Ingetraut Dahlberg
INDEKS GmbH, Frankfurt

ICC – Information Coding Classification – Principles, Structure and Application Possibilities

Dahlberg, I.: ICC – Information Coding Classification – principles, structure and application possibilities.
In: Int. Classif. 9 (1982) No. 2, p. 87–93, 12 refs.

Presentation of the design, characteristics and application possibilities of a new universal classification system called ICC which is based on the premises that whenever information is to be generated or to be presented (in coded form) at least two items are necessary one of which plays the part of a subject and the other one that of the predicate of a sentence, with both these items being framed into a third one. The first basic division is by the categorial concepts denoting general entities and general aspects/determinations of being, framed into an evolutionary pattern of levels creating the 81 subject groups of ICC. Each of these subject groups is structured by a socalled systematifier, applying a recurring series of facets. The overall structure is explained and some of its application fields are outlined.

(Author)

1. History of ICC

For some twelve years (since 1970) I have been trying to develop a new universal system which would use (a) a new design philosophy, (b) the relationship theory applied in thesaurus construction and (c) the experiences from the existing universal schemes, especially with regard to their notational representations. A number of publications of the last 12 years show this development, including my 1972 dissertation on the principles of universal organization of knowledge (1). They are included in the forthcoming bibliography (International Classification and Indexing Bibliography, ICIB, vol.3), thus I will cite here only items of direct relevance. For a long time it has been my desire to publish the scheme; however, so far there was no direct necessity. Now, the time has come when I must use it explicitly in a publication, namely vol.1 of ICIB mentioned above which lists all the universal and special classification systems and thesauri which we could find as having been elaborated and used in the past 30 years. (Implicitly the scheme has already been used since 1975 in the outline of the subject groups of classes 04, 5, 6 and 78 in Classification Literature, the annotated bibliography in Int. Classif. It has been presented also in a preliminary outline version in Int.Classif.2(1975)No.1, p.36). Therefore I take the liberty to explain it here in English. A German introduction – though within some other context – was presented at the 4th Annual Conference of the German Classification Society at Salzburg and has been published in its proceedings volume 1980 (3).

I beg the reader's pardon for confronting him/her with a new universal scheme, knowing as I do from the experience of predecessors what may be the reactions from the part of the colleagues. I am aware that there is even a frustration of sorts and a disbelief in the possibility of adequately depicting reality through concept organization. But for those who know that we need new solutions for the purposes of a number of applications of a universal classification system I have tried to create a tool to help organize knowledge in a more consistent and convincing way than this was possible so far. I asked myself, should not one attempt to apply new insights and new methods, especially those that have become common knowledge already, as e.g. the application of the integrative level theory, the facetting of substructures of fields, the consistent application of concept relationships and the recurring arrangement of facets?

What is presented in the following should therefore be looked at as such an attempt, which has, however, already led to an applicable system – although I do not mean to imply by this that we found something like the egg of Columbus.

2. Basic structure of ICC

The design principles of ICC summarized in English in "Ontical Structures and Universal Classification" (4). The structure is very simple indeed and can be memorized easily.

We distinguish first of all in an ontical sense between general entities and general aspects, determinations of being. The general entities can be displayed in the following three ontical area groups of

I structure and matter
II living beings and
III products of man (artefacts)

These can be subdivided each into three general entity areas (or "categories of being") as follows:

I	1	pure forms and structures
	2	energy and matter
	3	cosmos and earth
II	4	biological entities
	5	human beings
	6	society
III	7	material products of man and society
	8	intellectual products of man and society
	9	cultural-spiritual products of man and society

It is easy to see that there is an evolutionary series from 1–6 and also that there is a division according to man's faculties in the three latter entity areas. It should also be evident that the entities of the levels presuppose each other or contain each other in a natural sequence. The last three levels (7-9) show the same evolutionary series with respect to the products of man and society applied on a matter-oriented, intellect-oriented and mental-spiritual oriented level. Thus one can also say that the levels presuppose each other, they are "integrative". The determinations of these entities – on the other hand – exist in the following four groups of categories, namely regarding their

I kinds of objects
II characteristics

III activities
IV dimensions

which can be subdivided into the following twelve (augmented Aristotelean) "categories of form" namely

I
1 Principles
2 material objects
3 abstract objects

II
4 quantity
5 quality
6 relation

III
7 state
8 process
9 operation

IV
10 place
11 position
12 time

Any information presupposes the possibility to combine items of both these categories.

