Memo 4C-3/315

29 September 1987

To: Distribution

From: H.D. Lemmel

Subject: CINDA and EXFOR statistics

(submitted to the INDC Meeting and NRDC Meeting)

Please find attached some statistical figures showing the contents of the CINDA and EXFOR files by area and year, from which one can draw the following conclusions:

1. The decrease of neutron data work came to a (temporary?) halt in 1986 when a sharp peak was encountered, partly but not totally due to the 1985 Santa Fé Conference which was published in 1986.

2. The completeness and quality of CINDA and EXFOR appear to be good with 2 exceptions:

   a. In CINDA, and more so in EXFOR, the compilation of new work appears to be too slow in all areas but especially in area 4 (CJD Obninsk).

   b. There are important data types that are covered well in CINDA but not sufficiently systematically in EXFOR. (These include polarization data, spectra of secondary particles and gammas, fission product yields and others.)

3. To improve the situation in the aspects 2.a. and b. above, data centers appear to require more compilation staff that is not distracted by other duties.

4. CJD Obninsk is requested to increase their efforts to reduce the delays in EXFOR and CINDA compilation and transmission. In particular, a smooth 4-Centers CINDA co-operation is not possible with magnetic tape shipments that last between 5 and 10 weeks.

Clearance: J.J. Schmidt

Distribution:

1. S. Pearlstein, NNDC
2. N. Tubbs, NEA-DB
4. V.N. Manokhin, CJD

NDS: M. de Moraes Cunha, D. Gandarias Cruz, V. Goulo, M. Lammer, H.D. Lemmel, J. Martinez Rico, K. Okamoto, J.J. Schmidt, O. Schwerer, M. Seits, Wang Dahai, 3 spare copies

1. CINDA coverage and neutron data trends

Figures 1a and 1b show the number of CINDA blocks by area and year.

A CINDA "block" contains all references referring to the same data set. Consequently, multiple publications which would disturb the statistics, have been eliminated.

The "year" refers to the publication date of the main reference of a block.

The "area" refers to

1 = USA + Canada (NNDC)
2 = West European OECD countries + Japan (NEA-DB)
4 = USSR (CJD)
3 = all other countries (NDS)

These figures include all work types, i.e. experimental, evaluation, review, theory.

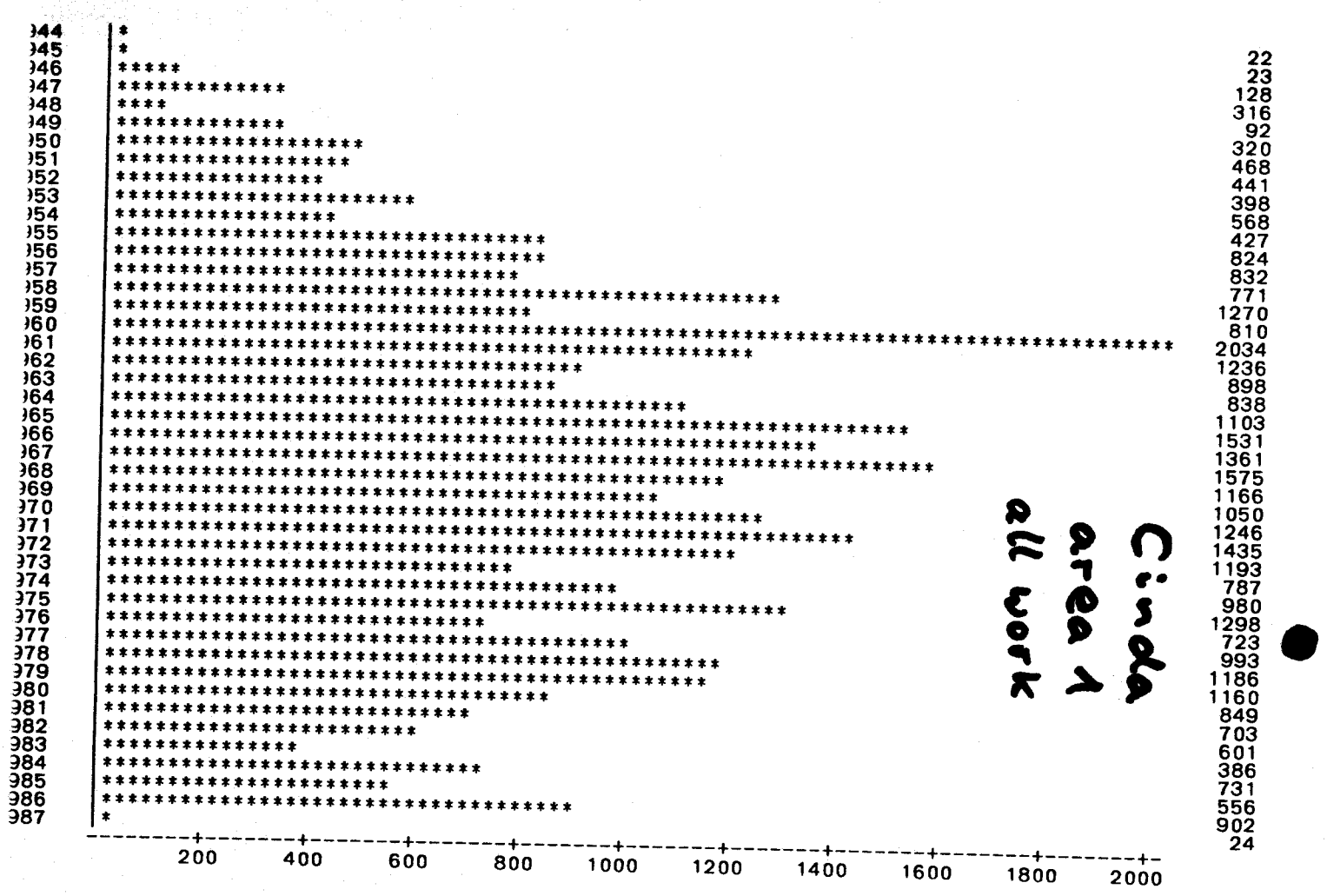
The date of retrieval is that of the book CINDA 87 for which the last entries were coded in March 1987.

