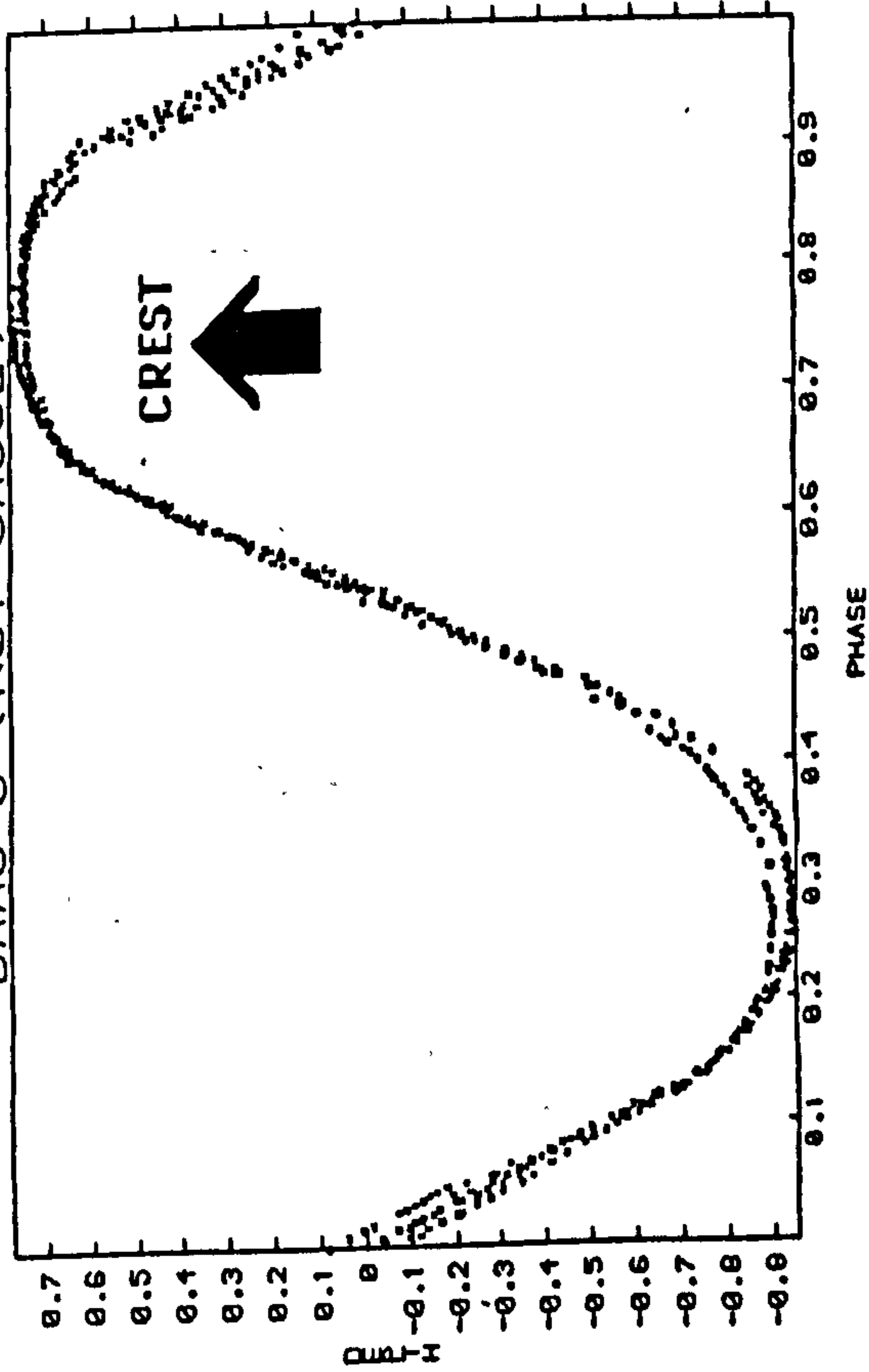
Instrument: Nut gauge

Maker: Pratt & Whitney  
(Geo. M. Bond)

Date: 1899

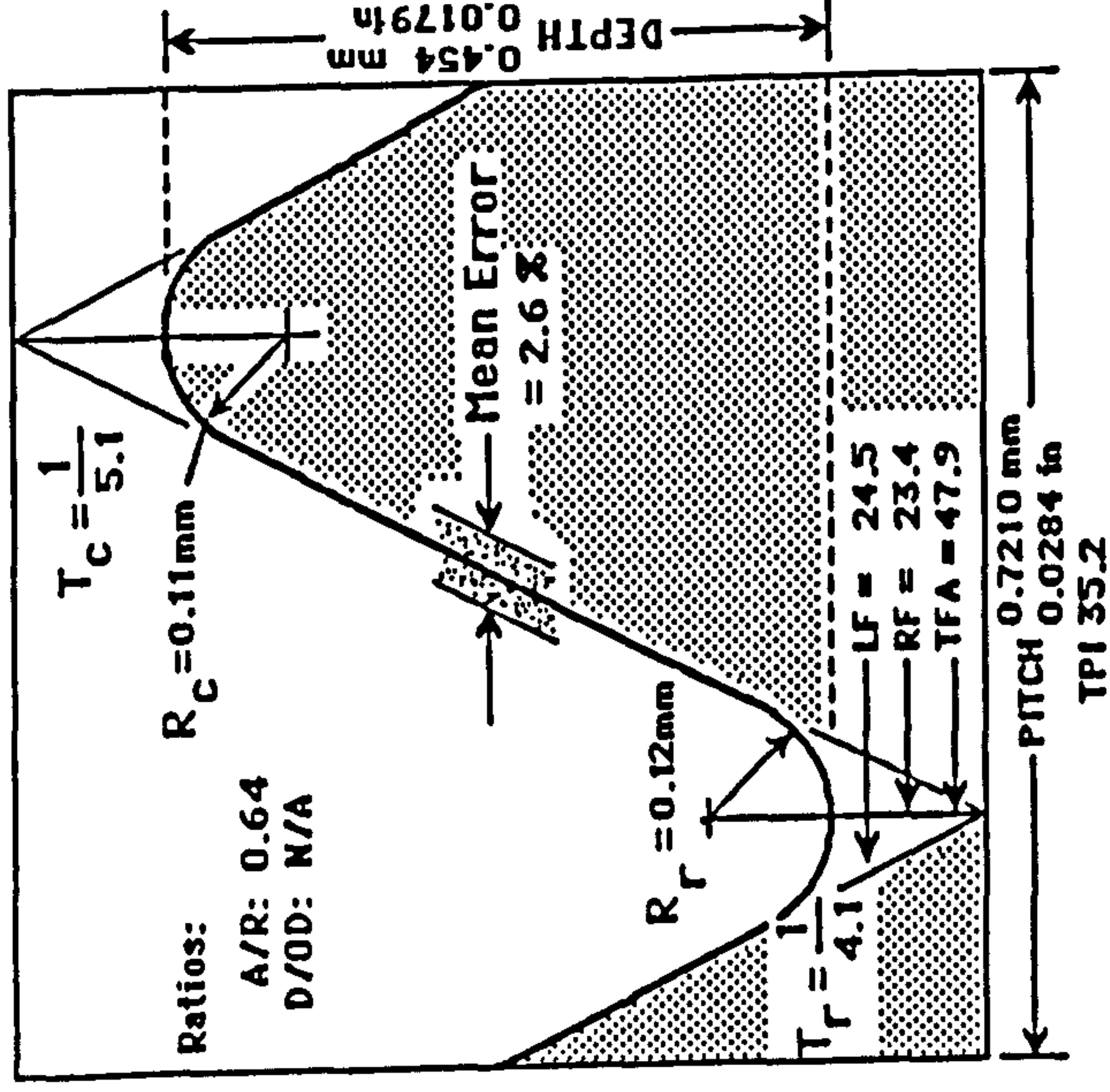
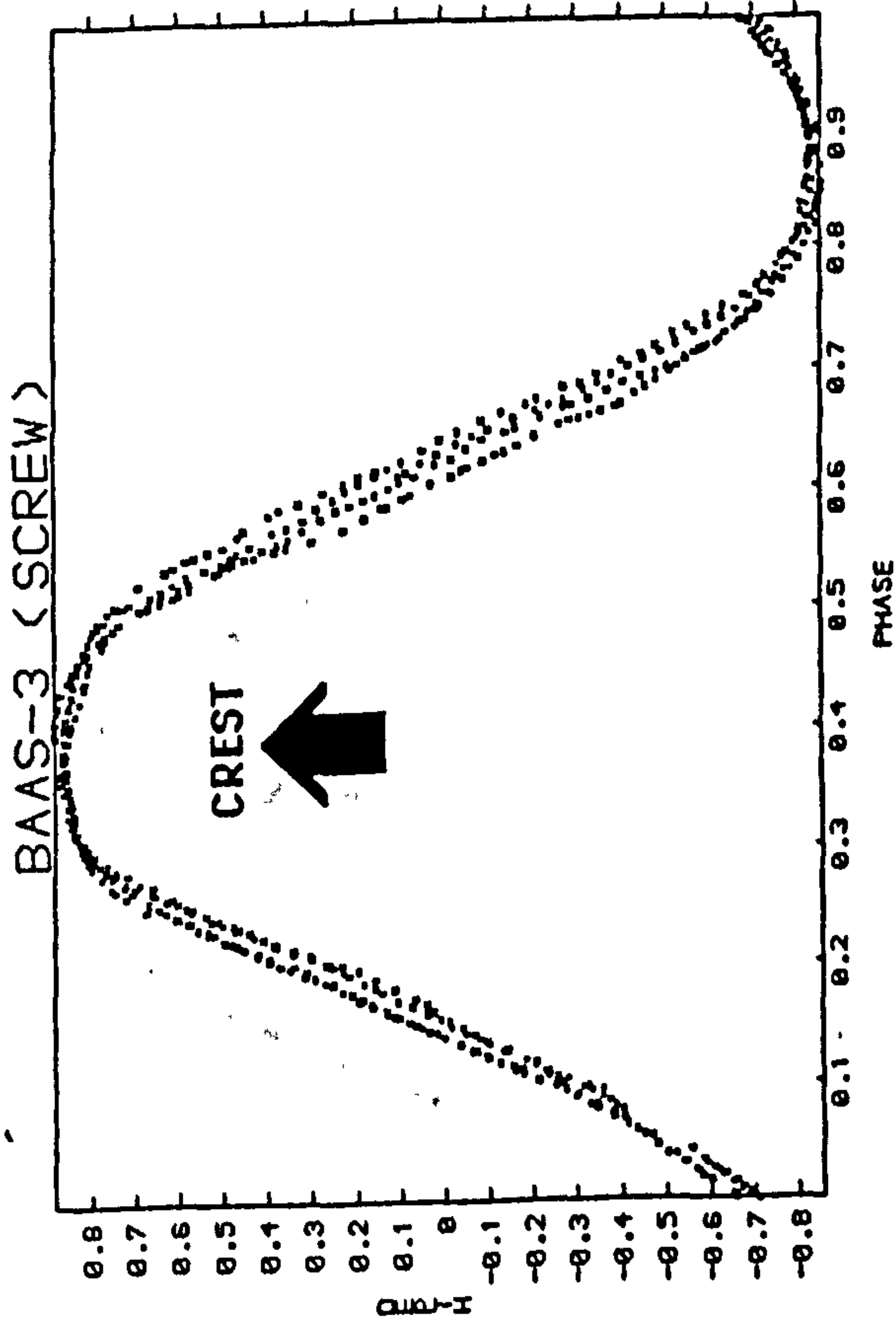
Ser./Acq. No. N/A

BAAS-3 (NUT GAUGE)



Mu — [ Filar Scale Bench Div. Eng. Adjust. Leveling Focus Eye P. Tube Tool Gauge Binding Misc. (Internal gauge)





### Characteristics:

**Screw**  **Nut** 

**Leng: N/A / N/A**

**Diameter: N/A**

	<b>Steel</b>
	<b>Brass</b>

**Other:**

### Instrument Identification:

Study Code: BAAS-3

**Instrument:** Screw gauge

**Maker:** Pratt & Whitney  
(George Bond)

Date: 1899

**Ser./Acq. No. N/A**

# Filar

**Mu + scale**

## Bench

Div. Eng.

**Adjust.**

## Leveling

## Focus

**Eye P.**

## Tube

## Tool

## Gaude

## Binding

**000**

Characteristics:

Screw
☒
Nut
☐

Leng:
N/A / N/A

Diameter:
N/A

Steel
☒
Brass
☐

Other:

Instrument Identification:

Study Code:
BAAS-7

Instrument:
Nut gauge

Maker:
Pratt & Whitney  
(Geo. M. Bond)

Date:
1899

Ser./Acq. No.
N/A

BAAS-7 (NUT GAUGE)

Depth

Phase

CREST

$T_C = \frac{1}{4.9}$   
 $R_C = 0.08\text{mm}$   
 $R_r = 0.07\text{mm}$   
 $T_r = \frac{1}{4.0}$   
 $A/R: 0.62$   
 $D/OD: N/A$   
 $LF = 24.2$   
 $RF = 24.5$   
 $TFA = 48.7$   
 $PITCH: 0.4823\text{mm}$   
 $0.0190\text{in}$   
 $TPI: 52.7$   
 $DEPTH: 0.293\text{mm}$   
 $0.0115\text{in}$   
 $Mean Error = 1.8\%$

Mu	Filar
	Scale
Bench	Div. Eng.
	Adjust.
Leveling	Focus
	Eye P.
Tube	Tool
	Gauge
Binding	Misc.
	(Internal gauge)

Characteristics:

Screw

☐

Nut

☒

Leng:

N/A

/

N/A

Diameter:

N/A

Steel

☒

Brass

☐

Other:

Instrument Identification:

Study Code:

BAAS-7

Instrument:

Screw gauge

Maker:

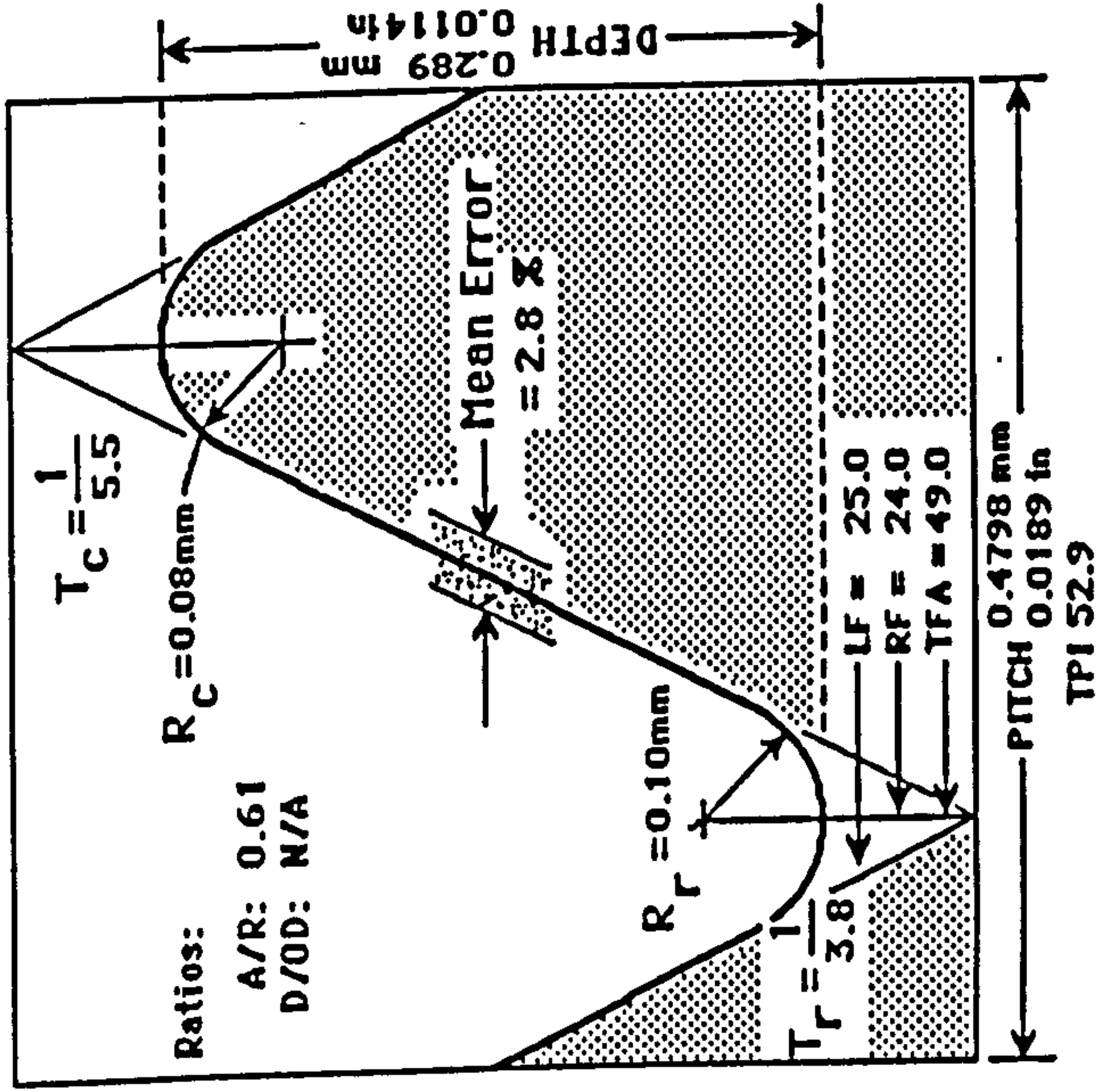
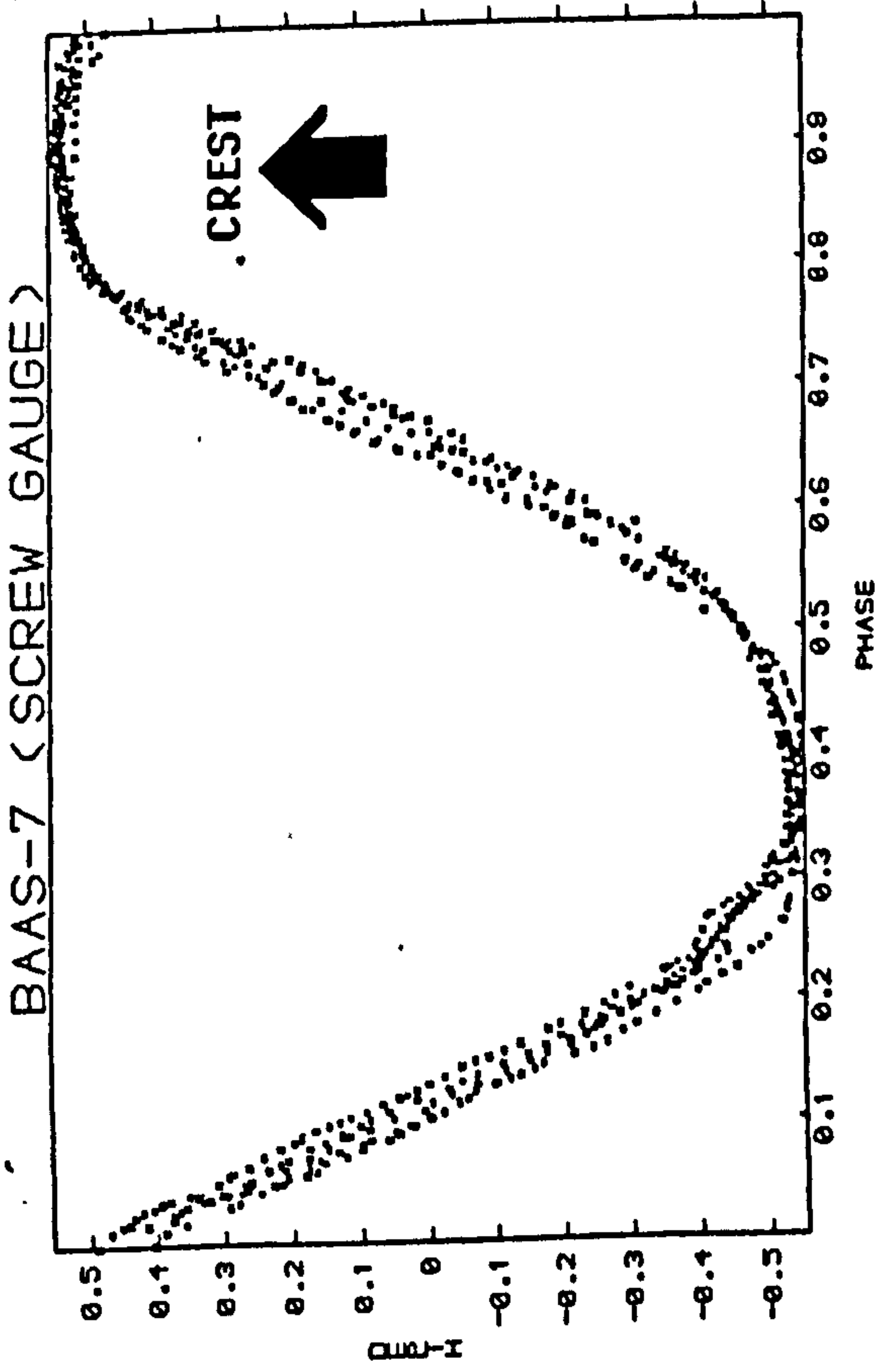
Pratt & Whitney  
(Geo. M. Bond)

Date:

1899

Ser./Acq. No.

N/A



Mu

Filar

Scale

Bench

Div. Eng.

Adjust.

Leveling

Focus

Eye P.

Tube

Tool

Gauge

Binding

Misc.

(External gauge)



Characteristics:

Screw ☒ Nut ☐

Leng: N/A / N/A

Diameter: N/A

Steel ☒ Brass ☐

Other:

Instrument Identification:

Study Code: BAAS-13

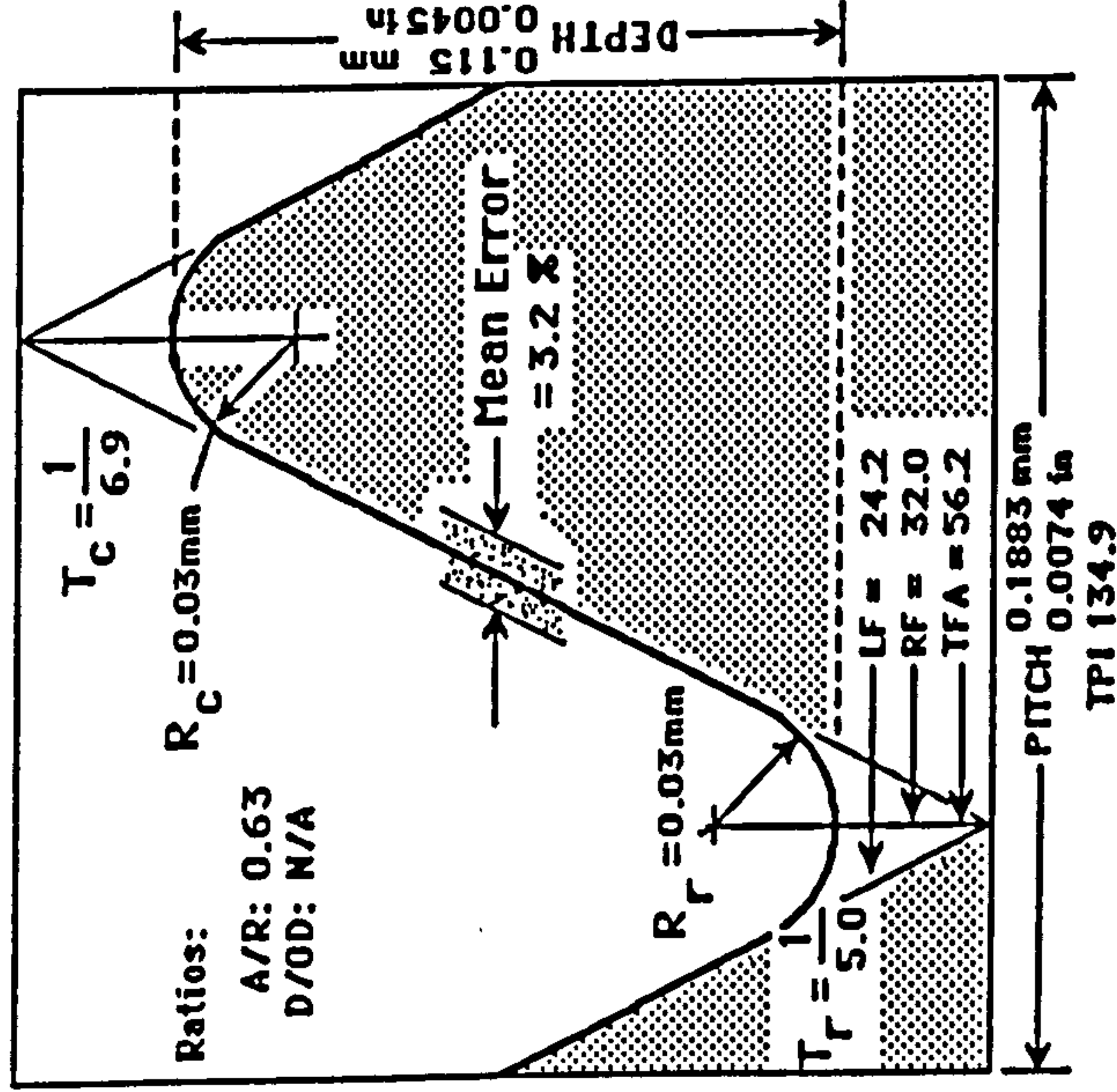
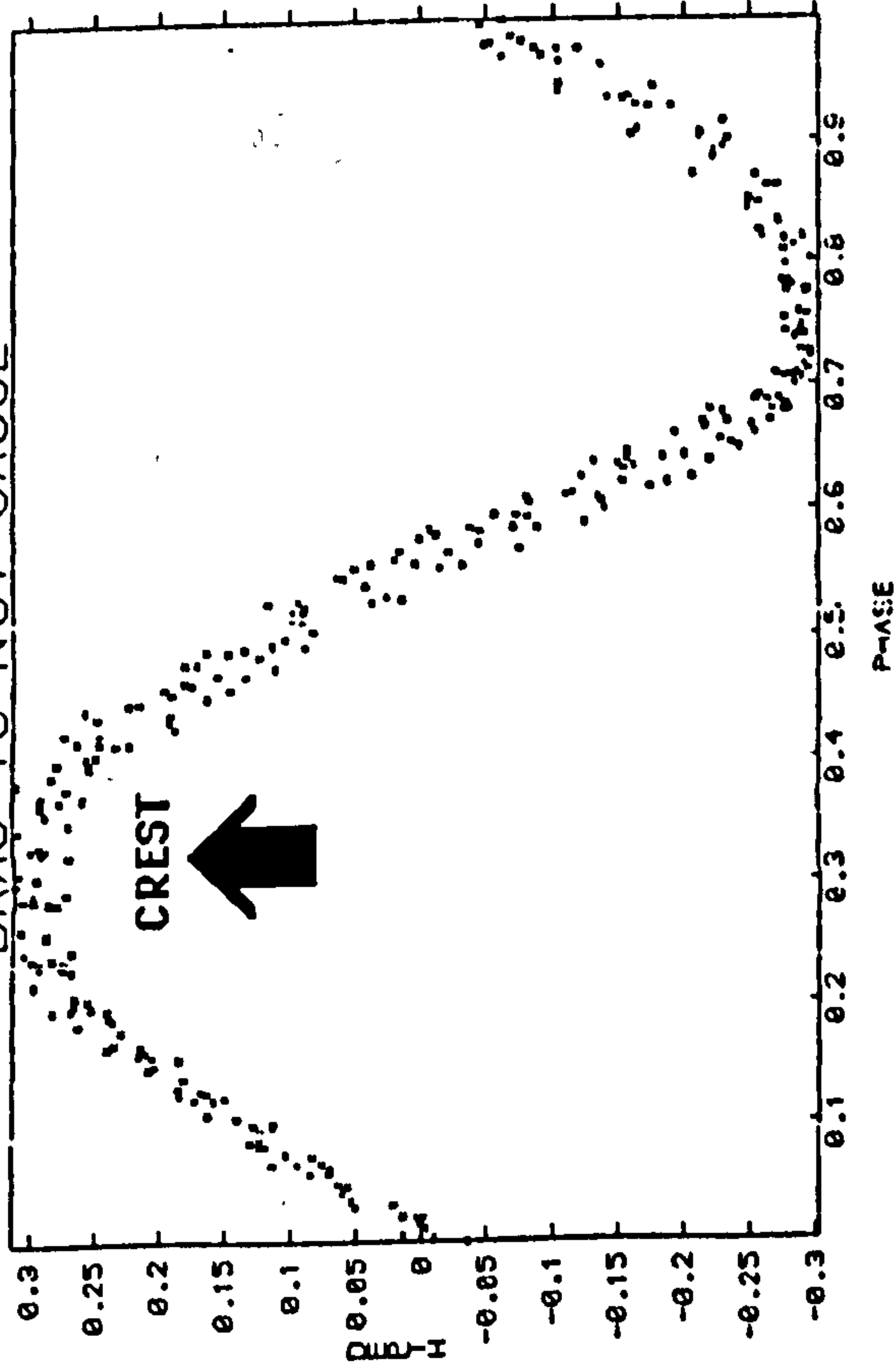
Instrument: Nut gauge

Maker: Pratt & Whitney  
(Geo. M. Bond)

Date: 1899

Ser./Acq. No. N/A

BAAS-13 NUT GAUGE



Mu — [ Filar Scale Bench Div. Eng. Adjust. Leveling Focus Eye P. Tube Tool Gauge Binding Misc. (Internal gauge) ]



Characteristics:

Screw ☐ Nut ☒

Leng: N/A / N/A

Diameter: N/A

Steel ☒ Brass ☐

Other: ☐

Instrument Identification:

Study Code: BAAS-13

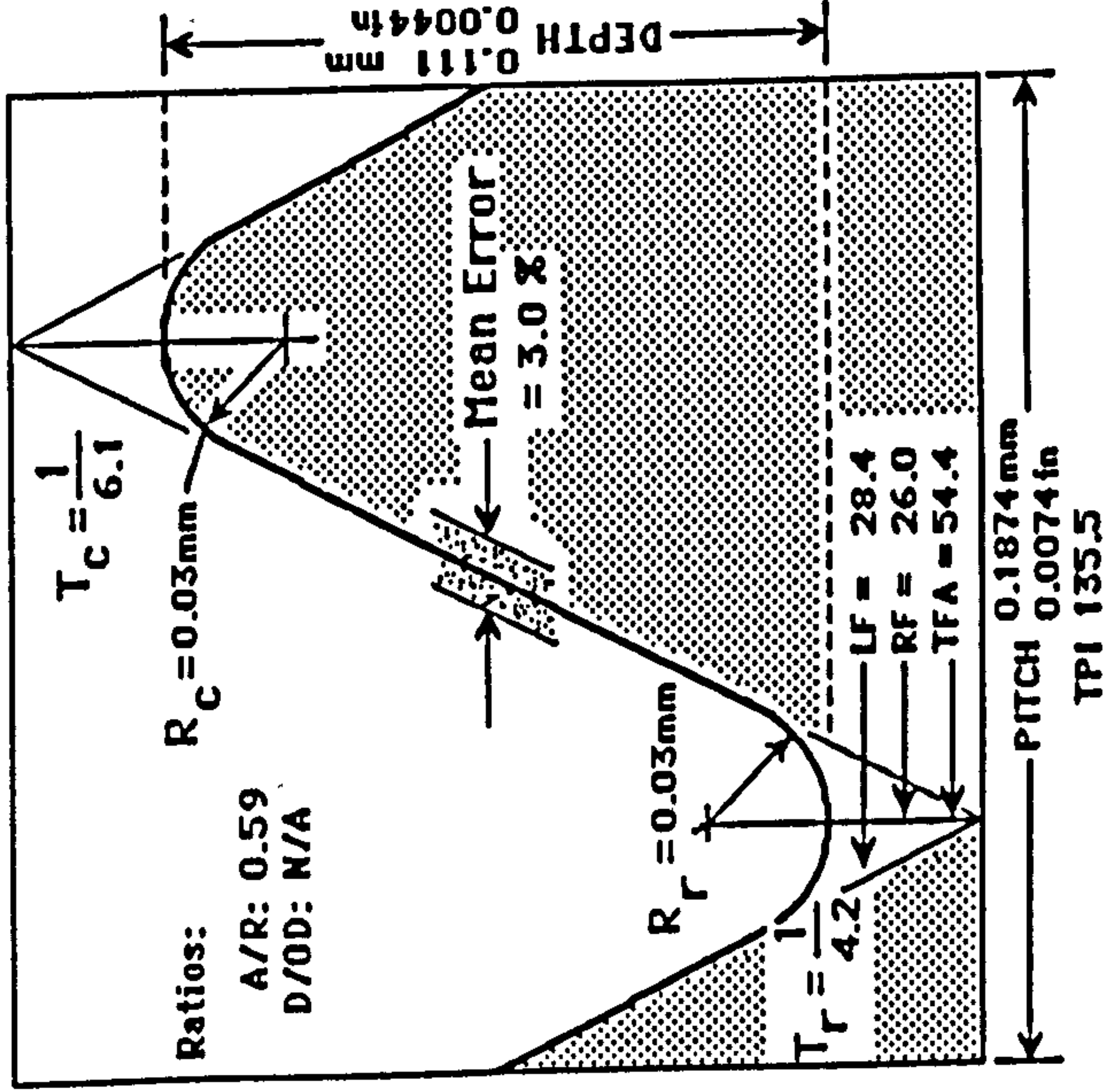
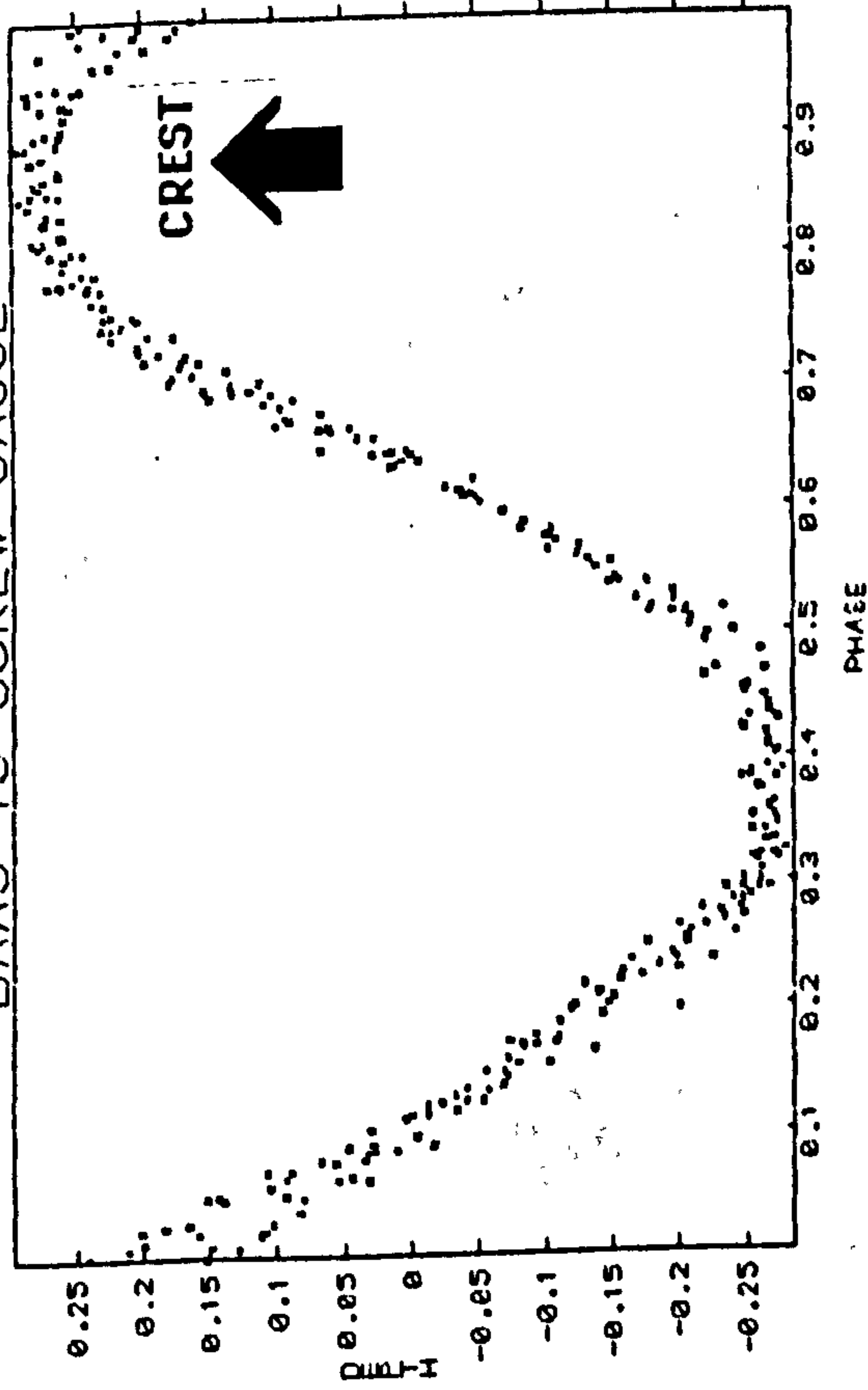
Instrument: Screw Gauge

Maker: Pratt & Whitney  
(Geo. M. Bond)

Date: 1899

Ser./Acq. No. N/A

BAAS-13 SCREW GAUGE



Mu

Filar

Scale

Bench

Div. Eng.

Adjust.

Leveling

Focus

Eye P.

Tube

Tool

Gauge

Binding

Misc.

(External gauge)

Characteristics:

Screw

Nut

Leng: 0.594 / N/A

Diameter: N/A

Steel

Brass

Other:

Instrument Identification:

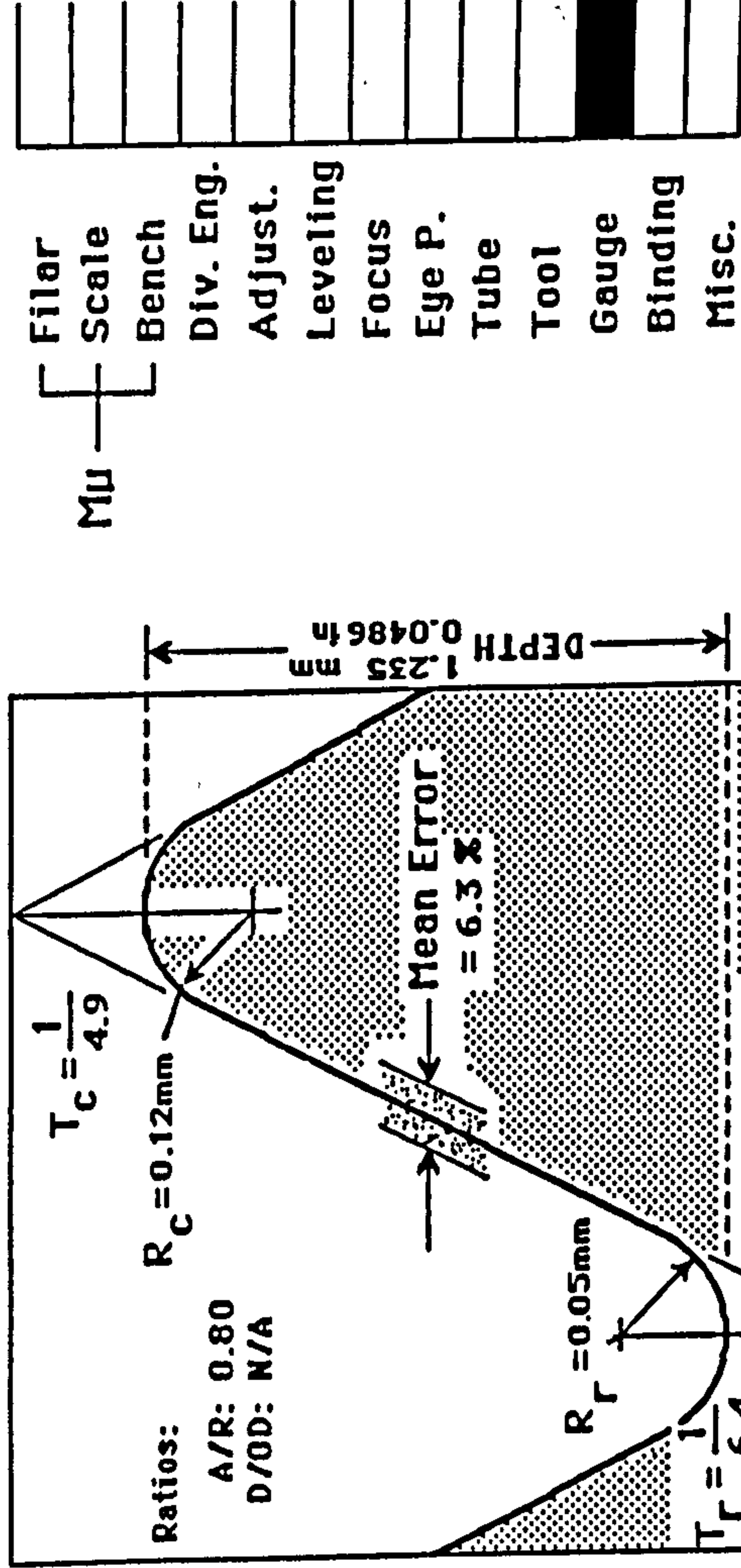
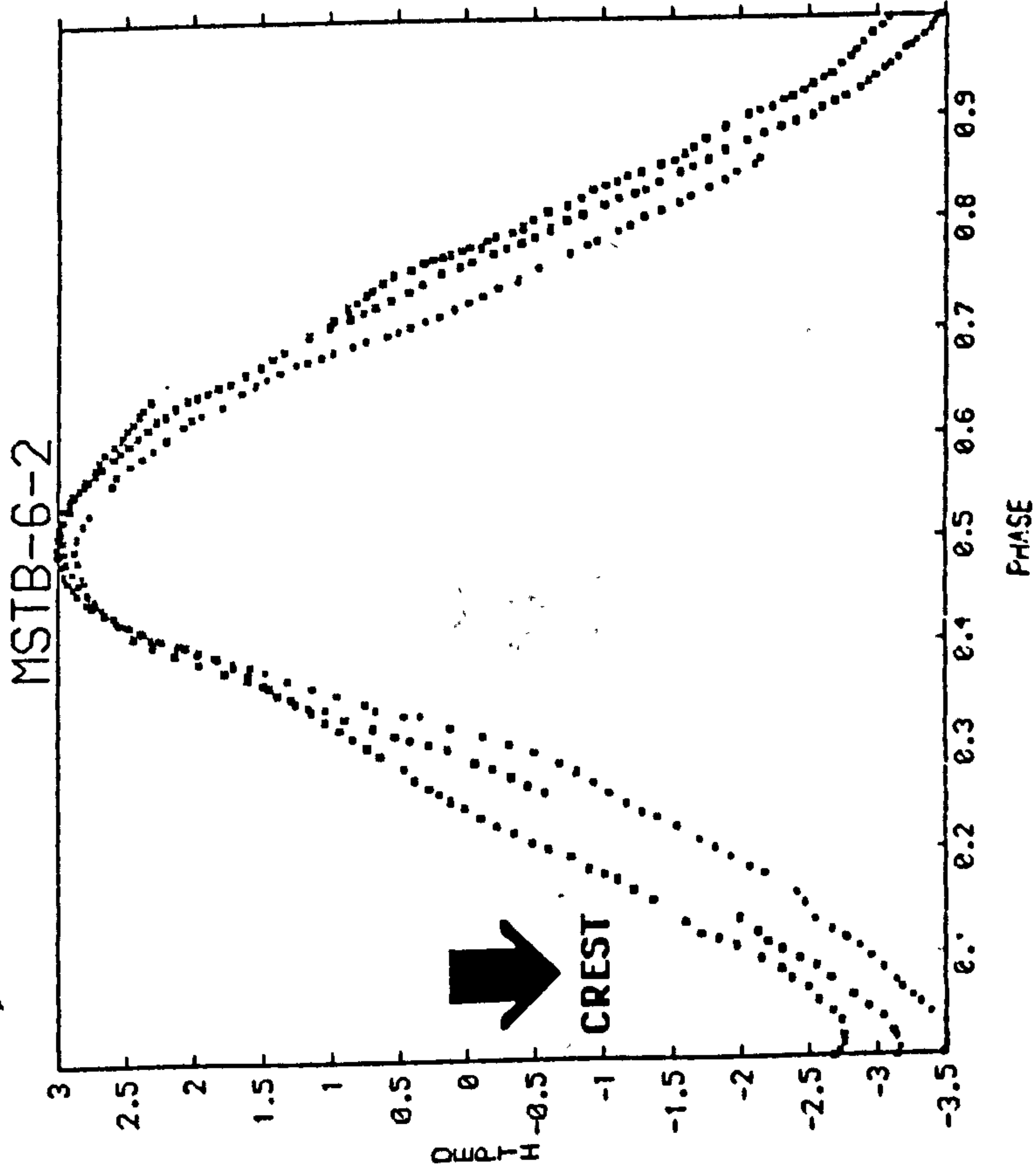
Study Code: MSTB-6-2

Instrument: Screw gauge

Maker: Holtzapffel

Date: 2nd h 19th c

Ser./Acq. No.



