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Analysis of Readers' Questions: A Case Study.
(Classification problems. 33) (Librametric series. 2).

A **Neelameghan,** *Professor, Documentation Research and Training Centre, Bangalore* 3.

[Mentions the need for the analysis of the subjects of questions put by the specialist readers to document finding systems. Gives data on the facet structures of the subjects of 323 questions in the fields of High-Speed Aerodynamics and Aeronautical Engineering. On the whole, such questions appear to be fairly well confined to the core subjects. The subjects could be patterned into 34 facet structures. About 73 per cent of the subjects were based on three similar facet structures with 3, 4, and 5 facets respectively. The maximum number of Levels of [P] in any one facet structure was 3; while that of the Levels of [1MP] in any one facet structure was 5. The maximum number of facets in any one subject was 12 and the minimum 2, with an average of 5·4. The maximum number of kernel ideas in any one subject was 18 and the minimum 3, with an average of 8. This appears to conform to the findings of psychology of the Span of Immediate Memory and the Span of Absolute Judgment. The average frequency of incidence of (P), (M), and (E) isolates was in the ratio of 4·2: 5·6: 1. The frequency of incidence of isolates from the second and later Rounds of [P] and [M] was quite small. The number of different (1P1) isolates incident in the subjects of the questions was 48; 20 such isolates accounted for a 90-per cent incidence of (1P1) isolates. The number of different (1MP) isolates incident in the subjects was 152. 20 such isolates accounted for a 62-per cent and 50 isolates for an 80-per cent incidence of (1MP) isolates. The number of different (1E) isolates incident in the subjects was 24. They were all common isolates. A principle is mentioned as an aid in differentiating whether an idea is to be deemed a manifestation of Matter

(Property) or of Energy, when the idea is associated with an "action". A total of 178 qualifiers occurring 266 times qualified 80 ideas in [1P1]. A total of 274 qualifiers occurring 577 times qualified 98 ideas in [1MP]. 22·5 per cent of the isolates in [1P1] and 88 per cent of the isolates in [1MP] did not have qualifiers. There were 76 Complex Subjects in the subjects of the questions. The influence Phase Relation had the highest incidence (68%) among the Complex Subjects. Concludes mentioning a few subjects for further investigation].

ABBREVIATIONS USED

(BS)	= Basic Subject	[MM]	= Matter (Material) Facet
CC	= Colon Classification		
(DFS)	= Document Finding System	[MP]	= Matter (Property) Facet
		[P]	= Personality Facet
[E]	= Energy Facet		

Note.— Notations such as (P), (MP), and (E) denote abbreviations for 'Personality', 'Matter Property', and 'Energy' respectively.

0 Study of Attributes of Subjects

01 TWO COMPONENTS OF DOCUMENT FINDING SYSTEM

The design of a (DFS) has to be based essentially on the attributes of the:

1 Universe of documents forming the input to the (DFS); and

2 Questions of readers to which the (DFS) is to be made responsive.

The predominant approach to documents by the readers is by "subject". Therefore, a study of the attributes of subjects embodied in documents and the attributes of subjects embodied in the questions of readers should be basic to the design of any (DFS).

02 NEED FOR ANALYSIS OF QUESTIONS

There have been several studies on the attributes of subjects, although much remains to be done yet. Most schemes for library classification attempt to structure and arrange subjects with a view to improving the efficiency of document finding. Questions by readers put to (DFS), on the other hand, have received comparatively less attention. In recent years, however, some of the studies on the behaviour of readers in using (DFS) have included a study of some aspects of the questions put by readers. In these studies again, however, the verbal plane of the questions appears to have received greater attention.