Overall, the figures show large fluctuations, often a factor of 2 from one year to the next. Apart from these statistical fluctuations the highest level of neutron data work was from about 1968 to 1980. The decline after 1980 came to a halt by a new peak in 1986, which is partly due to the proceedings of the 1985 Santa Fé Conference that was published in 1986.

There are some examples of too slow coverage of new literature. The 1986 Harrogate Conference on Nuclear Physics, which should have been included in the CINDA 86 Supplement, was not even included in CINDA 87. (This conference being on nuclear physics is likely to have not many contributions on neutron data; but certainly, these should have been included in CINDA promptly.)

For area 4, the statistics indicate, that by the deadline of CINDA87 the coverage for 1986 was very incomplete (probably less than 50%), and there was not a single entry for 1987. (The other centers had indexed, by the March 1987 deadline of CINDA87, few but at least some entries from 1987 literature.) A partial reason for the delays from area 4 is the still too slow mailing of magnetic tapes from Obninsk to Vienna. The newly introduced decentralized CINDA co-operation cannot function with such delays.

With the exception of the given examples of the sometimes too slow coverage of new literature, the completeness of CINDA is believed to be very good. This could be proven by incidental checks. Also, the reliability of CINDA entries, their blocking, and the removal of superseded references appear to be very good.



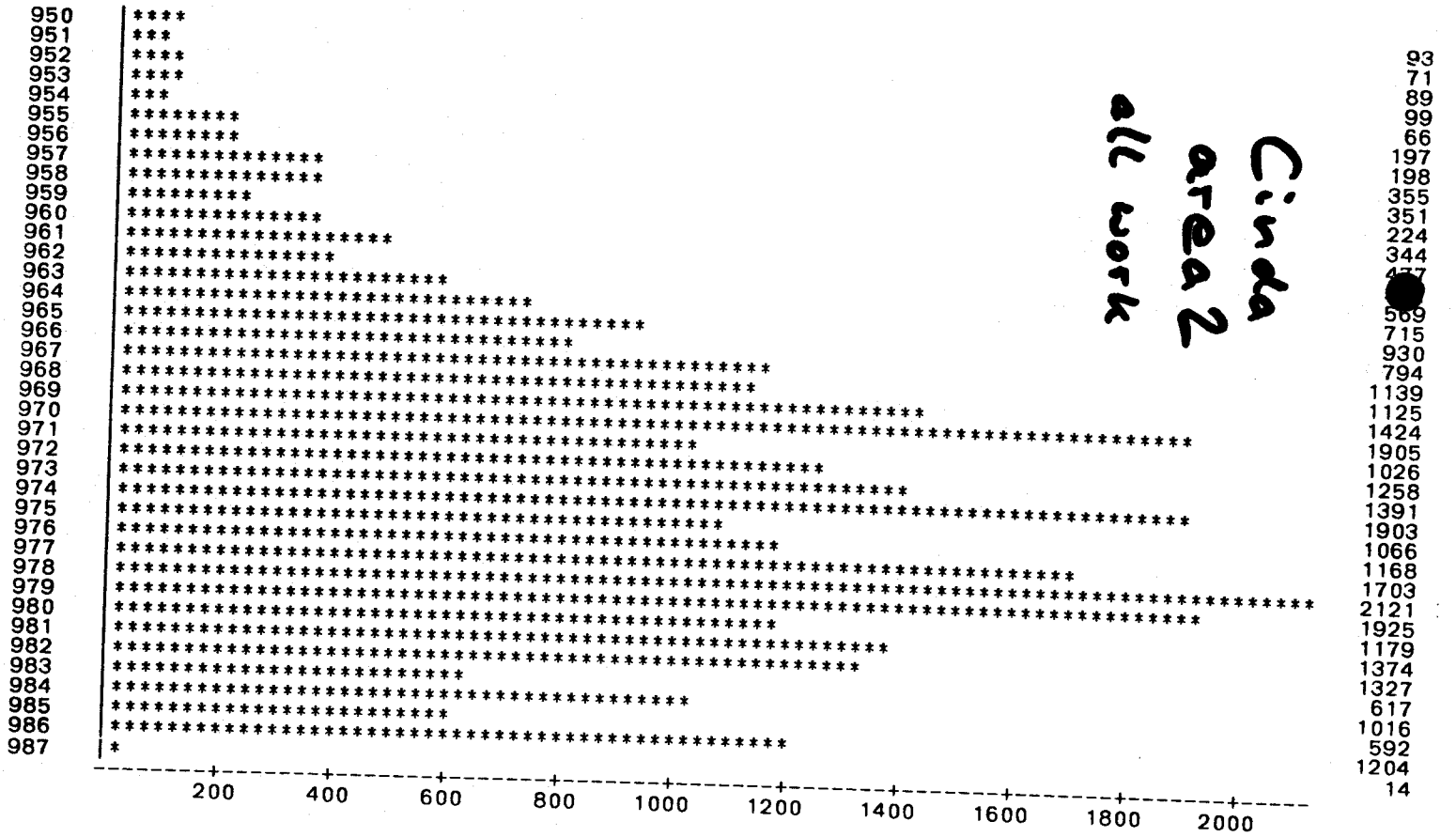
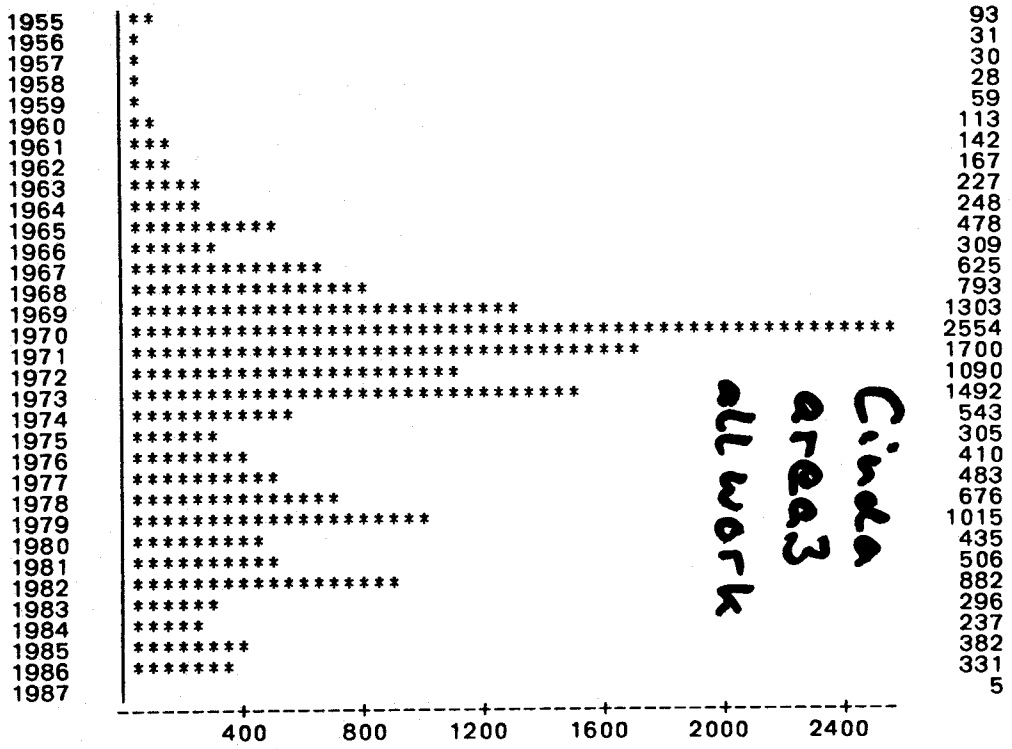