Characteristics:

Screw

Nut

Leng: 0.531" / N/A

Diameter: N/A

Steel

Brass

Other:

Instrument Identification:

Study Code: MSTB-6-4

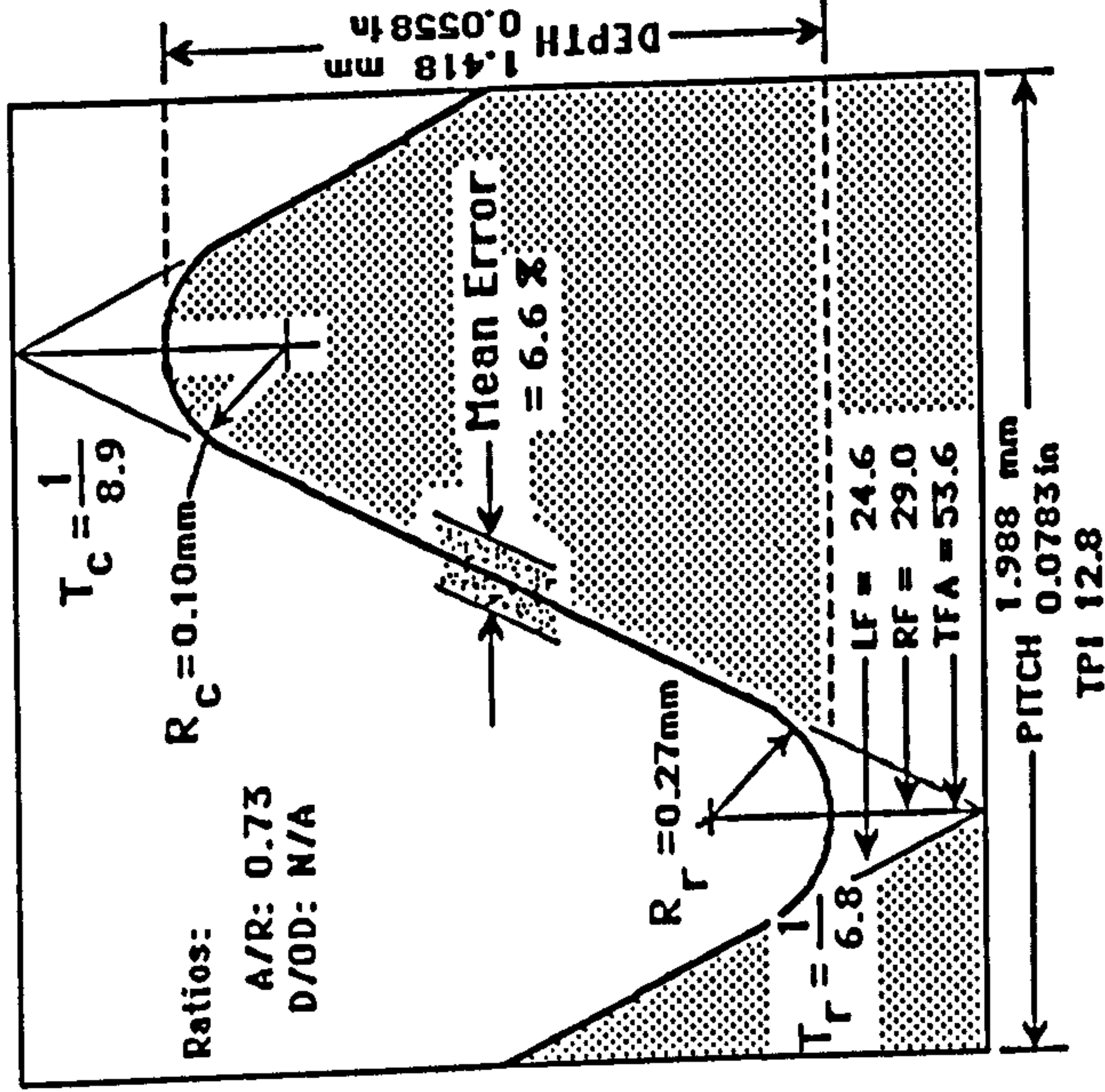
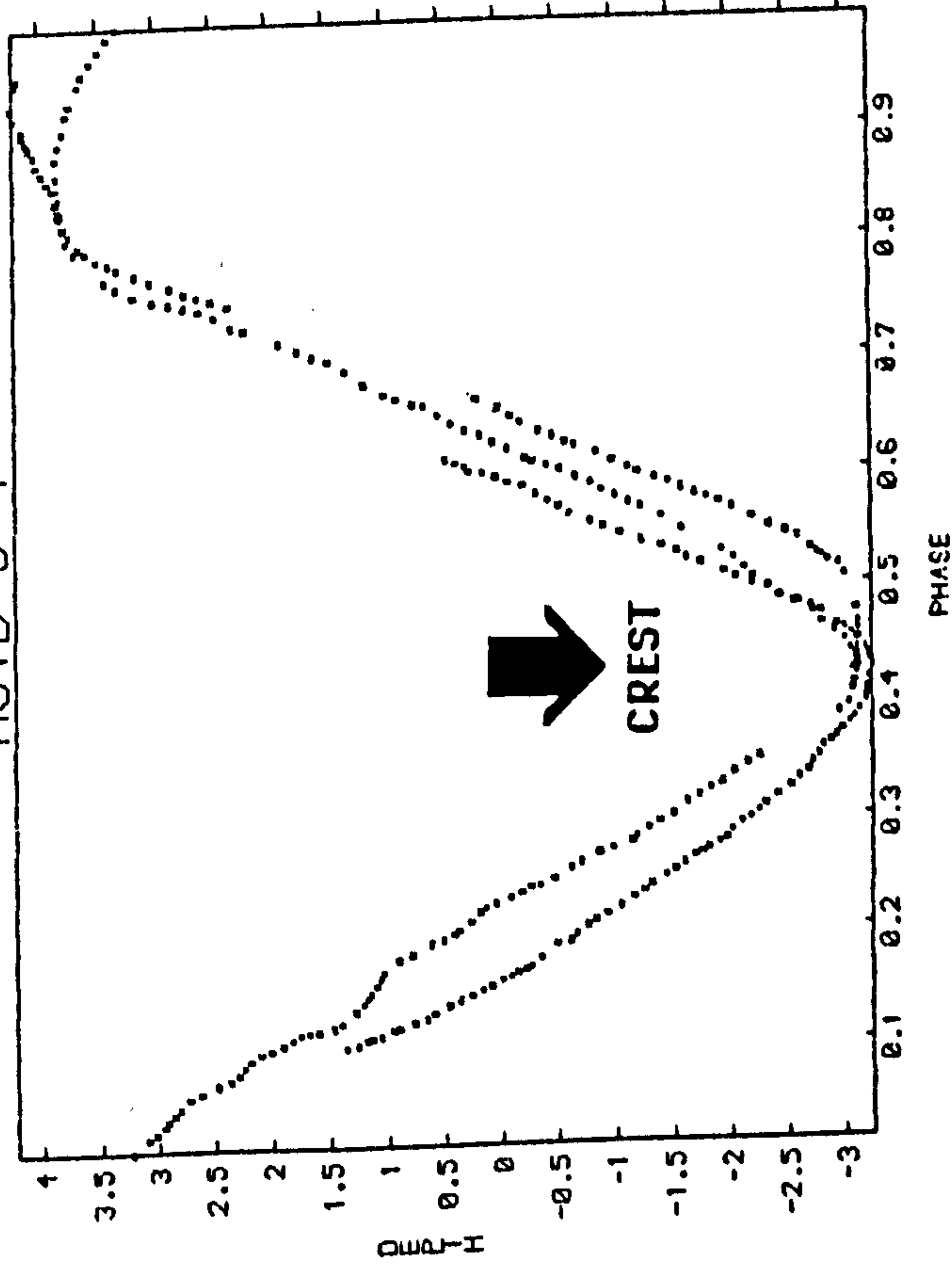
Instrument: Screw gauge

Maker: Holtzapffel

Date: ca.1860

Ser./Acq. No. None

MSTB-6-4



Mu

Filar

Scale

Bench

Div. Eng.

Adjust.

Leveling

Focus

Eye P.

Tube

Tool

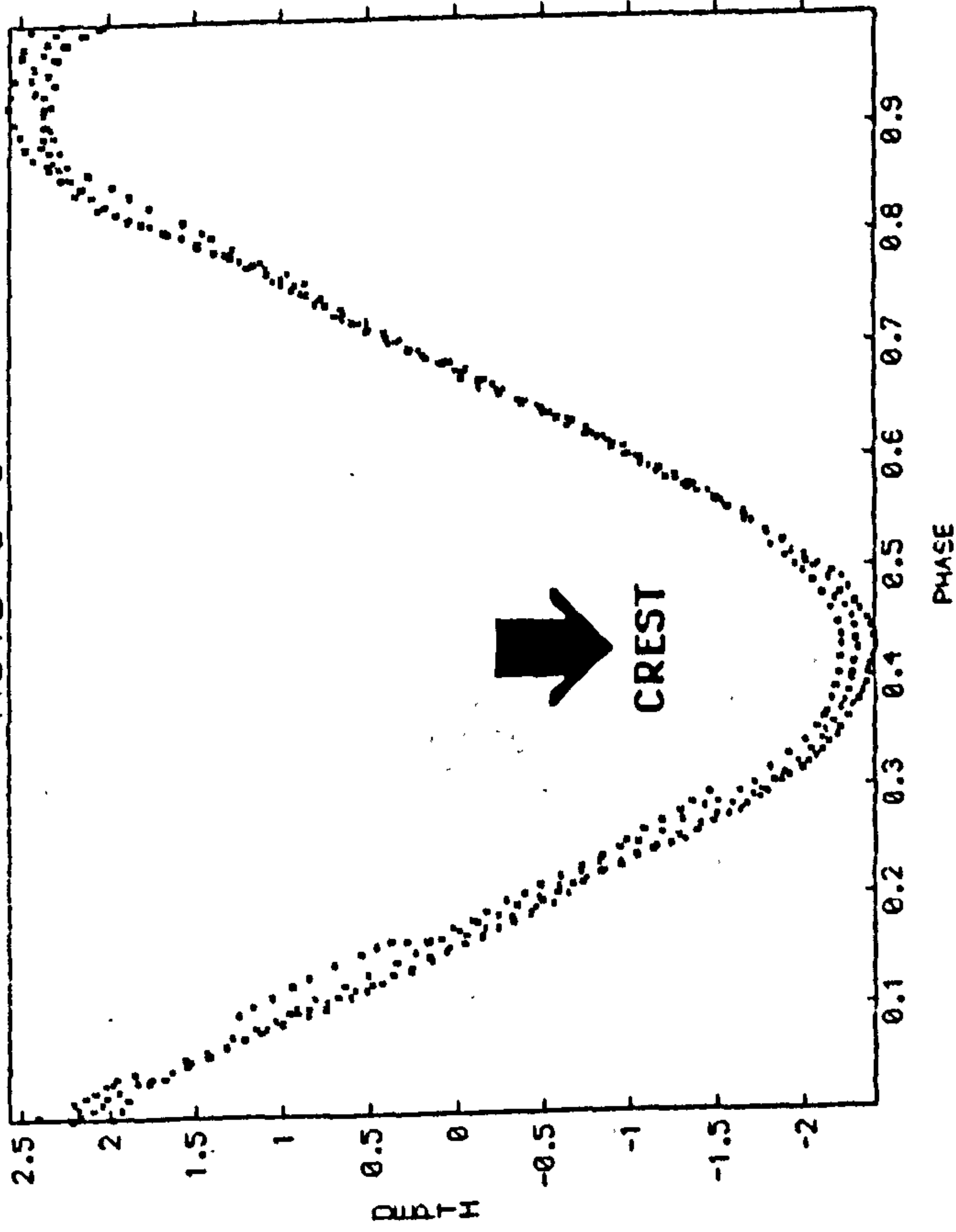
Gauge

Binding

Misc.

(External gauge)

MSTB-6-6



Characteristics:

Screw ☒ Nut ☐

Leng: 0.547" / N/A

Diameter: N/A

Steel ☐ Brass ☒

Other:

Instrument Identification:

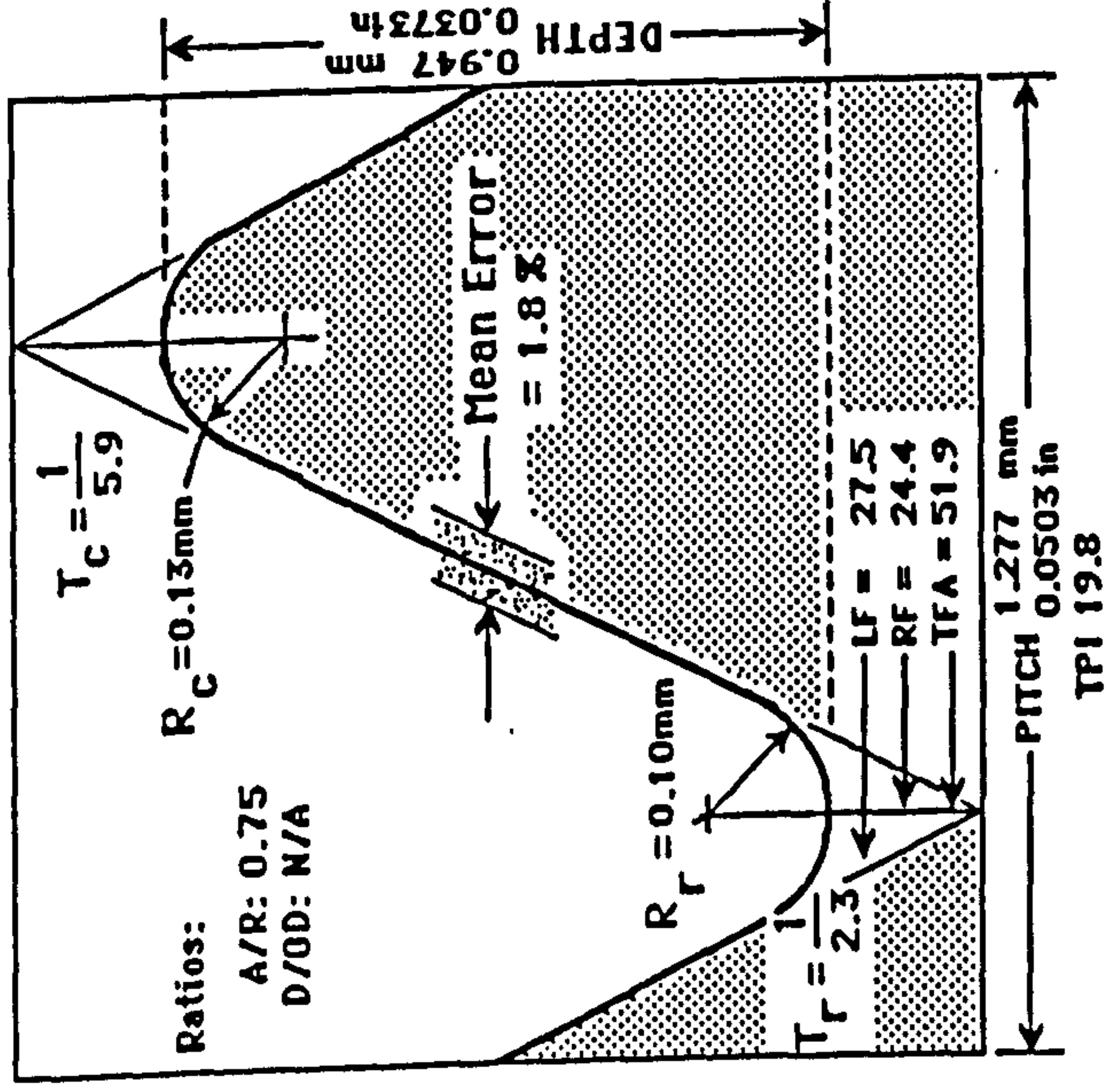
Study Code: MSTB-6-6

Instrument: Screw gauge

Maker: Holtzapffel

Date: ca. 1860

Ser./Acq. No. None



Mu — [	Filar	
	Scale	
	Bench	
	Div. Eng.	
	Adjust.	
	Leveling	
	Focus	
	Eye P.	
	Tube	
	Tool	
	Gauge	
	Binding	
	Misc.	
	(External gauge)	



Characteristics:

Screw

Nut

Leng: 0.502" / N/A

Diameter: N/A

Steel

Brass

Other:

Instrument Identification:

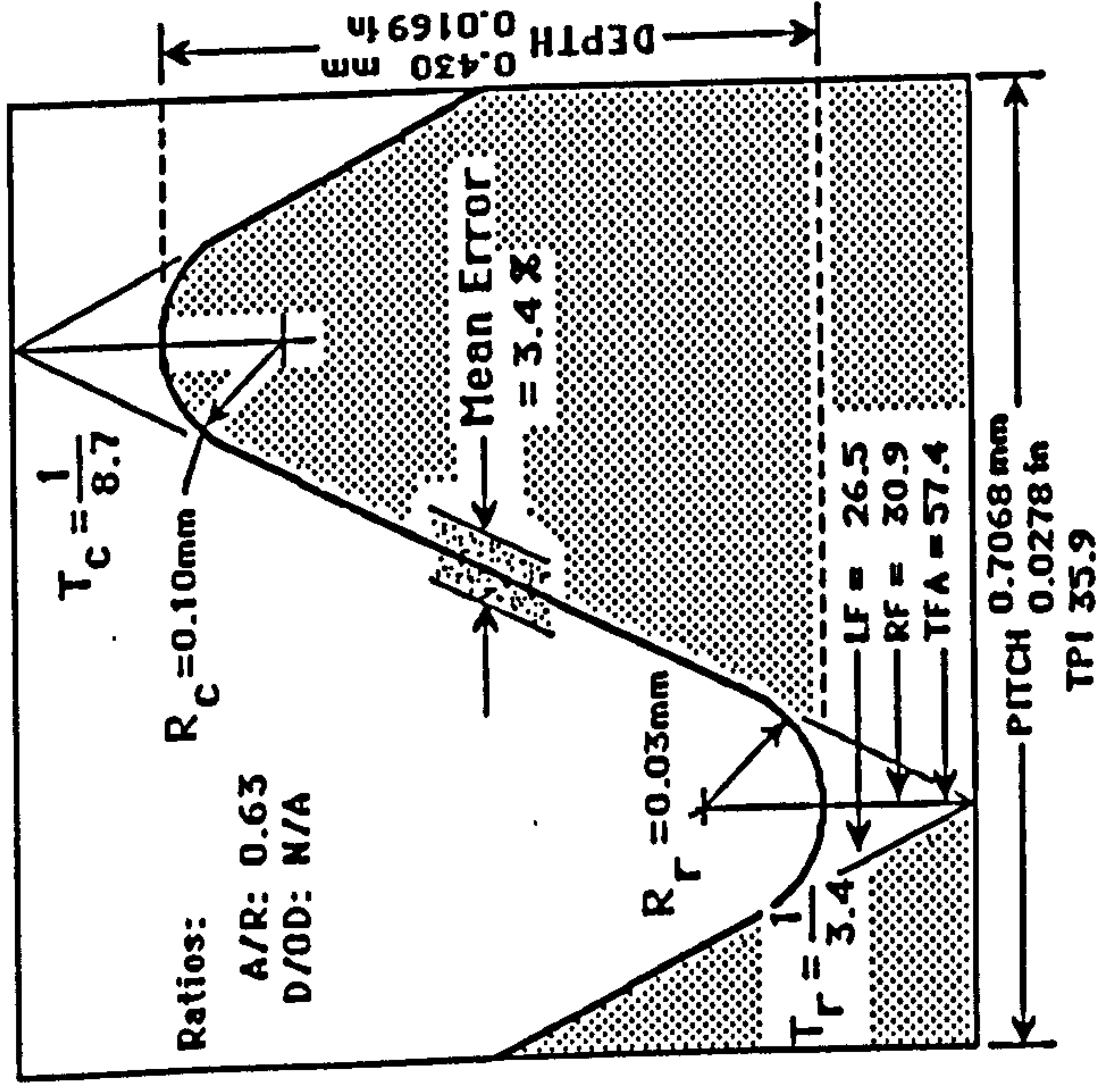
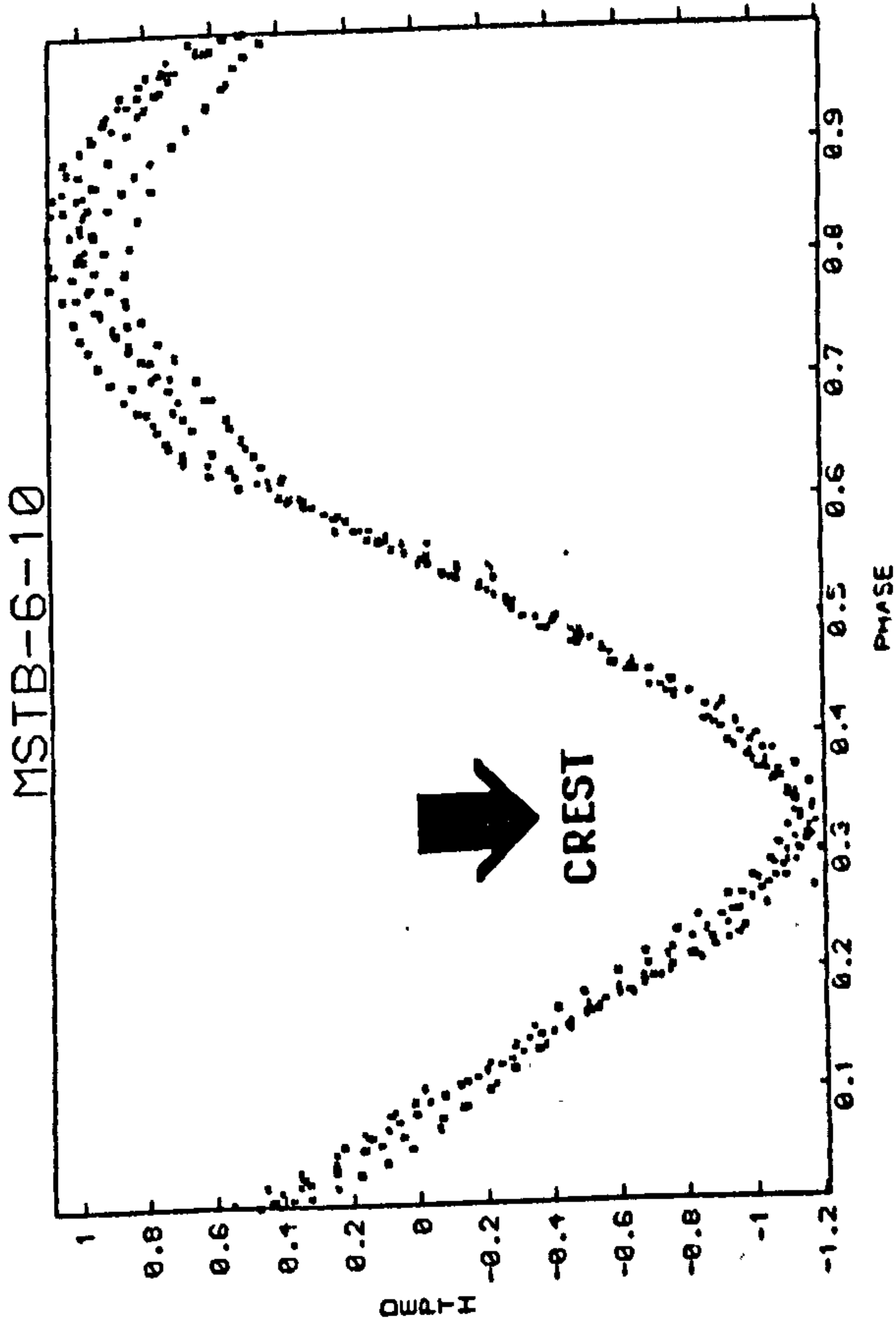
Study Code: MSTB-6-10

Instrument: Screw gauge

Maker: Holtzapffel

Date: 2nd h 19th c

Ser./Acq. No. None



Mu

Filar

Scale

Bench

Div. Eng.

Adjust.

Leveling

Focus

Eye P.

Tube

Tool

Gauge

Binding

Misc.

(External gauge)

Characteristics:

Screw

Nut

Leng: 0.502"

/N/A

Diameter: N/A

Steel

Brass

Other:

Instrument Identification:

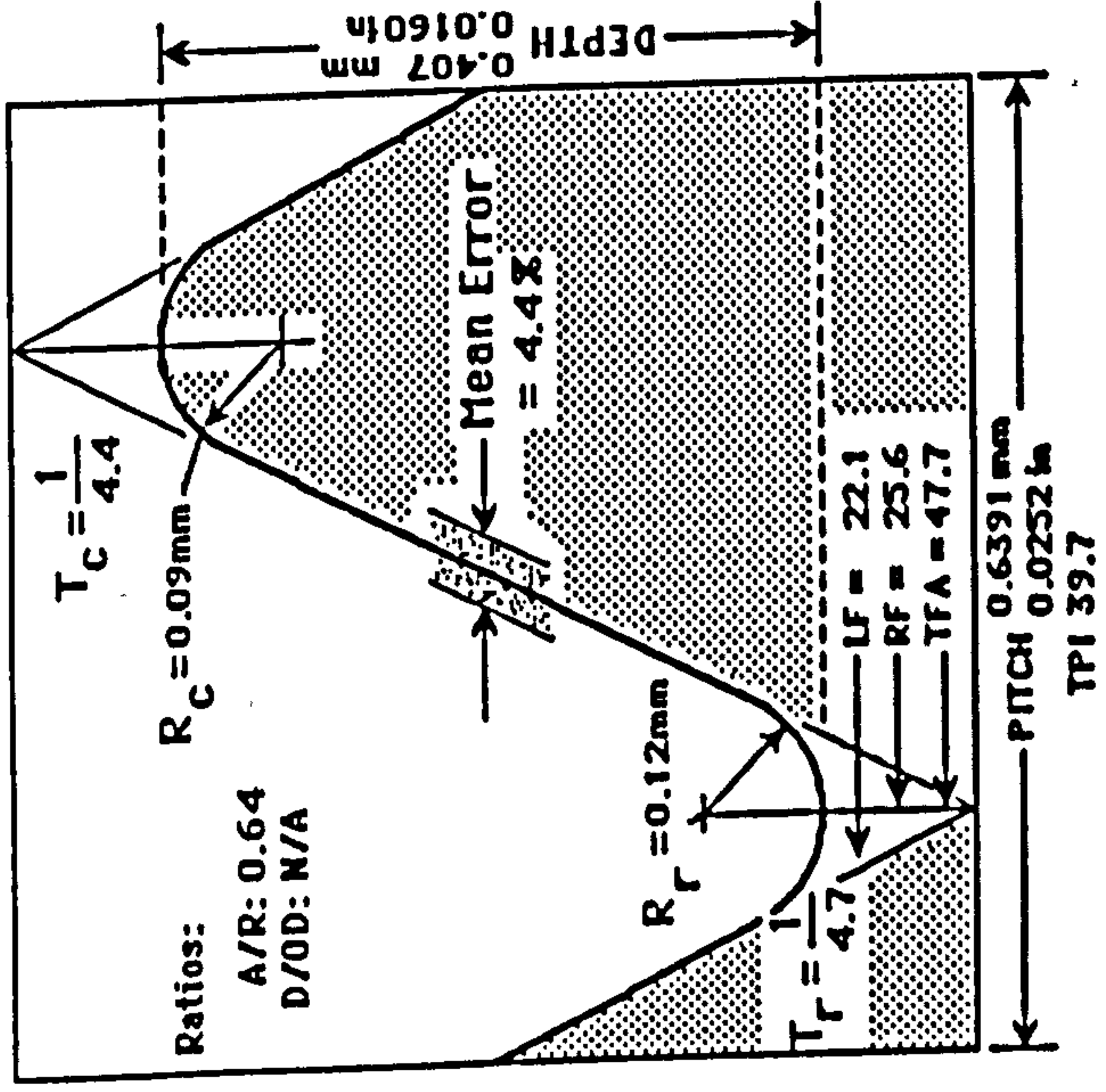
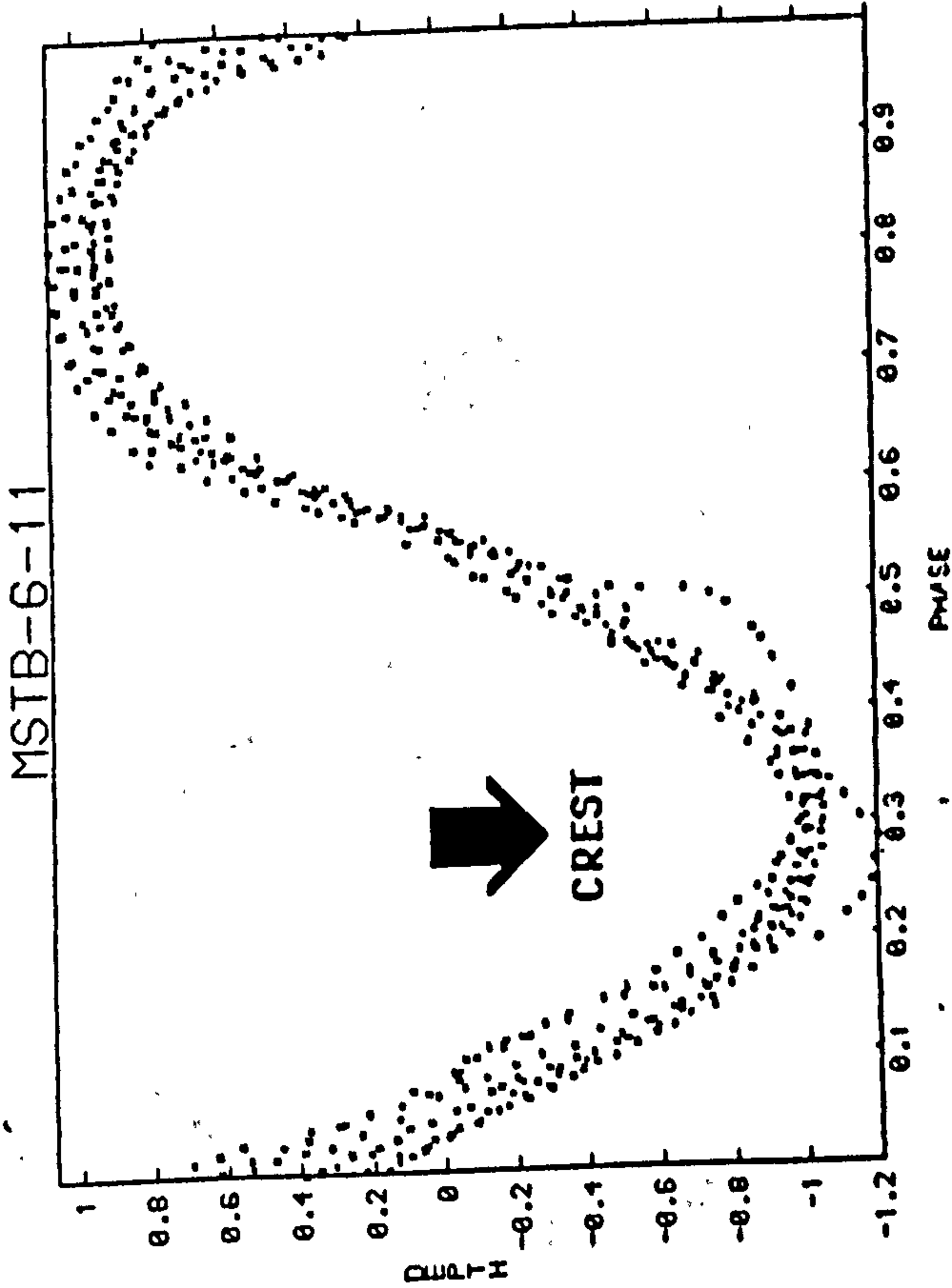
Study Code: MSTB-6-11

Instrument: Screw gauge

Maker: Holtzapffel

Date: 2nd h 19th c

Ser./Acq. No. None



Mu

Filar

Scale

Bench

Div. Eng.

Adjust.

Leveling

Focus

Eye P.

Tube

Tool

Gauge

Binding

Misc.

(External gauge)

Characteristics:

Screw ☐ Nut ☒

Leng: 0.502 / N/A

Diameter: N/A

Steel ☐ Brass ☒

Other:

Instrument Identification:

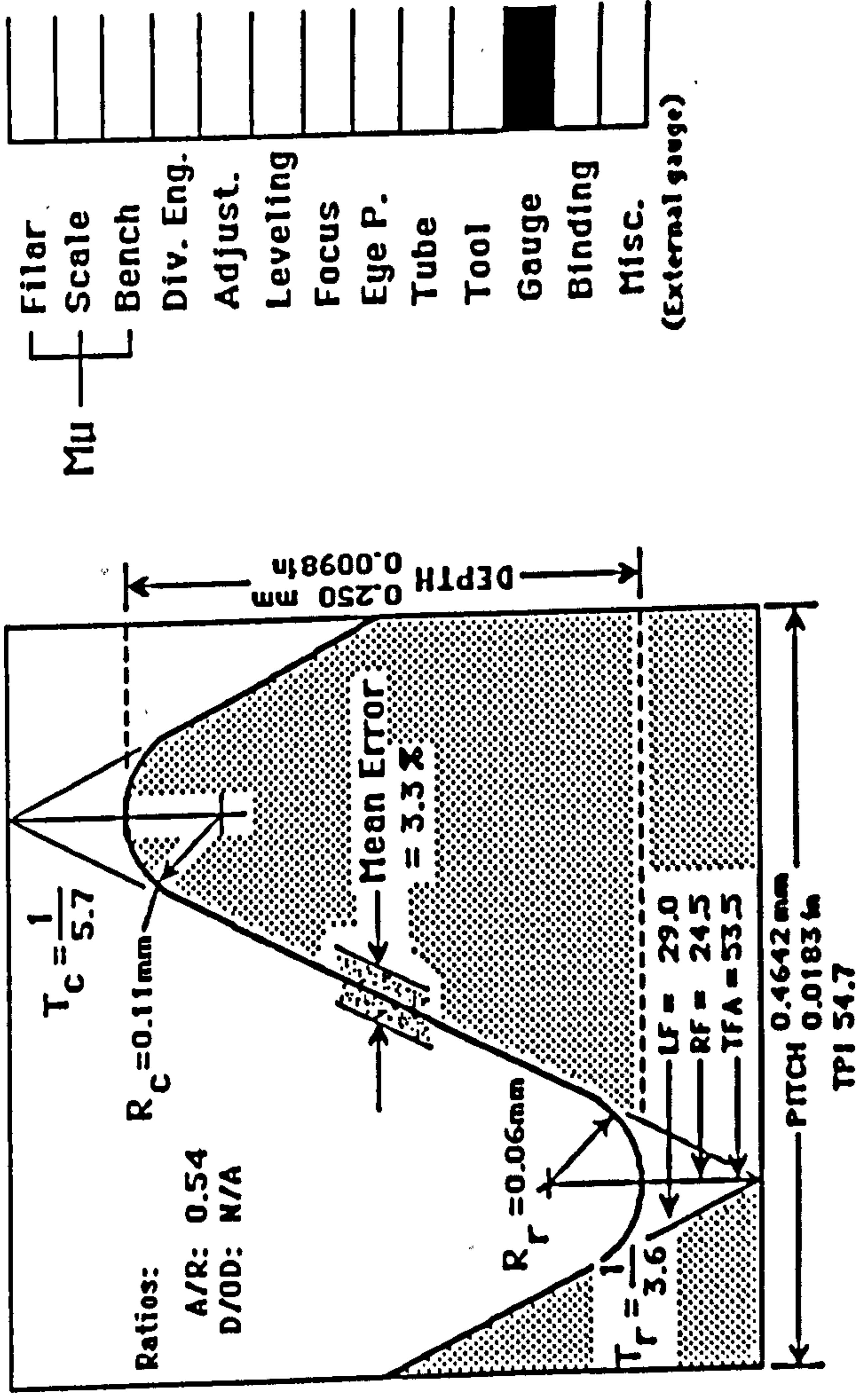
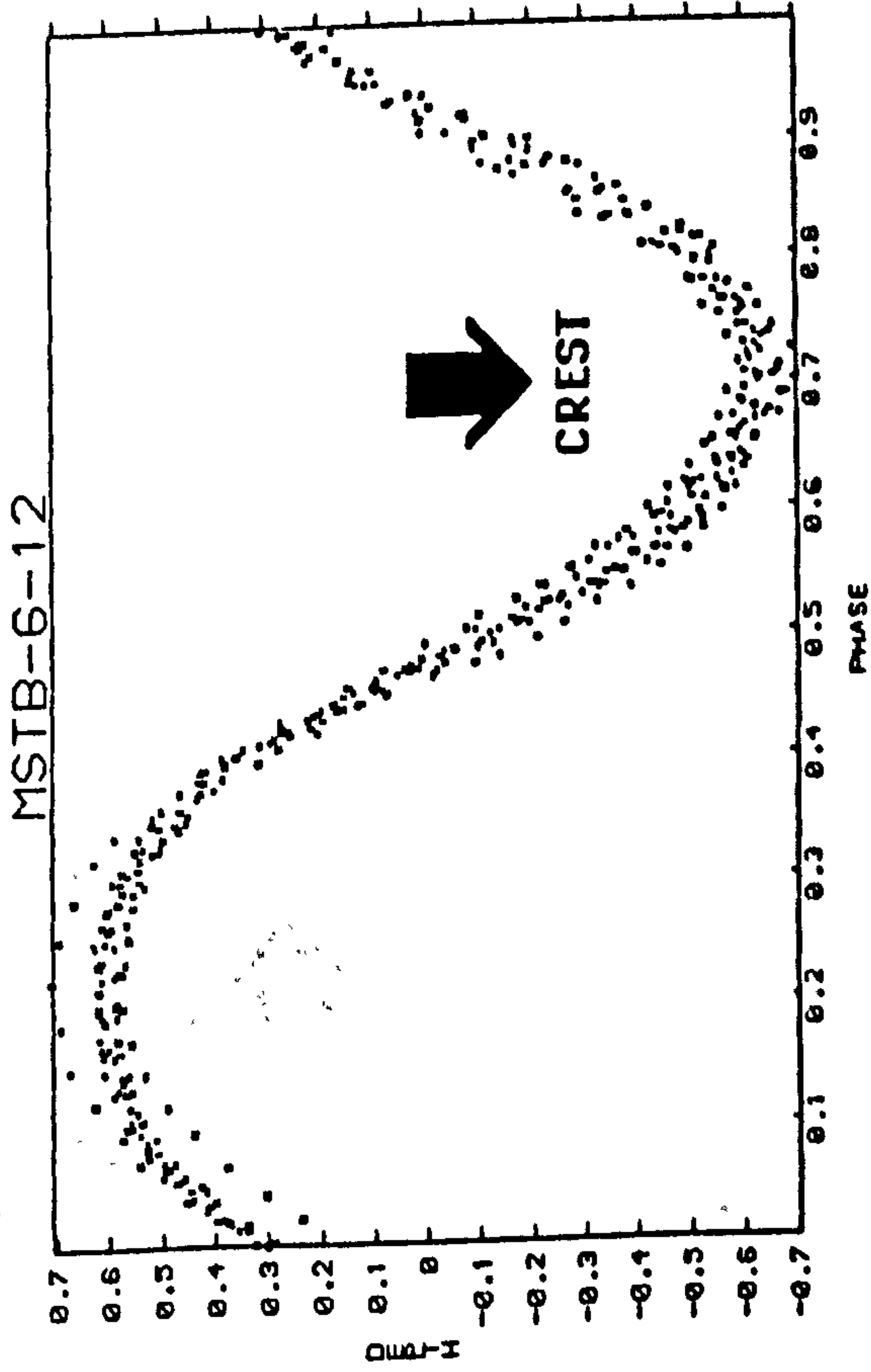
Study Code: MSTB-6-12

Instrument: Screw gauge

Maker: Holtzapffel

Date: 2nd h 19th c

Ser./Acq. No. None



Characteristics:

Screw

Nut

Leng: ~0.625"

Diameter: N/A

Steel

Brass

Other:

Instrument Identification:

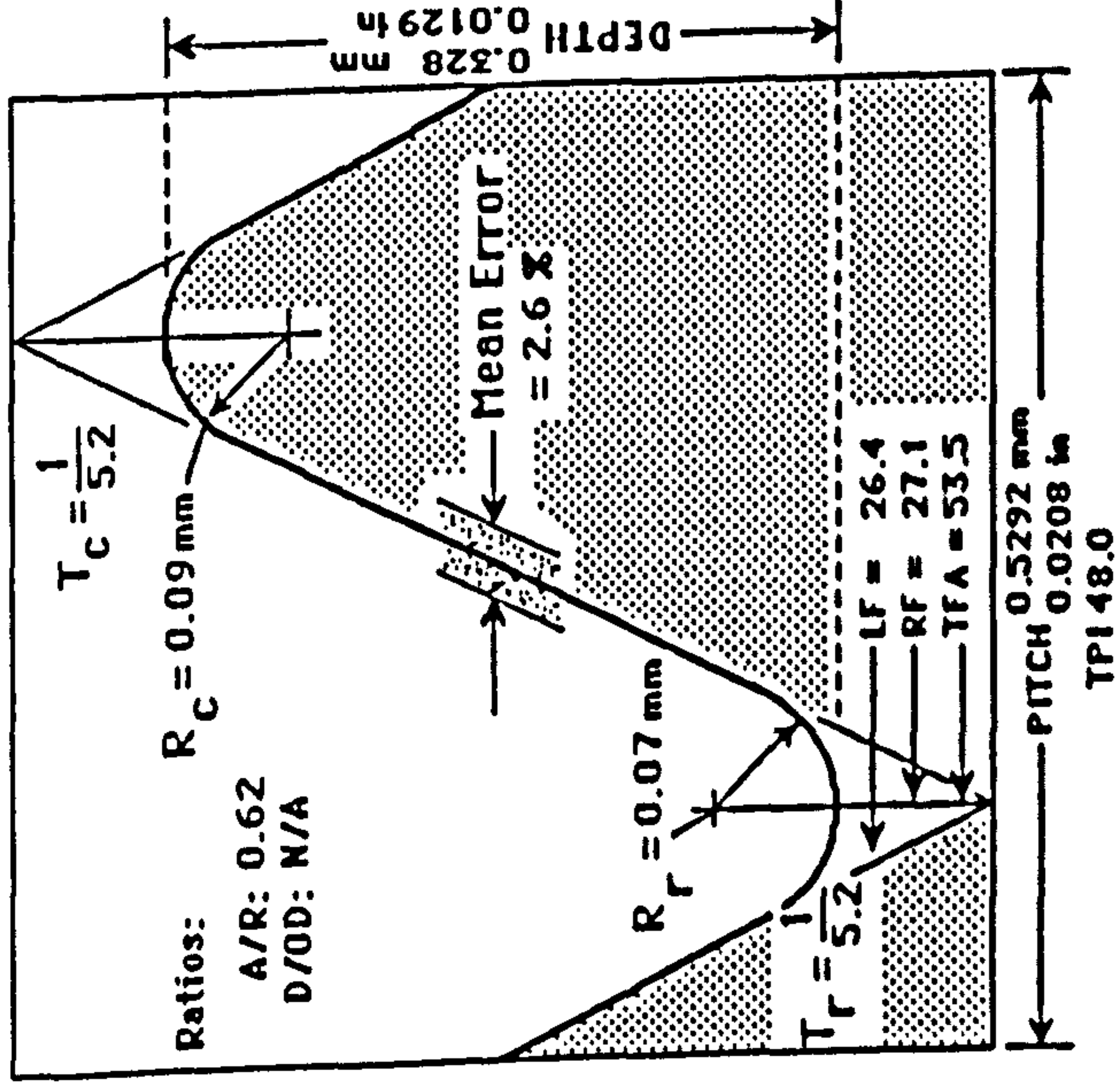
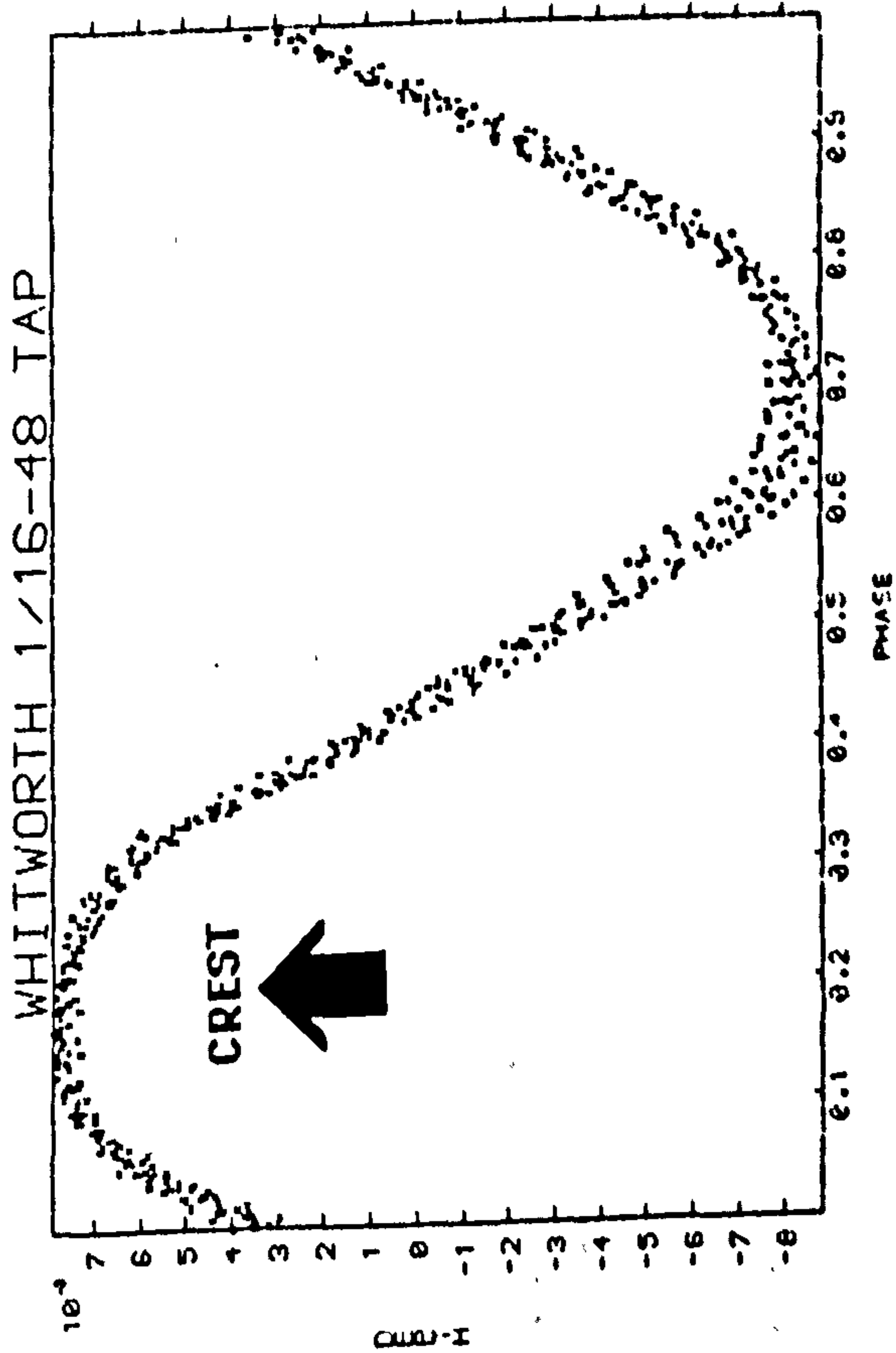
Study Code: Tap 1/16-48 Whit.

Instrument: Feeler gauge

Maker: Moore & Wright

Date: 3rd q 20th c

Ser./Acq. No. .



MW

Filar

Scale

Bench

Div. Eng.

Adjust.

Leveling

Focus

Eye P.

Tube

Tool

Gauge

Binding

Misc.

Whitworth form  
(taken directly from gauge)



Characteristics:

Screw ☐ Nut ☐

Leng: ~0.625"

Diameter: N/A

Steel ☒ Brass ☐

Other:

Instrument Identification:

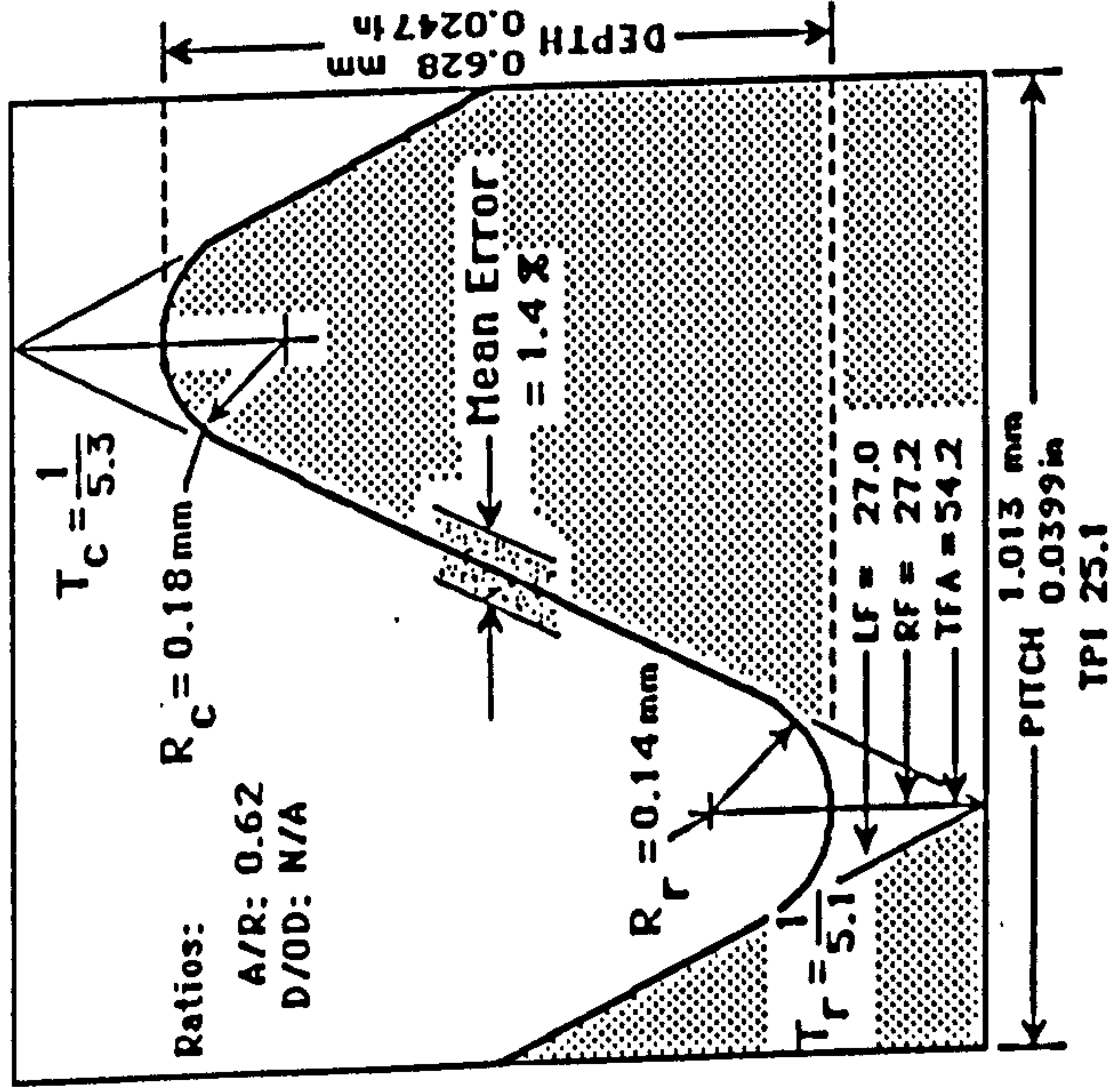
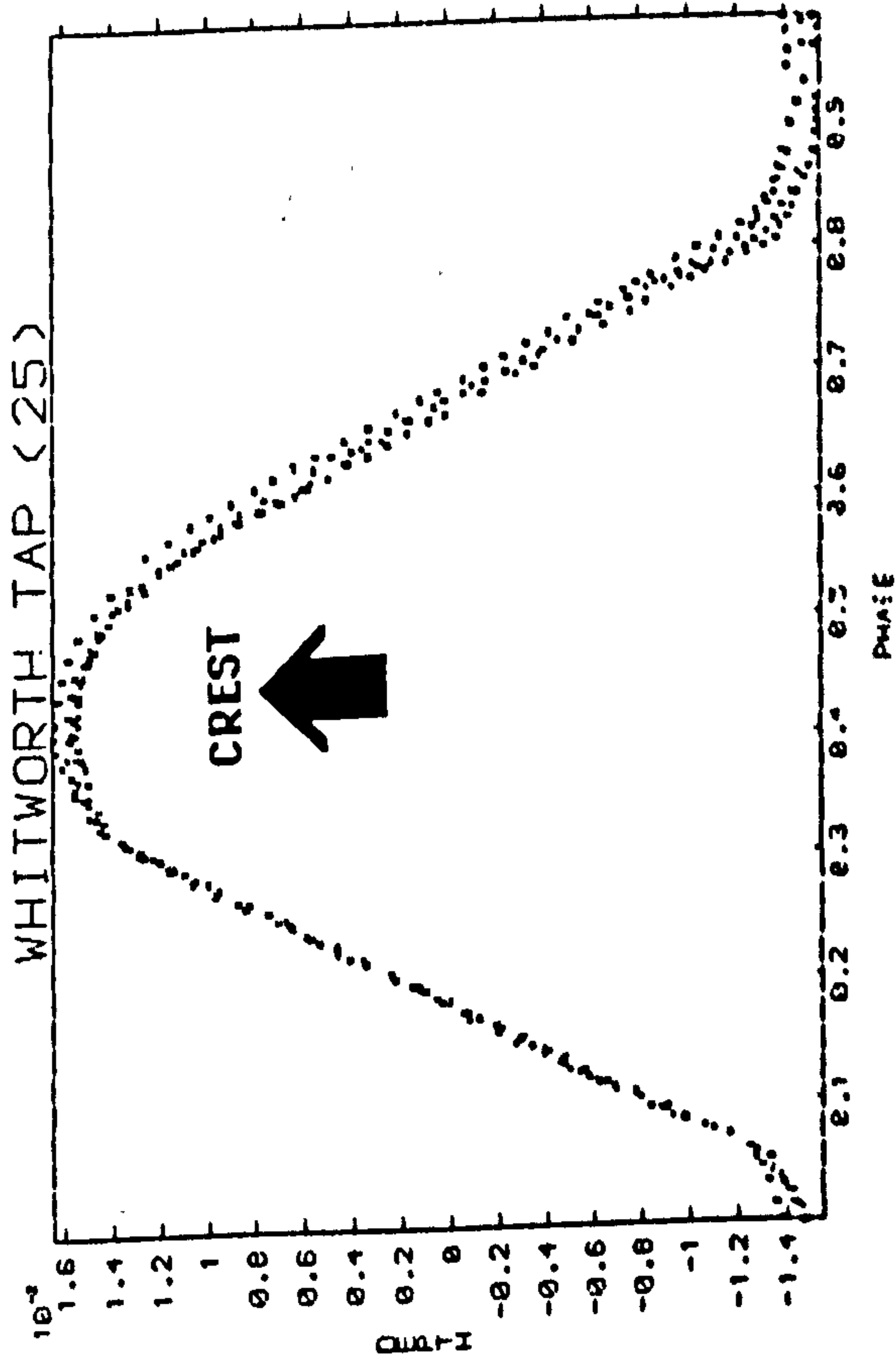
Study Code: Tap 1/4-25 Whit.

Instrument: Feeler guage

Maker: Moore & Wright

Date: 3rd q 20th c

Ser./Acq. No.:



Mu — [ Filar  
Scale  
Bench  
Div. Eng.  
Adjust.  
Leveling  
Focus  
Eye P.  
Tube  
Tool  
Gauge  
Binding  
Misc.

Whitworth form  
(taken directly from guage)

Characteristics:

Screw

☐

Nut

☒

Leng:

☐

n/a / circular

Diameter:

☐

0.130"

Steel

☐

Brass

☒

Other:

Instrument Identification:

Study Code:

MHS-2d

Instrument:

Micrometer-bifilar

Maker:

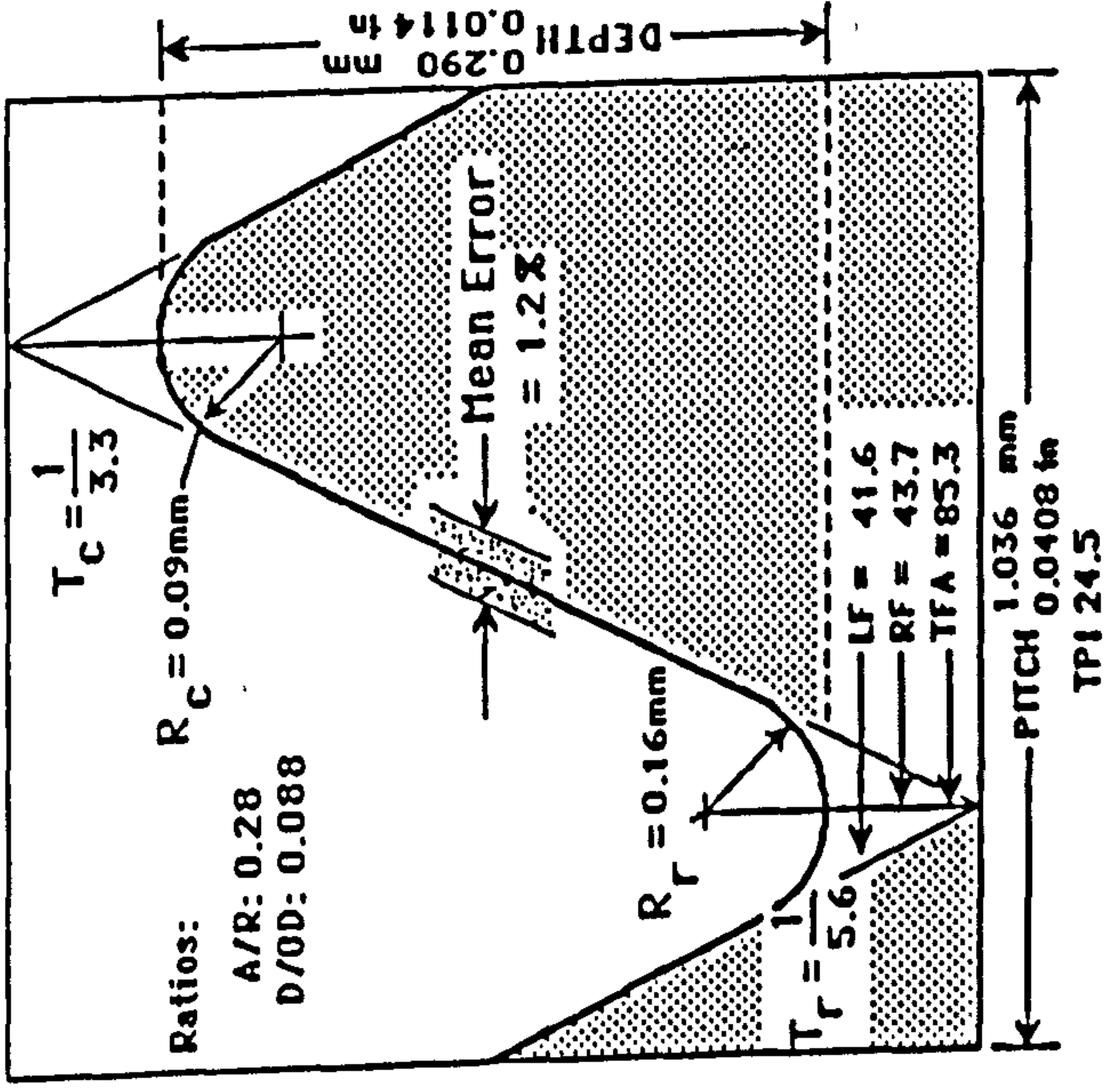
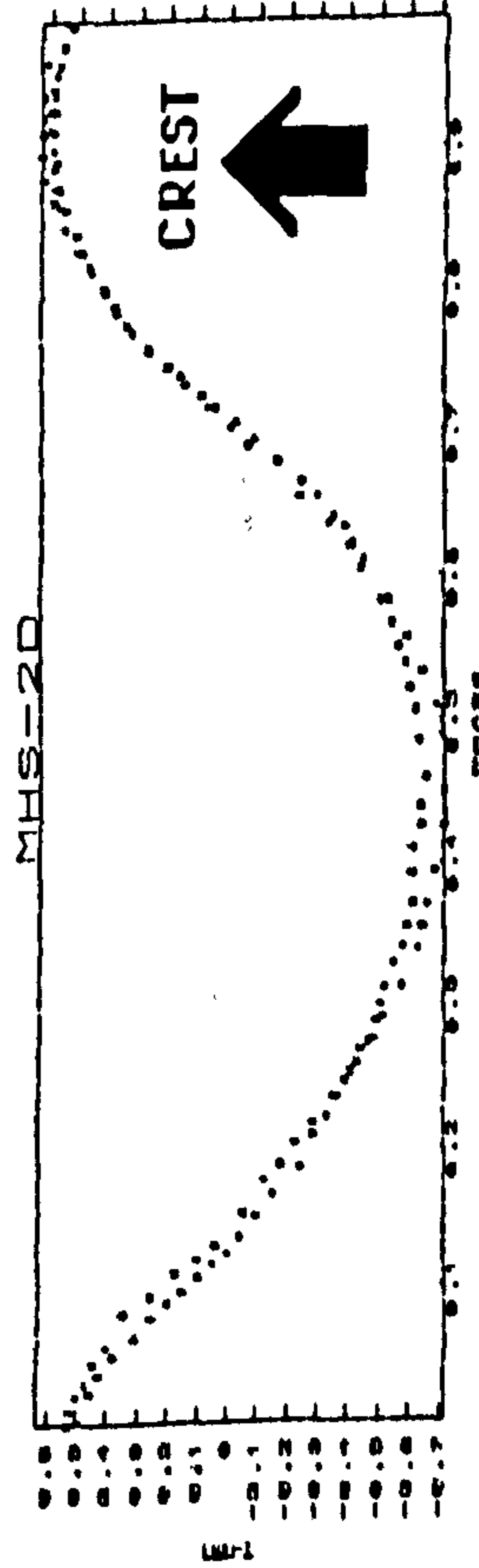
Thomas Jones

Date:

ca.1820

Ser./Acq. No.

79-23



Mu	Filar
	Scale
	Bench
	Div. Eng.
	Adjust.
	Leveling
	Focus
	Eye P.
	Tube
	Tool
	Gauge
	Binding
	(nut for Mu head reation)

Characteristics:

Screw

Nut

Leng: 2.0"

Diameter: 0.090"

Steel

Brass

Other:

Instrument Identification:

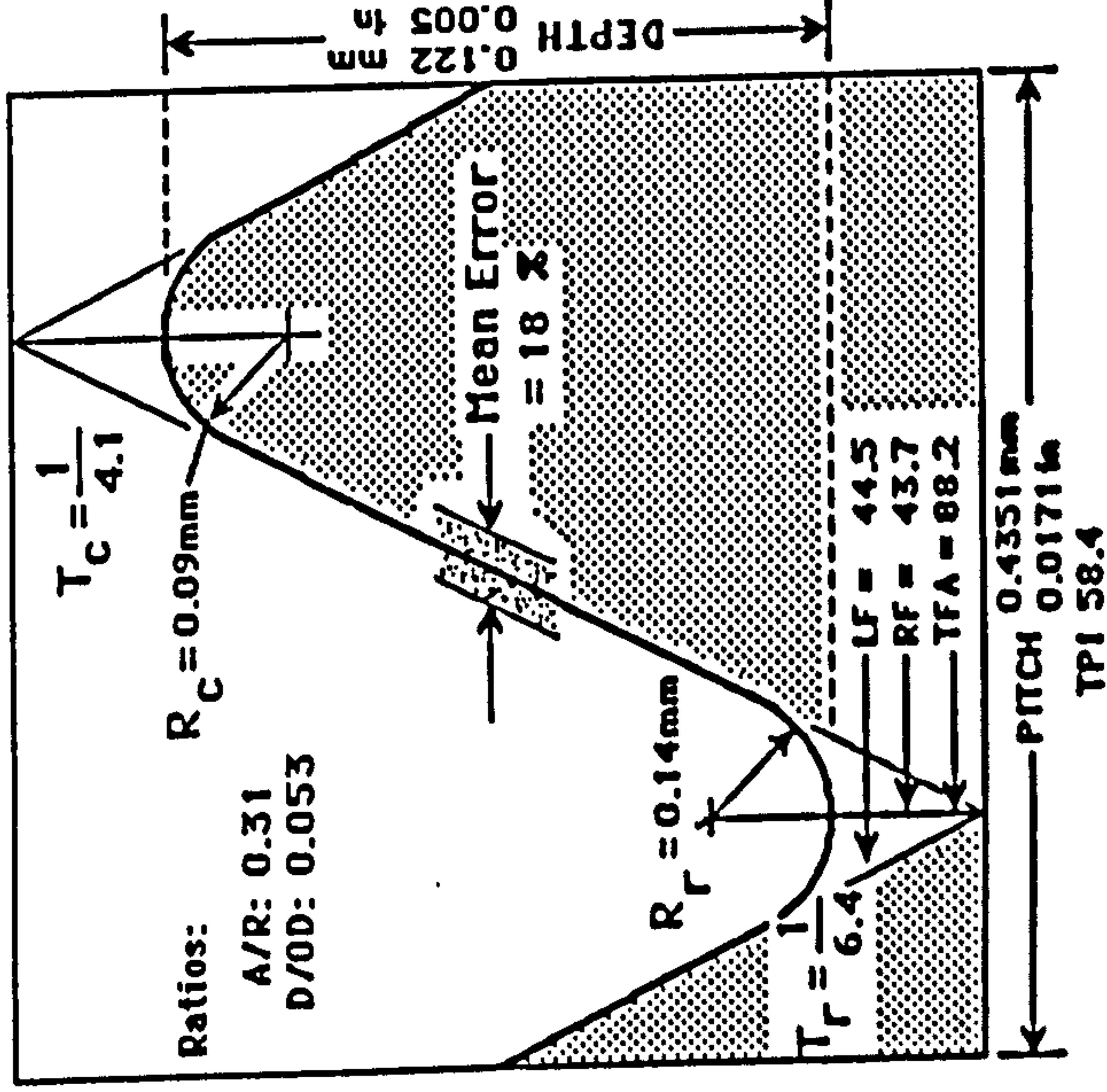
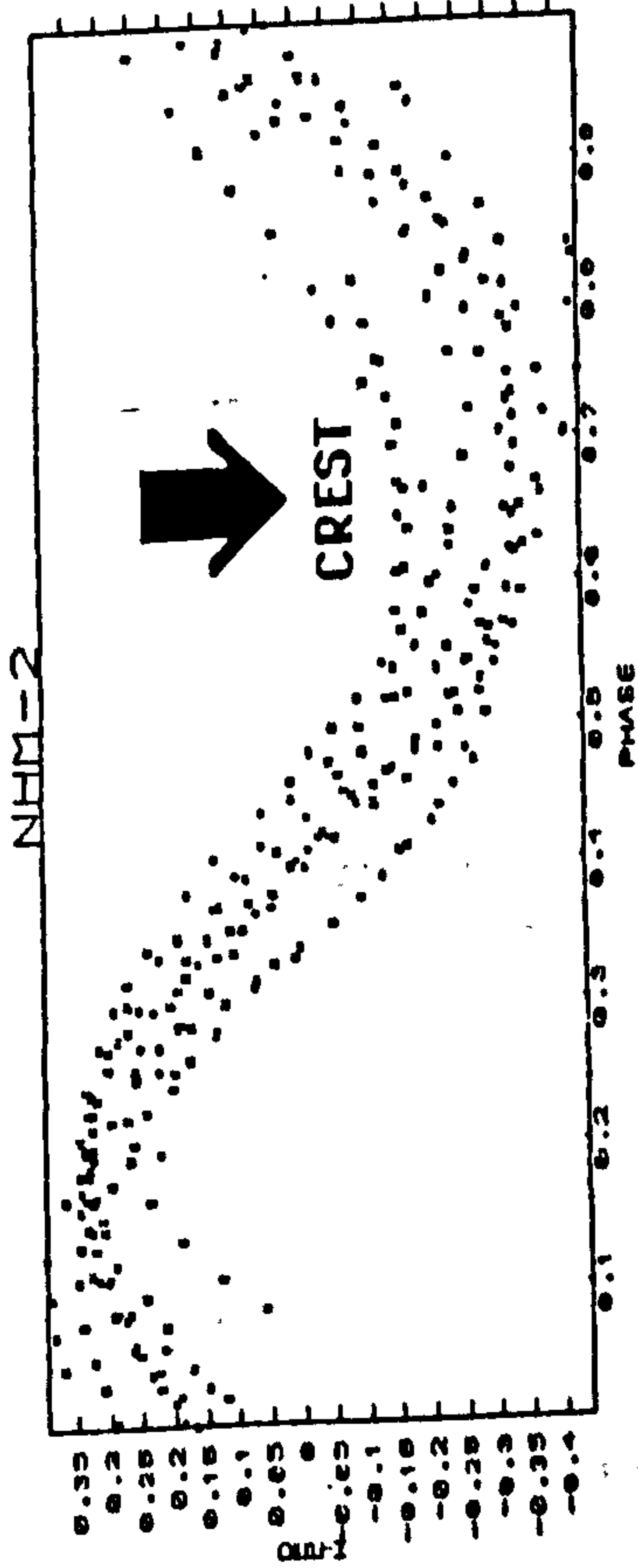
Study Code: NHM-2

Instrument: Pendulum bob

Maker: associated with Deacon

Date: e 19th c.?

Ser./Acq. No. none



Mu

Filar

Scale

Bench

Div. Eng. Adjust.

Leveling

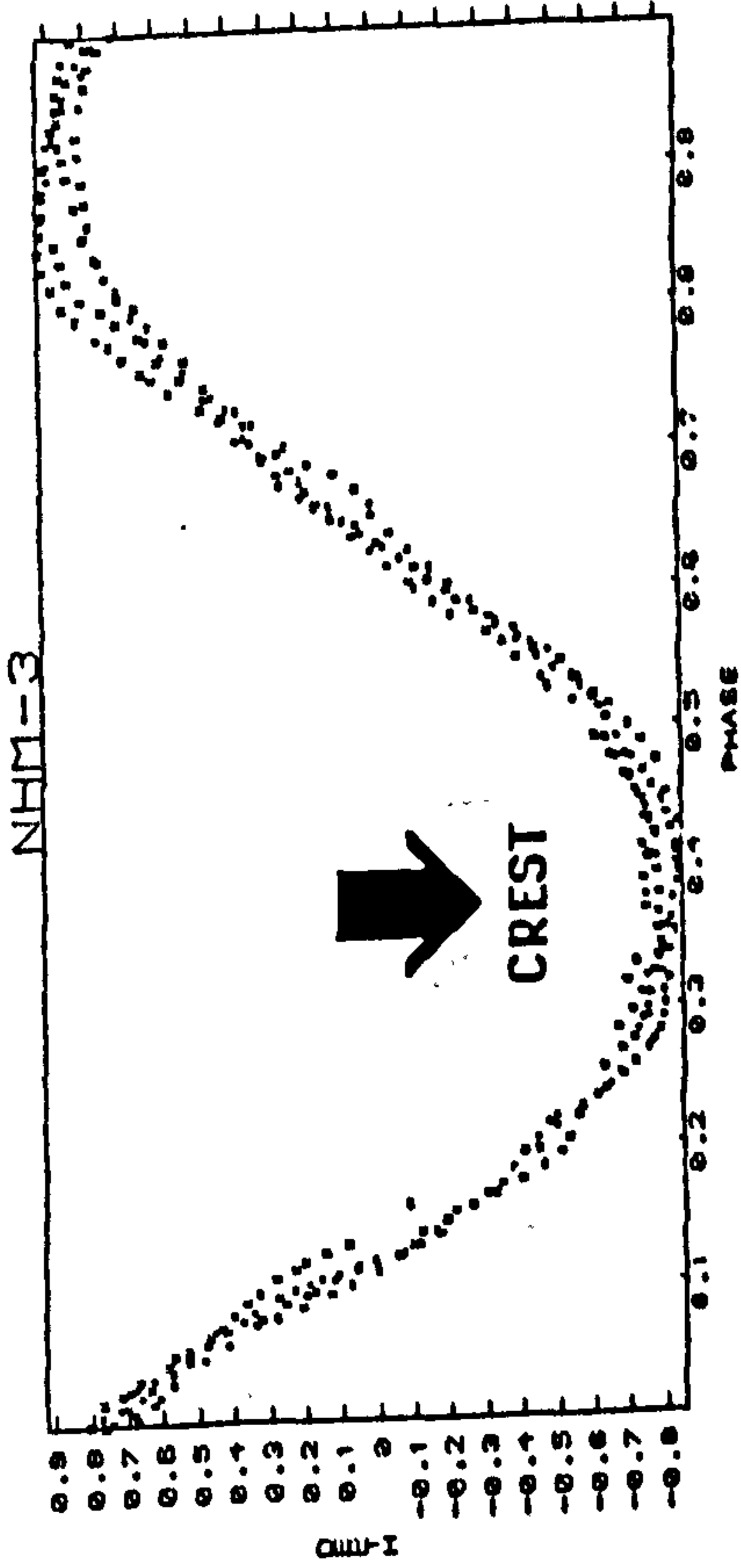
Focus

Eye P. Tube

Tool

Gauge

Binding



**Characteristics:**

Screw ☒ Nut ☐

Leng: ~0.375"

Diameter: 0.121"

Steel ☒ Brass ☐

Other: ☐

**Instrument Identification:**

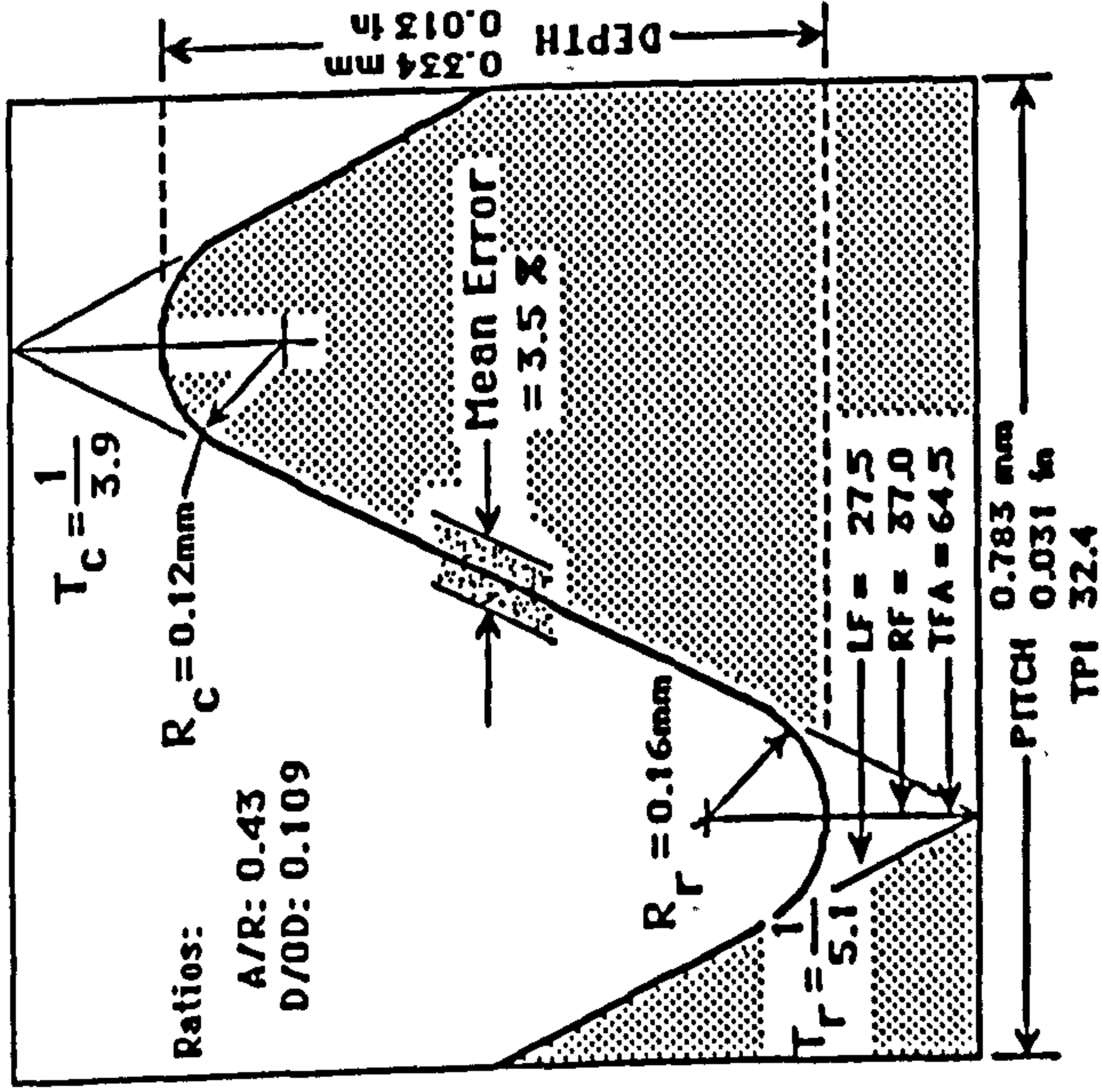
Study Code: NMH-3

Instrument: Toothed wheel

Maker: ? associated with Deacon

Date: ? 19th c.

Ser./Acq. No. none



Mu ☐ Filar Scale Bench Div. Eng. Adjust. Leveling Focus Eye P. Tube Tool Gauge Binding



Characteristics:

Screw

Nut

Leng: 0.25"

Diameter: tapered

Steel

Brass

Other:

Instrument Identification:

Study Code:

NHM-4

Instrument:

Ratchet mechanism

Maker:

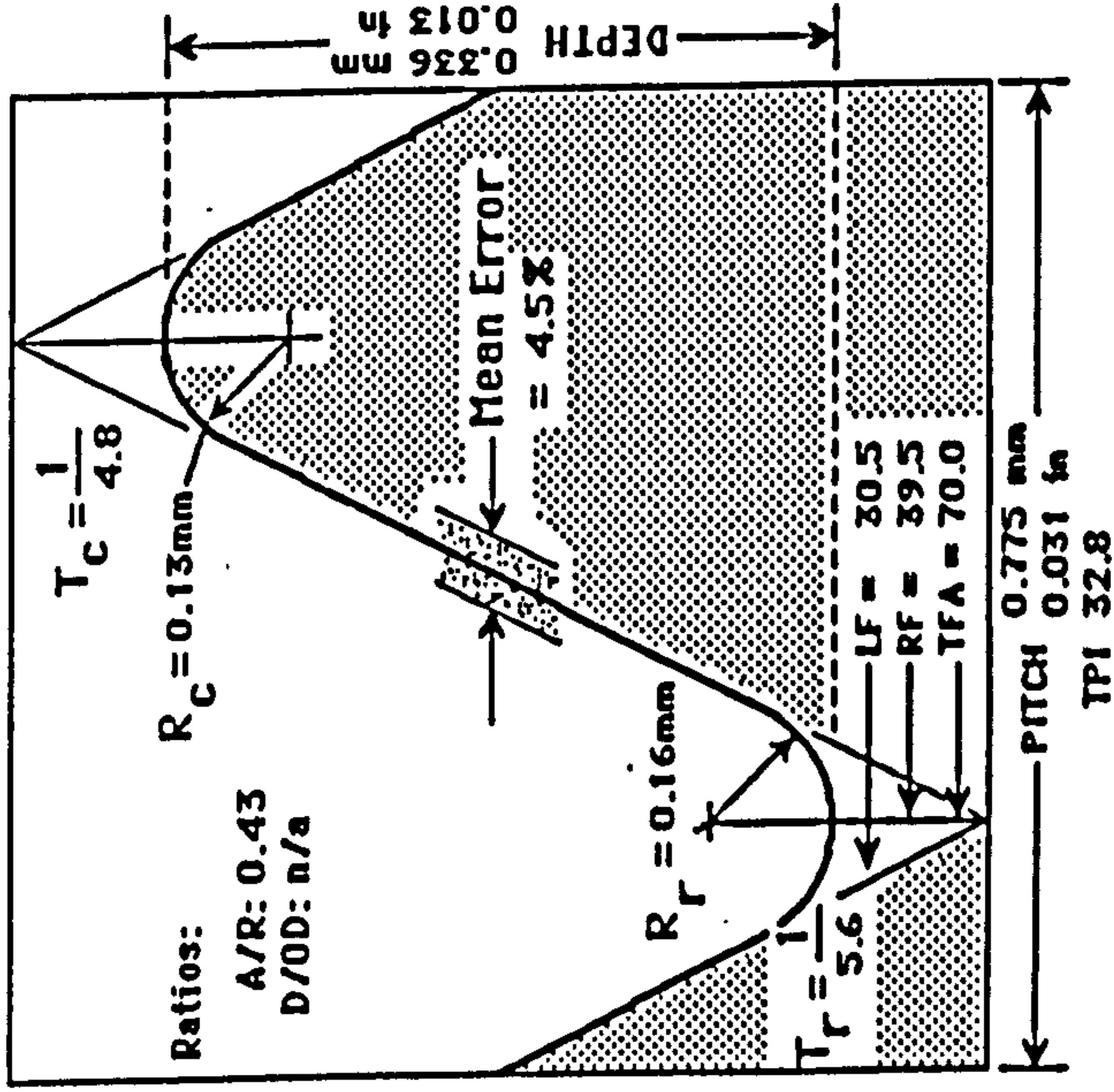
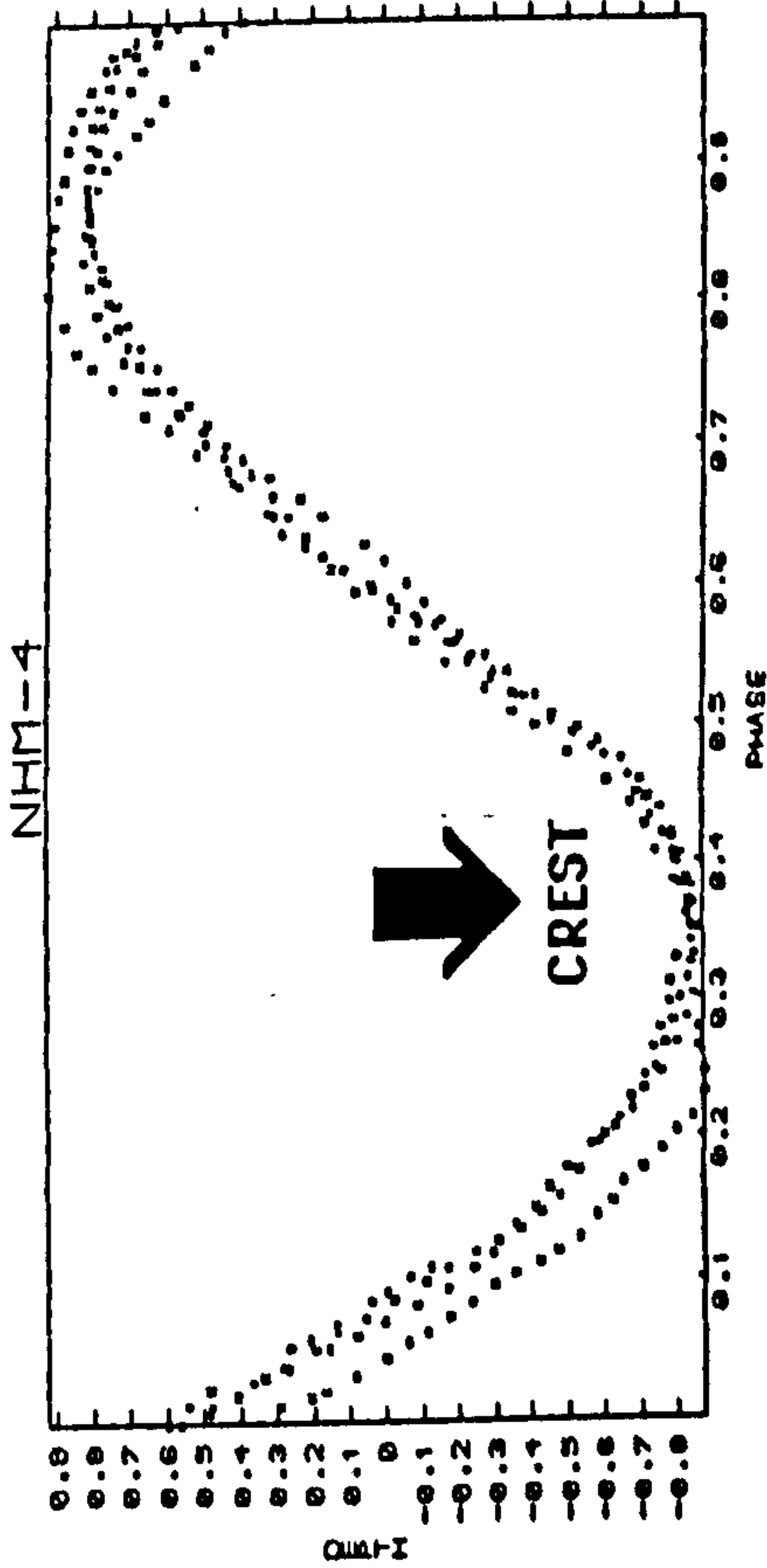
? associated with Deacon

Date:

19th c?