The organization of the concepts (units of knowledge) in ICC is based on the combinability of concepts from the categories of being with the categories of form on many levels in many possible ways of specification. The frame in which this combinability takes place has been fixed in the following sequence of facets (aspects, predications) which allow

(a) the placement and arrangement of concepts
(b) the formation of subjects and
(c) the recurrence of a pattern which can be memorized very fast.

Since this sequence serves at the same time in a way to systematize a subject group or a field of knowledge, we called it a "systematifier".

1 General and theoretical statements (axioms, frames, etc.)
2 Object-related statements (elements of objects, parts, characteristics, kinds of objects, etc.)
3 Activity-related statements (states and processes in objects, operations applied to them)
4/6 Statements related to specialties of the objects and/or activities concerned in 2 and 3
7 Statements on influences onto 2 and 3 from outside ("instrumental", technical relationship)
8 Statements on the use of 2 and 3 in other fields ("potential", resource orientation, application relationship)
9 Statements on the knowledge about 2 and 3 in distributing it by human beings, societies, documents, etc. ("actualization", synthesizing, environmental relationship)

This systematifier has similarities with Ranganathan's notion of "seminal mnemonics" (5) further elaborated by Neelameghan (6), however, it does not use the same meanings with the same numbers and was "reinvented" before knowing this notion of Ranganathan.

Again it is evident that these nine statement oriented facets are patterned in a 3x3 way, namely
3 general facets constituting a subject group/field
3 facets of a specialty-oriented character and
3 facets of an "outside"-oriented use of a subject group/field.

This systematifier has been applied to the nine general entity areas in order to create its corresponding general subject groups and within each such subject group to find the location of its subject-fields. The result of the first application case, namely the placement of the subject groups can be seen in Fig. 1. The sequence and contents of the placements will be explained roughly in section 5.

3. Concept relationships in ICC

In an earlier publication (7) a referent-oriented analytical concept theory was described with its four kinds of conceptual relationships, based on the common possession of one or more characteristics. We distinguished between

(1) generic
(2) partitive
(3) oppositional
(4) functional relationships

The first three relationships must be applied to specify e.g. objects and activities and their kinds, objects and activities and their parts as well as objects and activities and their opposite concepts. The functional relationship, however, is the one which occurs e.g. between an object and its activity as well as further aspect related specifications.

The first three kinds of relationships have to be used in classification systems alone or in combination at their respective facet positions. The functional relationship finds its expression in the sequence of the facets themselves. Otherwise it occurs in concept combinations, wherever a syntactical unit of a complex concept is created.

The subdivision of a subject group or a subject field according to its facets utilizes the partitive relationships since the contents of the facets may be regarded as the parts of a subject group or field. In elaborating a concept system into its detail some rules for the use of relationships have to be applied (see 3, p.300).

4. ICC notation and the system positions

When one starts out from 9 entity areas and distinguishes in each area 9 different facets then it is obvious that a decimal notation can be utilized to localize the position of concepts and concept combinations. And since any of the subject groups gained by this method can be differentiated equally well according to the systematifier, it is possible to use the decimal notation throughout. This is a great advantage since it allows us to indicate in each class notation the area position, the facet position and the hierarchical level. In this way the notation becomes a true conceptual representation language of a system and can also be used for any syntactical expression of concept combinations.