Fig. 1a: Cinda, all work



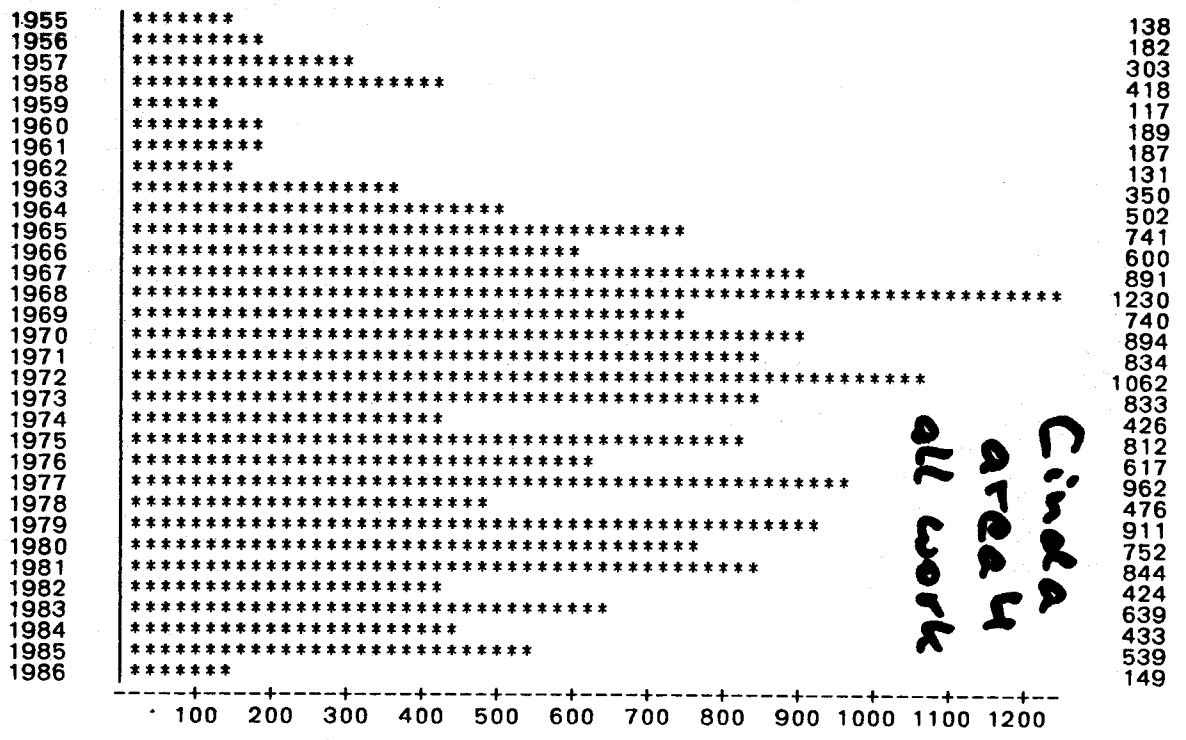


Fig. 16: Cinka all work

2. EXFOR compared to CINDA

Figures 2.1 to 2.4 show on the left side the same CINDA statistics as in Fig. 1, but restricted to experimental work only, in order to make a comparison to EXFOR possible. The comparison to Fig. 1 shows, that only a fraction of CINDA blocks (50 to 60%) is experimental work; the rest relates to theory, evaluation or review work, which is not the topic of EXFOR.

On the right side of figures 2.1 to 2.4, similar EXFOR statistics are shown: EXFOR subentries versus the "year of experiment" which is usually set equal to the publication date of the main reference. Often an EXFOR subentry will correspond to a CINDA block. But quite often not: a CINDA block may relate to several EXFOR subentries, and sometimes vice versa.