Ser./Acq. No.

none



Mu

Filar

Scale

Bench

Div. Eng.

Adjust.

Leveling

Focus

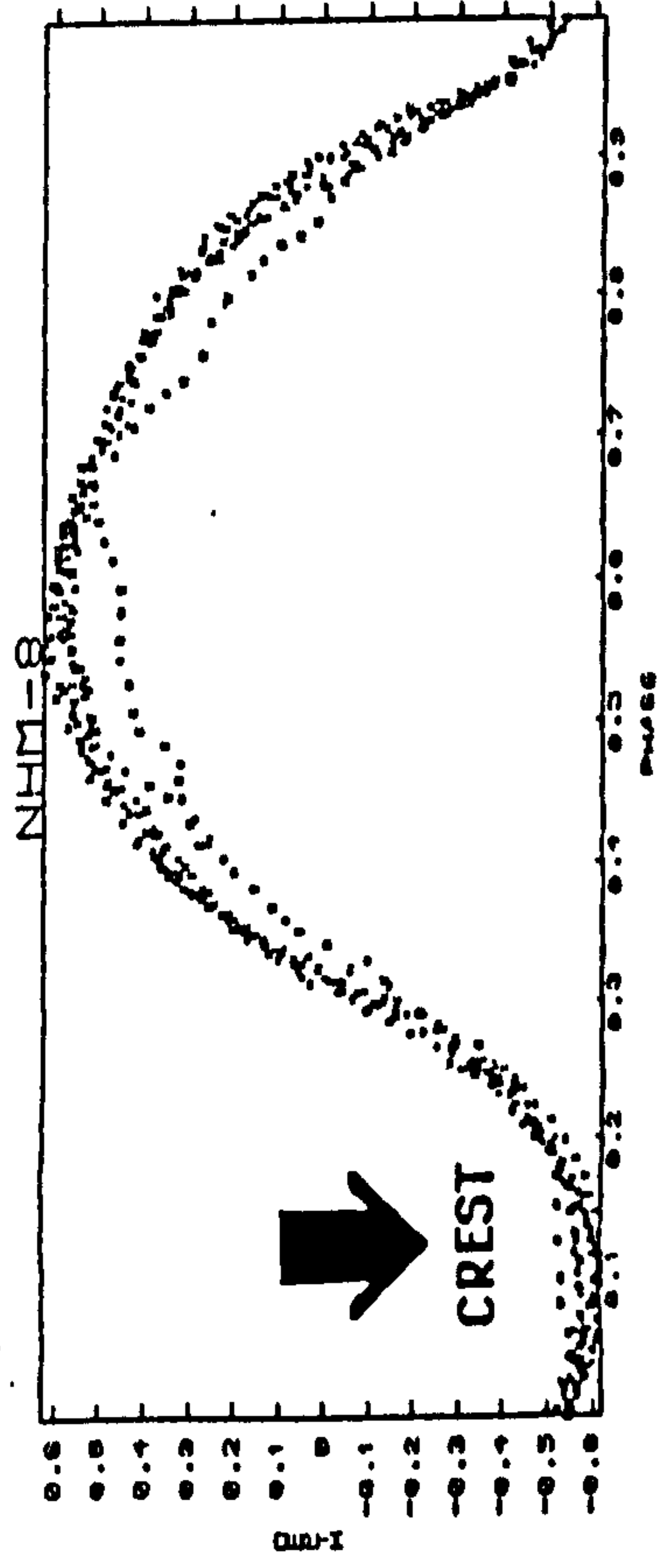
Eye P.

Tube

Tool

Gauge

Binding



Characteristics:

Screw

Nut

Leng: 2.5"

Diameter: 0.0756"

Steel

Brass

Other:

Instrument Identification:

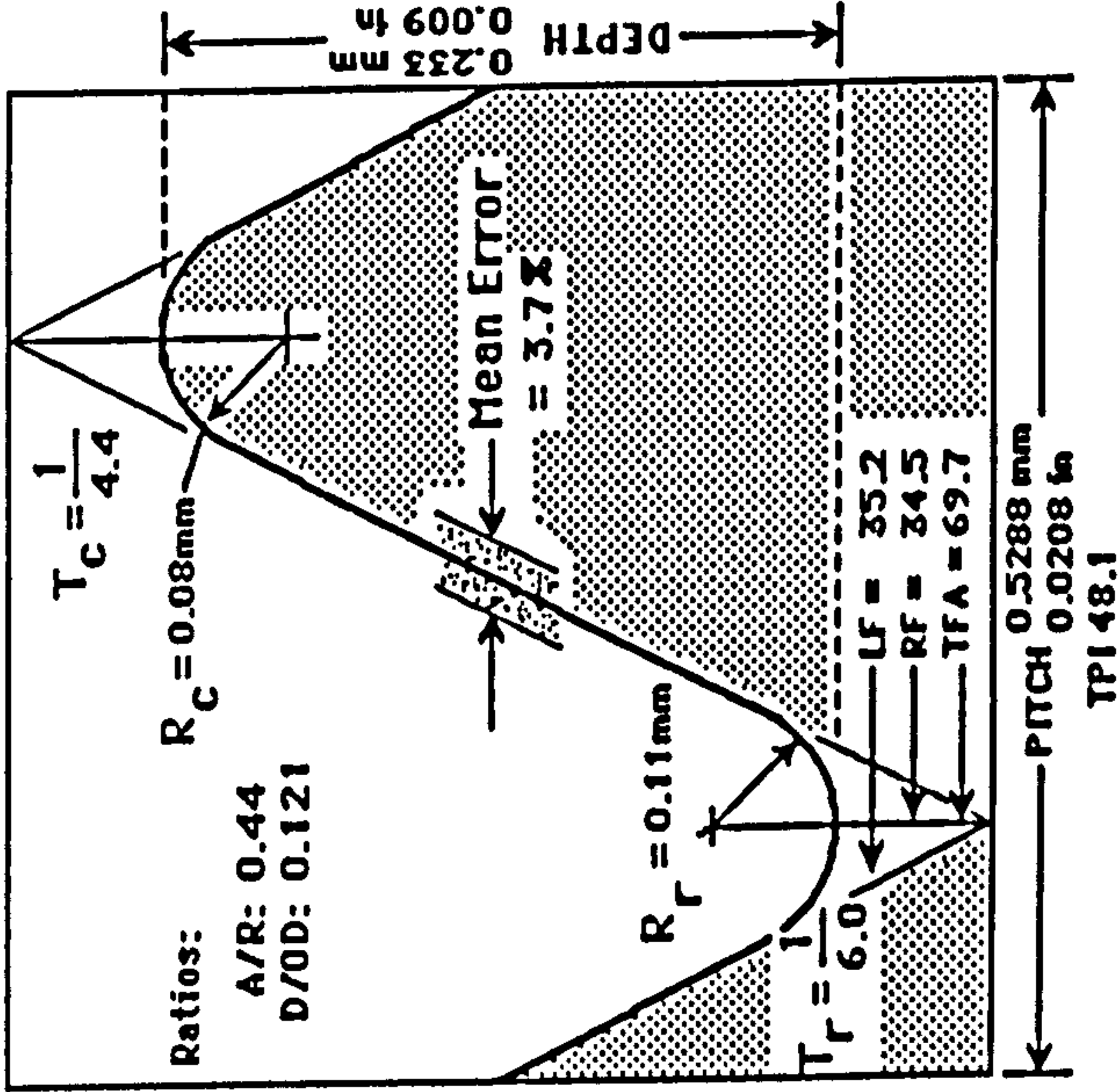
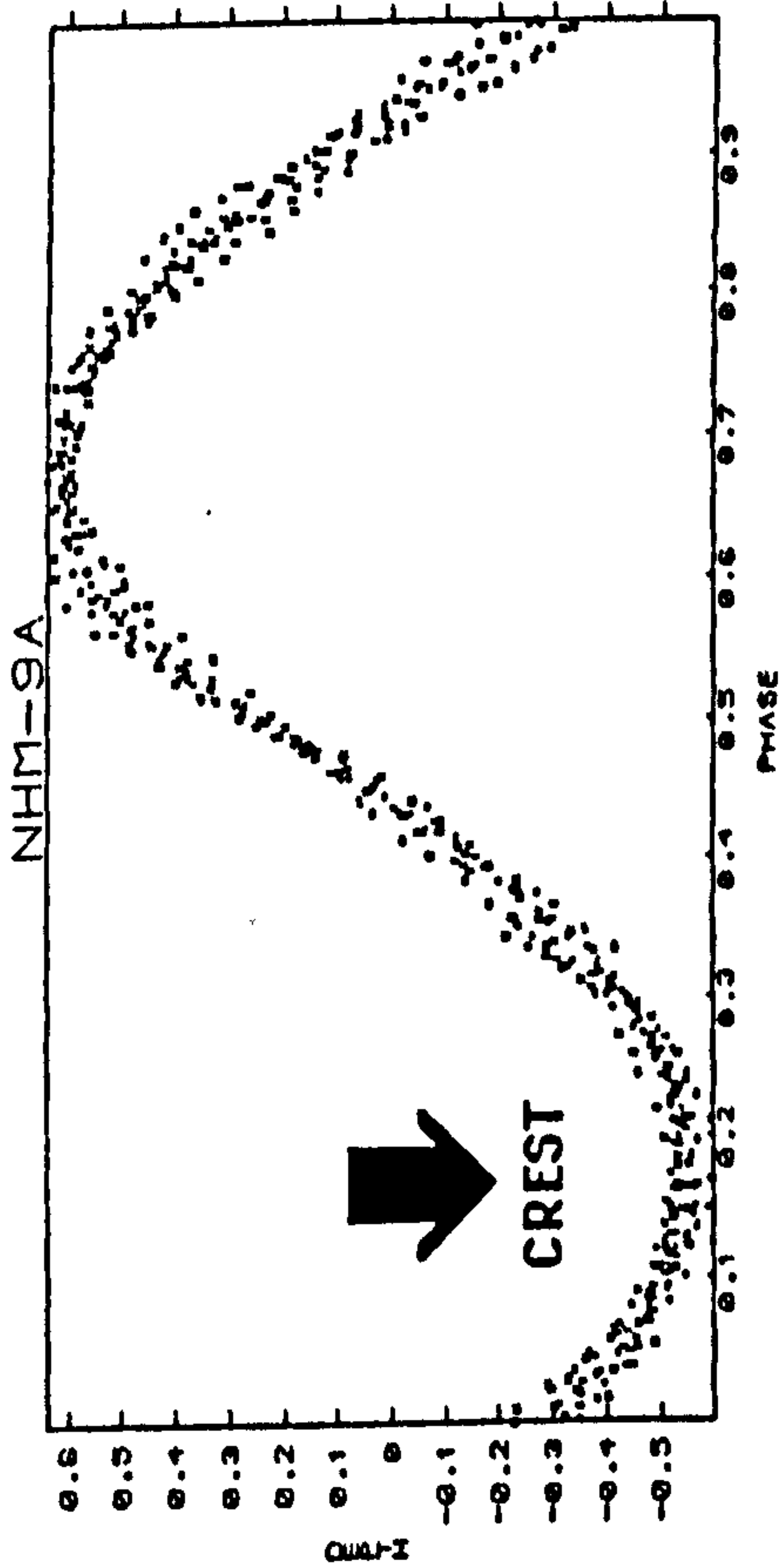
Study Code: NHM-9a

Instrument: Pendulum bob

Maker: associated with Deacon

Date: e-m19th c

Ser./Acq. No. none



MU	Filar	
	Scale	
	Bench	
	Div. Eng.	
	Adjust.	
	Leveling	
	Focus	
	Eye P.	
	Tube	
	Tool	
	Gauge	
	Binding	









Characteristics:

Screw

Nut

Leng: 0.703"

/ 0.156"

Diameter: 0.2455"

Steel

Brass

Other:

Instrument Identification:

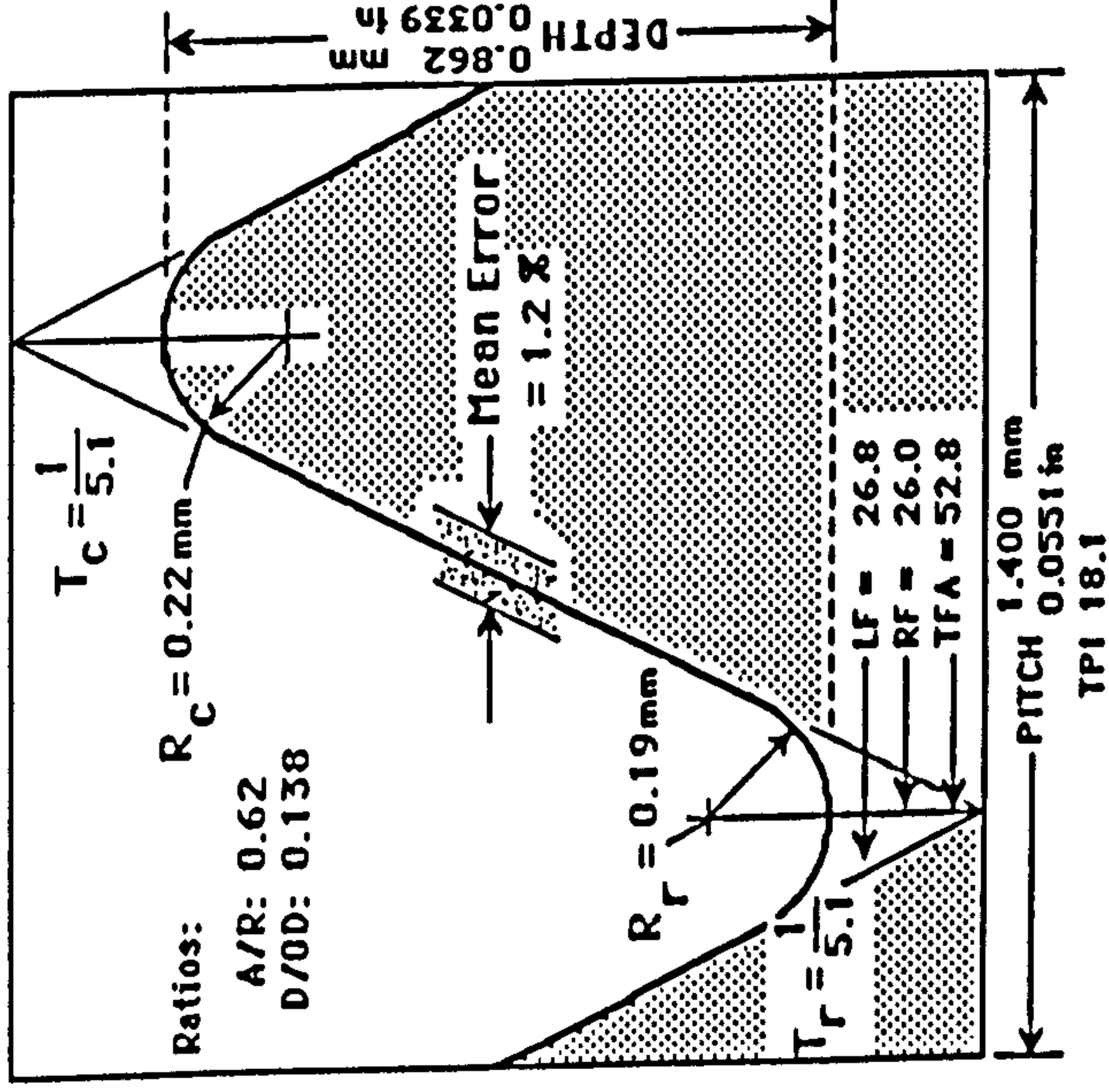
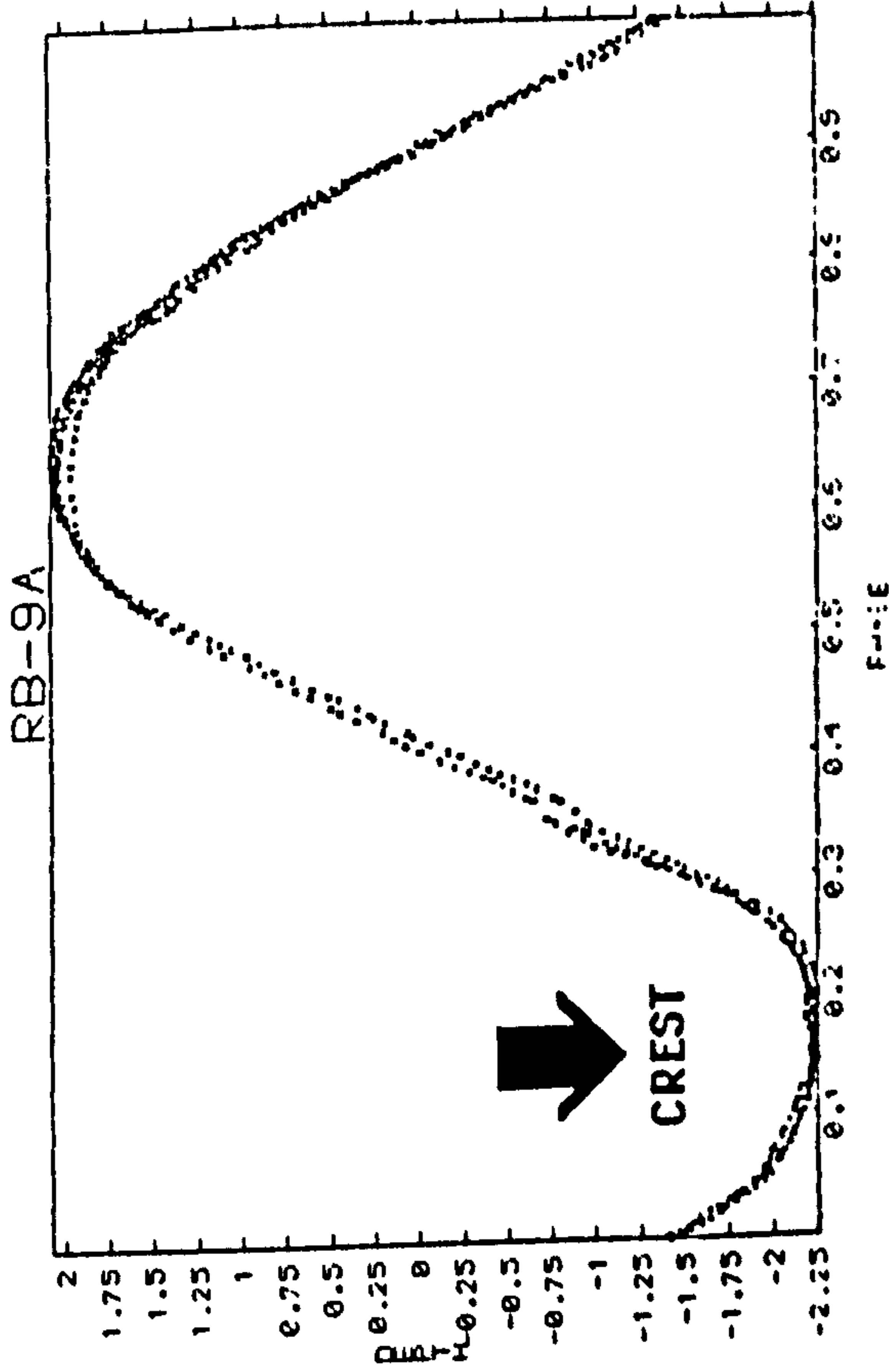
Study Code: RB-9a

Instrument: Refracting telescope

Maker: Broadhurst, Clarkson

Date: >1858

Ser./Acq. No.:



Mu	Filar
	Scale
	Bench
	Div. Eng.
	Adjust.
	Leveling
	Focus
	Eye P.
	Tube
	Tool
	Gauge
	Binding
	Misc.

Screw holding leg on base.  
This was suspected and is  
confirmed as a replacement  
screw of ISO form.

Characteristics:

Screw

Nut

Leng: 0.844" / 0.50"

Diameter: 0.3068"

Steel

Brass

Other:

Instrument Identification:

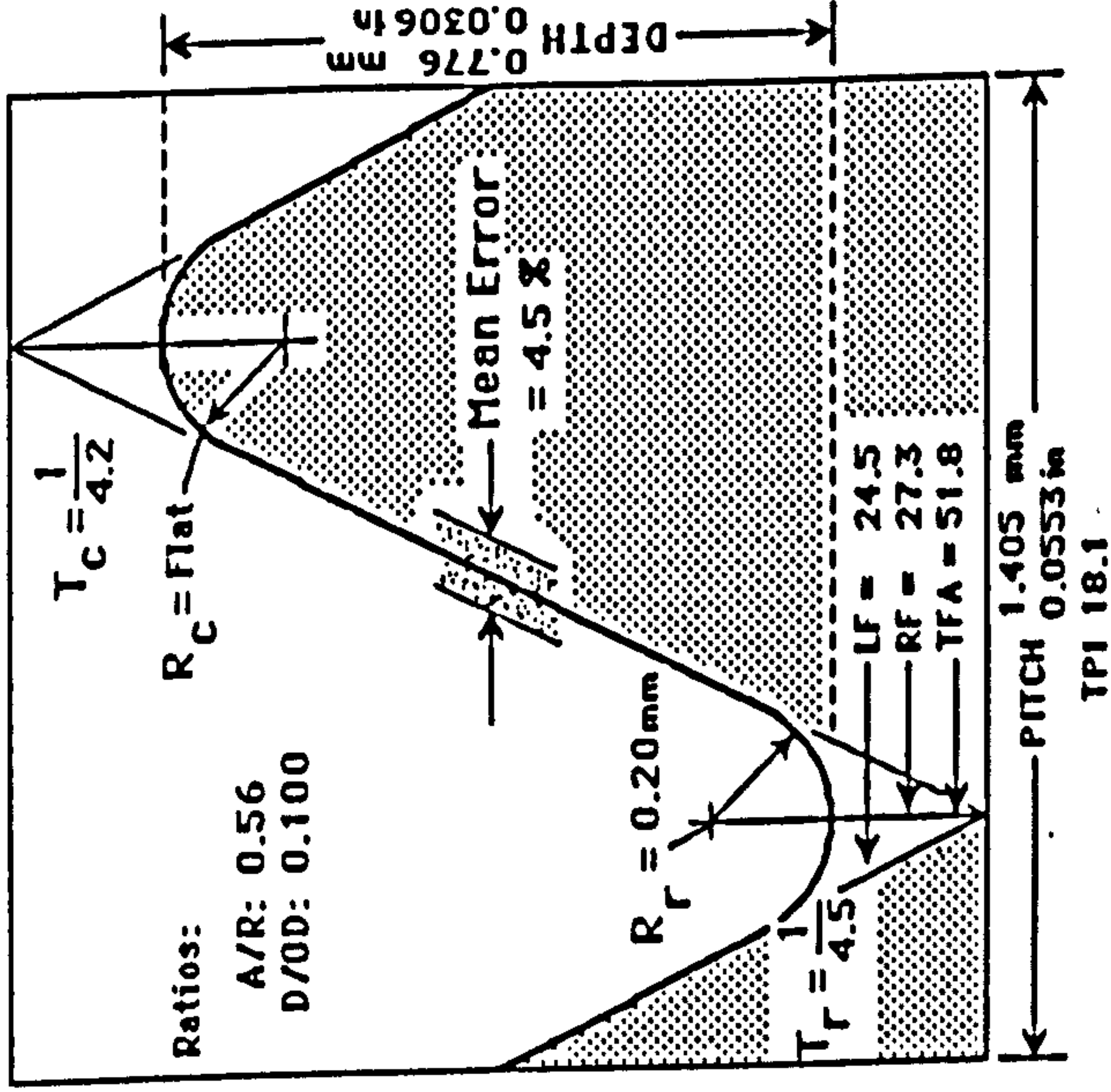
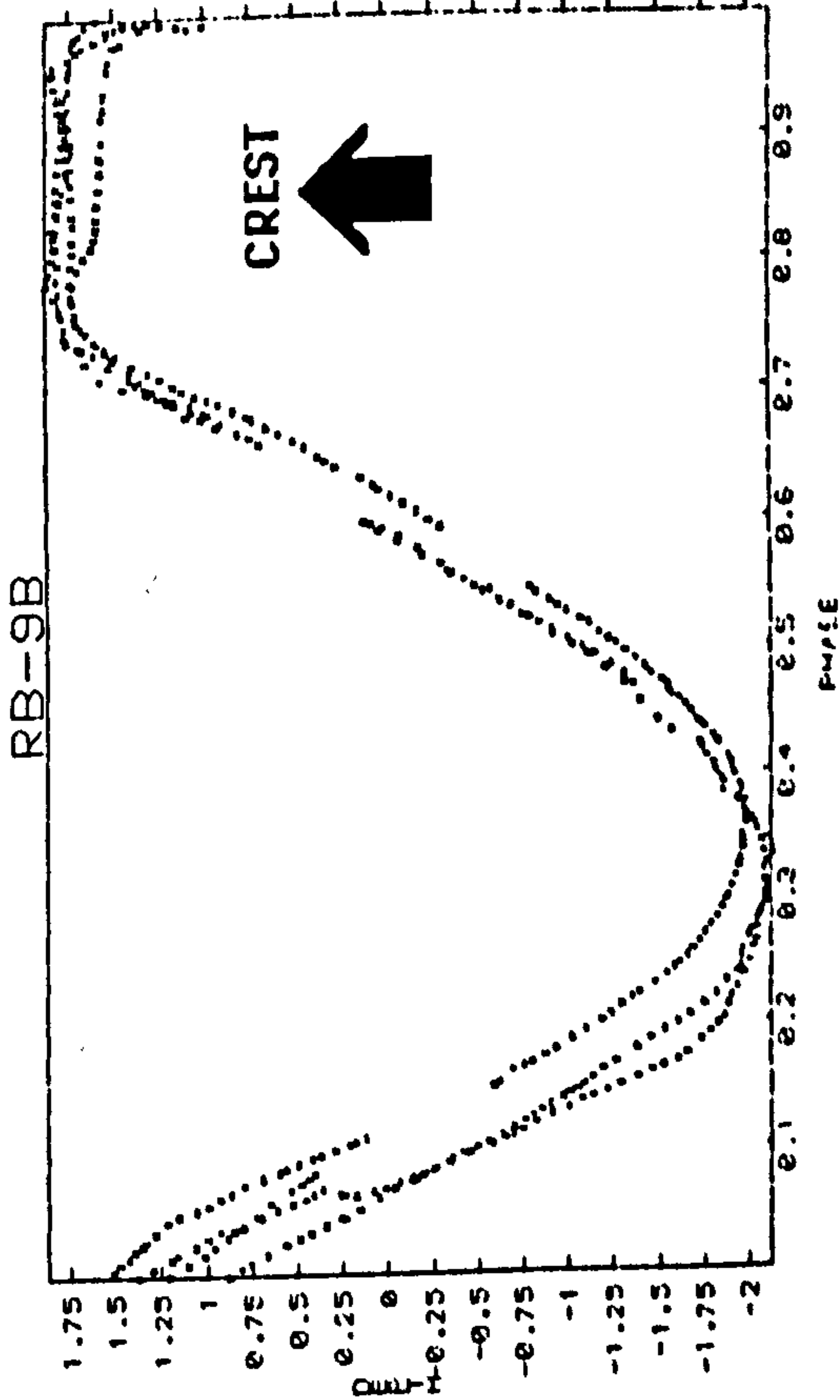
Study Code: RB-9b

Instrument: Refracting telescope

Maker: Broadhurst, Clarkson

Date: >1858

Ser./Acq. No. .



Mu

Filar

Scale

Bench

Div. Eng.

Adjust.

Leveling

Focus

Eye P.

Tube

Tool

Gauge

Binding

Misc.

Tube mounting on stand



Characteristics:

Screw

☒

Nut

☐

Leng: 0.313" / ~0.313"

Diameter: 0.3034"

Steel

☐

Brass

☐

Other: Wrought Iron

Instrument Identification:

Study Code:

SML-27a

Instrument:

Pendulum Clock

Maker:

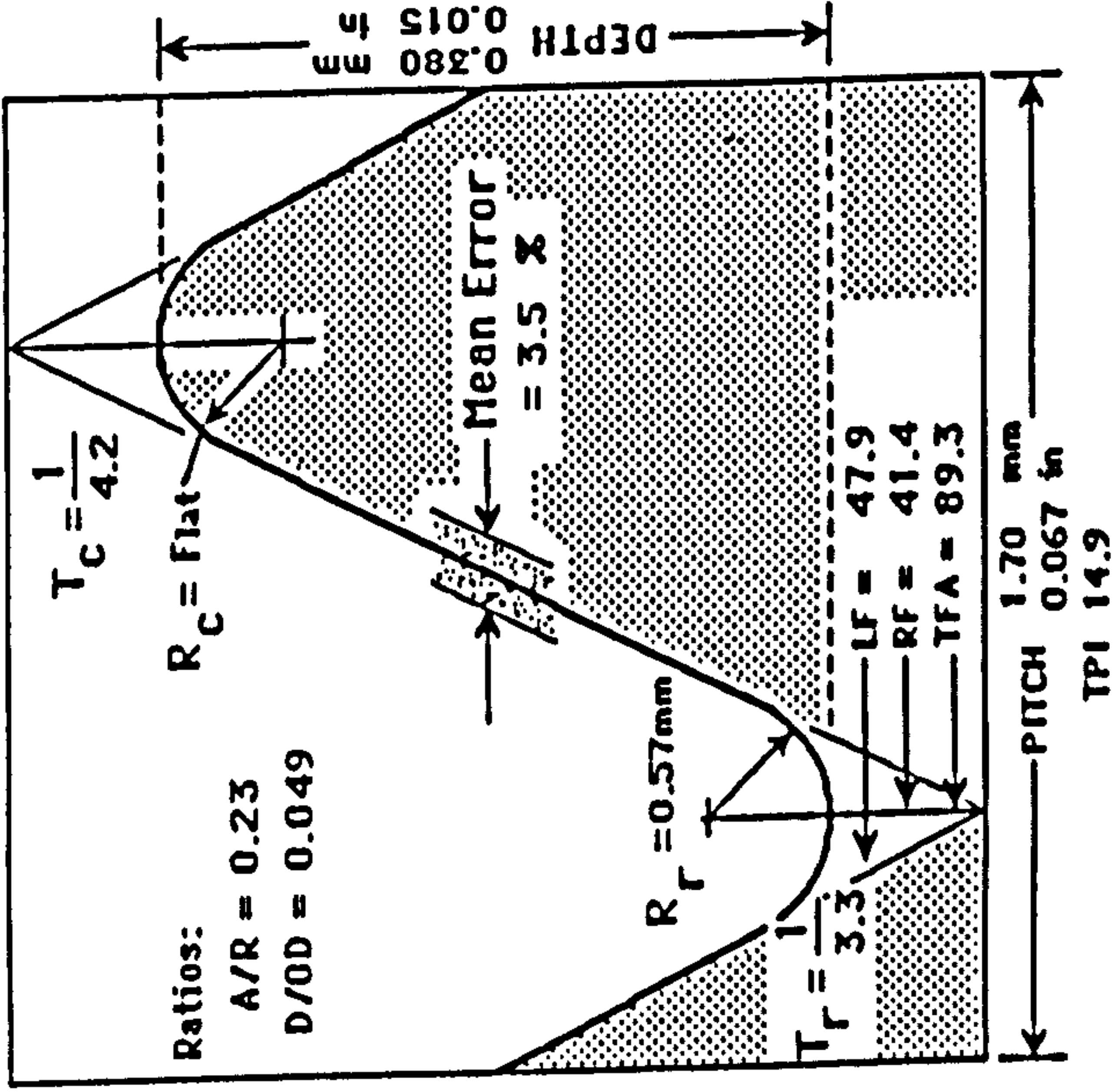
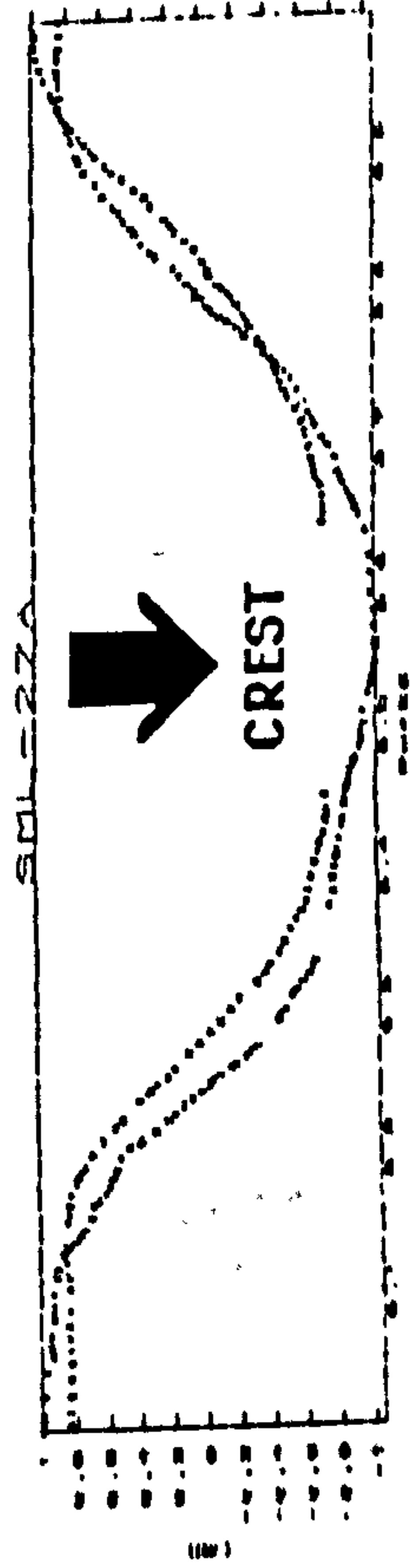
van Call

Date:

1657

Ser./Acq. No.

1986-1697



Mu

Filar

Scale

Bench

Div. Eng.

Adjust.

Leveling

Focus

Eye P.

Tube

Tool

Gauge

Binding

(Top of Frame)



Characteristics:

Screw

Nut

Leng: 0.313"

/ ~0.313"

Diameter: 0.3085"

Steel

Brass

Other: Wrought Iron

Instrument Identification:

Study Code:

SML-27b

Instrument:

Pendulum Clock

Maker:

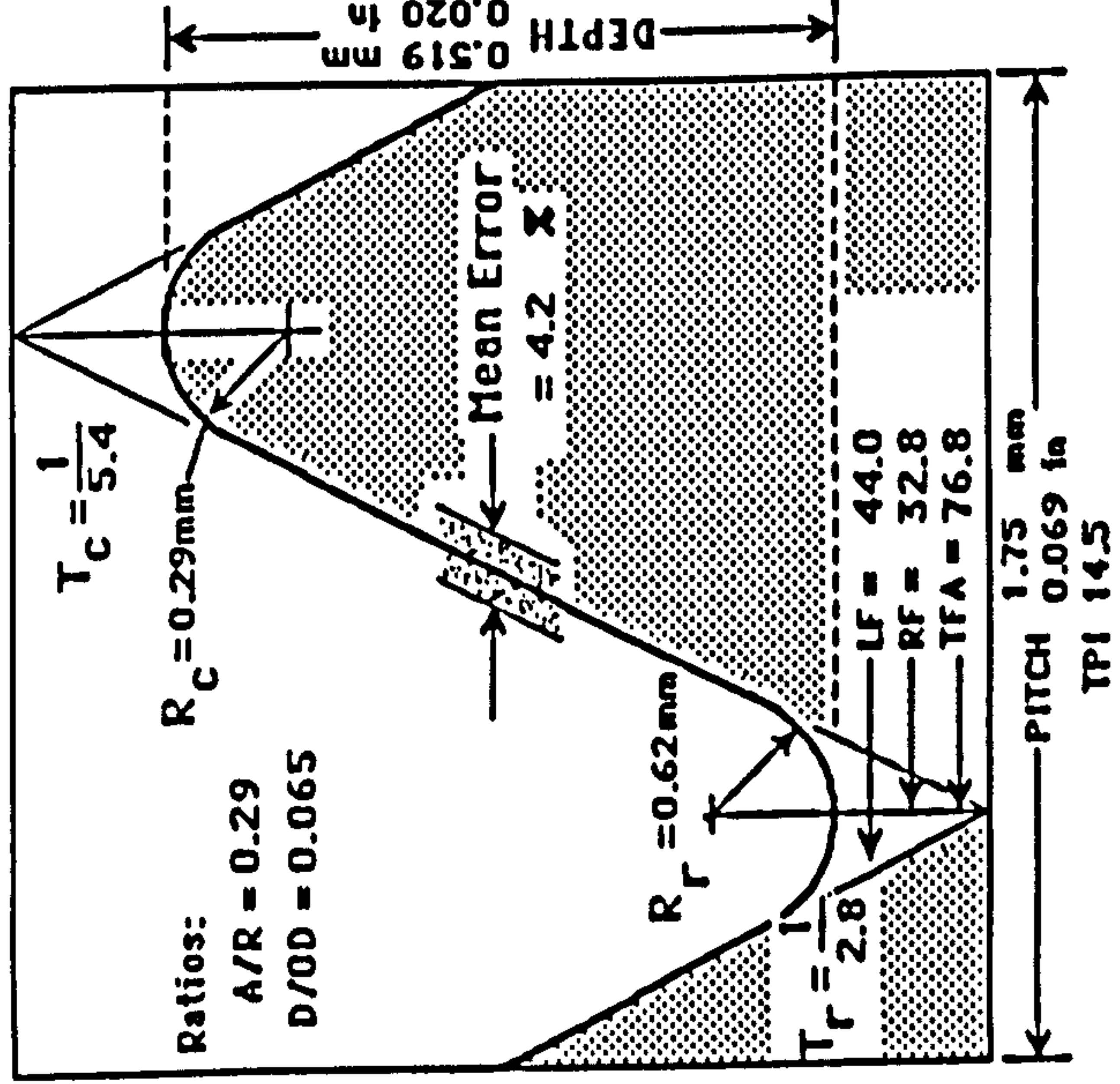
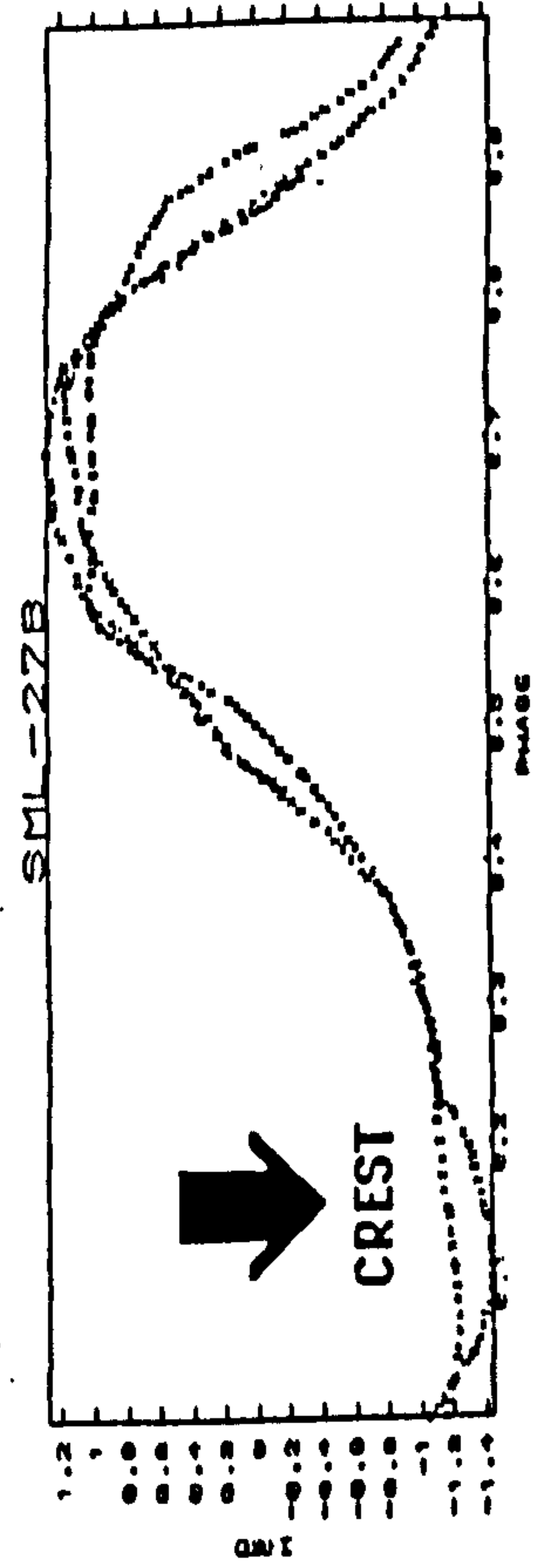
van Call

Date:

1657

Ser./Acq. No.

