



Eva Crane Trust

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A twenty-year experiment in documentation on bees

Bees and apiculture comprise a small and specialized subject compared with say chemistry, physics or crop husbandry. The scientific literature on which current knowledge is based is therefore comparatively small, and documentation procedures are workable which would be out of the question for a more general subject.

I am going to describe briefly the specialized documentation work carried out by the Bee Research Association (B.R.A.) since its foundation in 1949. The story covers the evolution of bee documentation all the way from the "anecdotal" stage, with no system at all, to the present sophisticated computer operation in which we have been able to take steps well in advance of the larger subjects.

We have already created a computer-based information system covering the past twenty years.

We make a dividing line at the year 1949, because this is the first year covered by the journal Apicultural Abstracts, whose Volume 1 was published in 1950. It was the first systematic attempt at objective reporting of current scientific literature on bees, linked with an international subject classification system - ^{UDC}UDK (Universal Decimal Classification). In 1949 we were able to make a complete revision of the beekeeping part of UDK for the International Federation of Documentation, which controls UDK throughout the world. This gave us ^a classification system tailor-made for modern beekeeping needs, and part of an officially agreed international system. The UDK system, moreover, is a numerical one, and so is independent of language. This is important in bee science, since bees are kept throughout the world, and material on them is

published in over fifty languages. A second advantage only became apparent much later: a numerical system can readily be put into machine-readable form for computer operation.

Since 1950 the journal Apicultural Abstracts has reported on 13,300 publications, providing a continuous "current awareness" service for bee research workers throughout the world. The present contents is just over 1000 items a year, and if funds were available we should like to include a further 200 or 300. The whole 22-year output constitutes an invaluable store of knowledge, and I shall now describe how our information retrieval system gives access to it.

(1)* We are going to follow through the system a specimen publication by Koltermann in Z. vergl. Physiol.: "Über ^{die} Lern- und Vergessensprozesse bei der Honigbiene - aufgezeigt anhand von Duftdressuren". The reprint on the right is accessioned by the B. R. A. Library, and the bibliographical details typed in standard form on the cover, shown on the left. (Later on (2) we received an English translation of the paper from America, which was accessioned into our Library of Translations.) The publication is prepared for reporting (3) in the journal Apicultural Abstracts, in which each issue is organized systematically with regard to subject, following the UDC system; 638.121 means "the individual honeybee", and this is the section (4) where Koltermann's paper is reported.

Let us look more closely (5) at this abstract. Author's name and address; journal reference (note the English summary), title, with an English translation of it, and then the abstract text, which here we have derived directly from the author's summary. There are four UDC subject numbers, of which the first is 638.121 (we shall return to these later); on the right B indicates that

* Numbers refer to slides

B.F.A. holds a copy of the paper and E that we hold an English translation of it.

A recent development (6) in co-operation with Université Laval in Quebec (Canada), is the production of microfich^e, coded to the serial abstract number. The microfiche of Koltermann's paper is not yet made, so I have substituted another, 59/70, written here as 70-0059.

Now about the UDC subject numbers. These are established (7) by reference to the official UDC schedules, of which a number are published in German. The specimen page here (8) shows part of the honey section, so is not directly relevant to Koltermann's paper. One prime consideration in any classification is consistency in selecting numbers, and word-descriptors that relate to them. (9) Over the past twenty years we have built up an English Alphabetical Subject Index (known as EASI from the initials), and we published the second edition this year, with 6700 word entries. These all relate to documentation in Apicultural Abstracts and the other B.R.A. systems. We use EASI in classifying, and scientists and beekeepers who make use of our system use it in information retrieval.

The first UDC number of Koltermann (5) is 638.121 - the individual honeybee. The second, 591.185.4, represents "sense of smell", through which Koltermann tested his bees. The third, 591.51B, represents memory, the basis of learning, and forgetting. Both of these are general zoology numbers, and would relate to any animal. The fourth number 638.124.38 is a subdivision of 638.124 (social behaviour in honeybees) and represents communication about food sources. Here (10) are three of the entries in EASI that are derived from these numbers, and relate to them.