The EXFOR cutoff dates were

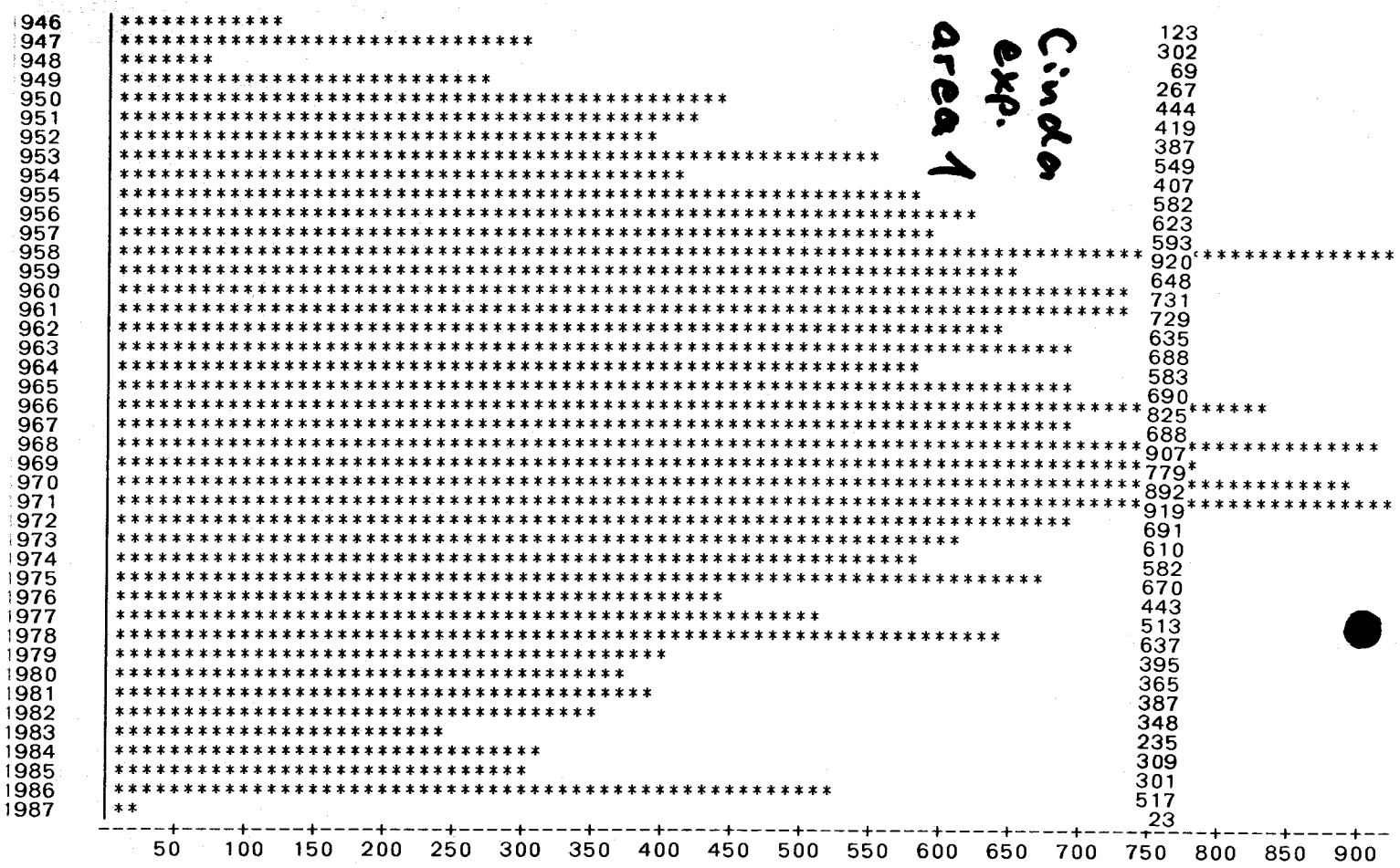
area	last TRANS tape included	
1	1227	July 1987
2	2116	May 1987
3	3060	July 1987
4	4066	June 1987

Completeness checks of EXFOR versus CINDA have been made systematically in connection with the handbook production by NNDC. It is noticeable that the completeness of EXFOR for those data that are included in the handbooks (cross-sections, resonance-parameters, angular distributions) is usually very good.

The EXFOR completeness is less good for data types that are considered of secondary importance such as polarization data, spectra of secondary particles, fission yields, and others. Some of the data types not satisfactorily covered in EXFOR are listed in the report on the 1986 meeting of the Nuclear Reaction Data Centers [INDC/P(87)-5].

In general, there are about 10% to 20% more CINDA blocks than EXFOR subentries. These differences may be due to the following reasons:

- secondary importance data, that are covered in EXFOR with lower priority only.
- lack of CINDA cleanup: that means that CINDA entries referring to the same experiment have not been put into the same "block".
- uncertainties in definitions: often a data set may be entered in one subentry or split into several subentries; also the assignment of a CINDA block or an EXFOR subentry to a year (as given in the statistics) may be uncertain by $\pm$ 1 or 2 years.