Taking this into consideration I do not think that one could still argue that the decimal notation is a "bed of Procrustes". The fact that the form divisions of the systematifier take care of the possible subdivisions of the fields will end this age-old trouble. One should also take into consideration that a notation which allows for 99 "subdivisions", as e.g. a centesimal notation which the BSO (8) uses, is apt to enumerate concepts rather than classify them according to their common characteristics. Also I would like to refer to a psychological observation pointed out by A.Judge (9), indicating that the capacity of the human mind in memorizing and organizing objects and subjects by numbers is generally limited by

Fig. 1: Subject groups according to general entity areas

AREAS	1	2	3	4	5	6	7	8	9
1 FORM & STRUCTURE AREA	11 Logic	12 Mathematics	13 Statistics	14 Systemology	15 Organization	16 Metrology	17 Cybernetics (Contr. & automat.)	18 Standardization	19 Testing & monitoring
2 ENERGY & MATTER AREA	21 Mechanics	22 Physics of matter	23 Gen. &tech. physics	24 Electronics	25 Physical chemistry	26 Pure chemistry	27 Chemical technol. & engg.	28 Energy sci. & technol.	29 Electrical engg.
3 COSMO & GEO-AREA	31 Astronomy & astrophysics	32 Astronautics & space research	33 Basic geosciences	34 Atmospher. sci. & tech.	35 Hydrospher & oceanol. sci. &tech.	36 Geological sciences	37 Mining	38 Materials sci. & metallurgy	39 Geography
4 BIO-AREA	41 Basic biol. sciences	42 Microbiology & cultivation	43 Plant biology & cultivation	44 Animal biology & breeding	45 Veterinary sciences	46 Agriculture & horticulture	47 Forestry & wood sci. & technol.	48 Food science & technol.	49 Ecology & environment
5 HUMAN AREA	51 Human biology	52 Health & theoretical medicine	53 Pathology & medicine	54 Clinical medicine & cure	55 Psychology	56 Education	57 Profession, labor, leisure	58 Sports	59 Household & home-life
6 SOCIO-AREA	61 Sociology	62 State & politics	63 Public administration	64 Money & finances	65 Social aid, social politics	66 Law	67 Area planning, urbanism	68 Military sci. & tech.	69 History
7 ECONOMICS & TECHNOLOGY AREA	71 Gen. & natl. economics	72 Business economics	73 Technology in general	74 Mechanical & precision engg.	75 Building	76 Commodity sci. & technol.	77 Vehicle sci. & technol.	78 Transport, technol. & services	79 Utilities & service econom.
8 SCIENCE & INFORMATION AREA	81 Science of science	82 Information sciences	83 Informatics, computer sci.	84 Information in general	85 Communication sci.	86 Mass-communication	87 Printing & publishing	88 Communication engg.	89 Semiotics
9 CULTURE AREA	91 Language & linguistics	92 Literature & philology	93 Music & musicology	94 Fine arts	95 Performing arts	96 Culture sci.i.n.s.	97 Philosophy	98 Religion & secret teachings	99 Christian Religion

the number 10 and mostly comprises only 5–7 items. It has also been shown by H.G.Körner (10) that the number 3 plays a fundamental role in decision processes. Most of the classification systems whose class sizes he investigated had only between 2–5 subdivisions. This finding could well support our assumption that the overall organization of knowledge in triades – in the sequence of the 3x3 general entities as well as in the recurring 3x3 facets – would mean a powerful mental support in comprehending the system and in applying it fast and effectively.

A final advantage of the decimal notation can be seen in that it is possible to display the system on the higher levels – and also separately on the lower ones – in a matrix form facilitating survey and use of it. Fig.1 thus shows the system on the first two levels of abstraction. It is possible to show it with its next hierarchical level in the same way, i.e. by depicting its 81 x 9 = 729 classes in the same matrix form on the same size of paper, which can then be carried in a pocket-book or displayed under a transparent plastic cover on the desk.

5. The order of the subject groups

In the following an explanation of the placement of subject groups within the areas is attempted. The reader is advised to have a look at Fig.1 and to follow the explanation row by row.