1986-1697



Mu — [ Filar Scale Bench Div. Eng. Adjust. Leveling Focus Eye P. Tube Tool Gauge Binding (Top of Frame)

Characteristics:

Screw ☒ Nut ☐

Leng: 0.313" /  $\approx 0.313$ "

Diameter: 0.3073"

Steel ☐ Brass ☐

Other: Wrought Iron

Instrument Identification:

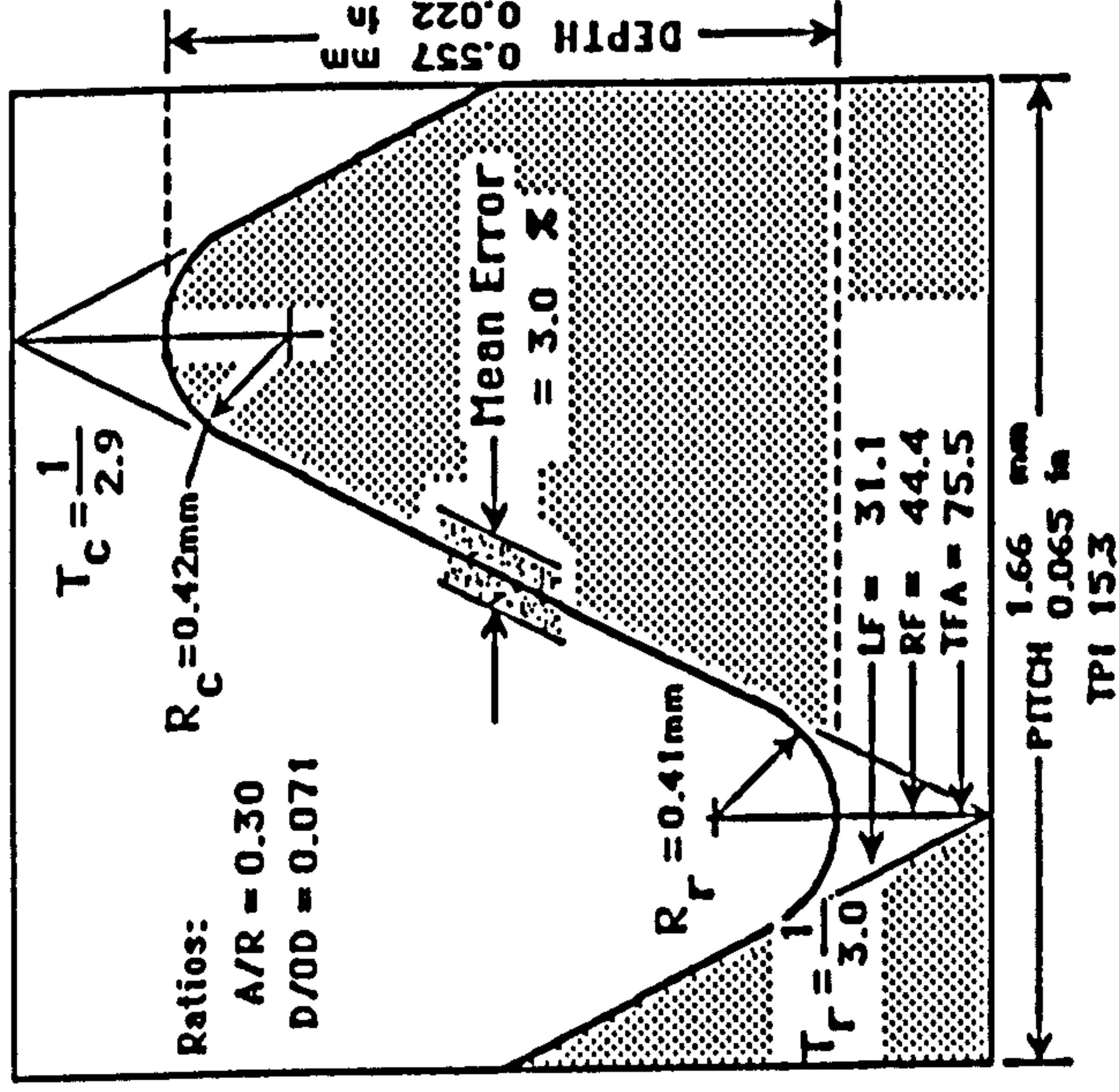
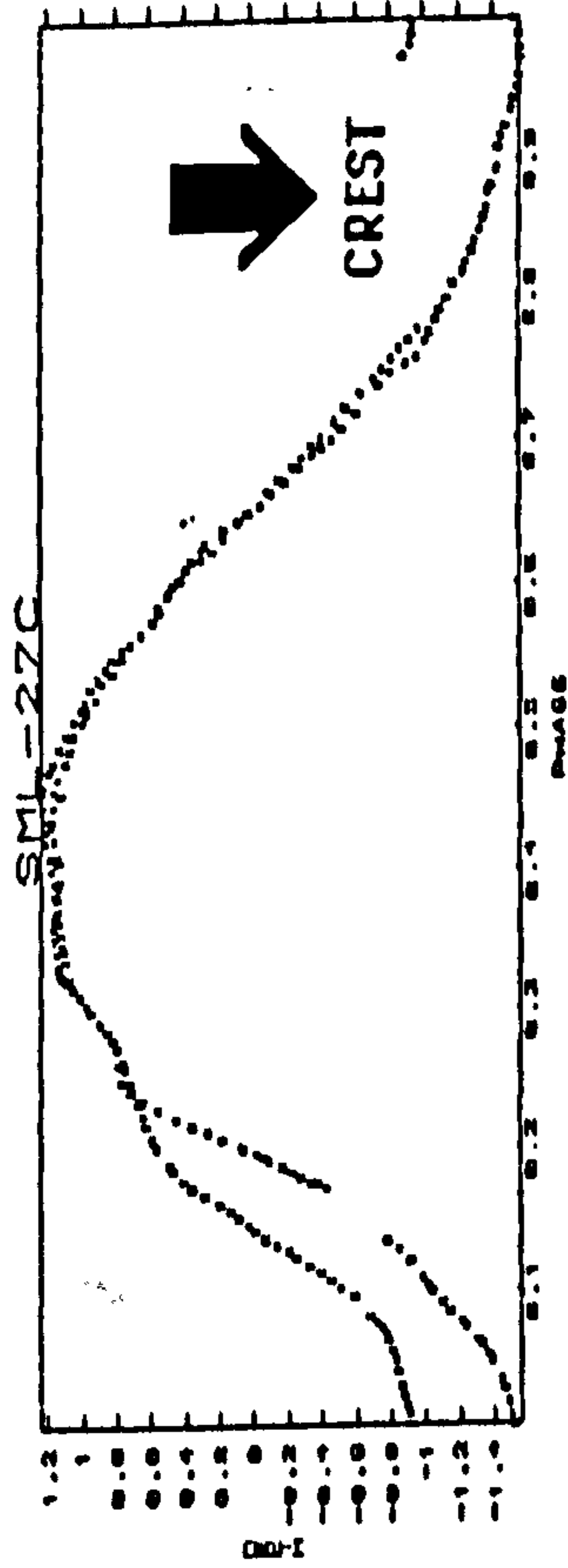
Study Code: SML-27c

Instrument: Pendulum Clock

Maker: van Call

Date: 1657

Ser./Acq. No. 1986-1697



Mu — [ Filar Scale Bench Div. Eng. Adjust. Leveling Focus Eye P. Tube Tool Gauge Binding (Top of Frame)

Characteristics:

Screw

Nut

Leng:0.313" /~0.313"

Diameter: 0.3073"

Steel

Brass

Other: Wrought Iron

Instrument Identification:

Study Code:

SML-27d

Instrument:

Pendulum Clock

Maker:

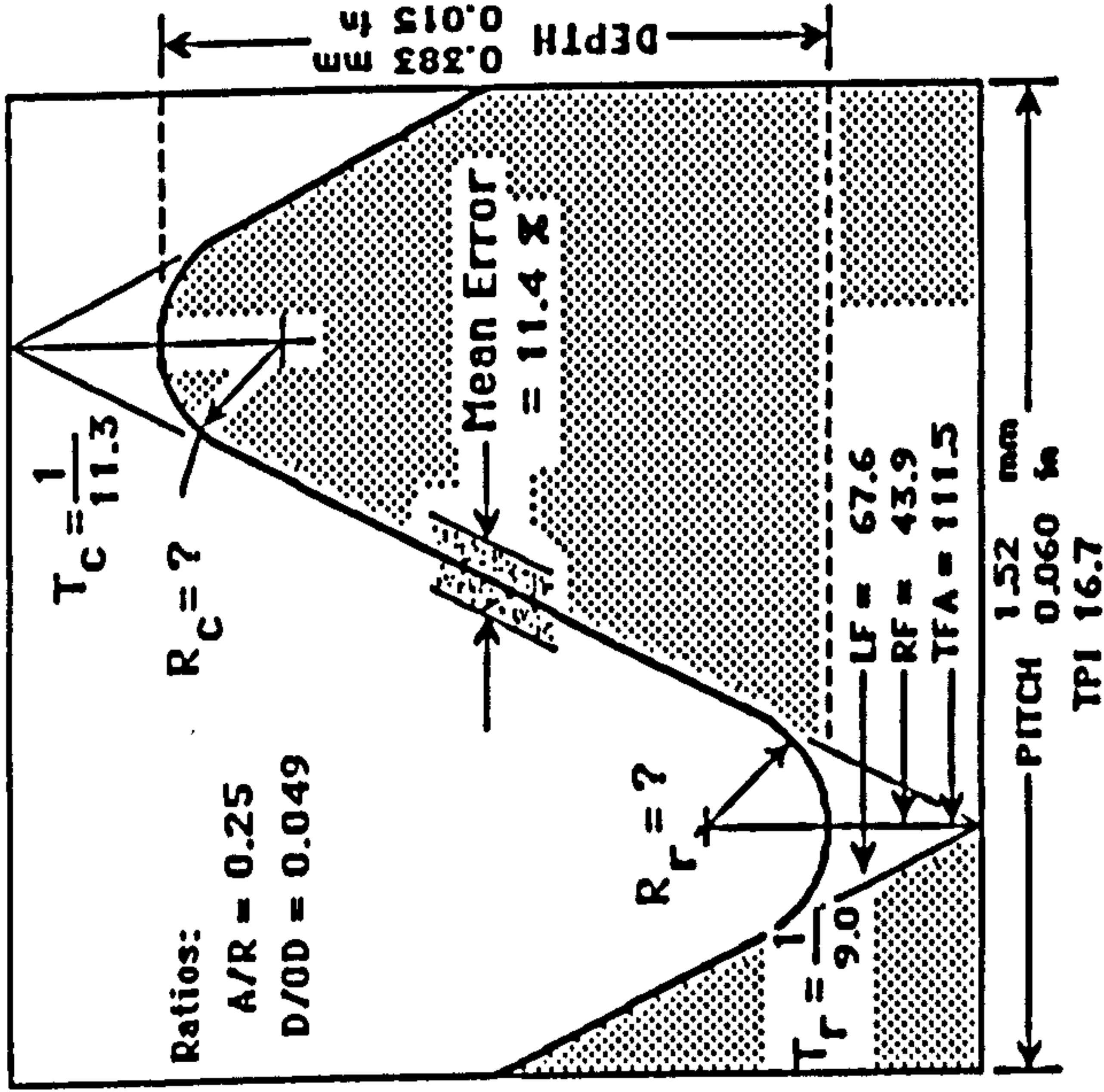
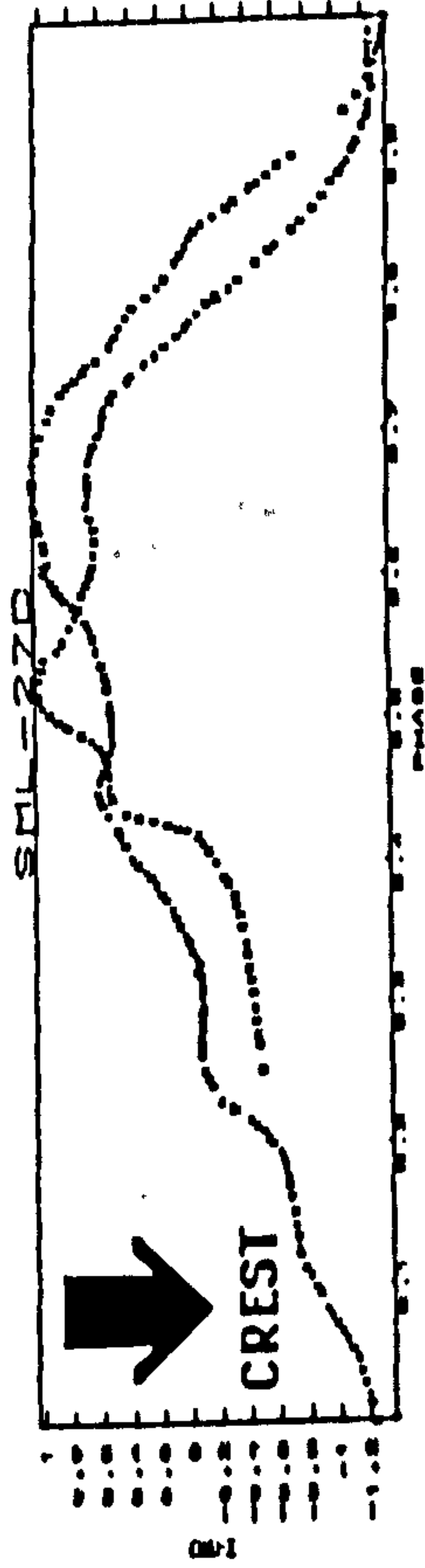
van Call

Date:

1657

Ser./Acq. No.

1986-1697



Mu

Filar

Scale

Bench

Div. Eng.

Adjust.

Leveling

Focus

Eye P.

Tube

Tool

Gauge

Binding

(Top of Frame)



Characteristics:

Screw

Nut

Length: 0.656"

Diameter: 0.2446"

Steel

Brass

Other: Wrought Iron

Instrument Identification:

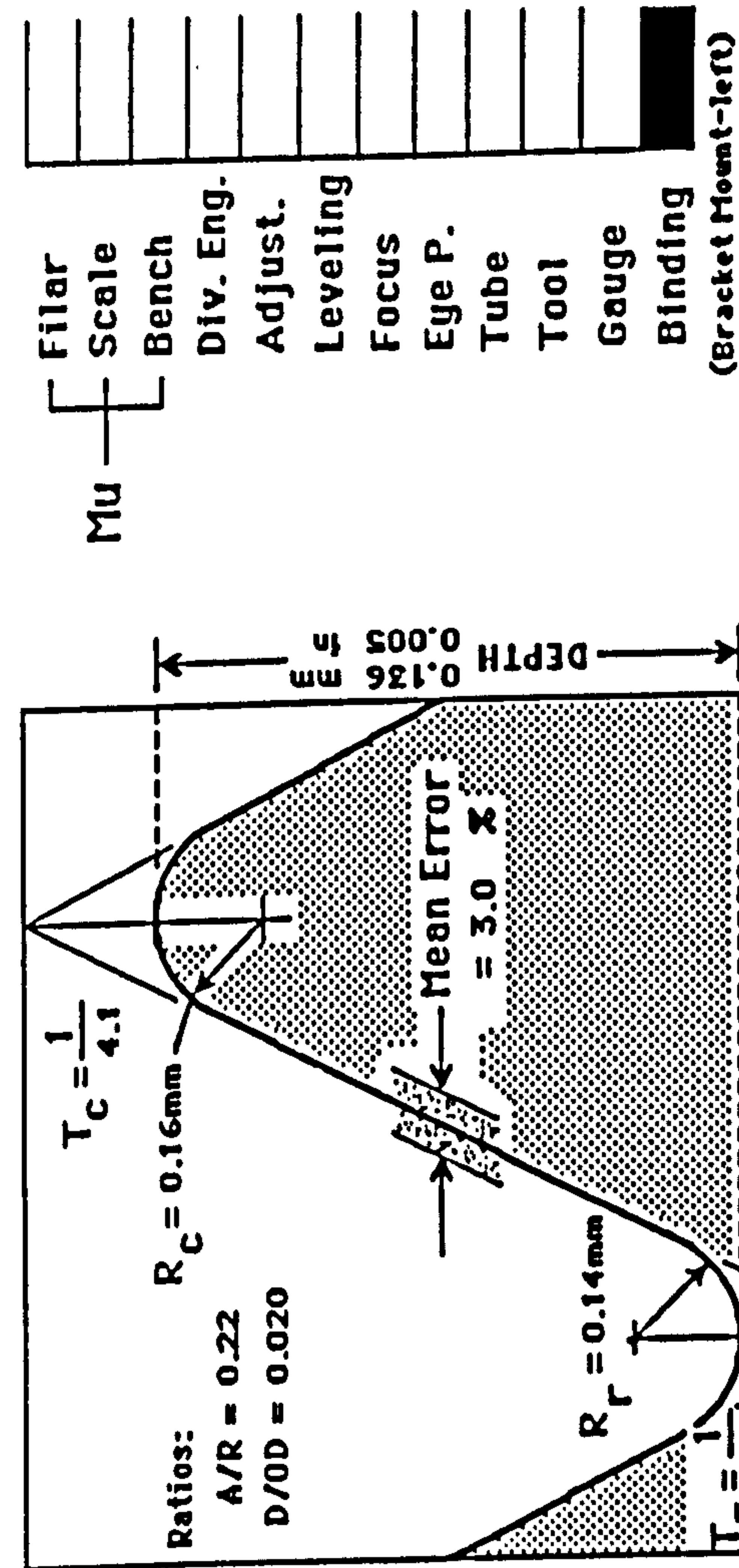
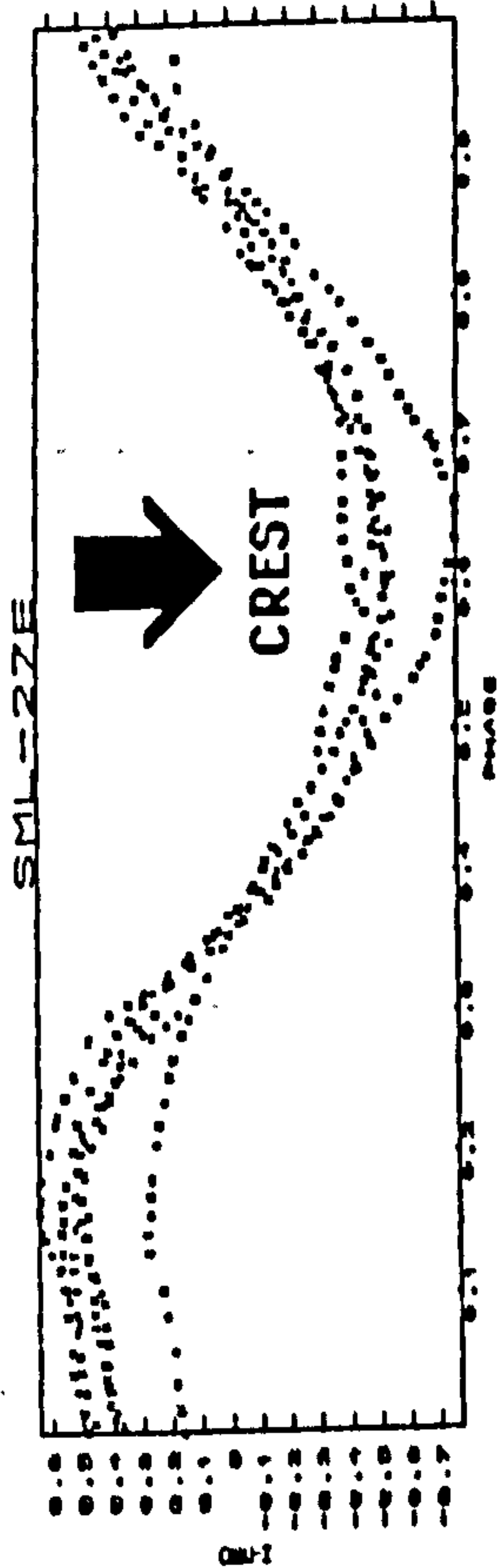
Study Code: SML-27e

Instrument: Pendulum Clock

Maker: van Call

Date: 1657

Ser./Acq. No. 1986-1697





Characteristics:

Screw

Nut

Leng: 0.656"

Diameter: 0.2438"

Steel

Brass

Other: Wrought Iron

Instrument Identification:

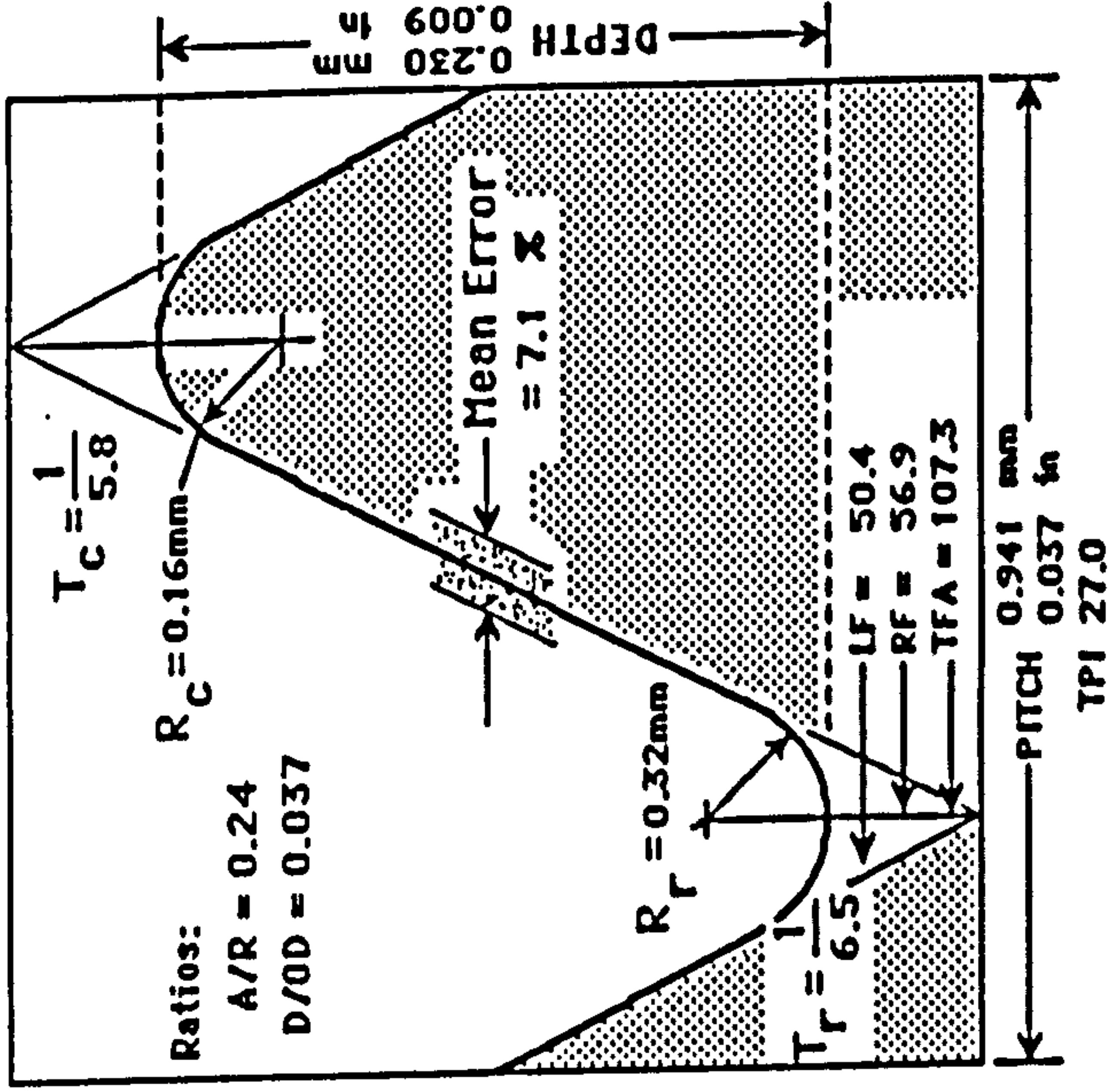
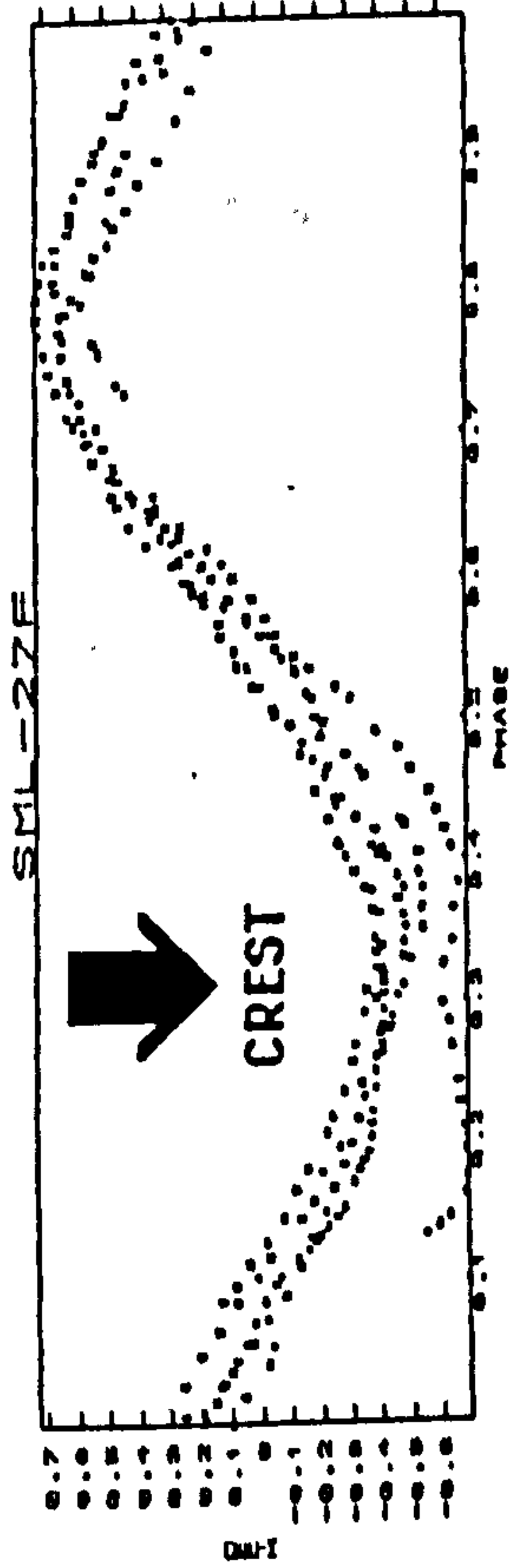
Study Code: SML-27f

Instrument: Pendulum Clock

Maker: van Call

Date: 1657

Ser./Acq. No. 1986-1697



Mu

Filar

Scale

Bench

Div. Eng.

Adjust.

Leveling

Focus

Eye P.

Tube

Tool

Gauge

Binding

(Top of Frame)

Characteristics:

Screw

Nut

Leng: 0.438"

Diameter: 0.2133"

Steel

Brass

Other: Wrought Iron

Instrument Identification:

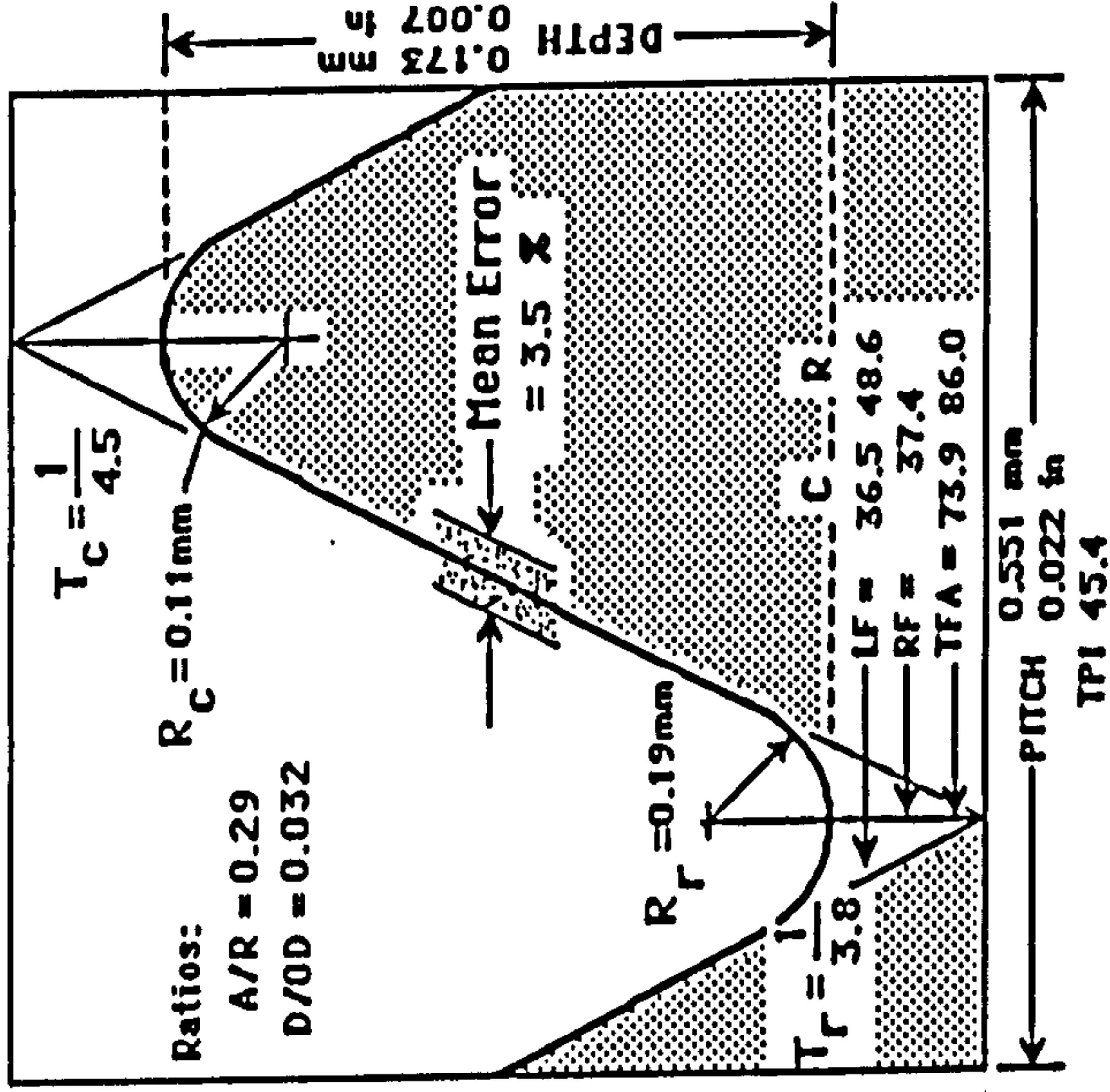
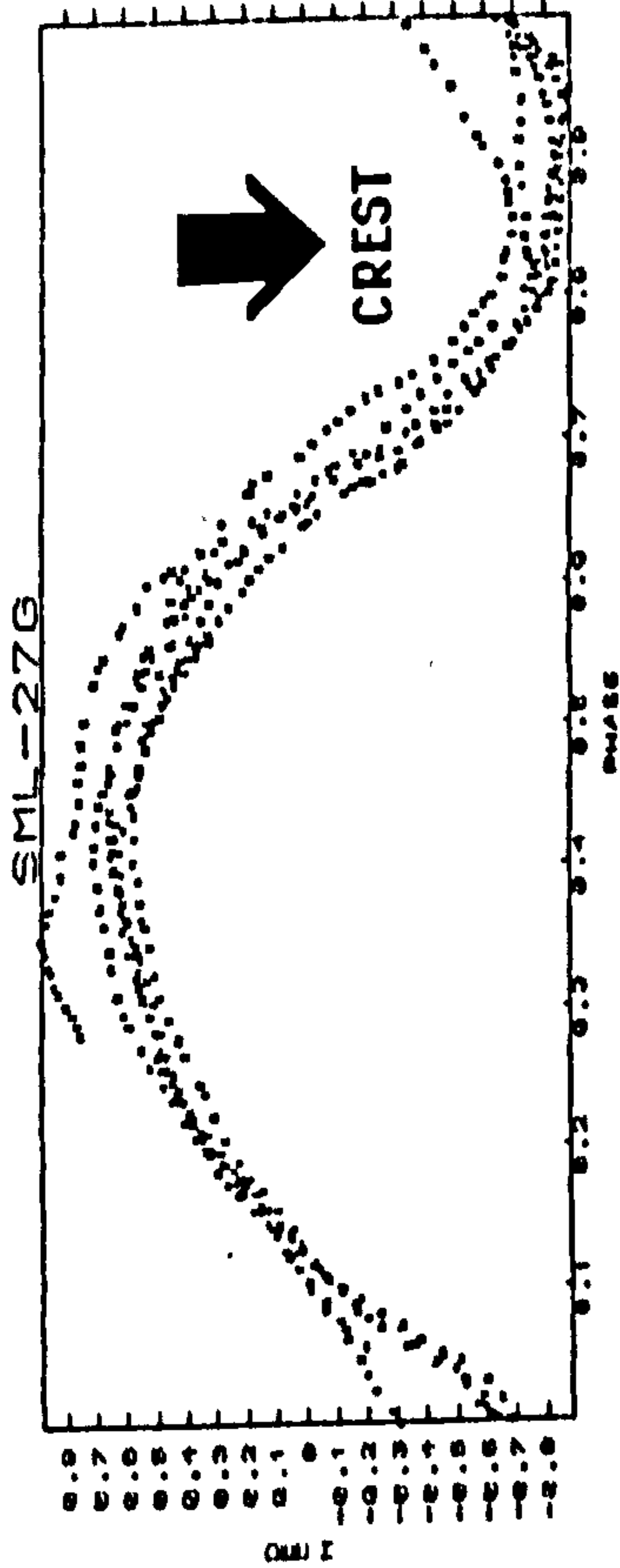
Study Code: SML-27g

Instrument: Pendulum Clock

Maker: van Call

Date: 1657

Ser./Acq. No. 1986-1697



Mu — [ Filar  
 Scale  
 Bench  
 Div. Eng.  
 Adjust.  
 Leveling  
 Focus  
 Eye P.  
 Tube  
 Tool  
 Gauge  
 Binding  
 (Pulley bracket  
 on back)

Characteristics:

Screw ☐

Nut ☒

Leng: 0.25"

Diameter: 0.1375"

Steel ☐

Brass ☐

Other: Wrought Iron

Instrument Identification:

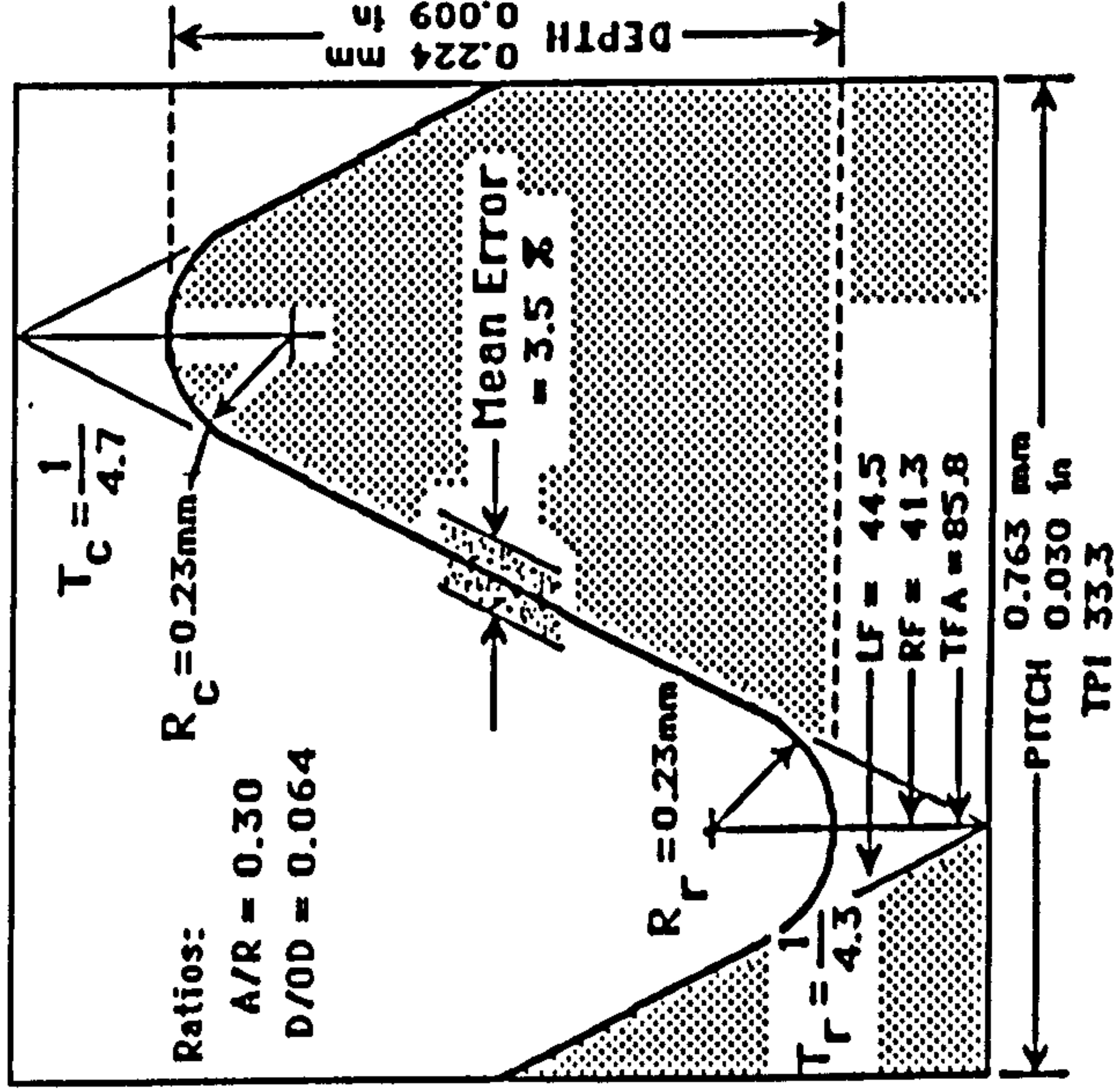
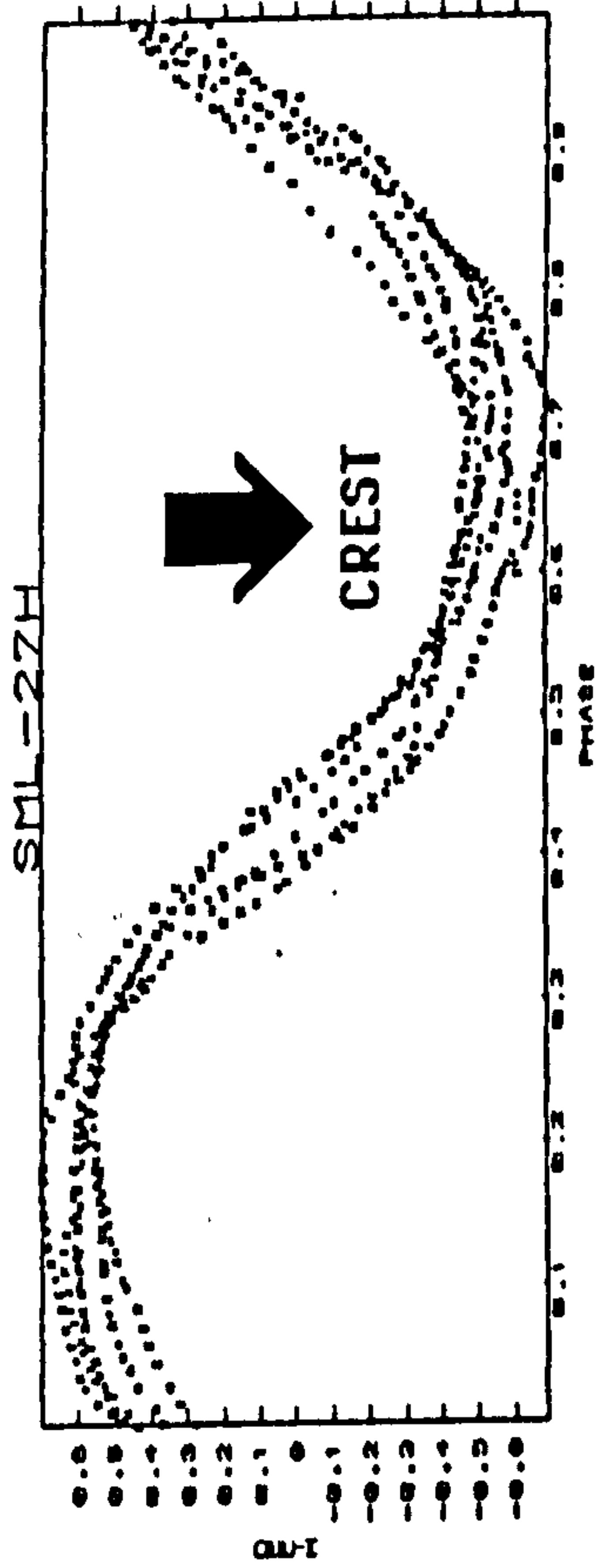
Study Code: SML-27h

Instrument: Pendulum Clock

Maker: van Call

Date: 1657

Ser./Acq. No. 1986-1697



Mu

Filar

Scale

Bench

Div. Eng.

Adjust.

Leveling

Focus

Eye P.