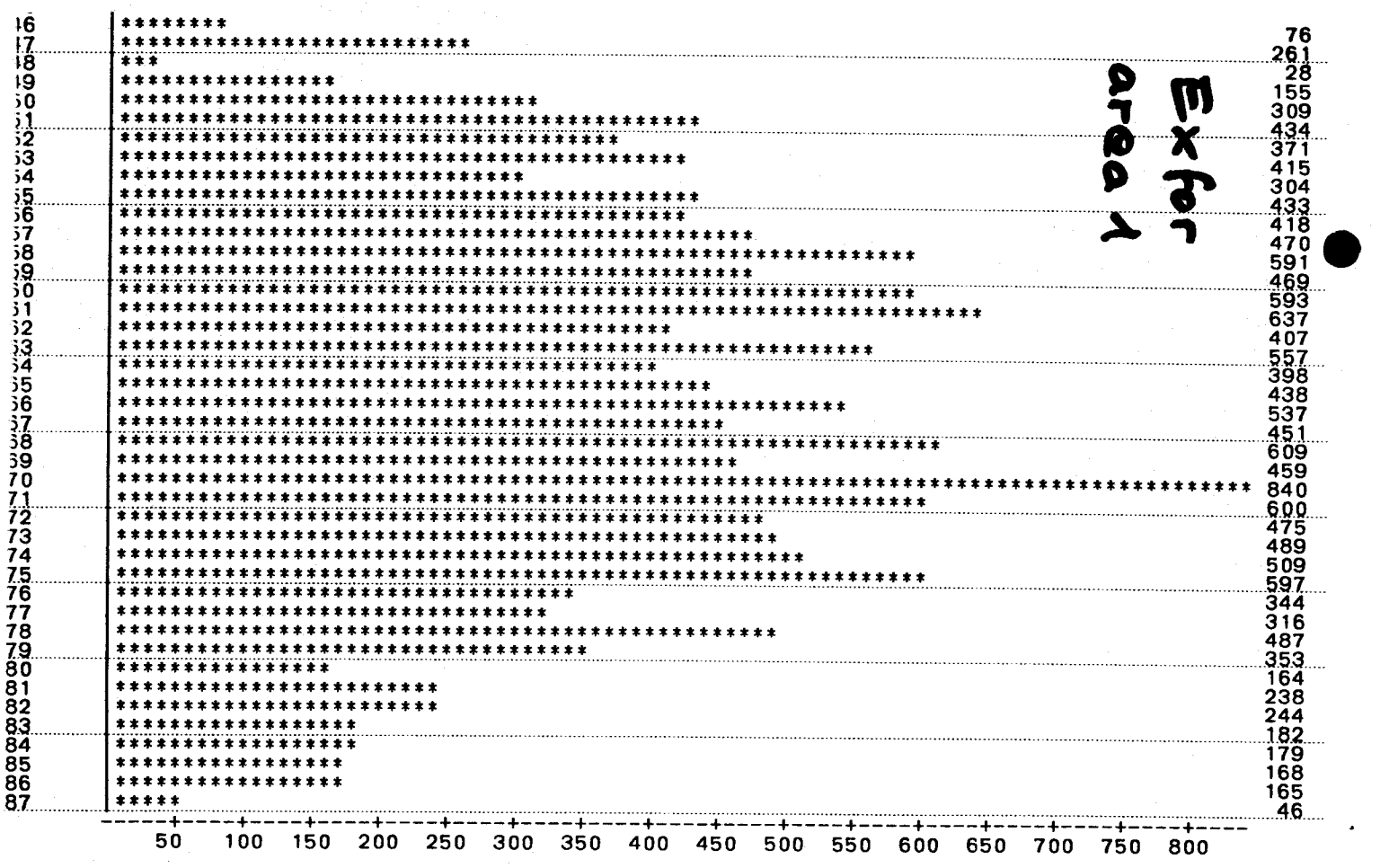
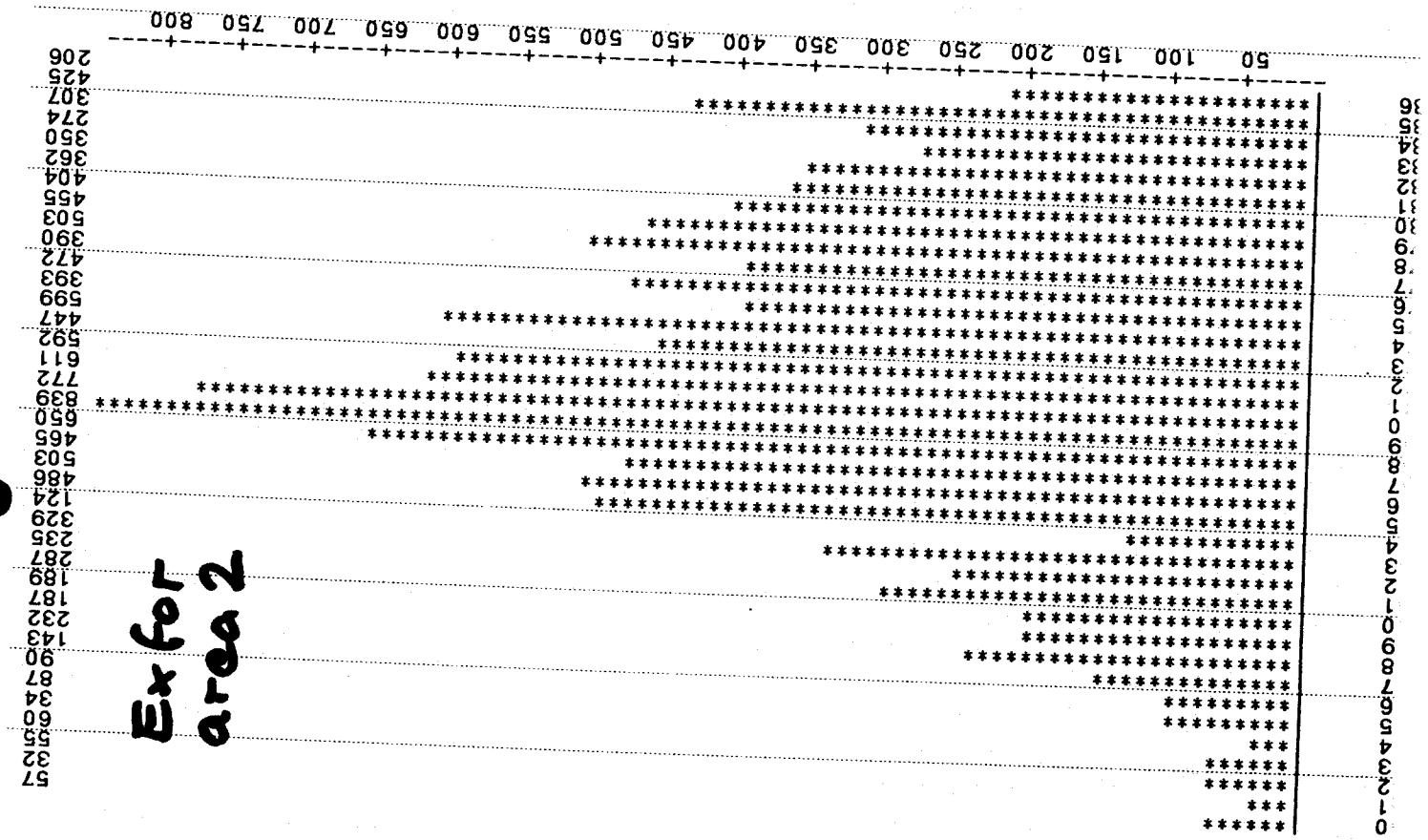