Row 1 "Form and structure area" starts out with 11 *Logic*, the most formal science of the principles of reasoning and inferential thinking which is necessary in all fields of knowledge. It is followed by 12 *Mathematics*, the science concerned with numbers, sets, structures and relationships as well as the activities applied to them in all possible dimensions. Mathematics presupposes logic and is followed by 13 *Statistics*, one very obvious consequence of mathematical activities, featuring, however, its own set of theories (e.g. probability theory). 14 *Systemology*, 15 *Organization* and 16 *Measurement* follow, meant as certain kinds of expressions of the first three groups when applied to general forms (systems, organizations) and to general activities (measurement). The following group 17 *Cybernetics* is concerned with the control (Steuern, Regeln) of processes and contains a technical aspect. In 18 *Standardization* the aspect of stabilization, a potential in this area is expressed and in 19 *Testing and monitoring* the idea of a synthesis of the contents of the former groups which certainly can be regarded as a presupposition to this group.

Row 2 "Energy and Matter" contains two triades of the facets 1–3 of the systematifier, namely regarding energy and matter in general through 21 *Mechanics*, 22 *Matter physics* and 23 *General and Technical Physics*, for matter as a specialty in 25 *Physical Chemistry*, 26 *Pure Chemistry* and 27 *Technical Chemistry*. In between these two triades the subject group 24 *Electronics* was placed as a specialty of technical physics. In 28 *Energy* the aspect of a resource and product-orientation is expressed and in 29 *Electrical engineering*, the synthesizing aspect of application of electrical energy in possibly all fields of knowledge.

Row 3 "Cosmo- and Geo-Area". Here the necessary study of the cosmos in 31 *Astronomy and Astrophysics* was put into the first place as a theoretical approach by necessity, even though highly specialized instruments are applied in this study. It is followed by 32 *Space Research* which is concerned with the exploration of the environment of the earth in the space of our galaxy. In 33 *Basic Geosciences* the methodical fields of 334 Geodesy, 335 Geophysics, 336 Geochemistry a.o. are comprised, following the fields concerned with the structure (332) and dynamics (333) of the entire earth itself. The next three subject groups deal with three specialties of the earth, namely its spheres: the atmosphere (34 *Meteorology*), the hydrosphere (35 *Water Sciences and Technology*) and the lithosphere (36 *Geological Sciences*). The technically oriented field of 37 *Mining* presupposing the geological sciences, reveals again the aspect given to the position 7 and equally the resource oriented group the one of position 8 in 38 *Materials Sciences and Technology* which "uses" so-to speak the results from 37 as well as of other fields of the previous areas. In 39 *Geography* we find again the idea of synthesis of the area 3 as well as of fields of other areas, still "ahead".

Row 4 "Bio-Area" starts with 41 *General Biology* where the fundamental laws and their fields with influence and applicability in all biological subject groups are summarized, e.g. in 412 Genetics, 414 Biometry, 415 Biophysics, 416 Biochemistry, 417 Bionics. The following three groups: 42 *Microbiology*, 43 *Plant Biology and Cultivation* and 44 *Animal Biology and Breeding* comprise the object groups of the bio-area in their evolutionary levels of development. In each one of these groups their activity related fields are included, however their more or less technically supported and application-oriented fields are excluded. They follow under 46 *Agriculture* and 47 *Forestry*. 45 *Veterinary Science* functions as a sort of an in-between-group being concerned with the sick animal on the one side and the production aspect of animals on the other side. 48 *Food Science and Technology* is again resource and product-oriented and 49 *Ecology and Environment* contains the synthesizing aspects relating to the entire bio-area and the areas following.