Tube

Tool

Gauge

Binding

(Pendulum bob)



Characteristics:

Screw ☒ Nut ☐

Leng: 0.313" / ~0.313"

Diameter: 0.1225"

Steel ☐ Brass ☐

Other: Wrought Iron

Instrument Identification:

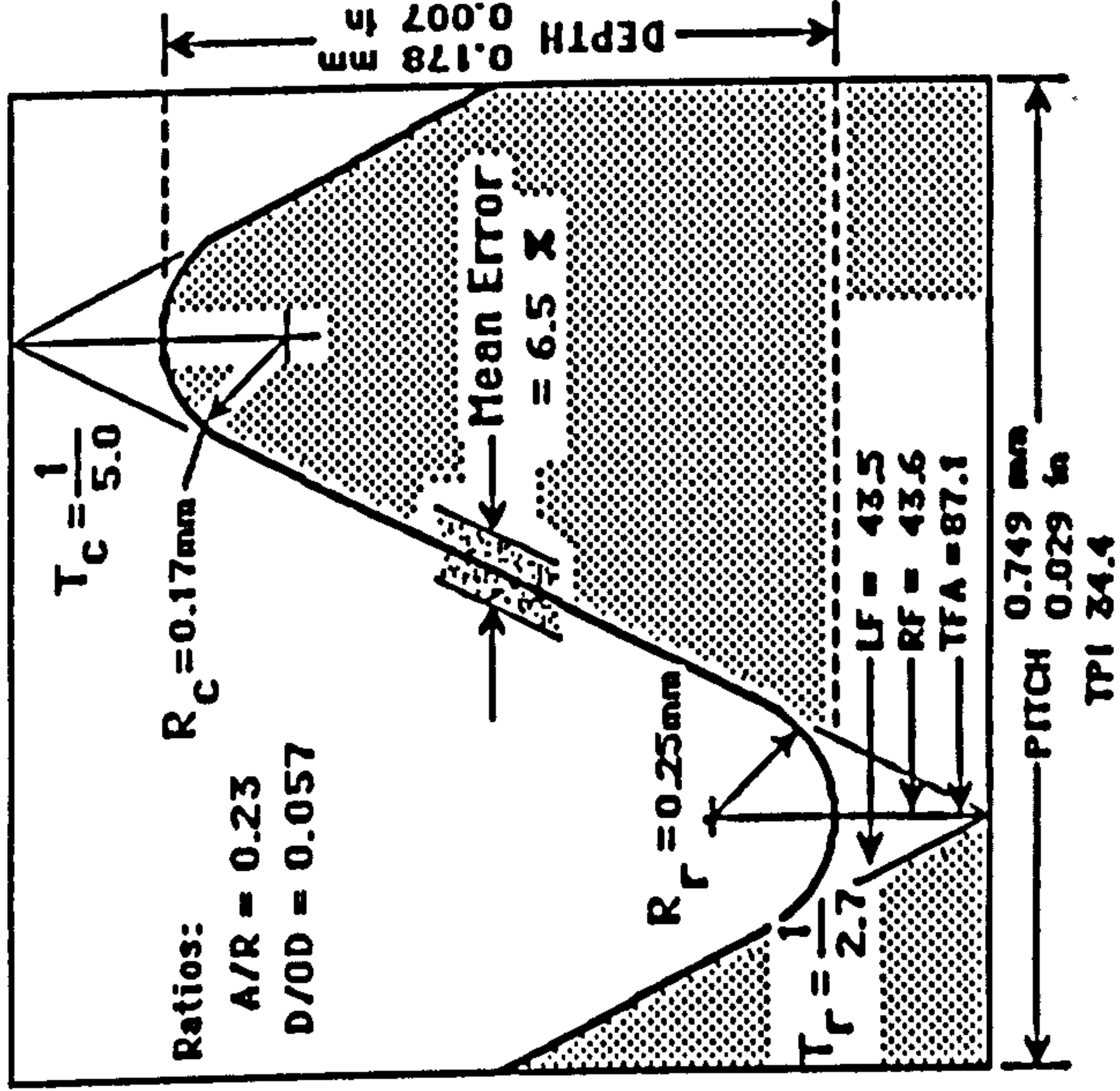
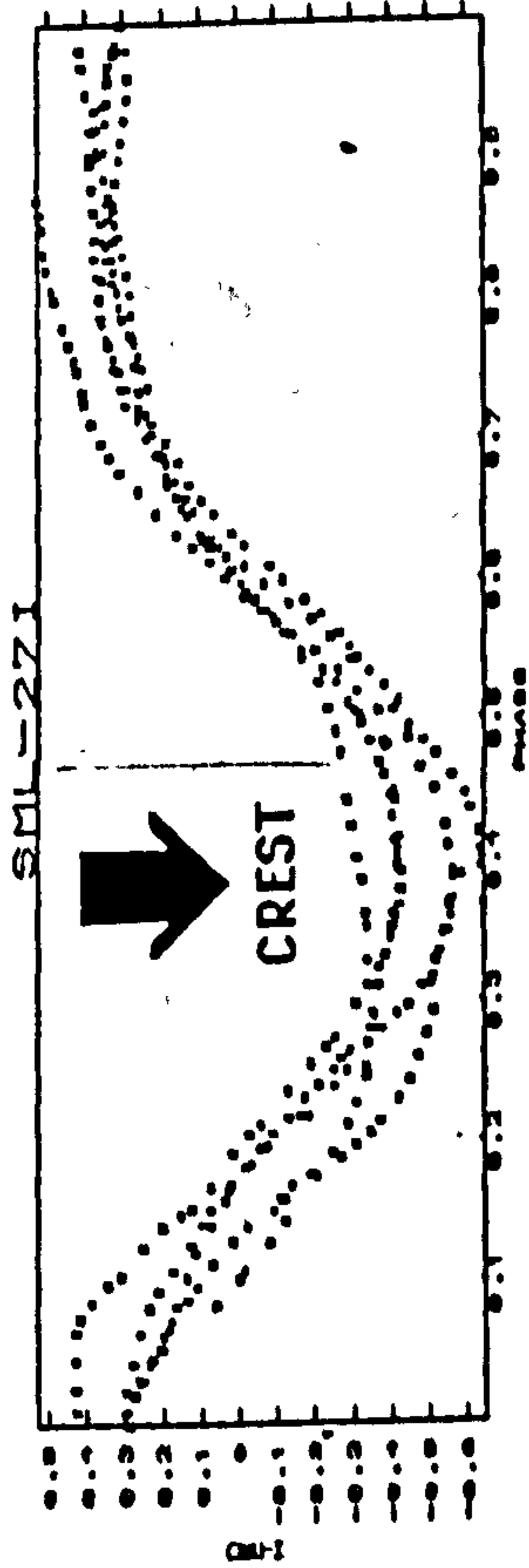
Study Code: SML-27i

Instrument: Pendulum Clock

Maker: van Call

Date: 1657

Ser./Acq. No. 1986-1697



Mu — [ Filar Scale Bench Div. Eng. Adjust. Leveling Focus Eye P. Tube Tool Gauge Binding (Top of Frame)

DEPTH 0.178 mm

DEPTH 0.007 in



Characteristics:

Screw

Nut

Leng: 0.188" / ~0.188"

Diameter: 0.0898"

Steel

Brass

Other: Wrought Iron

Instrument Identification:

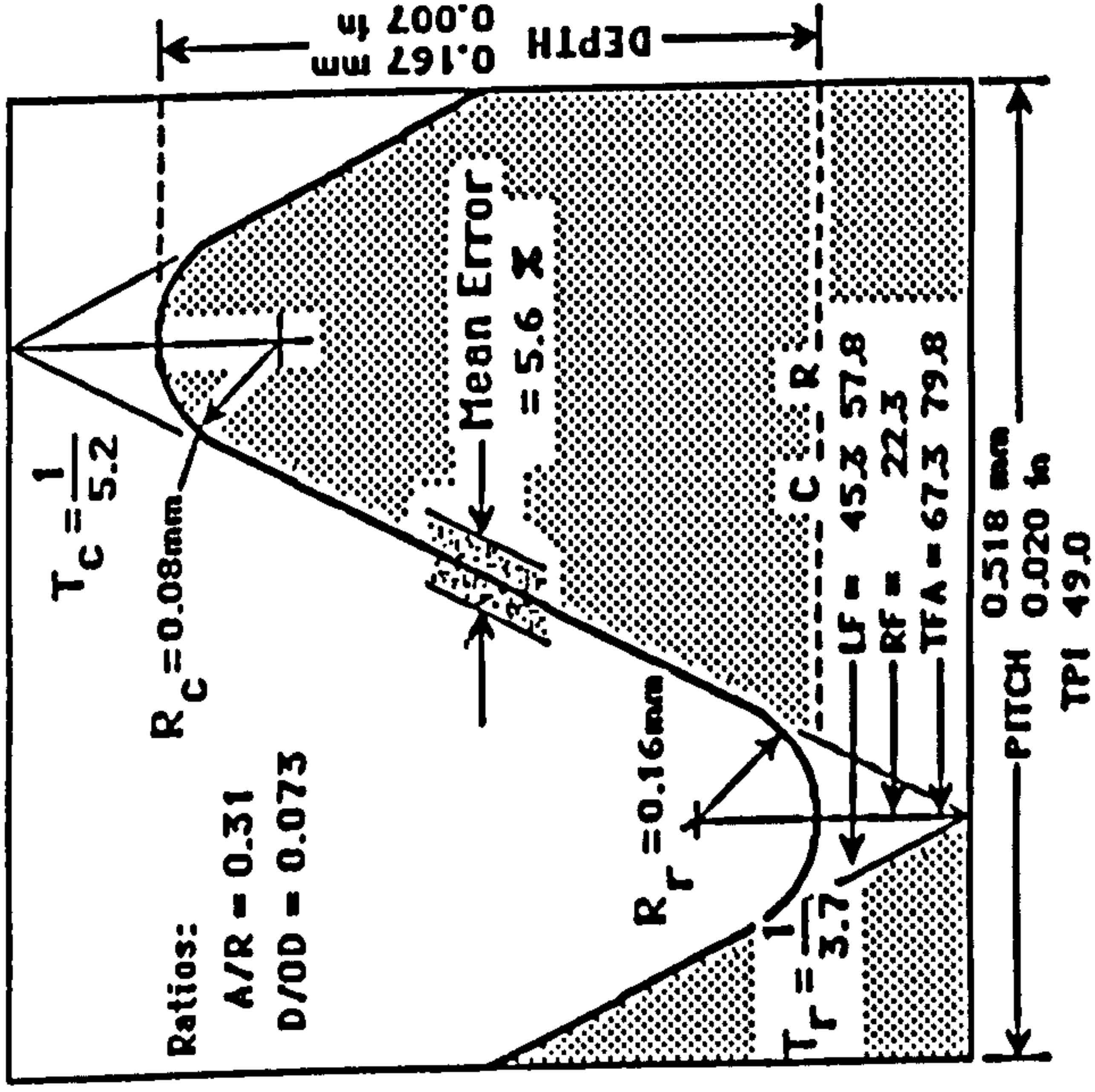
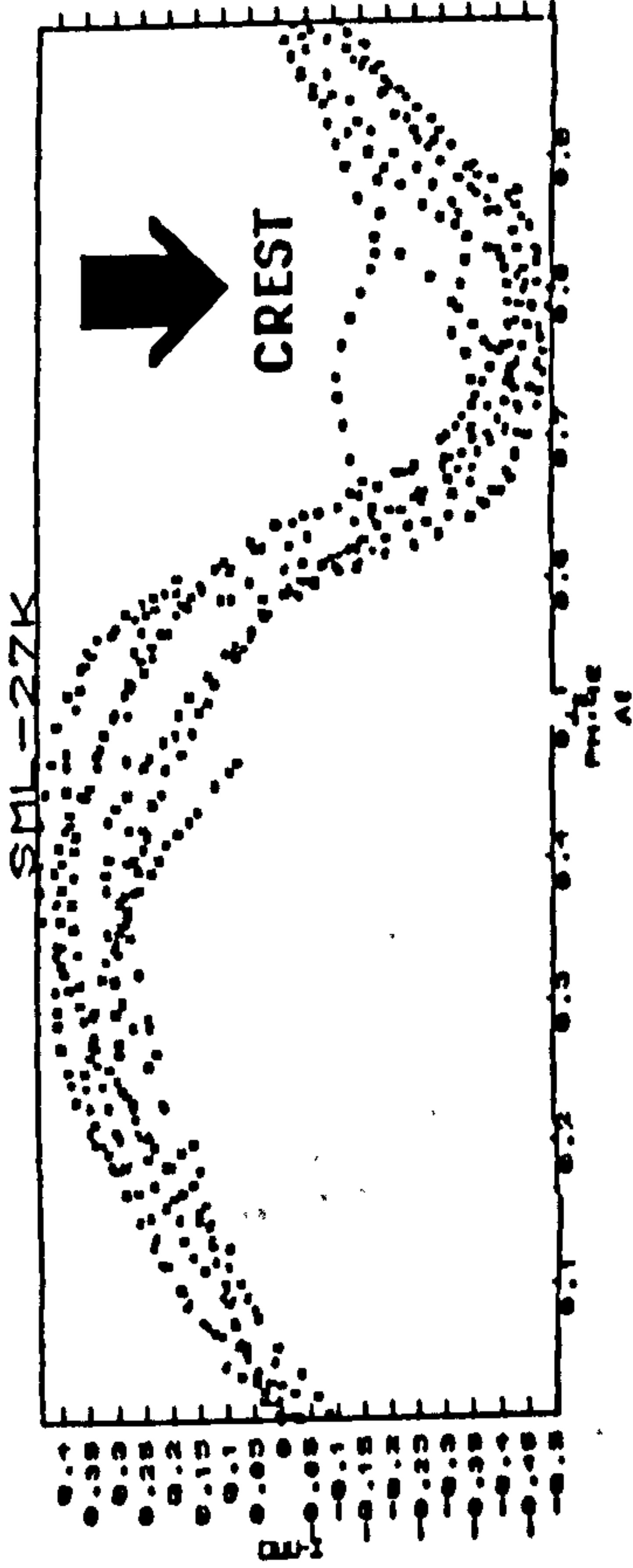
Study Code: SML-27k

Instrument: Pendulum Clock

Maker: van Call

Date: 1657

Ser./Acq. No. 1986-1697



Mu

Filar

Scale

Bench

Div. Eng.

Adjust.

Leveling

Focus

Eye P.

Tube

Tool

Gauge

Binding

(On face)

Characteristics:

Screw

Nut

Leng: 0.75"

Diameter: 0.1397"

Steel

Brass

Other:

Instrument Identification:

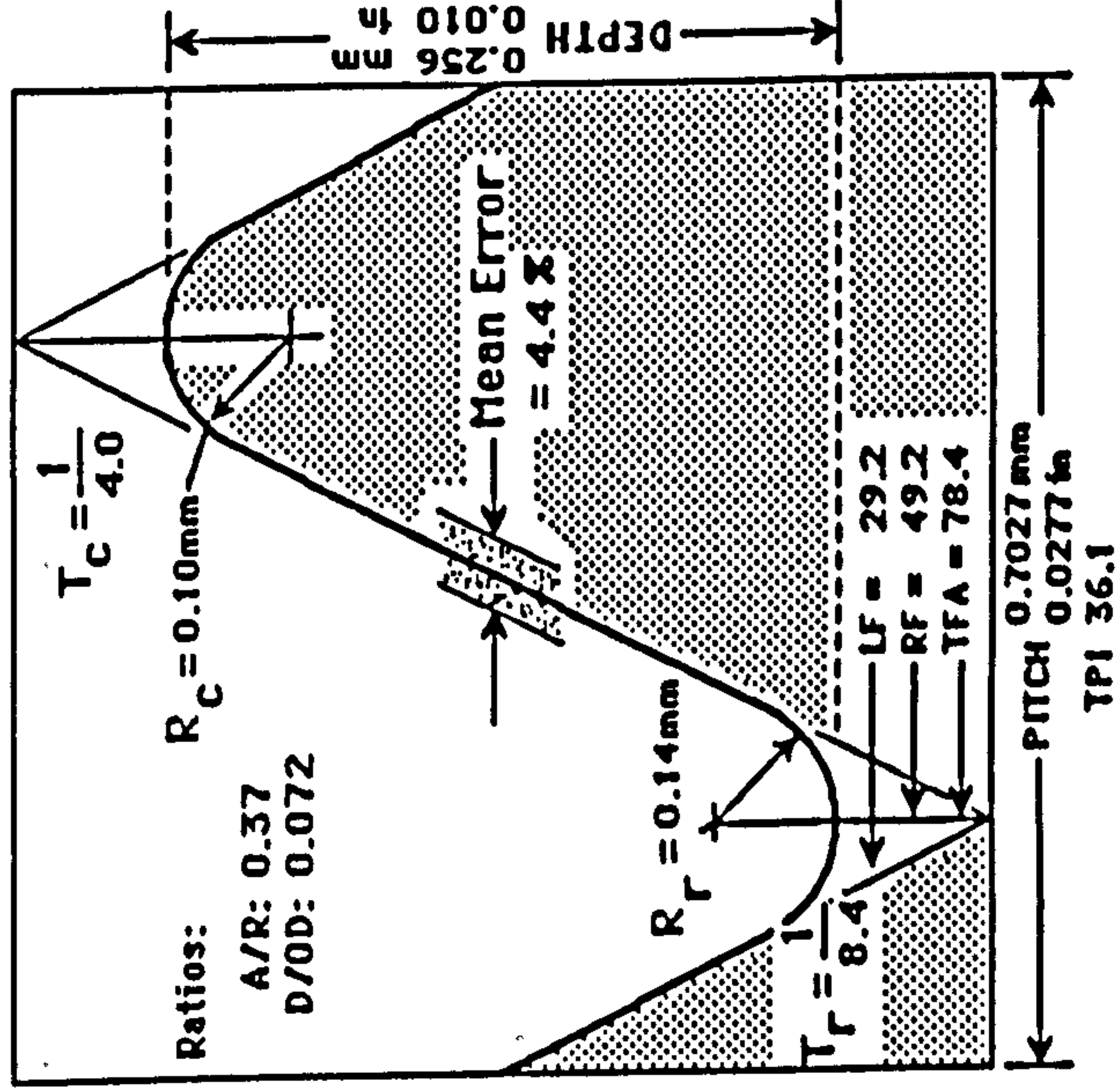
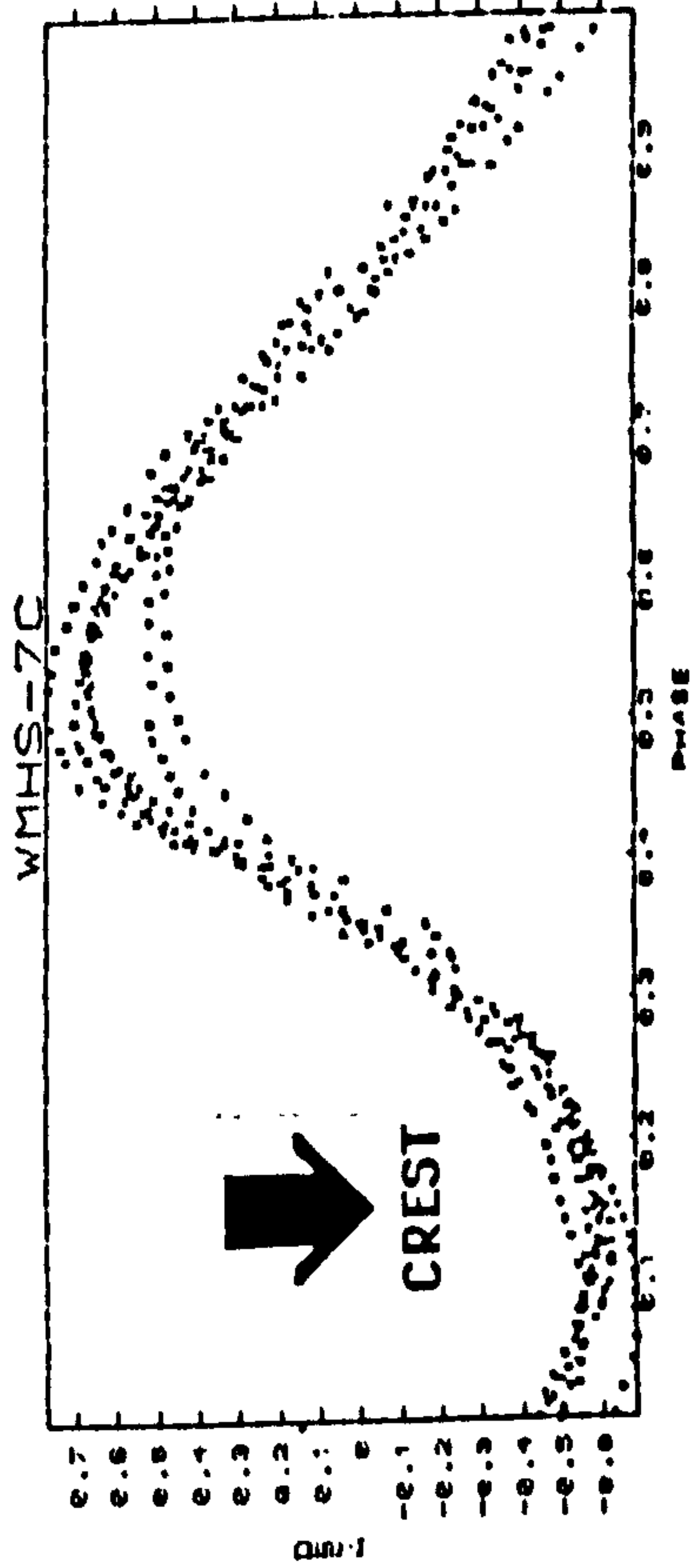
Study Code: WMHS-7c

Instrument: Micrometer-bifilar

Maker: John Rowley

Date: ca.1703

Ser./Acq. No. 1004



Mu

Filar

Scale

Bench

Div. Eng.

Adjust.

Leveling

Focus

Eye P.

Tube

Tool

Gauge

Binding

Characteristics:

Screw

Nut

Leng:  $\approx 0.50''$  /  $\approx 0.50''$

Diameter: 0.2303"

Steel

Brass

Other:

Instrument Identification:

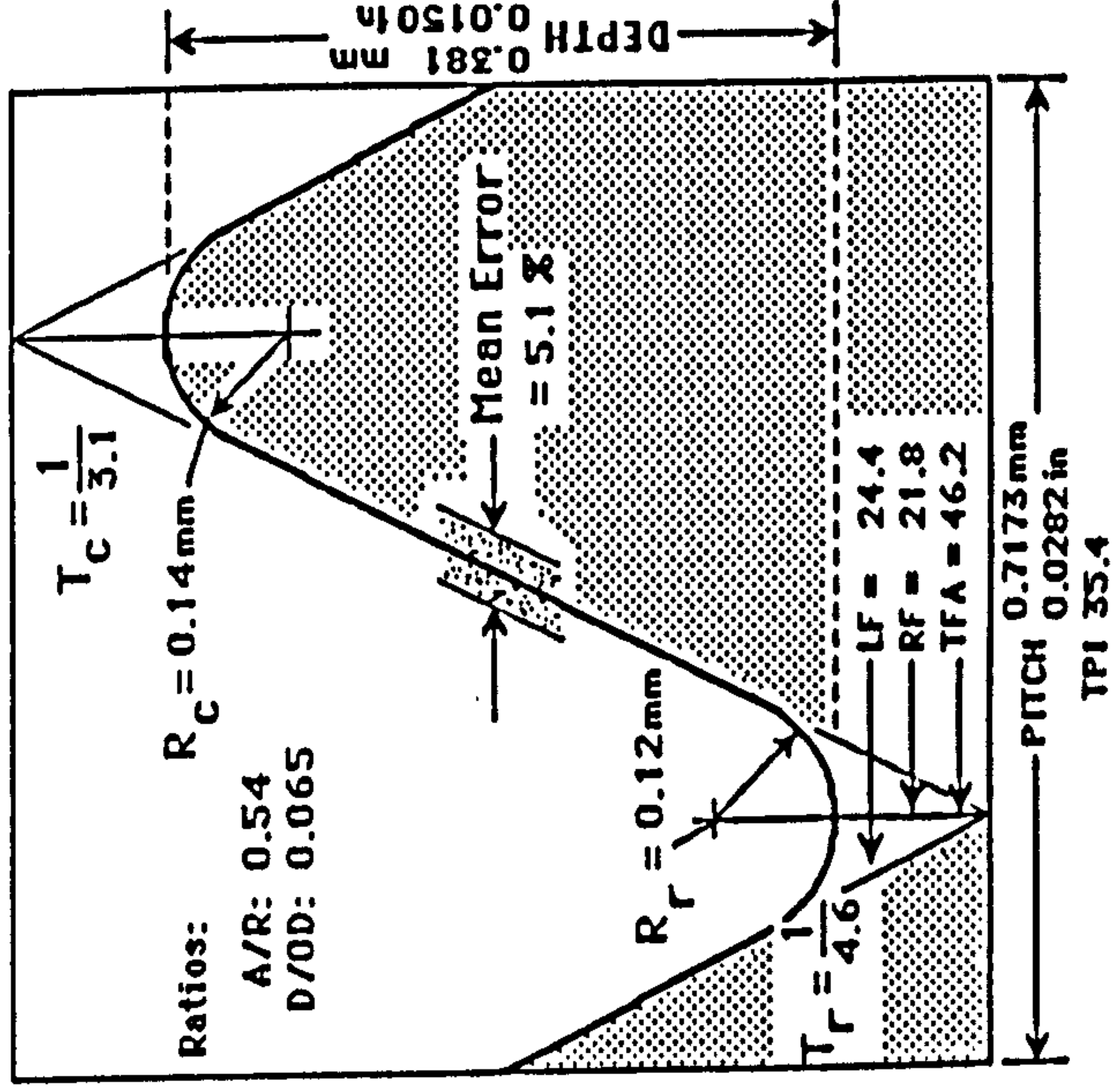
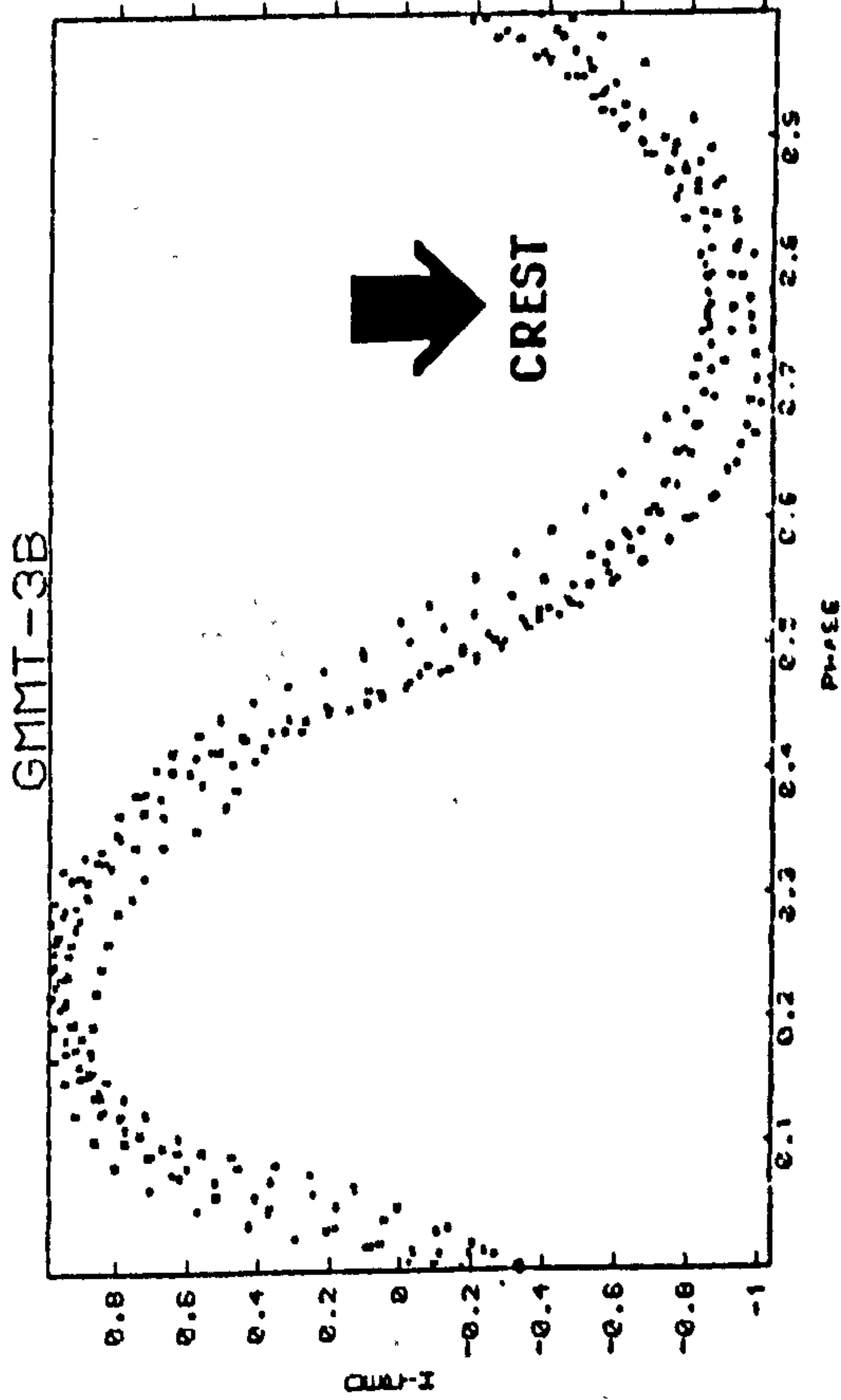
Study Code: GMT-3b

Instrument: Gregorian reflecting telescope

Maker: Watkins

Date: ca.1770

Ser./Acq. No. L1970.3



Mu	Filar
	Scale
	Bench
	Div. Eng.
	Adjust.
	Leveling
	Focus
	Eye P.
	Tube
	Tool
	Gauge
	Binding
	Misc.

From bottom of pillar stand  
Probably Francis Watkins I  
(b 1723-d ca.1784)



Characteristics:

Screw

Nut

Leng: 0.813"

Diameter: 0.125"

Steel

Brass

Other:

Instrument Identification:

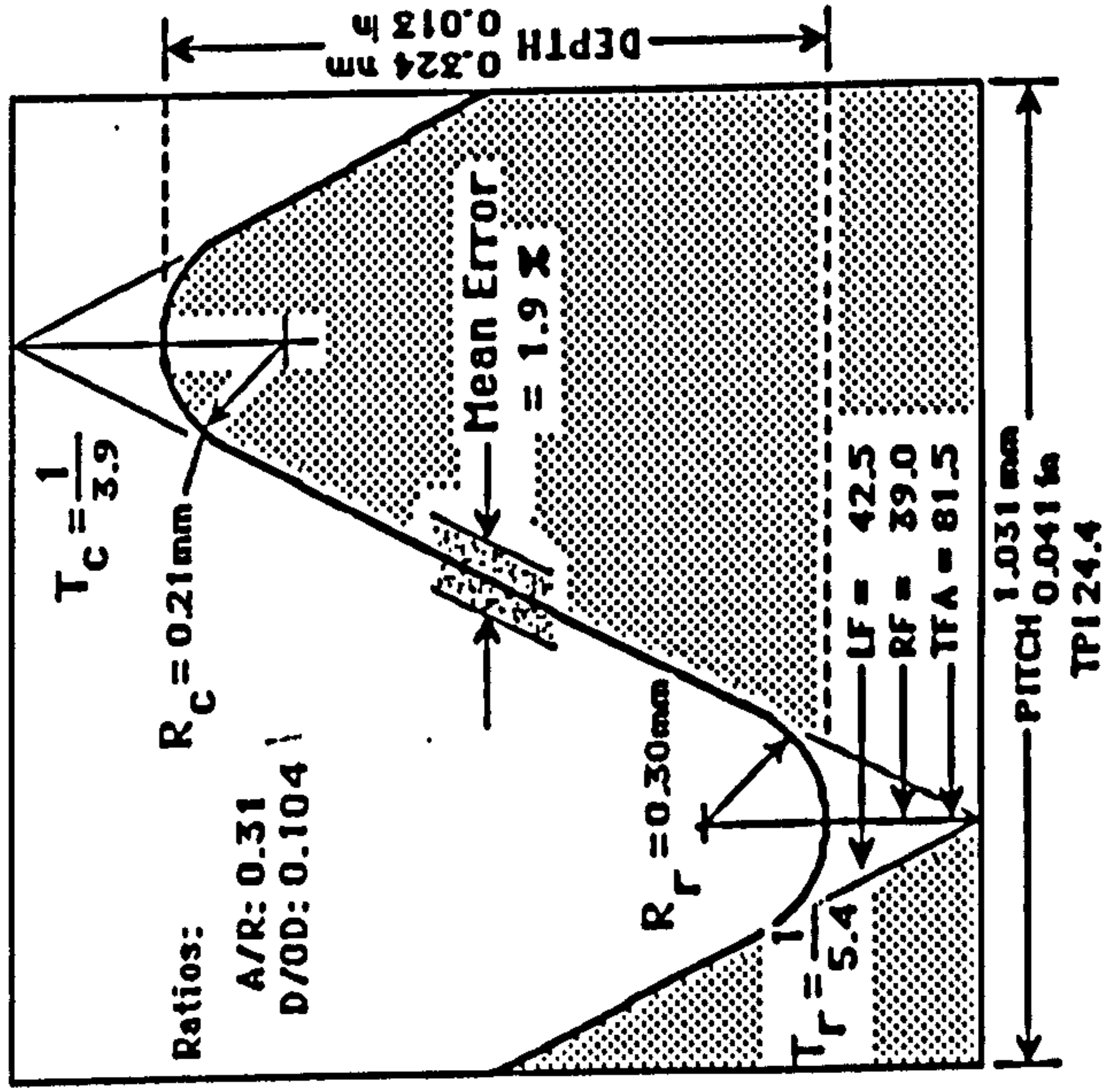
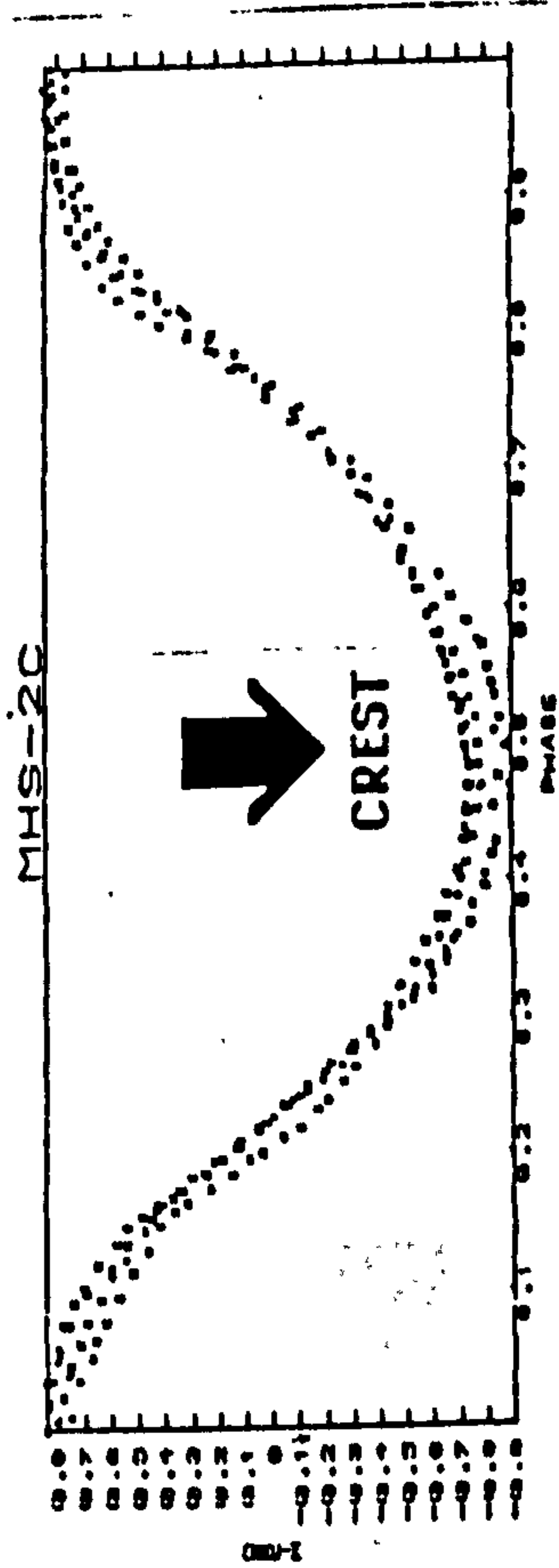
Study Code: MHS-2C

Instrument: Micrometer-Bifilar

Maker: Thomas Jones

Date: ca.1820

Ser./Acq. No. 79-23



Mu

Filar

Scale

Bench

Div. Eng.

Adjust.

Leveling

Focus

Eye P.

Tube

Tool

Gauge

Binding

Misc.

Multiple Thread screw  
for rotation of mu head



Characteristics:

Screw

Nut

Leng: 0.156"

Diameter: 0.745"

Steel

Brass

Other:

Instrument Identification:

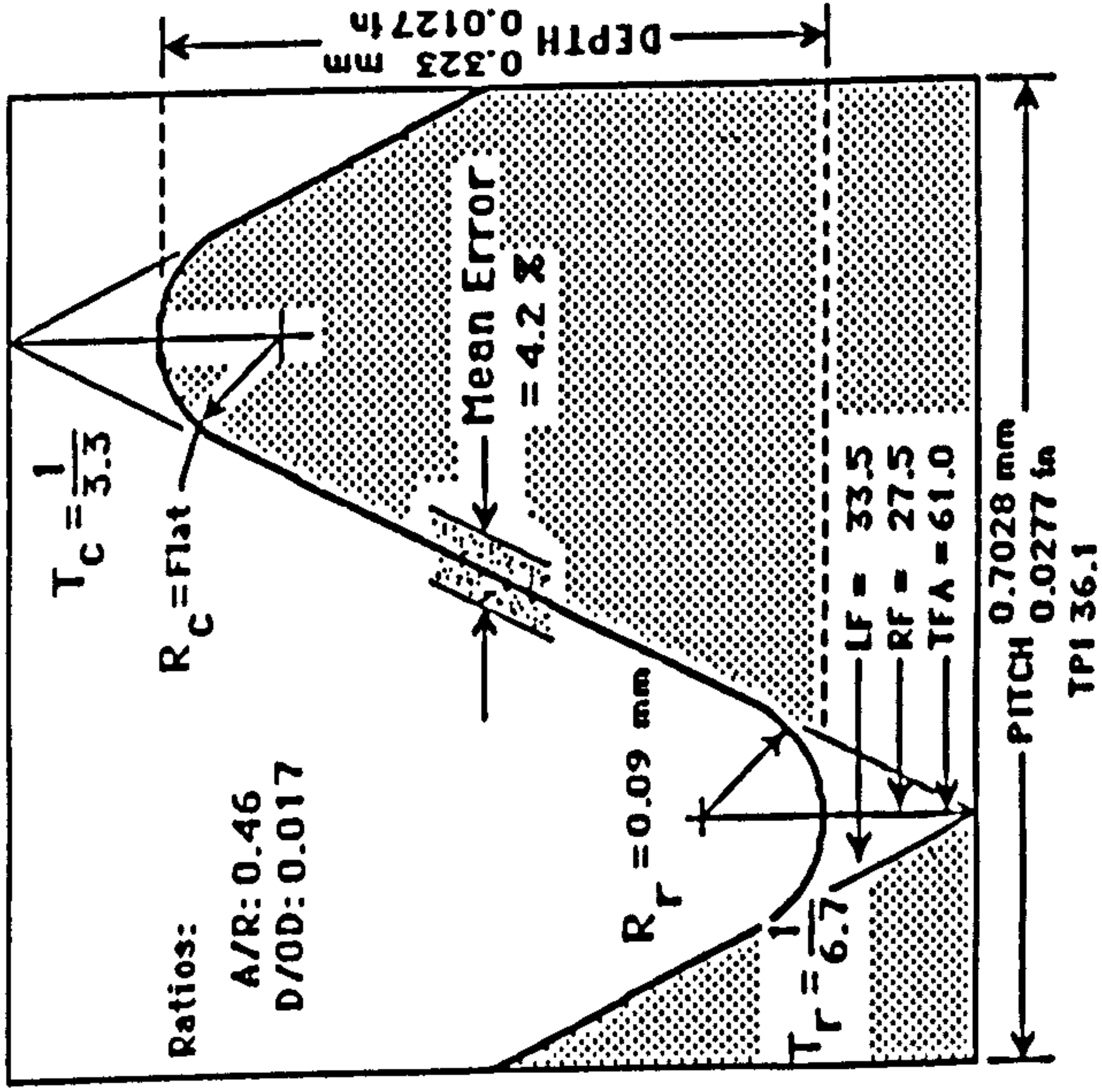
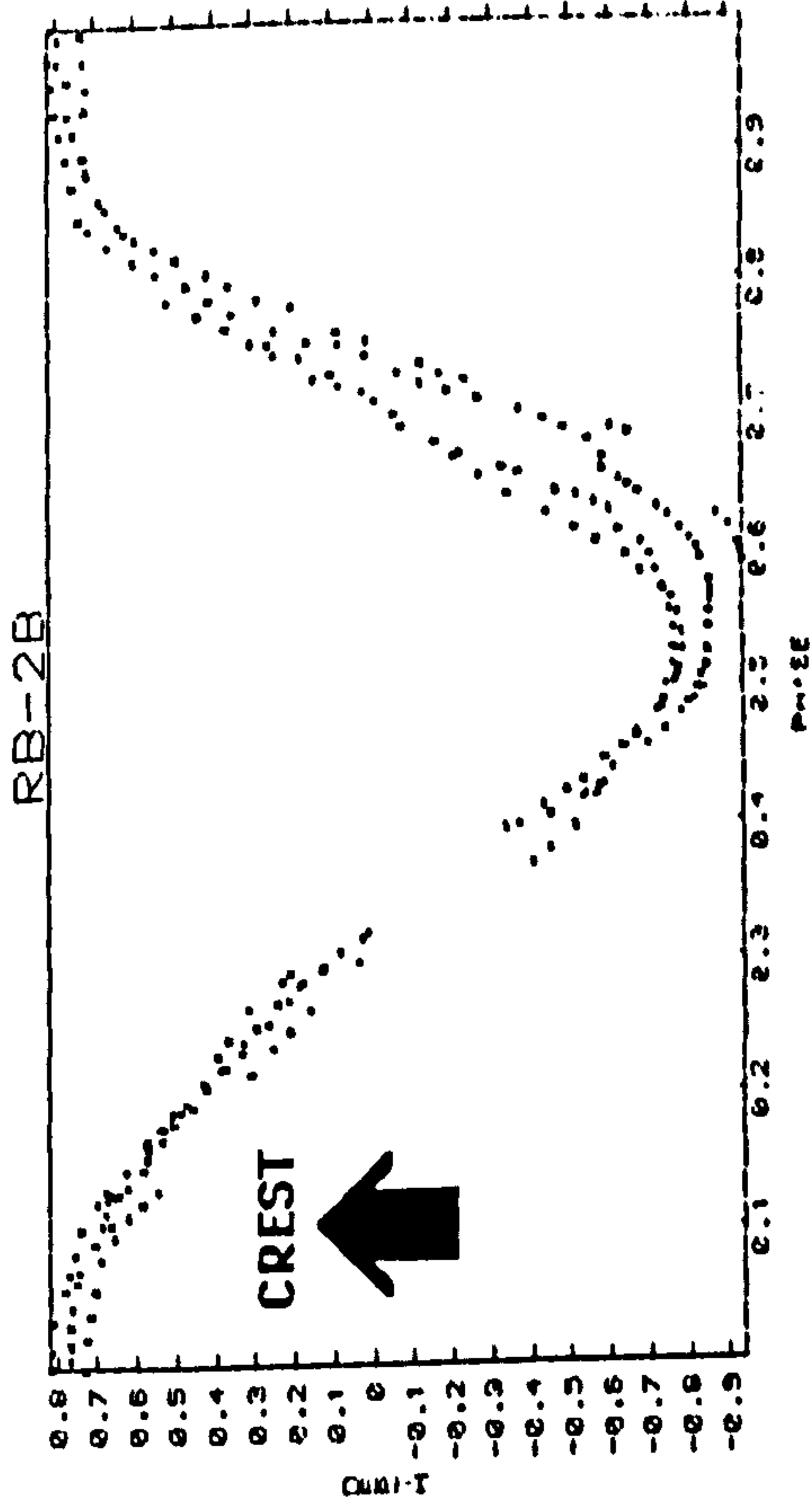
Study Code: RB-2b

Instrument: Octant

Maker: van der Voort

Date: ca.1860

Ser./Acq. No.