The analysis and study of the structure of the subjects embodied in questions by readers could lead to useful results. The findings may have implications on the

1 Selection of documents to form the input to the (DFS);
2 Structuring of the subjects embodied in documents forming the input to the (DFS);
3 Sensing the kinds of ideas to which a (DFS) has not or may not become responsive;
4 Modes of association of ideas forming the component of subjects of readers' questions;
5 Facet analysis of readers' questions in a helpful way leading to efficient reference service;
6 Sensing the patterns of expression and verbal behaviour of readers in their use of (DFS); and
7 Structuring and patterning of Subject Headings in a manner helpful to readers.

03 Scope of the Paper

The present paper gives preliminary data about the structure of 323 readers' questions. Some tentative inferences are made on the basis of analysis of the data.

1 Procedure

11 Source of Questions

The questions analysed in this paper are those used in the Aslib-Cranfield Research Project (= ACRP) (2). A majority of the questions are on High Speed Aerodynamics and Aeronautical Engineering. There are also questions falling either in a broader field or in a related field, such as Fluid Dynamics, and Structural Engineering. The choice for the present study of the questions used in the (ACRP) has nothing to do with any evaluation of the Cranfield Project. The reports on that project have provided a reliable set of search questions convenient for use in the present study. The procedure adopted in obtaining the search questions for the (ACRP) was as follows: 271 research papers and technical reports on High Speed Aerodynamics, and Aircraft Structures, published mostly during 1962, were selected. To the author of each of these papers a form was sent, quoting the title and reference of his own paper and also listing up to ten of the papers, included as reference papers. Each author was asked, among other things, "to state the basic problem in the form of a search question, which was the reason for the research being undertaken leading to the paper, and also to give not more than three supplementary questions that arose in the course of the work and which was, or might have been, put to an information service" (1). After several screenings, 279 questions were

used in the (ACRP).

12 FACET ANALYSIS

In the present paper each question was facet-analysed. Steps 0 to 4 of the postulational method (7) were followed. When a component idea in the subject of a question was not explicitly represented but only implied, it was explicitly named. In over 95 per cent of the subjects, the (BS) had to be so supplied. In the case of a question embodying a multi-focal subject, each focus was treated as constituting a separate subject and facet-analysed accordingly. Each Derived Composite Idea was broken down into its Fundamental Constituent Ideas.

121 *Example*

The following are examples of subjects of questions facet analysed:

1 Question: What theoretical and experimental guides do we have as to turbulent couette flow behaviour?

Facet analysis (Step 4):

Mechanics (BS), Fluid [1P1]; Flow-Turbulent-Couette [1MP1]; Pattern [1MP2]

2 Question: What analytical solutions are available for stresses in edge-loaded shells of revolution ?

Facet analysis (Step 4):

Structural engineering (BS), Shell-Edge loaded-Revolving [1P1]; Stress [1MP1]; Solution-Analytical [1MP2]

3 Question: How do apex located controls at low subsonic speeds compare with conventional trailing-edge flap ?

Facet analysis (Step 4):

Commodity production engineering (BS), Aircraft [1P1]; Flight-Velocity Subsonic-low [1MP]; Control [1E], Control Surface-Apex located [2P11] *Compared with* (Phase relation) Commodity production engineering (BS), Aircraft [1P1]; Flight [1MP1]: Control [1E], Flap-Trailing edge located [2P1]

13 TOTAL NUMBER OF QUESTIONS

The subjects of 12 questions were not clear and, therefore, they have not been included in the analysis. The subjects of the remaining questions were of two kinds. They were:

1 Compound Subjects ..	247	76·5%
2 Complex Subjects ..	76	23·5%
Total ..	323	100·0%

2 Basic Subject

In the facet analysis, the subject of each question was deemed to go with one or other of the (BS) enumerated in CC (6). The distribution of the subjects by (BS) is shown in Table 1. The (BS) in the second phase of complex subjects have been counted separately.