Row 5 "Human Area" starts out with 51 *Human Biology*, comprising the biosciences of a healthy person, e.g. 511 Physical Anthropology, 512 Anatomy, 513 Physiology etc. Under 52 *Health* all those fields are summarized which are necessary for the preservation of human health and the avoidance of sicknesses, including 522 Pharmacy and 523 Pharmacology as sciences concerned with the objects of preservation and cure and their possible effects. The fields of 53 *Pathology and Medicine* are arranged according to the ones under 51 and are concerned with the different sicknesses of the human body. 54 *Operative and Therapeutic Medicine* follows and summarizes all those fields necessary for the cure of a human disability or sickness. After these more or less biologically oriented subject groups of the human sciences follow those which refer to the powers of the human soul, namely 55 *Psychology* (presupposition for learning), 56 *Education* (formation and learning) and 57 *Profession and Labor* (application of what has been learned). In 58 *Sports* we find again a potentiality of the human body and soul (preservation of vigor) and in 59 *Home Economics and Home Life* a synthesis of activi-

ties related to the subsistence and re-creation of a human life in the protected environment of a home.

Row 6 "Socio Area". The "theoretical" subject group is here 61 *Sociology,* followed by 62 *State and Politics* as the group for the subjects concerned with the conditions of nations and other kinds of communities (regional, state, community level on the one hand and international relationships on the other hand). 63 *Public Administration* may be considered as the consequence of 61 and 62 concluding the triade with its activity orientation. The subject group of 64 *Money and Finances* reveals a "specialty" of societal life, its "nervus rerum" and is the necessary precondition for any help for those in need which are the subject of 65 *Social Aid/Social Politics,* a group that also deals with 656 Insurance and 657 Development Aid and Politics, both highly dependent on the will of a majority of persons to act for the benefit of individal persons, groups of persons or countries. The consolidation of social life – if not its "normalization" – is made possible by the subjects dealt with in 66 *Law.* A further and more recent societal activity is to be found in the subject group 67 *Regional Planning and Urbanism* which deals with the problem of an adequate use of land as the space for life and development of society. Another problem of society, also on a national level is its defense against its possible enemies: the preservation-oriented group (preservation of countries and nations) 68 *Military Science and Technology.* Finally as a synthesizing and actualizing subject group we find 69 *History* as the theory and description of the development of society in the last 6000 years, excluding though the history of the sciences (812) and Prehistory (under 969 Archeology).

Row 7 "Economics and Production Area". Here we find first of all 71 *General Economics* and its relation to national economics as the theoretical and general group and thereafter 72 *Business Economics* as the subject group concerned with the management of particular companies or similar establishments. In 73 *General Technology* only those technical devices and processes are dealt with which are applicable in a majority of technical fields. The technical specialty group is 74 *Mechanical Engineering,* comprising the engineering of all kinds of machines, apparatus, instruments and plants. Next we find again three specification groups of production, namely 75 *Building,* 76 *Commodity Science and Technology* and 77 *Vehicle Engineering and Production.* The latter leads us to the distribution group 78 *Transportation* with the subjects relating also to all kinds of transportation on road and railway, on water and by air. The area is concluded by the synthesizing group of 79 *Utilities and Services* where all the other economic activities with a consumer-orientation are summarized.

Row 8 "Science and Information Area" starts with 81 *Science of Science* as the theoretical foundation of all of knowledge handling. In 82 *Information Sciences* knowledge is regarded as (scientific) information and made accessible through different kinds of establishments (archives, libraries, documentation and information centers, museums, hence 824 Archivistics, 825 Library Science, 826 Documentation and Information Science and 828 Museology). The subject group of 83 *Informatics/Computer Science* supplies hardware and software to handle scientific information as well as any other kind of information, the forms and activities of which are summarized under 84 *General Information* with fields such as 842 Office Management and Technology, 843 Text Proceesing, 844 Consulting, 845 Advertisement, 846 Exhibitions, etc. This group is followed by 85 *Communication Science* dealing with information exchange on a personal level and 86 *Mass Communication* as the science and activity group of the public media. In 87 *Printing and Publishing* all those procedures and establishments are assembled which are concerned with the recording and distribution of knowledge and information on documents, whereas the group 88 *Communication Engineering/Telecommunication* takes care of the subjects concerning activities and establishments for wired or wireless messages including also the establishment of the post. Area 8 concludes with 89 *Semiotics,* the science of signs and symbols which synthesizes all the fields of the representation and handling of knowledge and information through the surrogate of any "sign".