Mu

Filar

Scale

Bench

Div. Eng.

Adjust.

Leveling

Focus

Eye P.

Tube

Tool

Gauge

Binding

Misc.

Thread for mounting  
solar filter

Characteristics:

Screw

Nut

Leng: 0.469" / 0.260"

Diameter: 0.1403"

Steel

Brass

Other:

Instrument Identification:

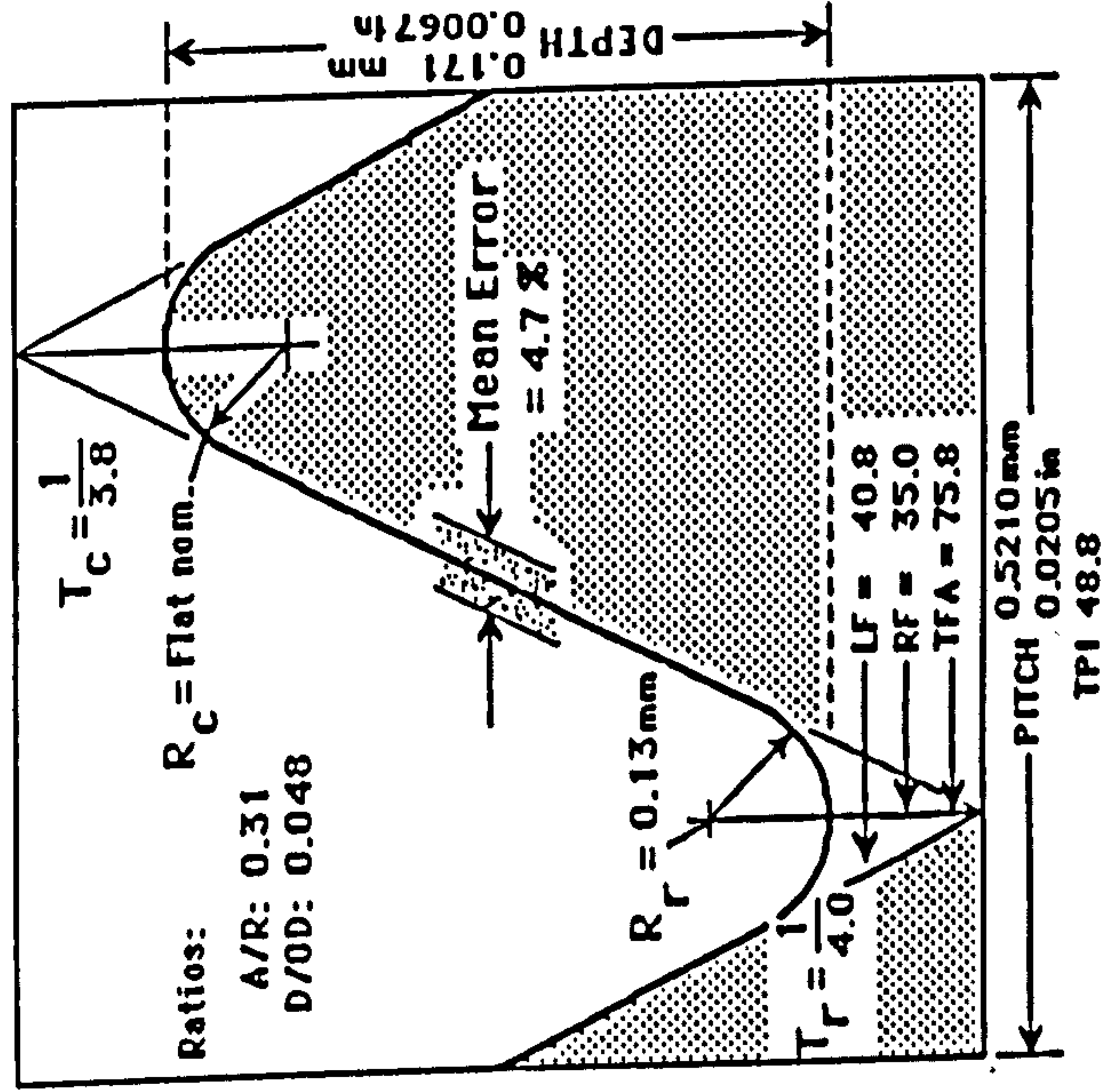
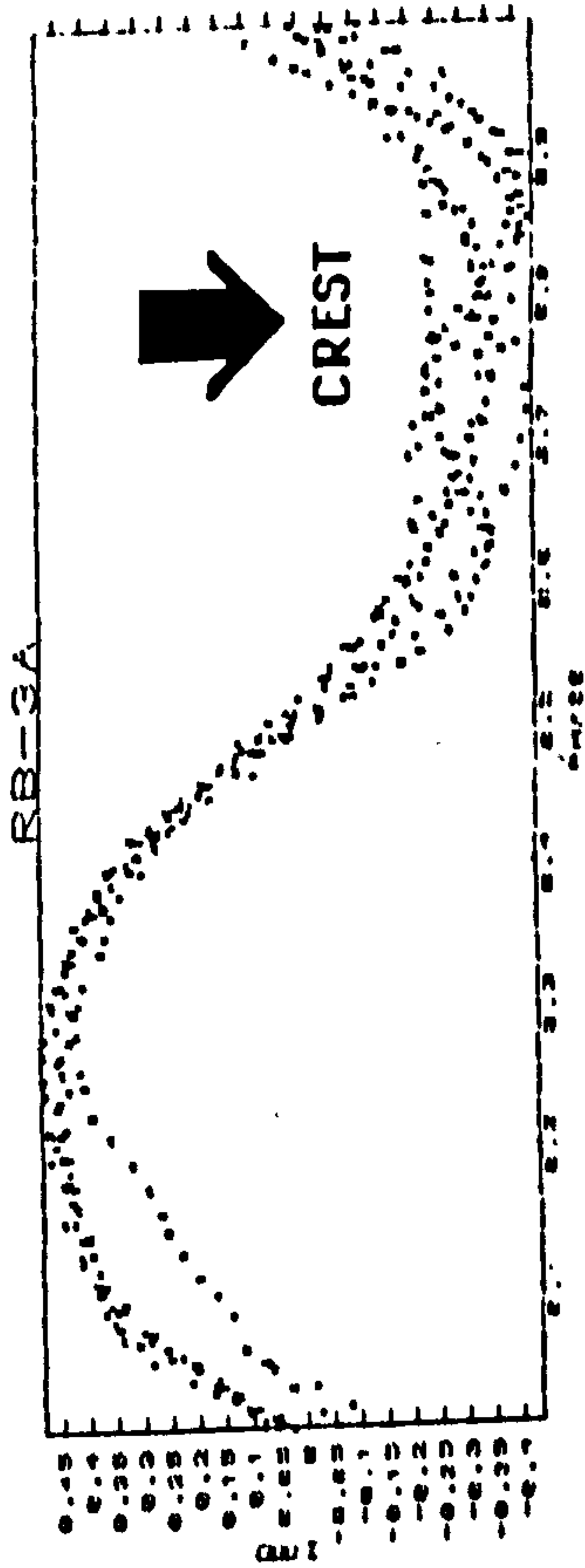
Study Code: RB-3a

Instrument: Octant

Maker: Spencer, Browning, Rust

Date: 1840's

Ser./Acq. No. .



Mu

Filar

Scale

Bench

Div. Eng.

Adjust.

Leveling

Focus

Eye P.

Tube

Tool

Gauge

Binding

Misc.

Clamp screw  
Ebony frame octant

Characteristics:

Screw

Nut

Leng: 0.375" / 0.188"

Diameter: 0.1486"

Steel

Brass

Other:

Instrument Identification:

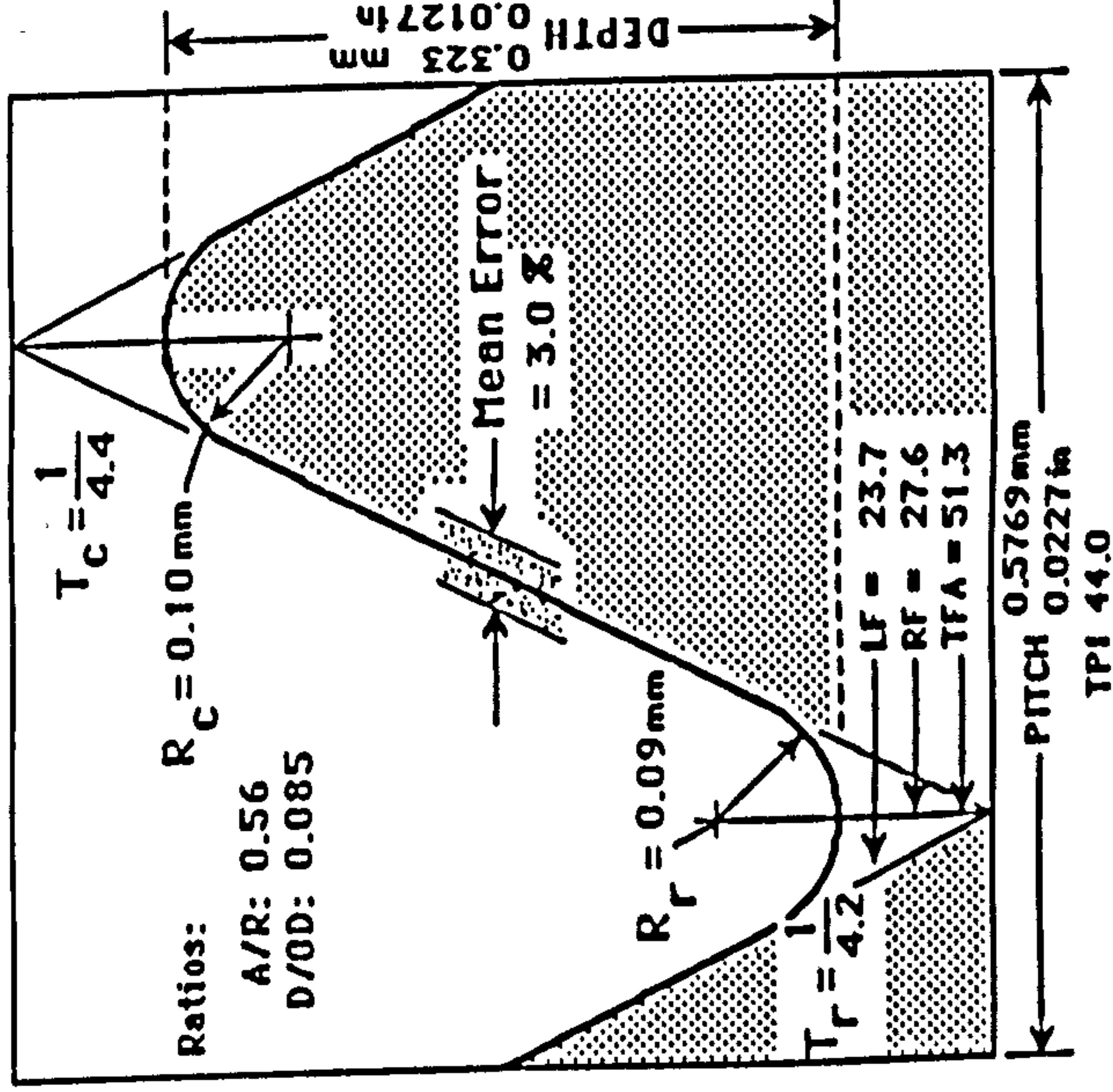
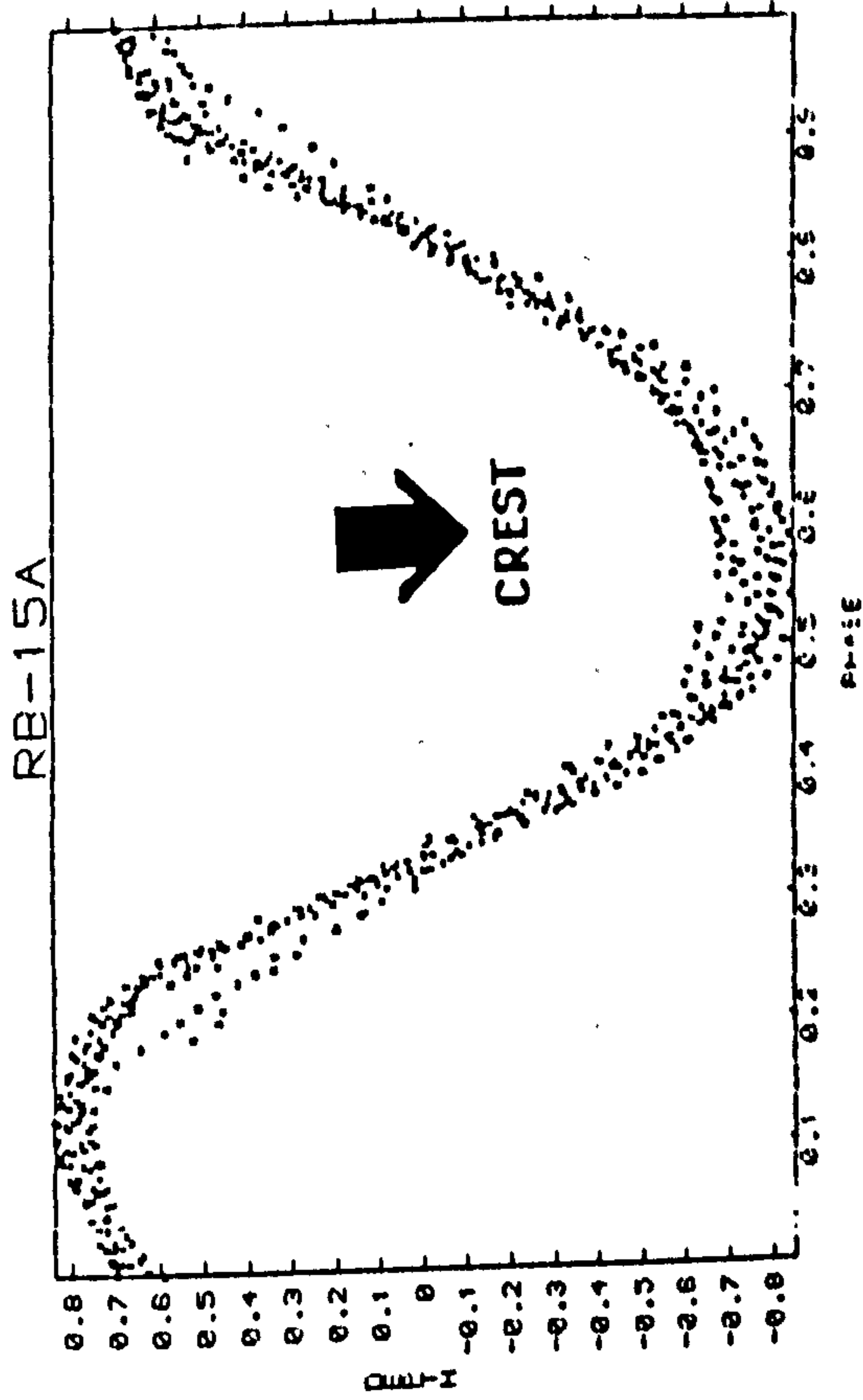
Study Code: RB-15a

Instrument: Surveyor's cross

Maker: Troughton & Simms

Date: m 19th c

Ser./Acq. No. .



Mu	Filar	
		Scale
Bench	Div. Eng.	
		Adjust.
Leveling	Focus	
		Eye P.
Tool	Tube	
		Tool
Gauge	Binding	
		Misc.

On tripod mounting clamp



Characteristics:

Screw

Nut

Leng: 0.25' / ~0.25"

Diameter: 0.1487"

Steel

Brass

Other:

Instrument Identification:

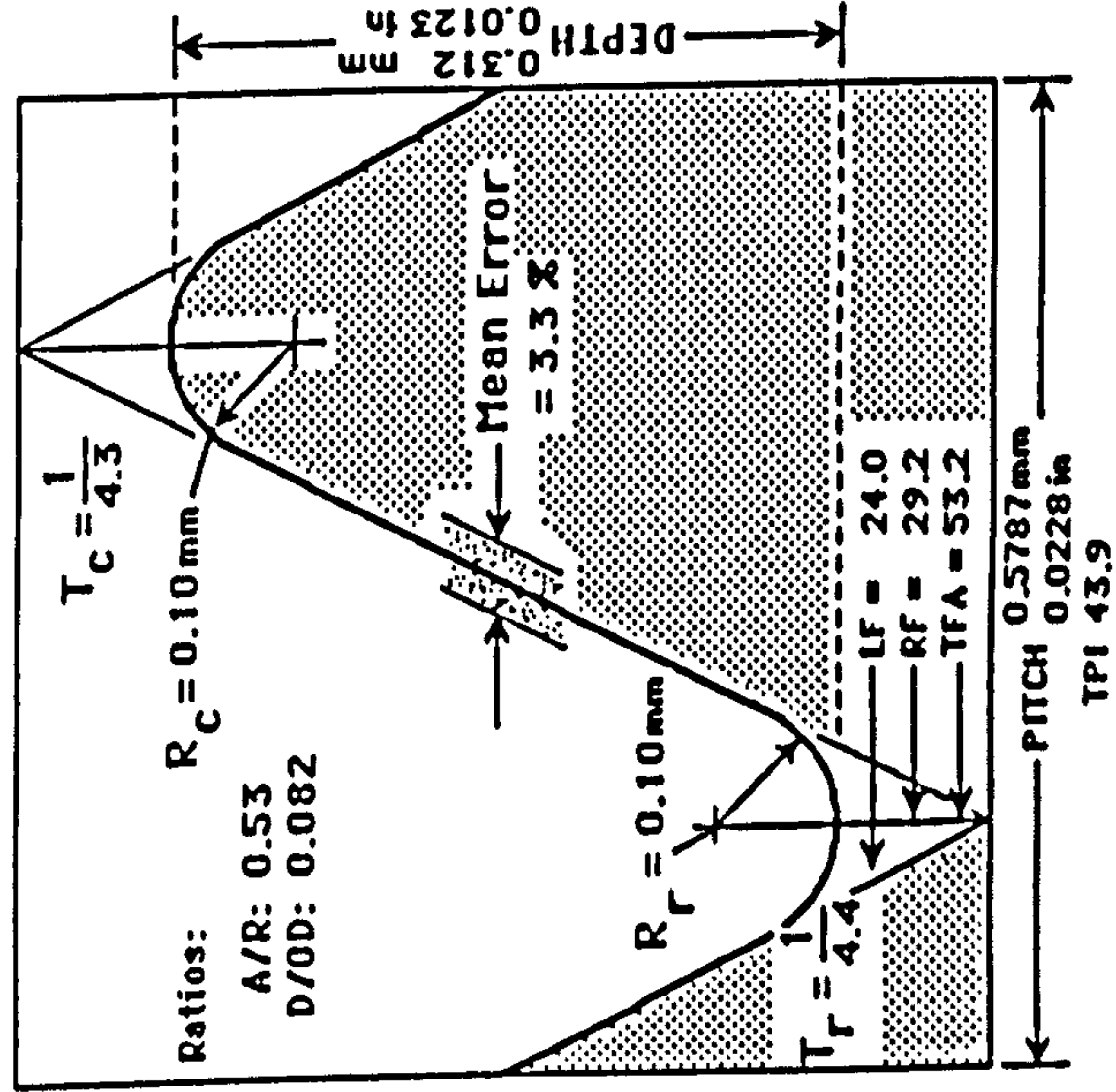
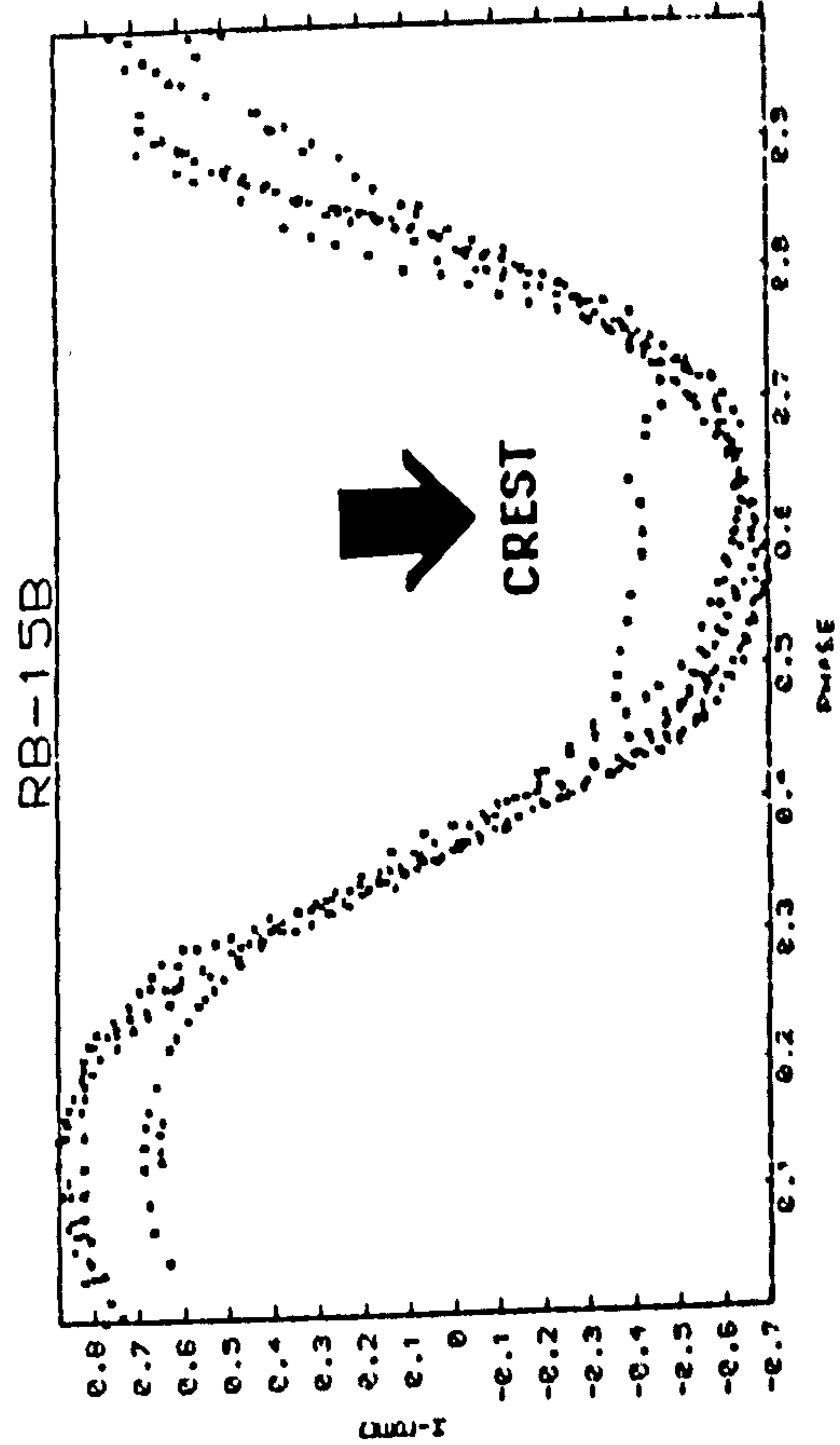
Study Code: RB-15b

Instrument: Surveyor's Cross

Maker: Troughton & Simms

Date: m 19th c

Ser./Acq. No. .



- Mu

Filar

Scale

Bench

Div. Eng.

Adjust.

Leveling

Focus

Eye P.

Tube

Tool

Gauge

Binding

Misc.

Attaching scale to body



Characteristics:

Screw

Nut

Leng: 0.375"

Diameter: 0.2238"

Steel

Brass

Other:

Instrument Identification:

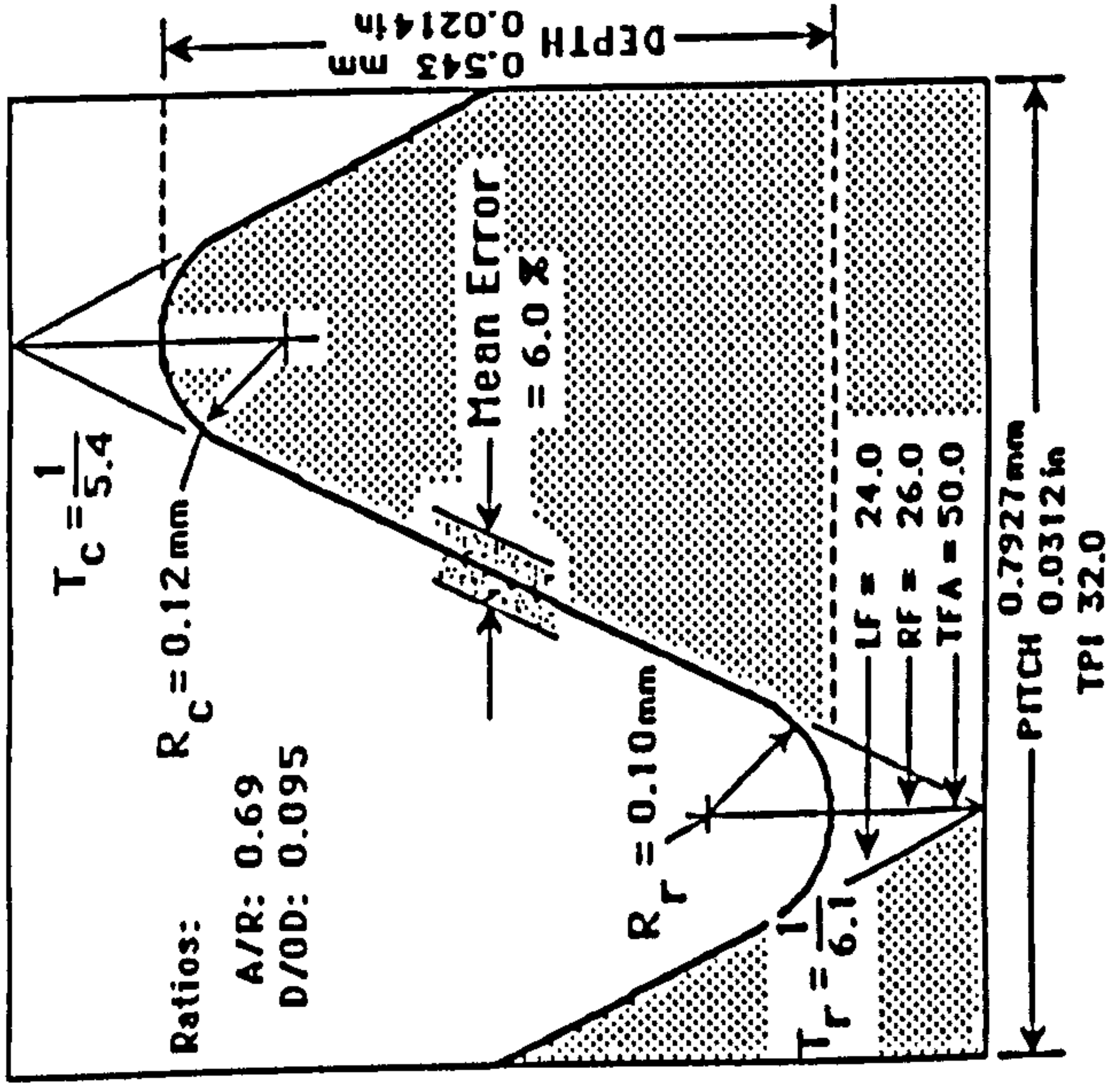
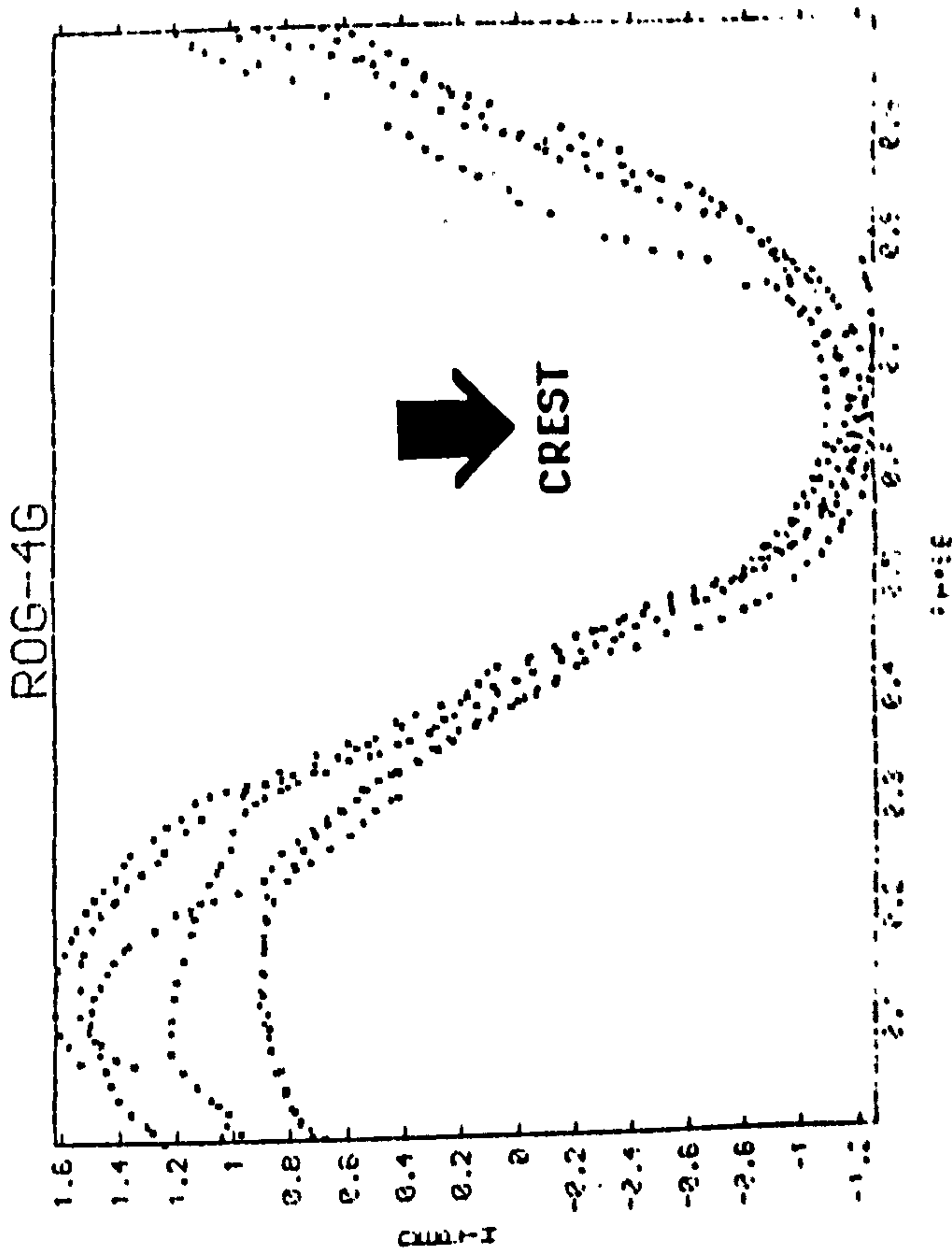
Study Code: ROG-4g

Instrument: Bifilar micrometer

Maker: Troughton & Simms

Date: ca.1840's

Ser./Acq. No. 0L-18



Mu	[	Filar	
		Scale	
		Bench	
		Div. Eng.	
		Adjust.	
		Leveling	
		Focus	
		Eye P.	
		Tube	
		Tool	
		Gauge	
		Binding	
		Misc.	

Clamp screw

Characteristics:

Screw

Nut

Leng: 0.25"

Diameter: 2.313"

Steel

Brass

Other: Lignum Vitae

Instrument Identification:

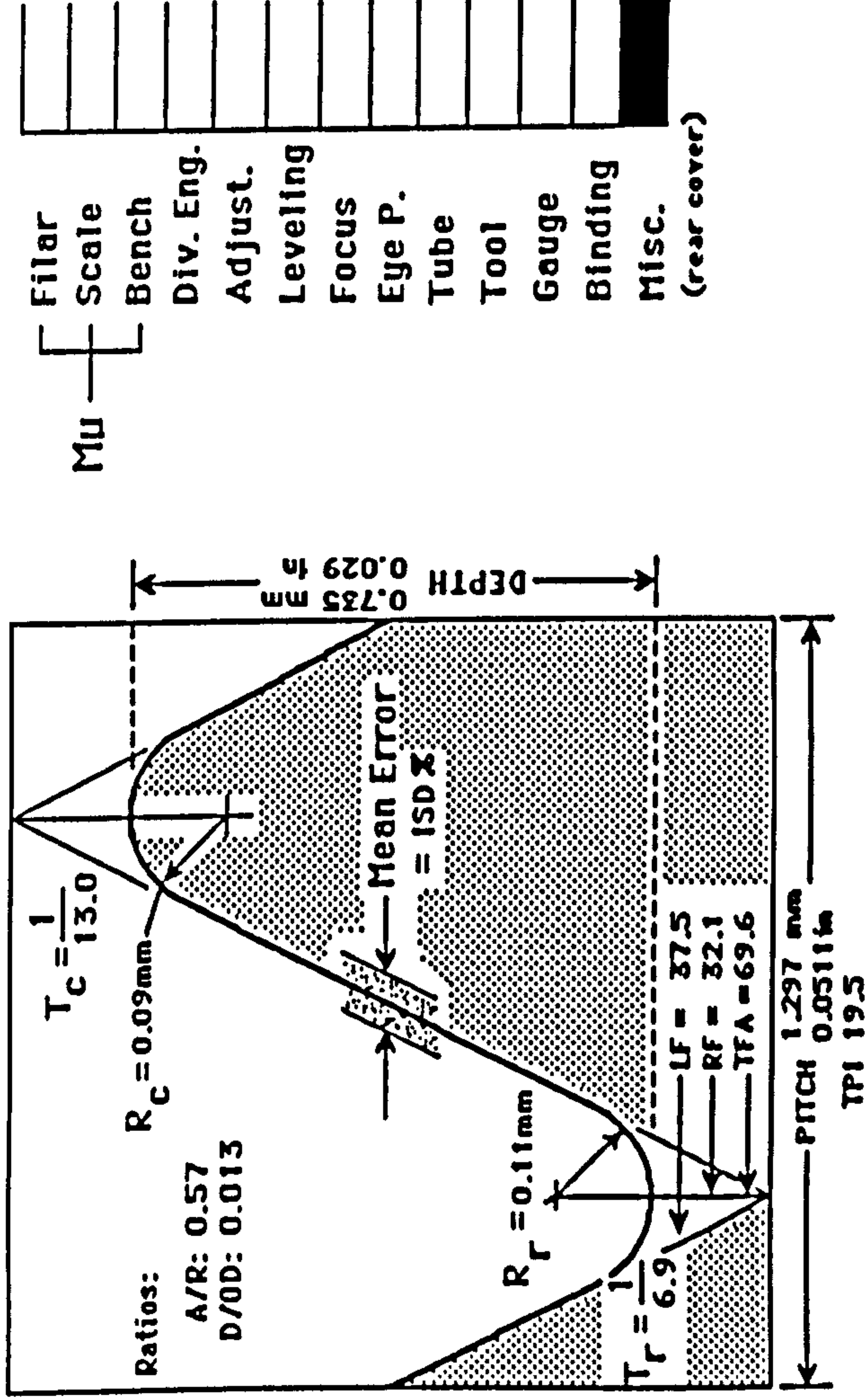
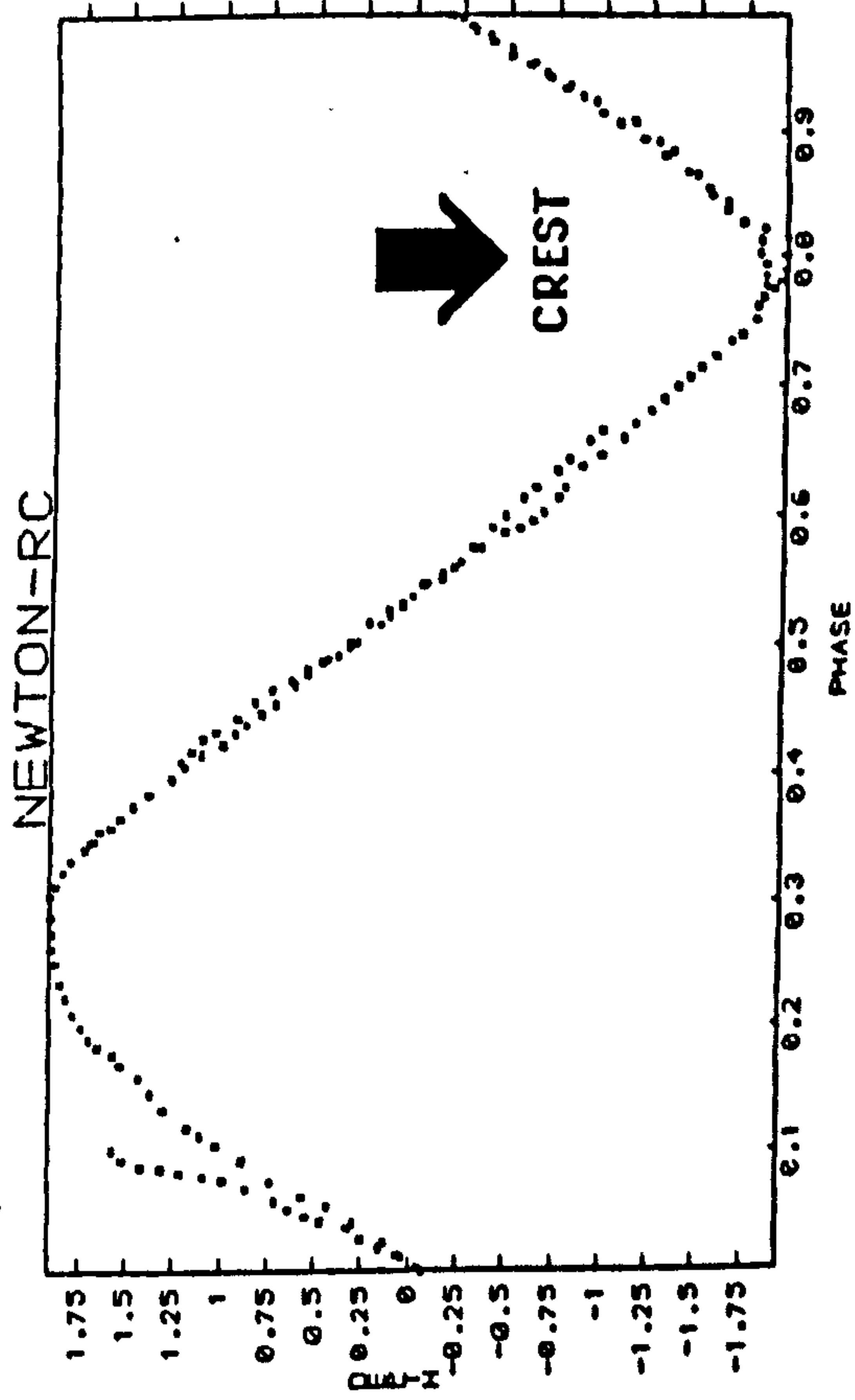
Study Code: RS-1a

Instrument: Newton's telescope

Maker: Newton or Heath & Wing

Date: 1671 or ca.1760

Ser./Acq. No.