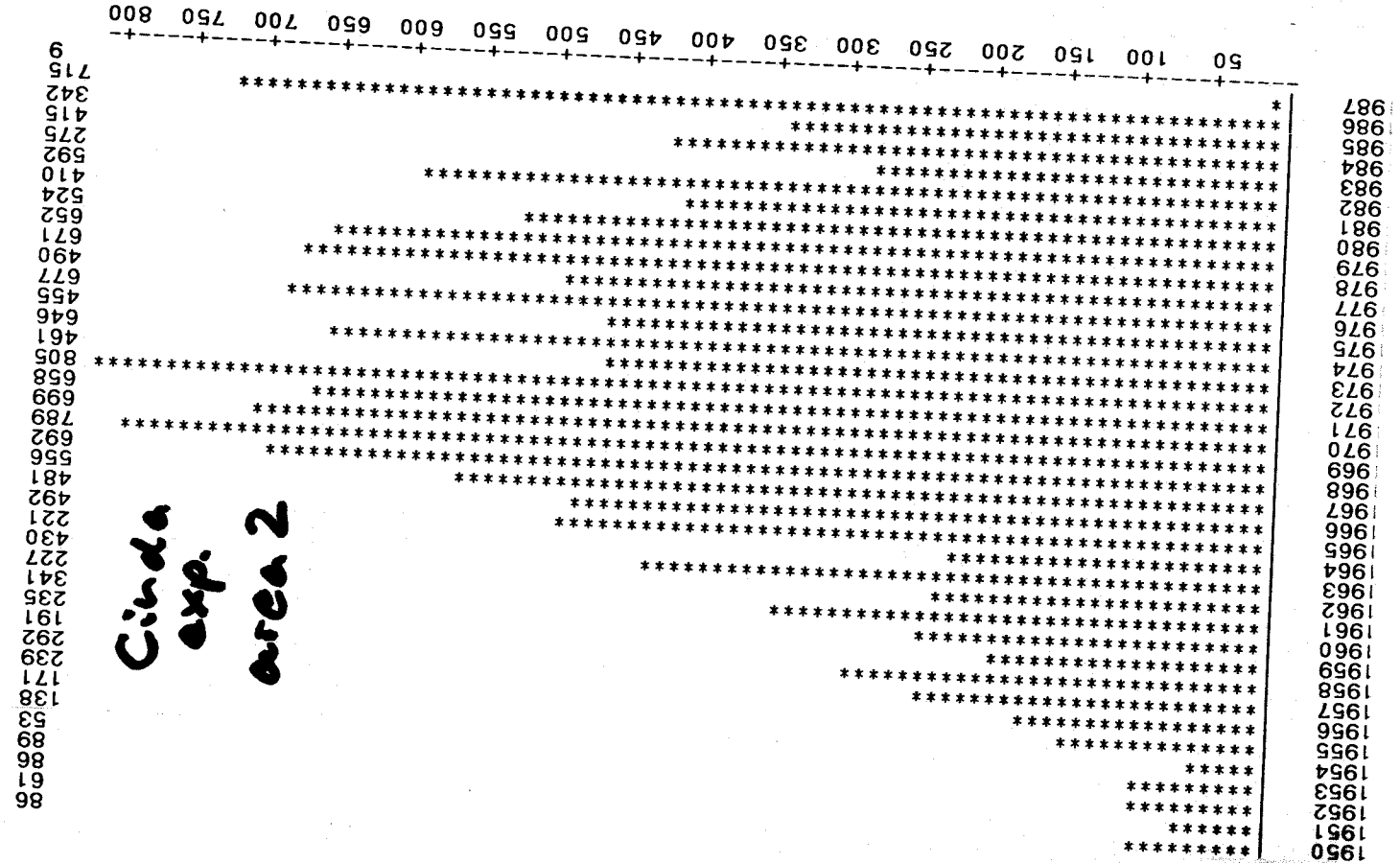
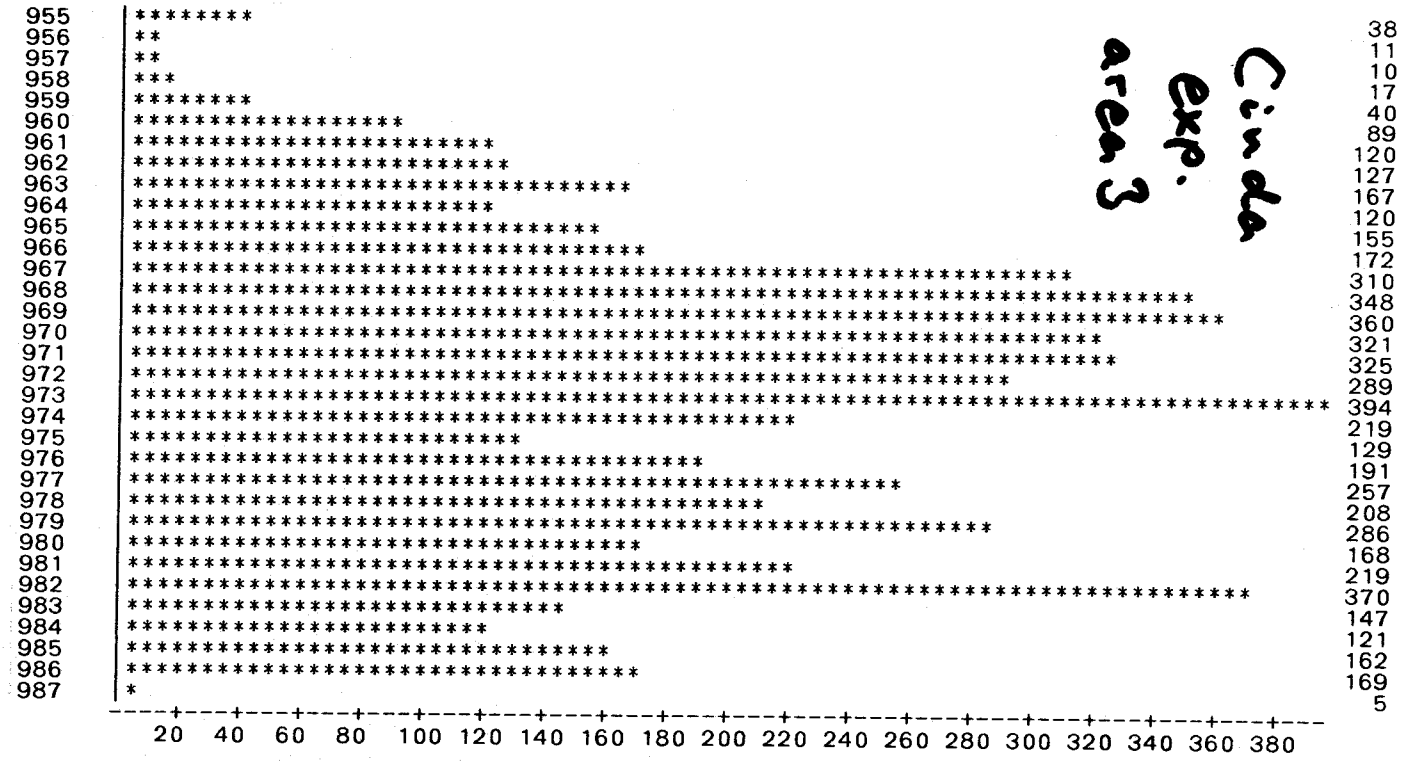