Row 9 "Culture Area" begins with the fundamental phenomenon of 91 *Language,* the mental faculty par excellence. Language is treated in 92 *Literature and Philology* according to its aesthetical qualities, distributed over all the old and new languages of the world. In 93 *Music and Musicology* language receives its most adequate mode of activation. In 94 *Fine Arts* any aesthetic statement becomes manifest through pieces of art whereas by 95 *Performing Arts* such manifestations are vivified by interpretation and representation through living human beings. All the subject groups named so far in area 9 are generalized and summarized once more under 96 *Culture Sciences* in a narrower sense and related – together with other human activities – to ethnic units. The last triade of the scheme is formed by 97 *Philosophy* with its main characteristic (technique?): to question theoretically and practically everything, 98 *Religion* as the potentiality factor of every human being in his inclination towards the good and his fight against the evil and 99 *Christian Religion* with the believe in God's incarnation into the matter of this earth through Jesus Christ for the redemption of the souls and with the teaching of the two forms of love (God above all and one's neighbor as oneself) synthesizing everything positive in this world by relating it to its Creator.

6. Mnemonics of subject groups and their facet syntax

The handling of any classification system is facilitated by the sense underlying its structures. It was pointed out that the main sequence of general objects in ICC is a pattern of 3x3 areas in an evolutionary sequence and that its "level character" takes care that every area becomes a presupposition for the existence of the following one. In the last area all instances of the previous ones are contained. If we would use the principles of the concept theory mentioned (7) we could say: the constituting characteristics of the concepts of objects of one level cumulate in these objects from one level to the other in the rows 1–6. The levels 7–9 build up on them, however, here, the characteristics "having life", „having a soul" of levels 5 and 6 are replaced by the characteristics "created by man", "having a purpose given by man", etc. Also, into the products of rows 7–9 the values are entered which man and society have implanted into

them, for all products of mankind are dependent on the knowledge, mastership and willpower of man, or, more precisely, the values which man and society put into their products determine their quality and durability.

When looking at the vertical order of the subject groups, one realizes that the theoretically oriented and structuring groups can be found in column 1 analogous to row I and the synthesizing and actualizing groups in column 9 just as in row 9.

The triade of facets 1–3 of the systematifier can be found in every row at the said positions and in analogous placings.

The specialties under 4 occur in 14, 24, 54, 64, 74, 84 and 94.

Starting with area 5 the relationship to persons becomes visible in 65, 75, 85, 95, as does the relationship to society in 56, 66, 76, 86, 96.

The technology orientation under 7 is visualized in 17, 27, 37, 47, 57, 67, 77, 87.

The potentiality and resource-orientation under 8 is contained in 28, 38, 48, 58, 68 and perhaps in 98, and the distribution relationship in 78 and 88.

The diagonal from 11 to 99 shows the way from the most formal group to the most contents-filled one. The other diagonal from 19 to 91 marks the path for those groups which seem to be most indicative of human progress. The meeting point of the two diagonals and the center-point of the entire system is the subject group concerned with man's mental faculties and consciousness: 55 Psychology.

In section 2 above the primary conception of ICC as consisting of categories of being and categories of form seen together in the integrated level sequence was mentioned. This triade depicts, however, also the structure of a sentence, consisting of a subject and a predicate functioning together as the basic elements of each sentence in the context of possible sentences. I have tried to retain this primeval-sentence pattern throughout the entire system on every level of abstraction, so that there is always a subject and a predicate framed by either a subject group, a theoretical field or a special subject field. This syntactical basis of ICC was considered necessary in order to provide the foundation for the construction of truly informative concept combinations which can function as informemes (11) according to A. Diemer with an expressibility in the form of statements.