21 TABLE 1. DISTRIBUTION BY (BS)

SN	Class Number	Name of Subject	Number of Subjects
1	B7	Mechanics ..	235
2	C	Physics ..	1
3	C1	Properties of Matter ..	12
4	C3	Sound ..	1
5	C4	Heat ..	12
6	D13	Materials engineering ..	2
7	D18	Structural engineering ..	76
8	D7	Service production engineering	1
9	D8	Commodity production engineering	41
10	E	Chemistry ..	13
11	F8	Commodity production technology ..	5
		Total ..	399

22 ANNOTATION

1 Nearly 60 per cent of the subjects of the questions were deemed to go with the (BS) Mechanics, the predominant Host Subject being Fluid Dynamics.

2 Nearly 20 per cent of the subjects of the questions were deemed to go with the (BS) Structural Engineering.

3 Another 10 per cent of the subjects of the questions were deemed to go with the (BS) Commodity Production Engineering, the predominant Host Subject being Aeronautical Engineering.

4 The remaining 10 per cent of the subjects of the questions were also in closely related fields, such as Physics and Chemistry.

5 Therefore, on the whole, specialists in aerodynamics confined their search questions to the core fields Mechanics and Aeronautical Engineering, with a small overflow into closely

related subject-fields. In other words, the extent of seepage of the subjects of the questions was not appreciable.

3 Facet Structure

Table 2 lists the 34 facet structures into which the 323 subjects of the questions were patterned. In each of the 76 Complex Subjects, only the first phase was taken into consideration.

31 TABLE 2. FACET STRUCTURE

SN	Facet Structure	Number of		Total of each Category
		Kernel Ideas	Subjects of Questions	
1	(BS); [1MP1]; [1MP2): [1E]	4	2	2
2	(BS), [1P1]	3	4	4
3	(BS), [1P1]: [1E]	5	2	2
4	(BS), [1P1]: [1E], [2P1]	5	1	
		6	1	2
5	(BS), [1P1]; [1MP1]	3	8	
		4	36	
		5	24	
		6	29	
		7	6	
		8	3	106
6	(BS), [1P1]; [1MP1]: [1E]	4	3	
		5	5	
		6	6	
		7	2	
		8	2	18
7	(BS), [1P1]; [1MP1]: [1E]; [2MP1]	7	2	2
8	(BS), [1P1]; [1MP1]: [1E], [2P1]	5	1	
		6	10	
		7	12	
		7	2	
		8	6	31
9	(BS), [1P1]; [1MP1]: [1E], [2P1]: [2E], [3P1]	11	2	2
10	(BS), [1P1]: (1MP1]: [1E], [2P1]; [2MP1]	6	1	1
11	(BS), [1P1]; [1MP1]: [1E], [2P1]; [2MP1]: [2E]	7	1	
		9	2	3
12	(BS), [1P1]; [1MP1]; [1MP2]	4	8	
		5	24	
		6	28	
		7	14	
		8	7	
		9	4	
		10	1	
		11	1	87

SN	Facet Structure	Number of		Total of each Category
		Kernel Ideas	Subjects of Questions	
13	(BS), [1P1]; [1MP1]; [1MP2]: [1E]			
		6	6	
		7	3	
		8	3	
		10	4	16
14	(BS), [1P1]; [1MP1]; [1MP2]: [1E]; [2MP1]	7	1	1
15	(BS), [1P1]; [1MP1]; [1MP2]: [1E]; [2MP1]; [2MP2]	9	1	1
16	(BS), [1P1]; [1MP1]; [1MP2]: [1E], [2P1]			
		6	1	
		7	7	
		8	3	
		9	4	
		10	2	17
17	(BS), [1P1]; [1MP1]: [1E], [2P1]; [2E]			
		7	1	
		9	1	2
18	(BS), [1P1]; [1MP1]; [1MP2]: [1E], [2P1]: [2E], [3P1]	11	2	2
19	(BS), [1P1]; [1MP1]: [1MP2]: [1E], [2P1]; [2MP1]	12	1	1
20	(BS), [1P1]; [1MP1]; [1MP2]; [1MP3]			
		5	3	
		6	10	
		7	15	
		8	8	
		9	4	
		10	3	43
21	(BS), [1P1]; [1MP1]; [1MP2]; [1MP3]: [1E]			
		6	2	
		7	1	
		8	4	7
22	(BS), [1P1]; [1MP1]; [1MP2]; [1MP3]: [1E], [2P1]			
		8	1	
		9	4	
		11	1	6
23	(BS), [1P1]; [1MP1]; [1MP2]; [1MP3]: [1E], [2P1]: [2E]	8	1	1
24	(BS), [1P1]; [1MP1]; [1MP2] [1MP3]: [1E], [2P1]; [2MP1]: [2E]	10	1	1
25	(BS), [1P1]; [1MP1]; [1MP2]; [1MP3]; [1MP4]			
		6	3	
		7	4	
		8	2	9
26	(BS), [1P1]; [1MP1]; [1MP2]; [1MP3]; [1MM1]; [1MP4]	10	1	1
27	(BS), [1P1]; [1MP1]; [1MP2]; [1MP3]; [1MP4]; [1MP5]	9	2	2