Fig. 2.1 Cinda/Expr area 1

Fig 2.2 Cinda/Exfor area 2







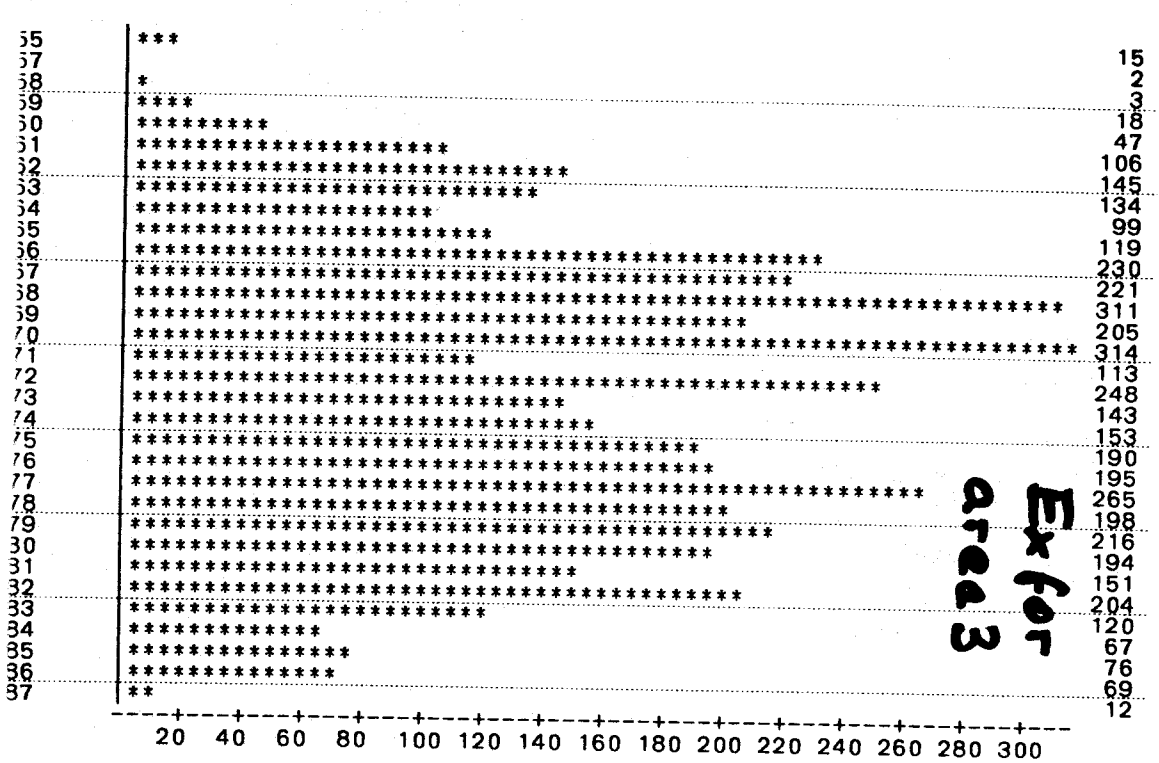
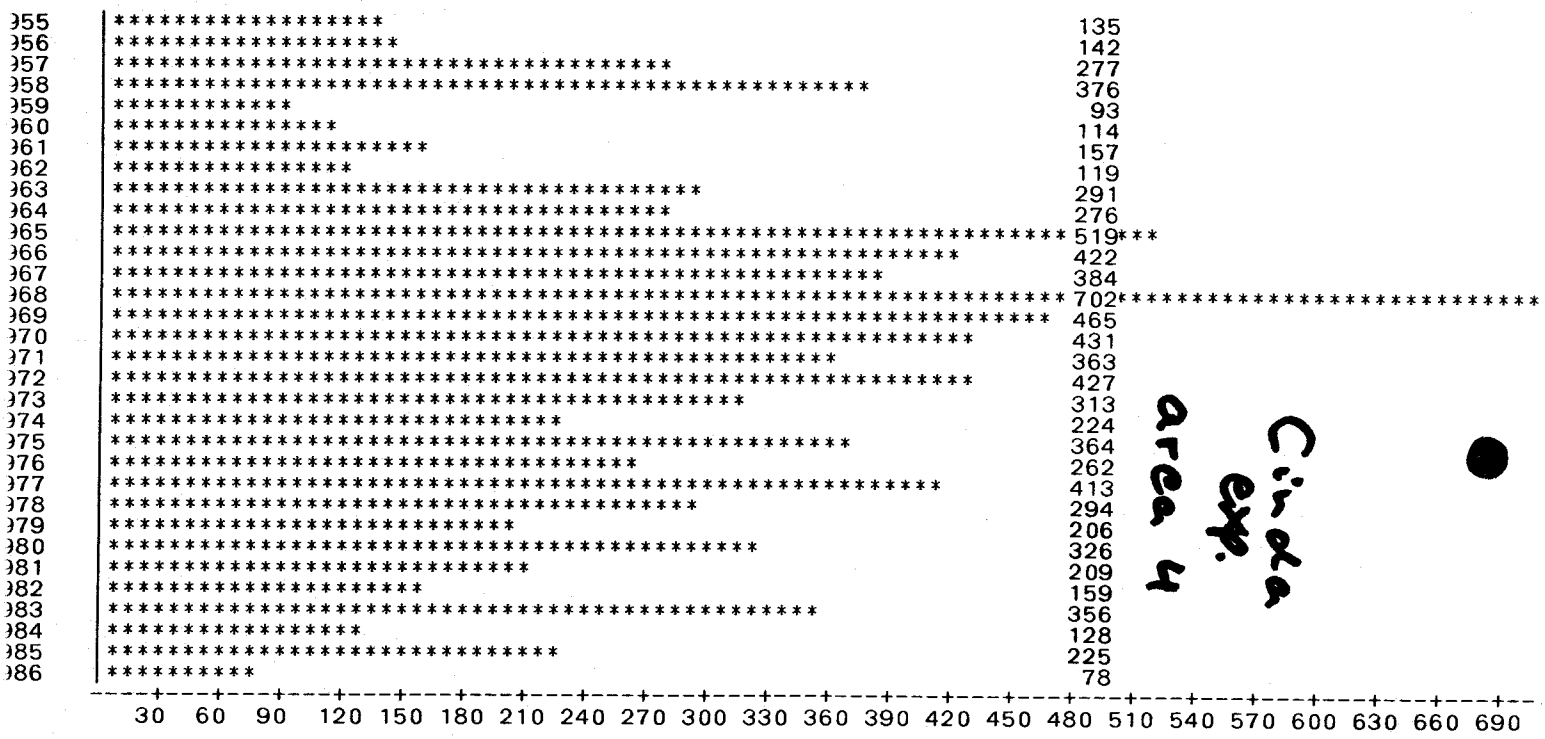