A further instance facilitating the use of ICC is its unlimited but organized possibility to combine all its elements with each other according to any need arising. The combinability can take place within subject groups (internal combinations) or between them (external combinations). For internal combinations it is e.g. possible to use subdivisions of the facets 1–3 in the facets 4–9, alone or in combination, always separated by a period.

Example:

82 Information sciences
822 Documents with 8227 Manuscripts
823 Information handling with 8232 Information analysis
824 Archivistics
824.27 Archival manuscripts
824.27.32 Information analysis of archival manuscripts

External combinations become necessary whenever a statement involves concepts from two different subject groups, as e.g. when methods used in one field are applied in others or when theoretically supporting fields are used as a basis for other fields. Such theoretically supporting fields are e.g. logic, mathematics, statistics, psychology, sociology, law, history, science theory, philosophy. The position for such a combination is then always under the 1 (general and theoretical basis of a subject group/field).

Example:

91 Language
911 General and theoretical basis of language
911:118 Logic of language
911:558 Psychology of language
911:618 Sociology of language
911:978 Philosophy of language

In the UDC the rule would say to combine just the group numbers, as e.g. 91:11 or 91:55. This, however, does not clarify the function of the two components of a combination, since there is a syntactical relationship which needs to be made explicit. In the cases shown above "language" is the subject and the combination concepts form the predicates in each case. These predication concepts have therefore been taken from the 8th position which is the application facet 8. Thus the positions of the notation and the connecting symbol : (colon) depict the contents of the concepts, as e.g.

651:698 History of Social aid whereas
691:978 Philosophy of history

In those cases when one wants to keep the application field in the first place, say, if one has a library or a bibliography on psychology and wants to start always only with this subject group 55 one might assemble all the application fields of psychology by a symbol that reverses the sentence order shown above, e.g.:

558x561 Psychology of education instead of 561:558
558x581 Psychology of sports instead of 581:558
558x911 Psychology of language instead of 911:558

7. Applicability of ICC

Since ICC is not discipline-based, it offers wide application possibilities, surely going far beyond those for which it has been used so far. We used it as an aid to structure the following objects:

(1) subject fields taught at German universities
(2) subject fields and their subfields in a lexicon of subject fields
(3) descriptors of the German National Library
(4) monolingual dictionaries
(5) taxonomies, classification systems and thesauri as such
(6) literature on classification systems and thesauri
(7) terminology work in certain fields
(8) classification and indexing done in certain subject fields
(9) research reports

The scheme was elaborated to comprise some 7000 concepts, so far mostly fields of knowledge. There is, however, no limit to its further extension into depth applying the systematifier and including the concepts of single objects, activities and other aspects. Its principles have also been used in demonstrating the construction of

a classified scheme and its thesaurus in *Sports* from the descriptors of the Deutsche Bibliothek (12) and also in establishing a classification scheme for the field of classification and indexing, as we use it in the annotated bibliography "Classification Literature" in every issue of Int.Classif. This scheme will be published soon.

A version of ICC with its classes elaborated to the third level (some 700 classes) is available in a preliminary version in German and English together with its indexes. I hope to be able to publish a more extended version (some 7000 classes) by 1983.

References:

(1) Dahlberg, I.: Grundlagen universaler Wissensordnung. Probleme und Möglichkeiten eines universalen Klassifikationssystems des Wissens. Pullach bei München: Verlag Dokumentation 1974. 384 p.

(2) Dahlberg, I.: The terminology of subject fields. In: Int. Classif. 2(1975)No.1, p.31–37

(3) Dahlberg, I.: Wissensmuster und Musterwissen im Erfassen klassifikatorischer Ganzheiten. In: Studien zur Klassifikation, 9(1980)p.294–315

(4) Dahlberg, I.: Ontical structures and universal classification. Bangalore, India: Sarada Ranganathan Endowment for Library Science 1978. 64 p.

(5) Ranganathan, S.R.: Prolegomena to library classification. 3rd ed. Bombay etc.: Asia Publ.House 1967. 640 p.