SN	Facet Structure	Number of		Total of each Category
		Kernel Ideas	Subjects of Questions	
28	(BS), [1P1], [1P2]; [1MP1]	5	2	
		6	1	3
29	(BS), [1P1], [1P2]; [1MP1]:[1E]	7	2	2
30	(BS), [1P1], [1P2]; [1MP1]; [1MP2]	8	1	1
31	(BS), [1P1], [1P2]; [1MP1], [1MP2]: [1E], [2P1]	8	1	1
32	(BS), [1P1], [1P2]; [1MP1]; [1MP2]; [1MP3]	7	1	1
33	(BS), [1P1], [1P2]; [1MP1]; [1MM1]; [1MP2]	10	1	1
34	(BS), [1P1], [1P2], [1P3]; [1MP1]	5	1	
		7	1	2
	Total ..			381

32 ANNOTATION

1 The maximum number of facets occurring in any one subject of the questions was 9, and the minimum 2. This counting included the Basic Facet also (*See also* Sec 41).

2 In only one facet structure (SN 1), (1P1) isolate did not occur.

3 In only three facet structures (SN 2, 3, 4), (1MP) isolate did not occur.

4 In most of the facet structures from SN 12 onwards, the consecutive incidence of two or more (1MP) isolates may be noted.

5 The maximum number of (1MP) isolates occurring consecutively in any one subject was 5 (SN 27).

6 The sequence between any two consecutive (1MP) isolates was determined by the Wall-Picture Principle.

7 Over 73 per cent of the 323 subjects were patterned according to the following three similar facet structures:

(BS), [1P1]; [1MP1]	..	106 (SN 5)
(BS), [1P1]; [1MP1]; [1MP2]	..	87 (SN 12)
(BS), [1P1]; [1MP1]; [1MP2]; [1MP3]		43 (SN 20)
		236

4 Frequency of Isolates

Table 3 gives data on the incidence of (BS) and different kinds of isolates in the 323 subjects of the questions. Both the

phases in the Complex Subjects have been taken into account. Table 4 gives a summary of the data from Table 3.

41 TABLE 3. FREQUENCY OF ISOLATES

Number of Facets including (BS)	(P) isolates					(M) isolates				(E) isolates	
	(1P)			(2P)	(3P)	(MP)			(MMt)	(1E)	(2E)
	(1P1)	(1P2)	(1P3)	(2P1)	(3P1)	(1MP)	(2MP)	(3MP)	(MMt)		
a	b	c	d	e	f	g	h	j	k	m	n
1	—	—	—	—	—	—	—	—	—	—	—
2	3	—	—	—	—	—	—	—	—	—	—
3	45	—	—	46	—	—	—	—	—	—	—
4	76	2	—	2	—	132	—	—	—	15	—
5	66	3	—	8	—	147	2	—	—	26	—
6	63	2	—	14	—	126	6	—	2	25	—
7	66	6	1	9	1	109	3	2	—	16	6
8	44	2	1	6	3	97	—	—	2	8	4
9	9	1	—	4	—	23	—	—	—	2	—
10	14	—	—	5	—	26	—	—	2	11	—
11	4	—	—	2	1	6	—	—	—	4	1
12	6	—	—	4	—	13	1	—	—	6	—
	396	16	2	100	5	679	12	2	6	113	11

42 GRAPH

Fig 1 visualises the data given in Col b, g, and m of Table 3 in the form of curves.