Fig. 2.3 Cinda/Exp. area 3



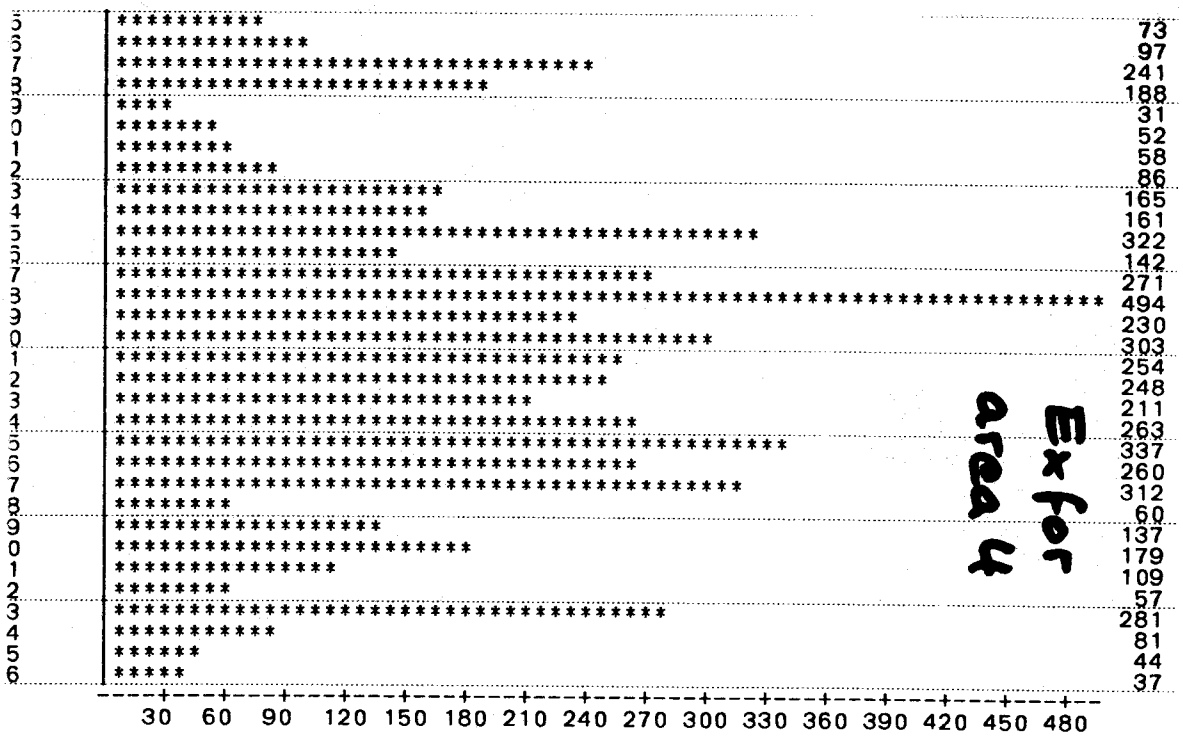


Fig. 2.4 China/Expor area 4

Despite of these uncertainties the statistics show a lack of speed for the compilation of new data:

- CINDA shows a large peak of data production for 1986. This peak does not yet show up in EXFOR. By the middle of 1987 the completeness of EXFOR for data published in 1986 can be estimated not better than 40%.

- In area 4 the delay seems to be worse, as not only 1986 but also the year 1985 shows a very low completeness of EXFOR compared to CINDA. To a small extent this is due to a very slow magnetic tape transmission from Obninsk to Vienna, which is typically between 5 and 10 weeks.

- By the middle of 1987 there are no 1987 EXFOR subentries in areas 2 and 4, whereas areas 1 and 3 show at least some entries from 1987 (only partly due to the slightly later cutoff date of last TRANS tapes considered).

- On the other hand, for 1987, NNDC and NDS show even <u>more</u> EXFOR subentries than CINDA blocks. This must be due to data tables that are sent in to the data centers <u>prior</u> to publication. This is the most desirable way of efficient data compilation, and it is regrettable, that the centers cannot stimulate this more often (most likely because of lack of manpower in the centers).