Characteristics:

Screw

Nut

Leng: 0.25"

Diameter: 0.75"

Steel

Brass

Other: Lignum Vitae

Instrument Identification:

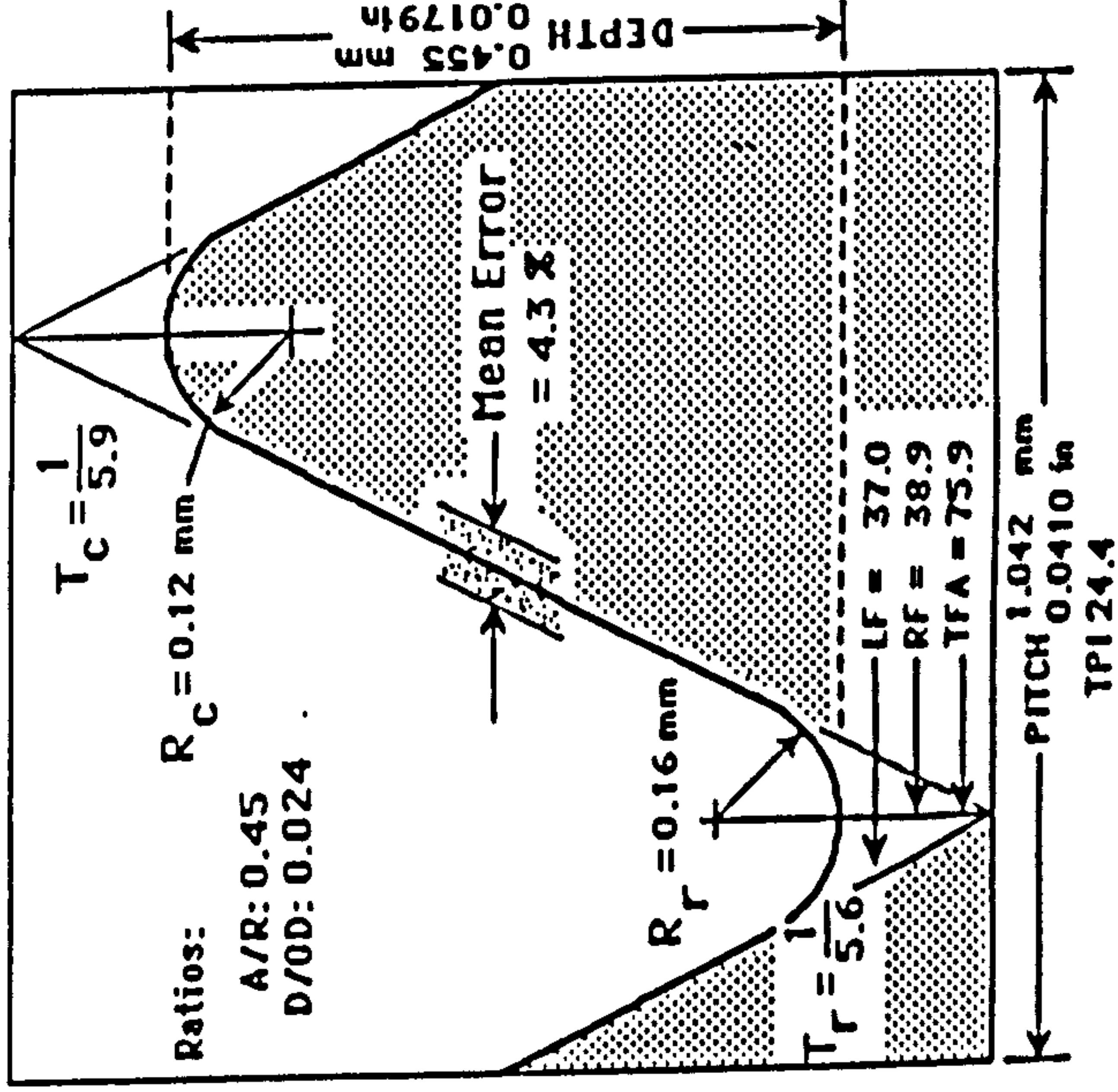
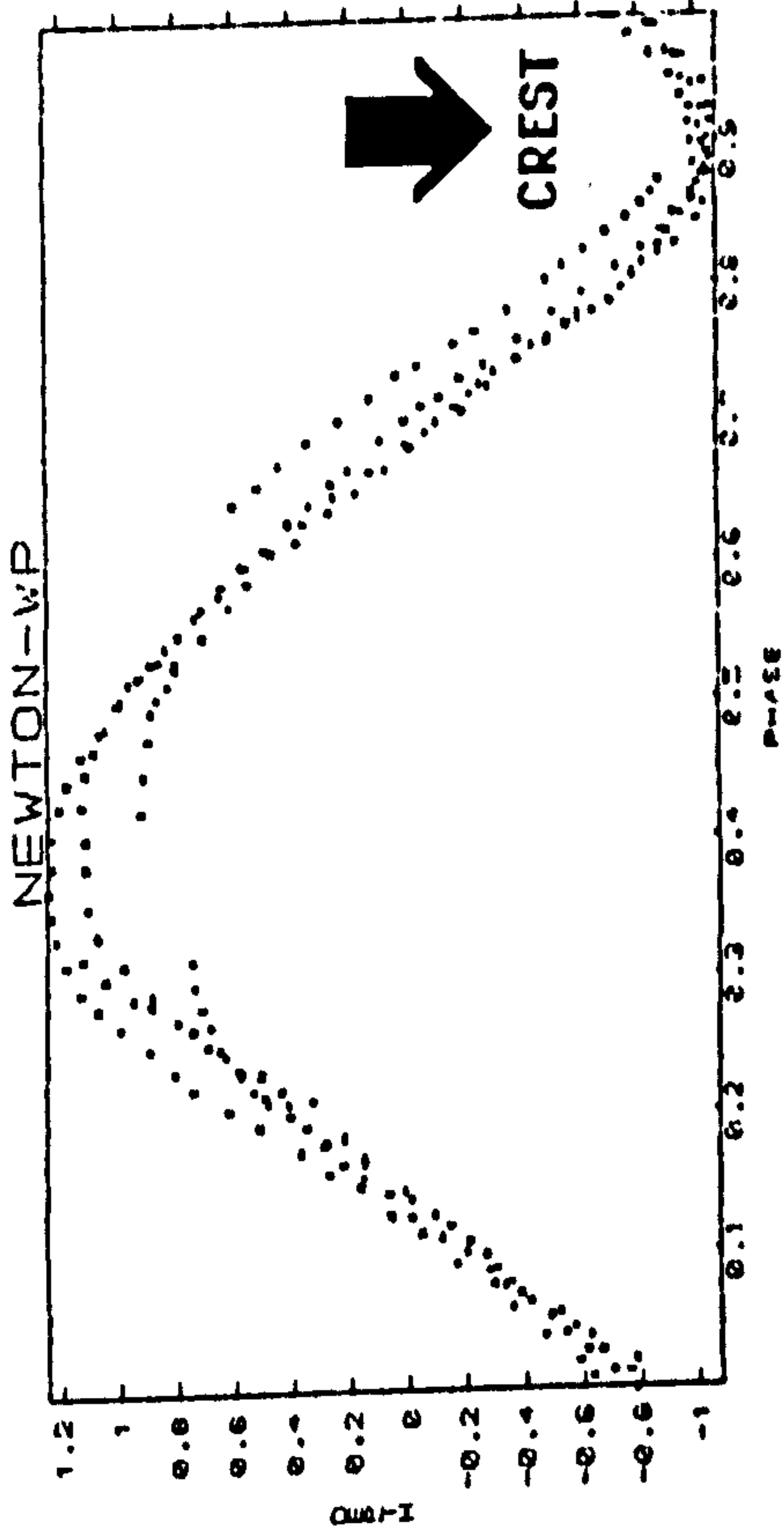
Study Code: RS-1e

Instrument: Newtonian Telescope

Maker: Isaac Newton/Heath & Wing

Date: 1671/ca.1760

Ser./Acq. No.



Mu	—	Filar	
		Scale	
—	—	Bench	
		Div. Eng.	
—	—	Adjust.	
		Leveling	
—	—	Focus	
		Eye P.	
—	—	Tube	
		Tool	
—	—	Gauge	
		Binding	
—	—	Misc.	

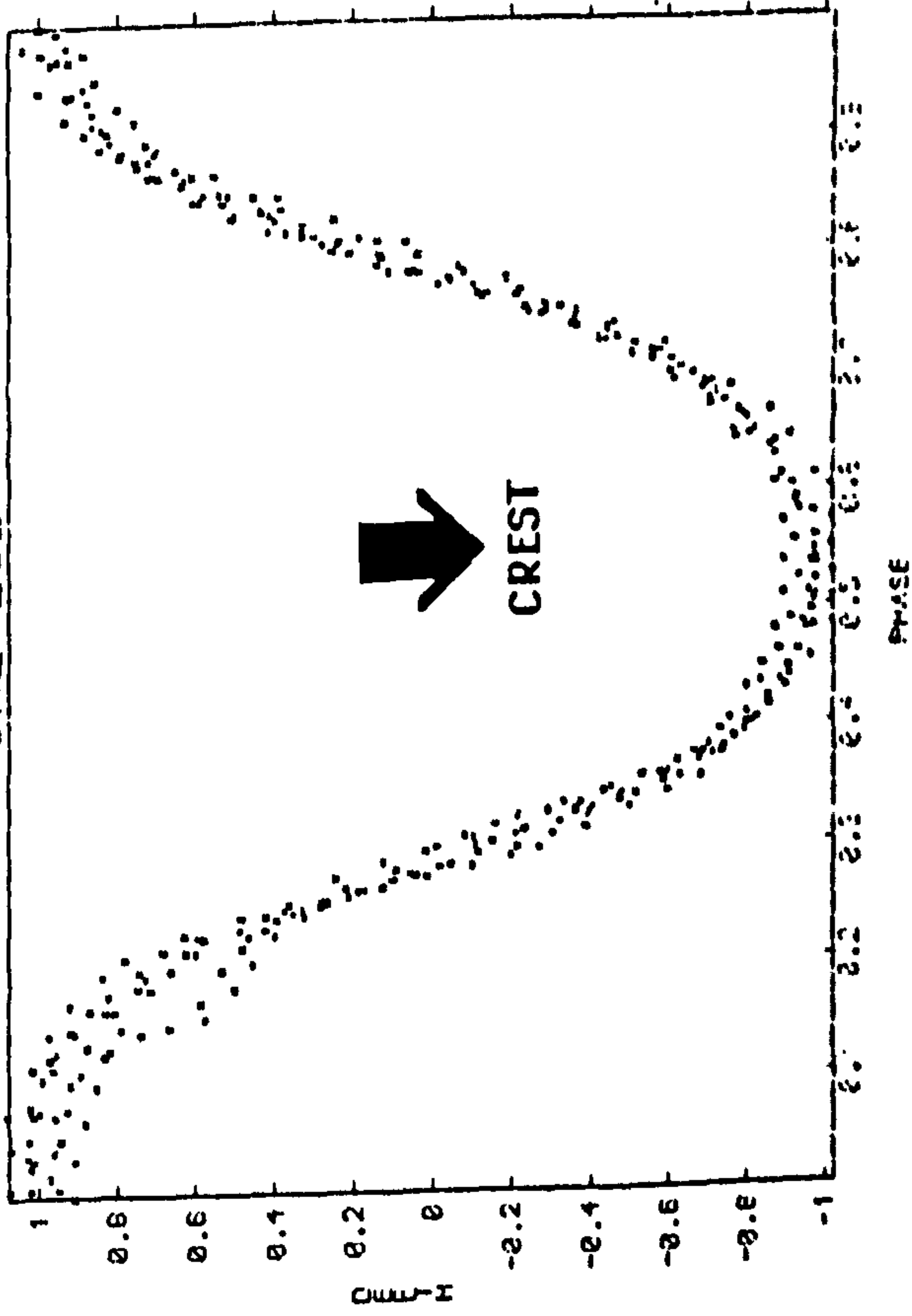
Plug for eyepiece hole







SML-23B



Characteristics:

Screw ☒ Nut ☐

Leng: 0.25" /  $\approx 0.109$ "

Diameter: 0.1858"

Steel ☐ Brass ☒

Other:

Instrument Identification:

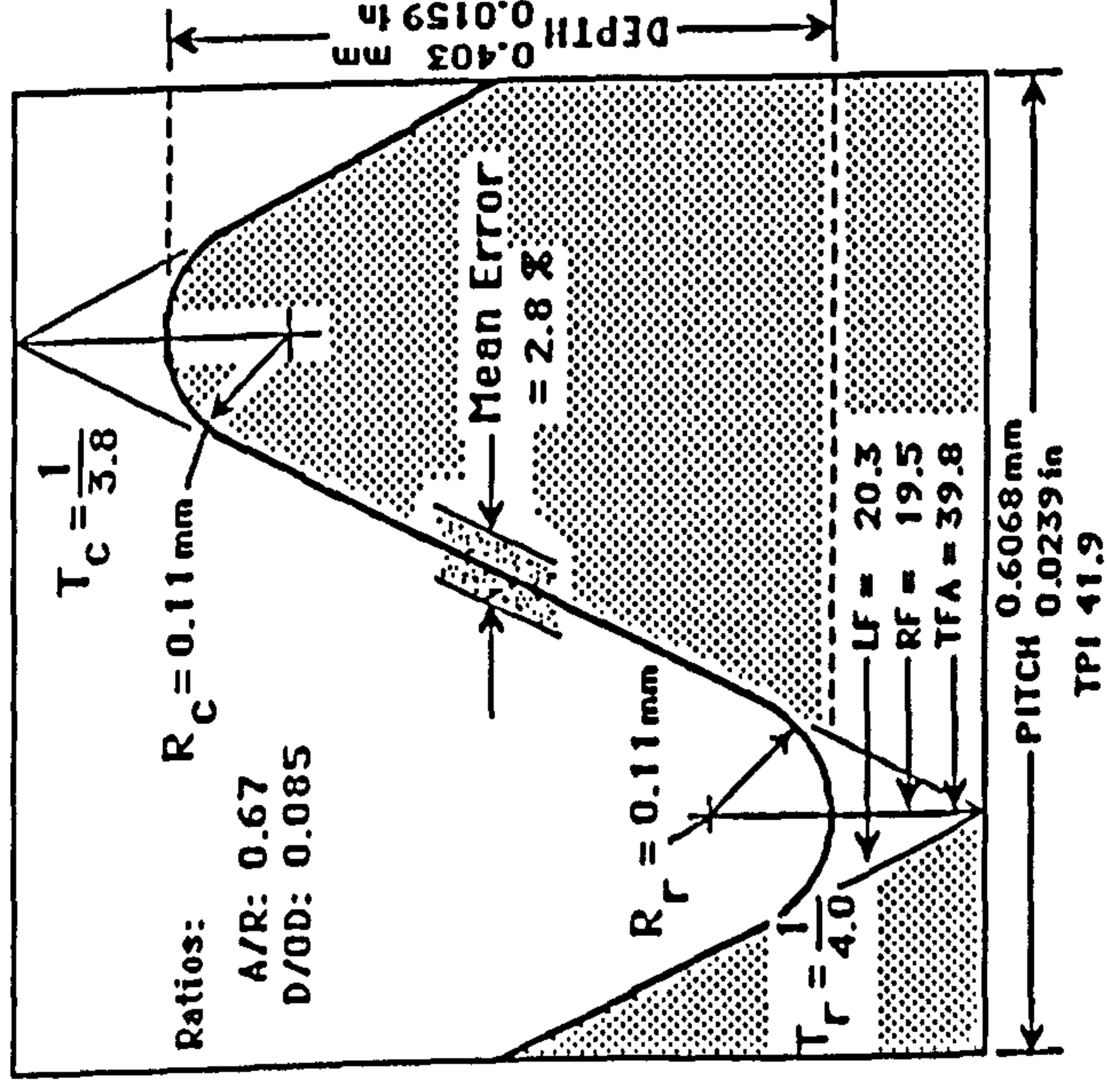
Study Code: SML-23b

Instrument: Portable quadrant

Maker: Dollond

Date: ca.1767

Ser./Acq. No. 1911-214

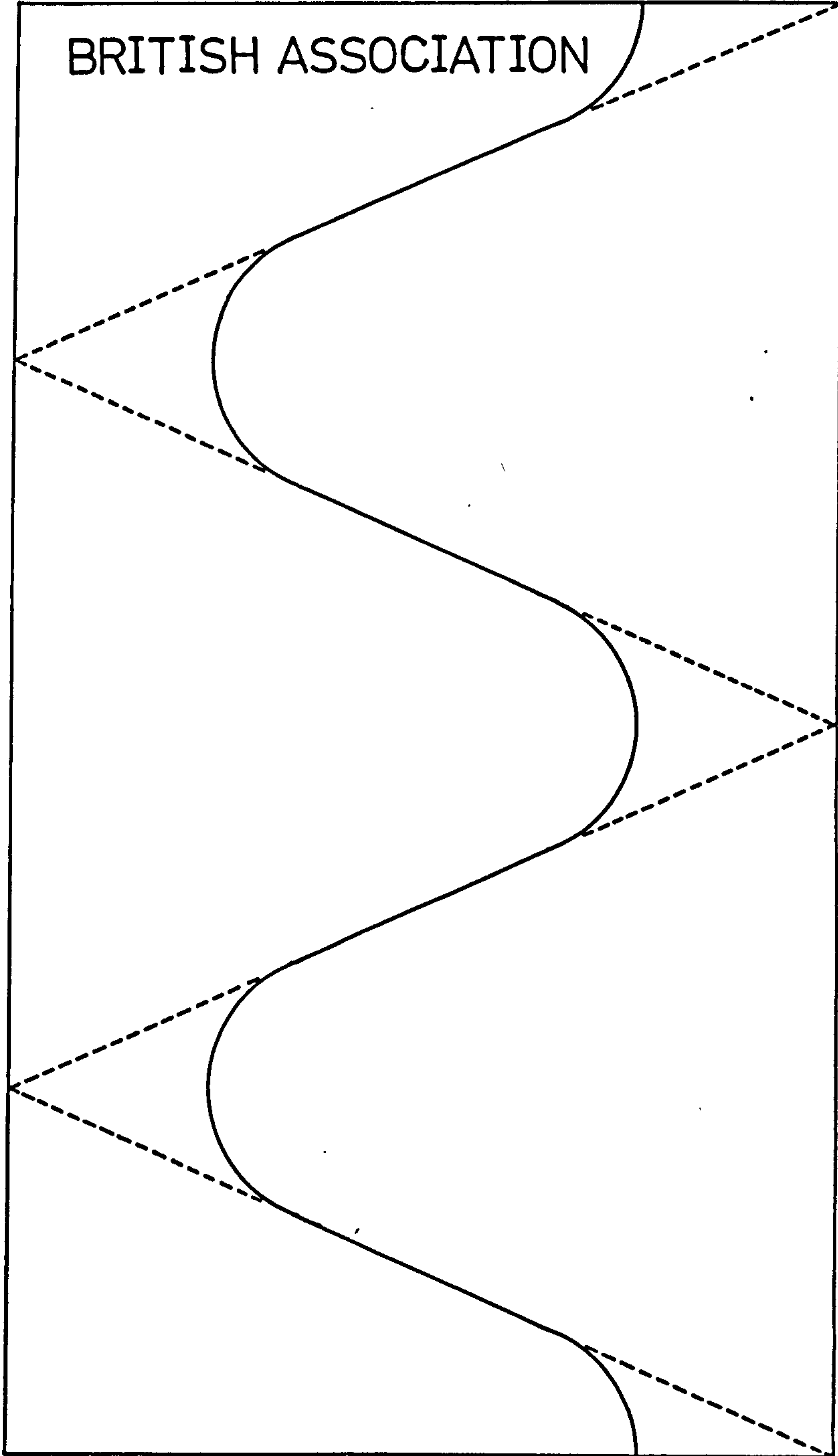


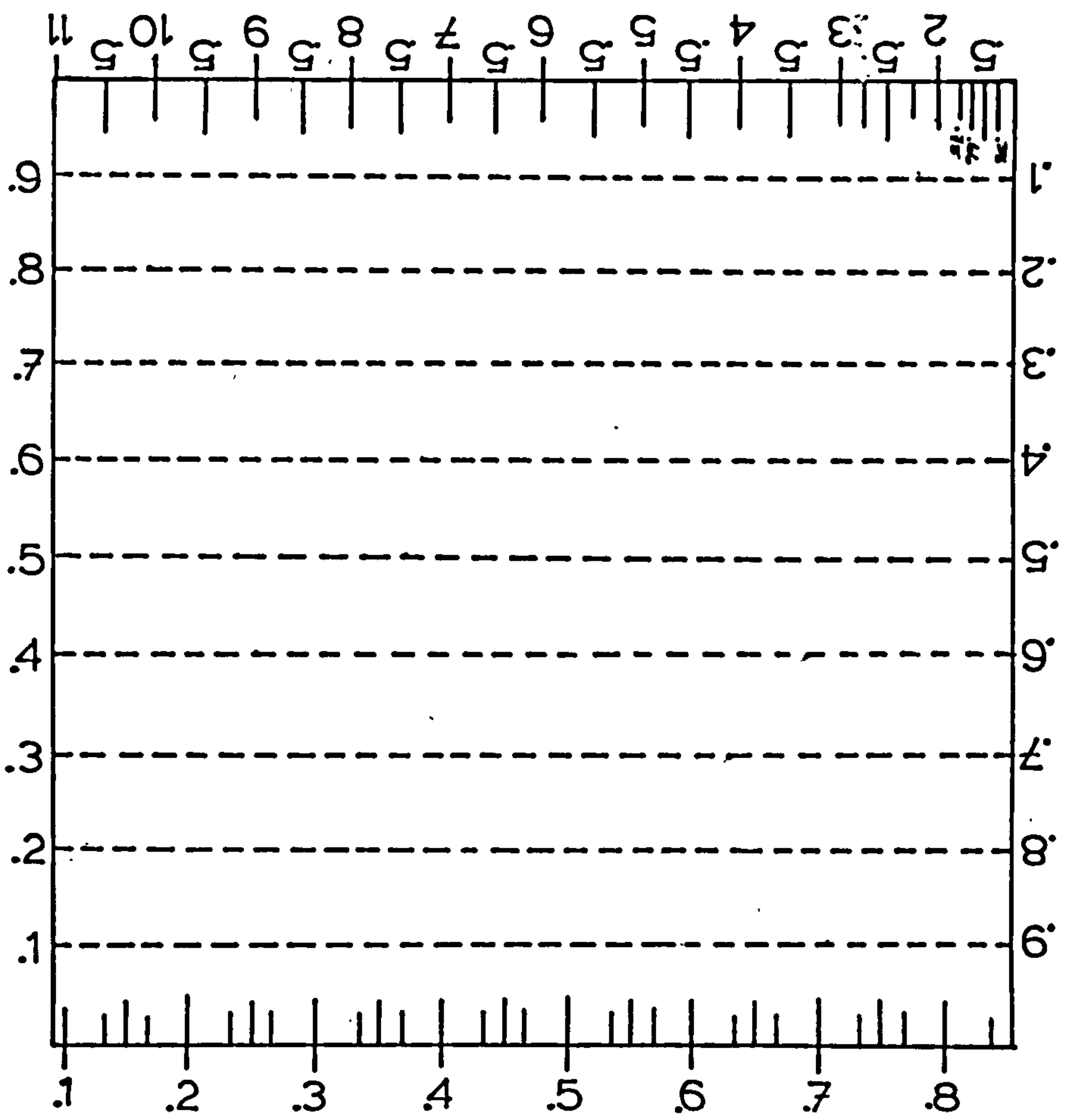
Mu — [ Filar  
Scale  
Bench  
Div. Eng.  
Adjust.  
Leveling  
Focus  
Eye P.  
Tube  
Tool  
Gauge  
Binding  
Misc.

Clamp screw

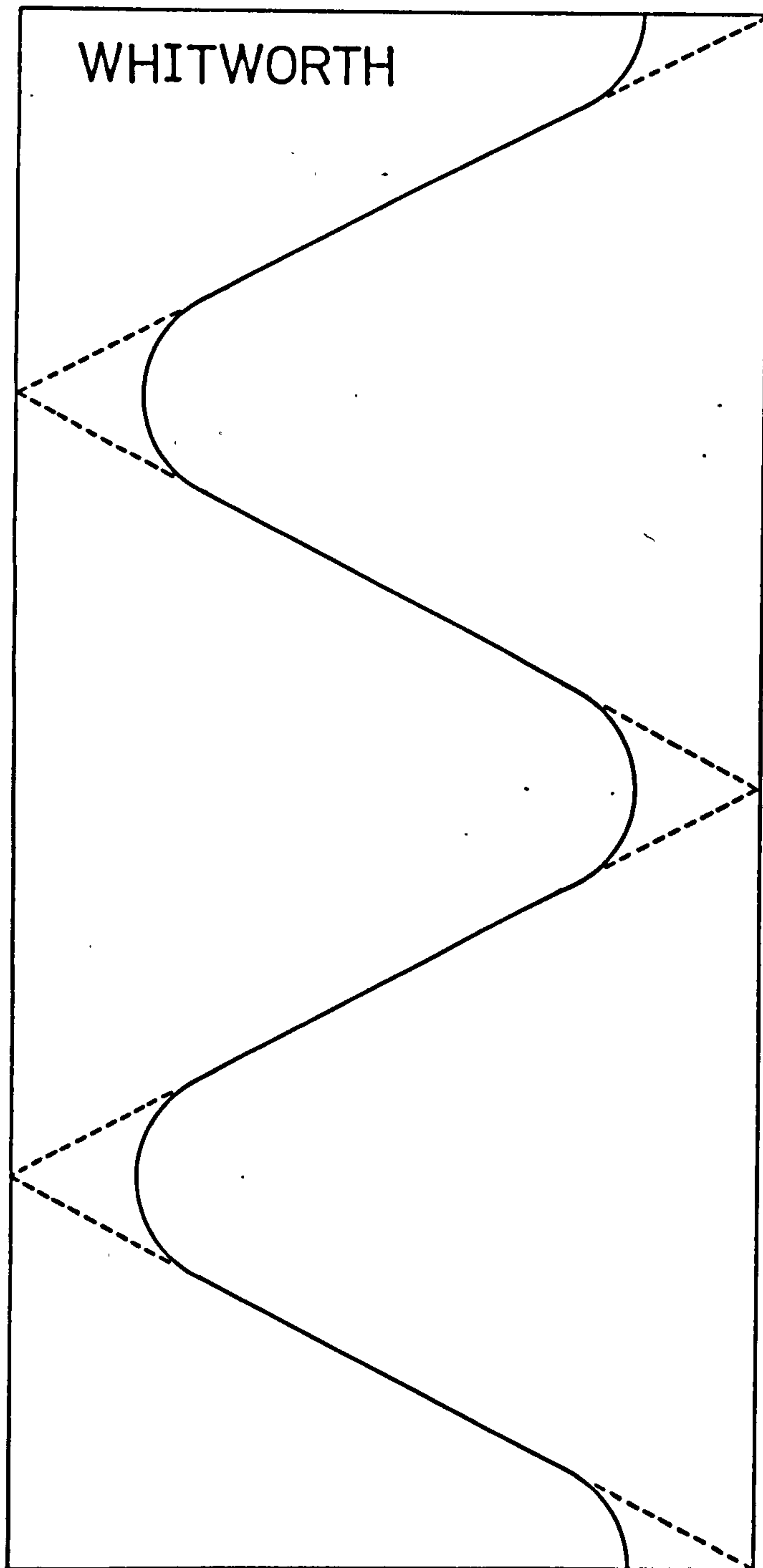
Quadrant used in survey of Quebec  
by Samuel Holland

BRITISH ASSOCIATION





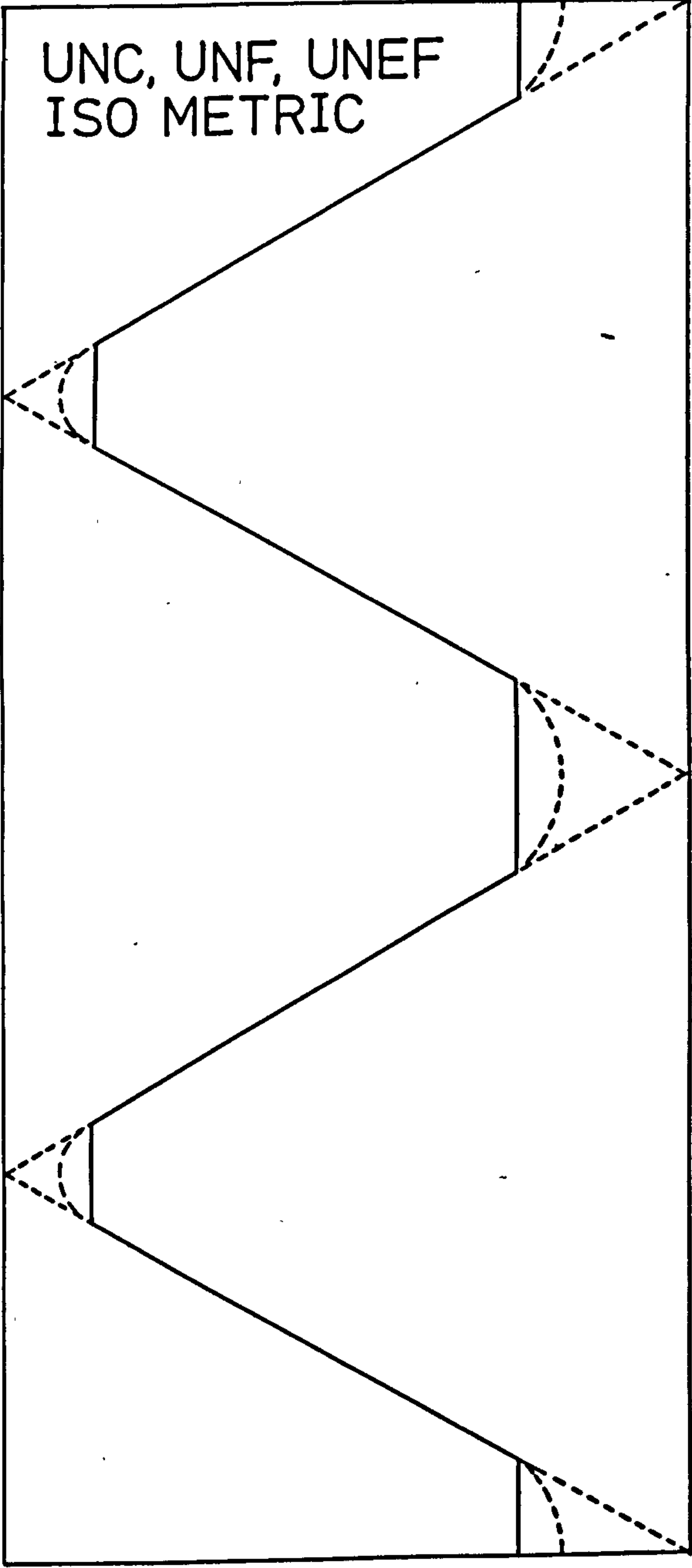
WHITWORTH



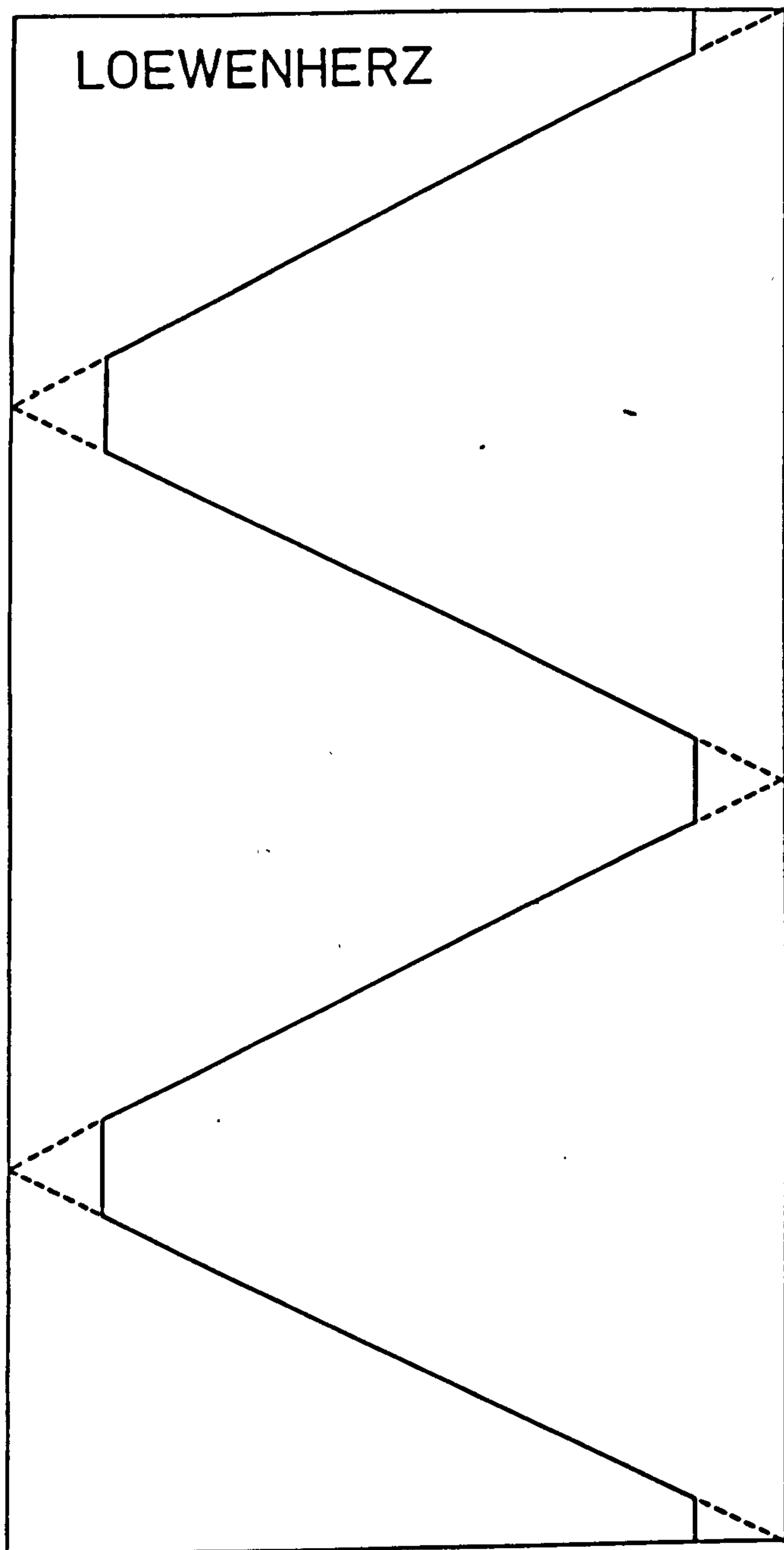


SYSTÈME INTERNAT.  
SELLARS

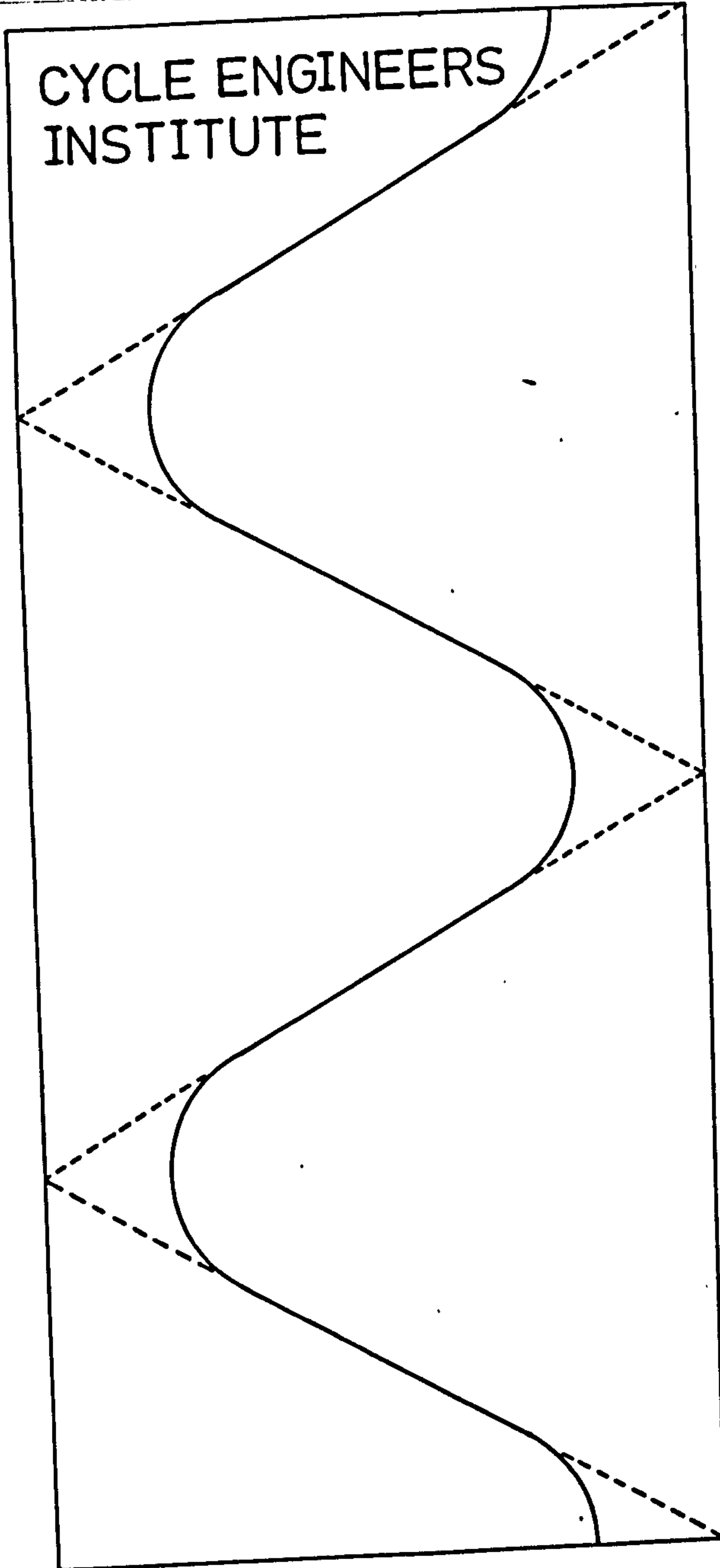
UNC, UNF, UNEF  
ISO METRIC



LOEWENHERZ



CYCLE ENGINEERS  
INSTITUTE

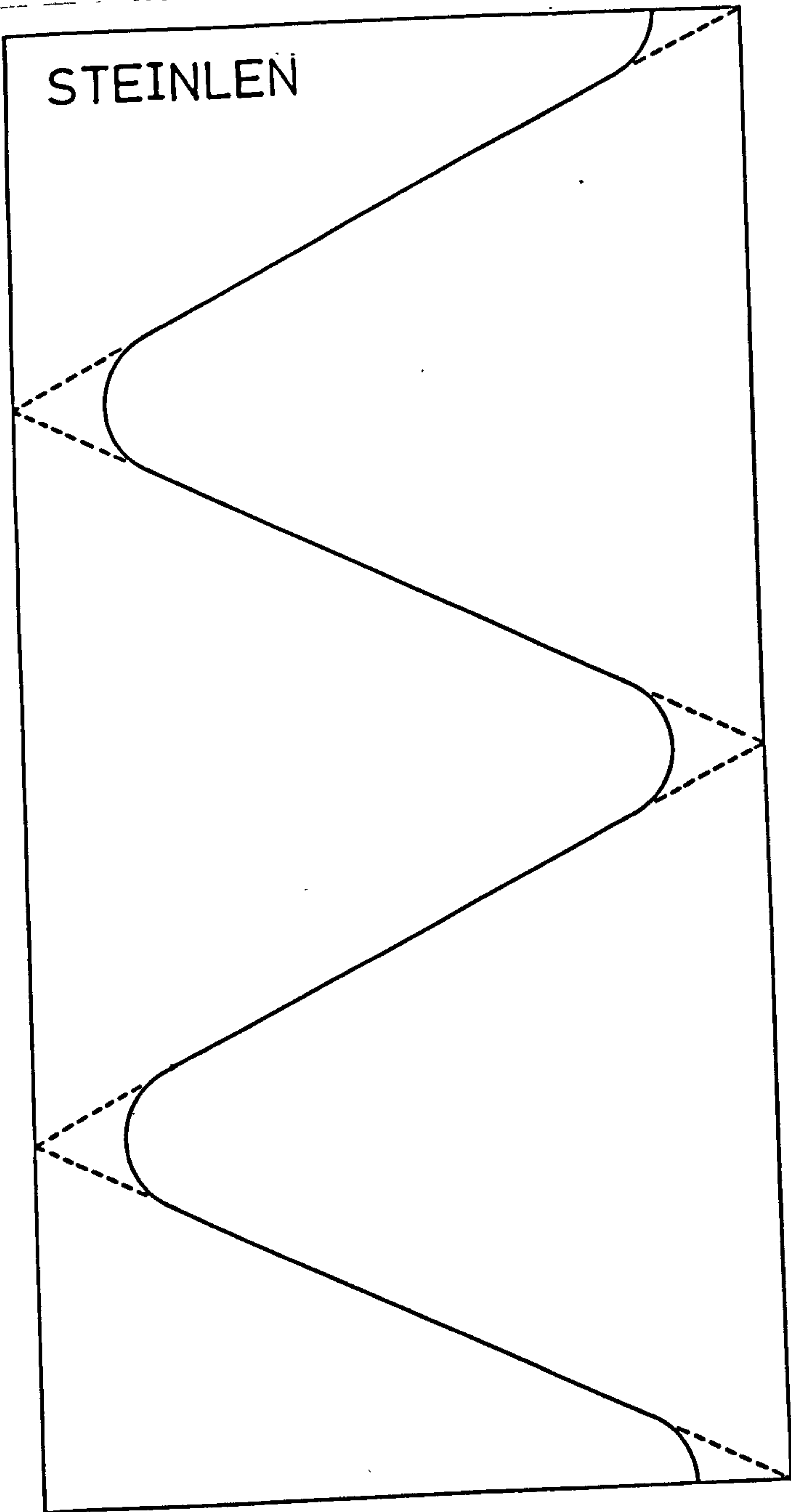


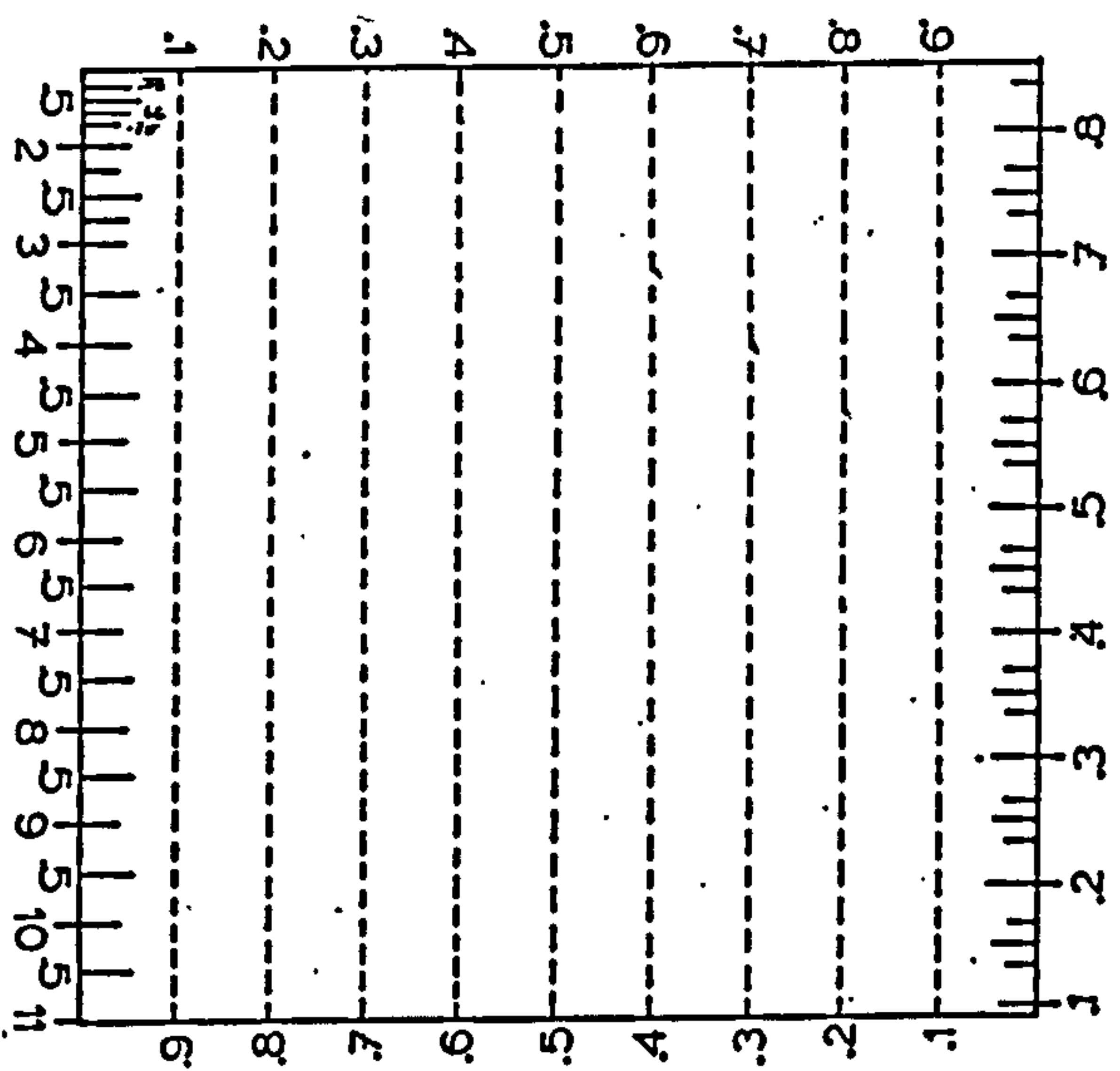


FILIERE SUISSE

5415

STEINLEN





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Brooks, R.C., 'Standard screw threads for scientific instruments Part I: Production Techniques and the Filière Suisse' in *History and Technology*, 1988, Vol. 5, pp. 59-76

Brooks, R.C., 'Standard screw threads for scientific instruments Part II: The British Association screw gauge' in *History and Technology*, 1988, Vol. 6, pp. 45-59

Brooks, R.C., 'Errors in Measurement of the Solar Diameter in the Seventeenth and Eighteenth Centuries' in *Journal for the History of Astronomy*, 1988, 19 (4), pp. 239-255