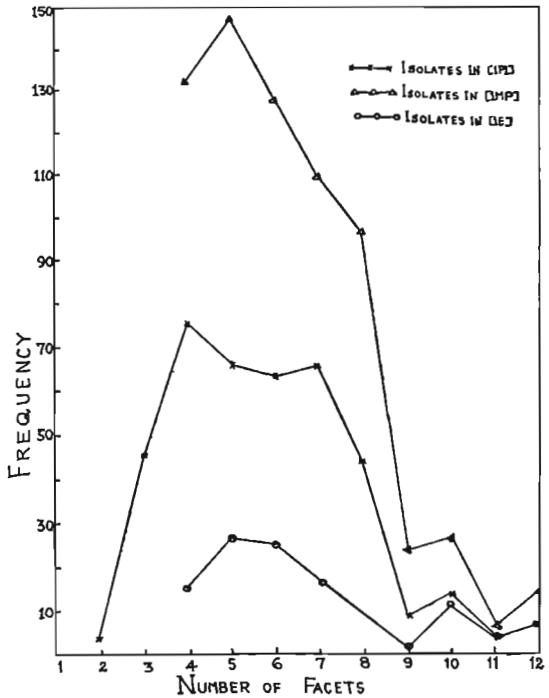

FIG 1. FREQUENCY OF INCIDENCE OF ISOLATES

43 TABLE 4. SUMMARY OF DATA FROM TABLE 3

SN	Component	Frequency	% of 1741
1	(BS)	399	22·9
2	(P) isolate ..	519	29·8
3	(MP) isolate ..	693	39·9
4	(MM) isolate ..	6	0·3
5	(E) isolate ..	124	7·1
	Total ..	1,741	100·0

44 ANNOTATION

1 The maximum number of components — (BS) and isolates — in any one subject of the questions was 12, and the minimum 2.

2 The (P) isolates and (MP) isolates taken together were incident upto about 70 per cent. Out of this, the (MP) isolates accounted for 40 per cent.

3 The average number of components — (BS) plus isolates — per subject was 5·4.

4 The incidence of isolates for the later levels of (P) was practically negligible.

5 The incidence of isolates from the second and third rounds of (P) and (MP) taken together was about 7 per cent only.

6 The proportion of the average incidence of (P), (M), and (E) isolates in a subject was 4·2: 5·6: 1.

5 Frequency of Kernel Ideas

An isolate idea forming the component of a Compound Subject may be either simple or compound. The majority of the Compound Isolates consisted of a Host Isolate with one or more qualifiers added to it. The addition of such qualifying ideas was done by using the Indicator Digit 'hyphen' between the constituent Kernel Ideas. For instance, in the Example 1, given in Sec 121, "Flow-Turbulent-Couette" is a Compound Isolate in which "Flow" is the Host Isolate, and "Turbulent" and "Couette" are qualifiers. Table 5 gives data on the incidence of Kernel Ideas in the subjects of the 323 questions.

51 TABLE 5. INCIDENCE OF KERNEL IDEAS

N of Kernel Ideas	Incidence	a × b
a	b	c
1	0	0
2	0	0
3	3	9
4	15	60
5	22	110
6	38	228
7	59	413
8	52	416
9	37	333
10	31	310
11	24	264
12	18	216
13	9	117
14	6	84
15	5	75
16	2	32
17	1	17
18	1	18
Total ..	323	2,702

52 GRAPH

Fig 2 visualises the data given in col a and b of Table 5 in the form of a curve.