Each publication reported in Apicultural Abstracts is allocated one, two, or even up to five or six UDK^C subject numbers; our example had four. In B.R.A. we have made and maintained a master card index of abstracts. An abstract with one author and four subject numbers (take our example) gets 5 cards, one going to the Author Index, and four to the Subject Index, arranged in UDK number order. (11) The cards are printed ~~by~~^{by} four to a sheet by a diazo process. All four abstracts on this sheet ~~read~~ need five copies, as the code number indicates; three have one author plus four subject numbers, while the fourth has two + three. We print five copies of this sheet, and the appropriate numbers of others, and so build up what we call CASCIAA (Combined Author and Subject Card Index to Apicultural Abstracts).

The journal Apicultural Abstracts has always been run on a world-wide basis - publications ~~for~~ come from all over the world, information and abstracts come from many countries, and the use of the journal, and of the card indexes derived from it, is world-wide. One of the institutions we have worked especially closely with is the University of Guelph in Canada where Professor Townsend is head of the Apiculture Department. In 1968 this University started an Institute of Computer Science, and Professor Townsend quickly saw the possibility of using this new tool for bee documentation. Everything was to hand - the 10,000 items published in Apicultural Abstracts since 1949 were ideally suited for key-punching, for storage on magnetic tape, because the form and style of publication was systematized in such a way that it could be fed directly into the system (12). The data base used in this initial effort has since been

modified, as we have gained experience in the capabilities of computers, and in their limitations, most of which arise through prohibitive costs of some of the operations. I will not take you through our "growing pains", but explain briefly what we can offer at present from this joint venture between the B.R.A. and the University of Guelph.

(13) The index entry for each publication is key punched according to the standard form devised, and stored on magnetic tape. These 13 000 index entries are sorted first according to alphabetical order of author, and secondly by UDC number; print-outs are thus produced of Author and Subject Catalogues. So our friend Koltermann's paper gets five index entries, one in the Author Catalogue and four (14) in the Subject Catalogue, one under each UDC number - just like the cards.

(15) The Index entry consists of the serial reference number in Apicultural Abstracts 111/71, written as 71-0111; a code giving the language of the original publication (G for German here); whether there is a summary in English (S), or an English translation (T); and whether the publication is obtainable from B.R.A. (B). Then comes the year of publication, {1969} (the next set of code numbers is obsolete) and the authors' name(s). On the next line are all UDC subject numbers. Recently the English title is included on the third line.

Cumulative catalogues (print-outs), covering publications from 1949 to date, are issued at the end of each year. They are leased for one year, after which they may be retained for a further year at a reduced fee, or the new up-dated print-out can be leased. To those who can work at all in English, EASI provides easy access to the Subject Catalogue. For others, (16)

we have produced multilingual dictionaries of beekeeping terms, with alphabetical indexes in each language. Twelve languages have been covered so far (17) : English - French - German - Czech - Polish - Russian; Italian - Spanish - Dutch; Danish - Norwegian - Swedish. Others are in preparation.

One fruitful use of the computer print-outs - or the CASCIAA cards - (18) is the publication of bibliographies on a subject of current importance, here is one on drone honeybees.

We are very soon going to embark on a further joint venture by B.R.A., the University of Guelph and Université Laval. We shall store, on magnetic tape, similar index entries to those from Apicultural Abstracts, for scientific literature before 1949. The first five thousand of these are now being prepared for key-punching; funds must then be sought to proceed with others. At least twenty thousand will be needed in all, probably more. But computers are not frightened of large numbers.

There are research workers in some countries who need to be pushed hard to make them read the literature on the subject they propose to investigate - they prefer to experiment, without stopping to read. I know that this is not true in Germany, where you have a long tradition of documentation. Because of this tradition and ability, we should very much value German co-operation in developing and extending the system we have built up which is, as far as possible, independent of language. This would be especially valuable in making German research work, which is of an outstandingly high standard, more rapidly and more effectively known in the world at large.

In any case, I hope that ways and means can be found whereby the bee scientists here in Germany can make use of the documentation system I have described.