(6) Neelameghan, A.: Computer simulation of some steps in classifying: built-in features of a theory-based scheme for classification. In: Libr. Sci. Slant Docum. 9 (1972) No. 4, p.499-522

(7) Dahlberg, I.: A referent-oriented, analytical concept theory for Interconcept. In: Int.Classif. 5(1978)No.3, p.142–151

(8) BSO. Broad System of Ordering. Schedule and Index. 3rd Rev. The Hague-Paris: FID and UNESCO 1978. 102+82 p.

(9) Judge, A.J.N.: Representation, comprehension and communication of sets: the role of number. (In three parts) In: Int.Classif.5(1978)No. 3, p.126–133, 6(1979)No.1 and 2.

(10) Körner, H.G.: Optimale Klassengröße, die mathematische Konstante e und Notationsfragen. In: Studien zur Klassifikation 9(1980)p.50–67

(11) Diemer, A.: Informationswissenschaft. Zur Begründung einer eigenständigen Wissenschaft und zur Grundlegung eines autonomen Bereichs "Informationswissenschaften". In: Nachr.Dokum.22(1971)No.3, p.105–113

(12) Dahlberg, I.: Die Pilotstudie DB-Thesaurus. Forschungsbericht für die Deutsche Bibliothek Frankfurt. Eggenstein-Leopoldshafen: FIZ Energie, Physik, Mathematik GmbH 1980. 74 p. = BMFT-FB-ID 80-015

Reports and Communications

Computer Applications in Archaeology 1982

The European Branch of The Classification Society held its Annual General Meeting on March 27 in connection with the meeting on Computer Applications in Archaeology at the University of Birmingham 26-27 March 1982. Papers on classification and quantitative methods were scheduled for March 27. There had not been any meeting of this Society during the last twelve months. The chairman of the society is at present Dr. A.F.Parker-Rhodes, Cambridge, the European Branch Secretary: Mrs. S.Laflin-Barker, University of Birmingham, P.O.Box 363, Birmingham B15 2TT, England.

The Classification Society, NAB, Montréal 1982

The annual meeting of the North American Branch (NAB) of The Classification Society took place at the Université de Québec at Montréal (UQAM) from May 30 to June 2nd, 1982. President of the NAB conference was Dr.J.D.Carroll from Bell Labs., program chairperson was Pascale Rousseau from the Department of Mathematics, UQAM. The conference was a joint meeting of the NAB together with the Psychometric Society, which, however, had its own program of 83 papers in 15 sessions (according to its preliminary program) some of which can also be regarded as highly relevant for classification. At the NAB meeting 55 papers were presented in 12 sessions. There were two plenary sessions in the mornings (from 8-10 und 10:15 to 12:15) and two paralell sessions in the afternoons. In the following the papers are listed as stated in the program:

CLASSIFICATION IN BUSINESS.
Chair: Wayne DeSarbo

Willie, R.R.: An interactive program for categorical analysis of market segments (CAMS). - Carroll, J.D., Clark, L., DeSarbo, W.S., Green, P.E.: Synthesized clustering: a method for amalgamating alternative clustering bases with differential weighting of variables. - Whaley, C.P.: Overlapping cluster procedures. - Harshman, R.A., Lundy, M.E.: Fuzzy clustering and multidimensional scaling based on analysis of asymmetrical relationships: progress report on DEDICOM.

MATHEMATICAL STATISTICS.
Chair: John Van Ness

Peck, R.W., Van Ness, J.W.: Approximate confidence bounds on the number of clusters. - Milligan, G.W.: Some validation results of procedures for determining the number of clusters in a data set. - Bozdogan, H., Scolve, S.L.: Multi-sample cluster analysis using Akaike's information criterion. -Wong, A.M.: Lennington, R.K., Sorensen, C.T.: Resolution of highly overlapped cluster using the CLASSY approach to the normal mixture problem.

APPLICATION IN PSYCHOLOGY.
Chair: Phipps Arabie

Heiser, W.J.: Metric multidimensional unfolding with restrictions on the configuration. - Pruzansky, S., Sen,