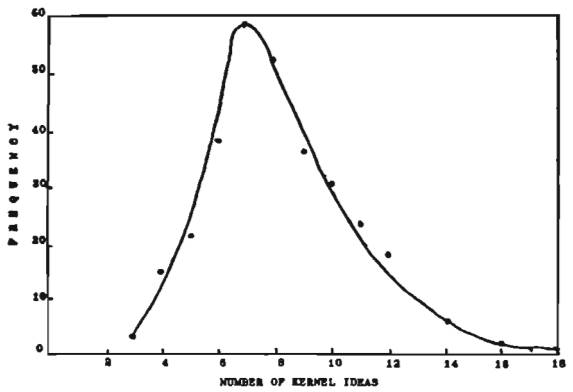

FIG 2. FREQUENCY OF INCIDENCE OF KERNEL IDEAS

53 ANNOTATION

1 The maximum number of Kernel Ideas incident in any one subject was 18, and the minimum 3.

2 The average number of Kernel Ideas per subject was 8·4.

3 About 80 per cent of the subjects of the questions had less than 11 Kernel Ideas, with an average of 7·3 Kernel Ideas.

4 In the facet analysis, for most of the subjects of the questions, the (BS) was supplied. Kernel Ideas not explicitly stated in questions were also supplied in the facet analysis. The total number of such ideas supplied was about 500. If these are not included in the computation of the incidence of Kernel Ideas in a Subject, then the average number of explicitly stated Kernel Ideas in the subject of a question will be about 7.

5 This pattern of incidence of the Kernel Ideas in the statement of a question about a subject appears to be in conformity with George Miller's findings about the "Span of absolute judgment" and the "Span of immediate memory". He writes that "there is a clear and definite limit to the accuracy with which one can identify absolutely the magnitude of a unidimensional stimulus variable ... this span is usually in the neighbourhood of seven". A similar limitation of the Span of Immediate Memory to seven units has also been noted (3).

6 Pattern of Occurrence of Isolates

61 (1P1) ISOLATES

Table 6 gives a list of the (1P1) isolates indicating the incidence of each. The (1P1) isolates occurring in the second phase of the Complex Subjects have not been taken into account. The isolates are arranged according to their decreasing frequency of occurrence in the subjects of the questions.

611 *Table 6. Incidence of* (1P1) *Isolates*

Note.— See Sec 713, category 5, for an explanation of the asterisk mark.

SN	(1P1) Isolate	Incidence	SN	(1P1) Isolate	Incidence
1	Fluid	57	10	Plate	10
2	Air	46	11	Structure	9
3	Aircraft	46	12	Spacecraft	7
4	Body	32	13	Aerofoil	6
5	Shell	28	14	Column	4
6	Wing	22	15	Compressor	4
7	Cone	12	*16	Metal	4
8	Cylinder	12	17	Panel	4
9	Gas	10	*18	Engine	3

SN	(1P1) Isolate	Incidence	SN	(1P1) Isolate	Incidence
*19	Solid	3	34	Hovercraft	1
20	Aileron	2	*35	Liquid	1
*21	Control surface	2	*36	Missile	1
*22	Fin-body	2	*37	Nose-cone	1
23	Jet	2	*38	Nozzle	1
*24	Lifting-surface	2	*39	Pitot-static tube	1
*25	Material	2	*40	Satellite	1
*26	Pump	2	41	Slab	1
*27	Rocket engine	2	42	Sphere	1
28	Water and air	2	43	Stabiliser	1
*29	Alloy	1	44	System	1
30	Beam	1	45	Tube	1
31	Forebody	1	46	Vehicle	1
*32	Helium	1	47	Vessel	1
*33	Hemisphere	1	48	Wall	1

612 *Annotation*

1 The isolates going with the (BS) Mechanics had the highest incidence (about 45 per cent) in the questions.

2 Out of this, the isolates deemed to fall in the field of Fluid Dynamics had an incidence of about 32 per cent.

3 The isolates denoting different kinds of Air Vehicles and their parts (organs) had an incidence of about 26 per cent.

4 The isolates going with the (BS) Structural Engineering had an incidence of about 16 percent.

5 Running down the list of (1P1) isolates in Table 6, it may be noted that the

1 First 6 isolates accounted for an incidence of about 64 per cent;

2 First 10 isolates accounted for an incidence of about 76 per cent; and

3 First 20 isolates accounted for an incidence of about 90 per cent.

4 The remaining 28 isolates accounted for an incidence of about 10 per cent only.

62 (1MP) ISOLATES

Table 7 gives a list of the 152 (1MP) isolates occurring in the subjects of the questions, together with an indication of the frequency of incidence of each of them. The (1MP) isolates occurring in the second phase of the Complex Subjects have not been taken into account. The isolates have been arranged according to their decreasing frequency of incidence.

621 *Table 7. Incidence of* (1MP) *Isolates*

Note.— *See* Sec 722, category 5, for an explanation of the asterisk mark.

SN	(1MP) Isolate	Incidence	SN	(1MP) Isolate	Incidence
1	Flow	96	49	Friction	3
2	Motion	78	*50	Mass	3
3	Layer	33	*51	Similarity	3
4	Pressure	29	*52	Vibration	3
5	Heat	23	53	Wake	3
6	Buckling	22	54	Angle	2
7	Solution	21	55	Boundary	2
8	Transfer	19	56	Defect	2
9	Distribution	15	57	Deformation	2
10	Flutter	15	*58	Dissociation	2
11	Stress	12	*59	Distance	2
12	Theory	11	60	Drag	2
13	Flight	10	*61	Energy	2
14	Stability	10	62	Equilibrium	2
*15	Aerodynamics	9	*63	Experiment-data	2
16	Force	9	*64	Frequency	2
*17	Dynamics	8	65	Kinetics	2
18	Equation	8	66	Law	2
*19	Pattern	8	*67	Mode	2
20	Shape	8	*68	Nearness	2
21	Conduction	7	*69	Non-equilibrium	2
22	Lift	7	70	Principle	2
*23	Design	6	*71	Property	2
*24	Transport	6	72	Rate	2
25	Wave	6	73	Reaction	2
*26	Displacement	5	*74	Sonic-boom	2
27	Fatigue	5	*75	Thickness	2
28	Interference	5	76	Vortex-sheet	2
29	Oscillation	5	77	Vorticity	2
30	Re-entry	5	*78	Absorption	1
31	Separation	5	*79	Applicability	1
32	Time	5	*80	Asymmetry	1
33	Transition	5	*81	Attachment	1
34	Value	5	*82	Axisymmetry	1
*35	Bending	4	*83	Bluntness	1
36	Buckling-strength	4	*84	Buzz	1
*37	Failure	4	*85	Combination	1
*38	Interaction	4	86	Capacity	1
39	Load	4	87	Cascade	1
*40	Rarefaction	4	*88	Cessation	1
41	Variation	4	*89	Characteristic	1
*42	Viscosity	4	*90	Choking-line	1
*43	Ablation	3	*91	Circularity	1
*44	Accuracy	3	92	Collapse	1
*45	Aeroelasticity	3	93	Compression	1
*46	Contamination	3	*94	Condition	1
47	Deflection	3	*95	Contour	1
*48	Flow-field	3	96	Creep	1

SN	(1MP) Isolate	Incidence	NS	(1MP) Isolate	Incidence
*97	Cross-section	1	127	Orbit	1
*98	Damage	1	128	Parameter	1
99	Damping	1	129	Pitch	1
*100	Deceleration maximum	1	130	Position	1
*101	Deficiency	1	131	Profile	1
*102	Density	1	132	Propagation	1
*103	Detachment	1	*133	Retention	1
*104	Deviation	1	*134	Relaxation	1
*105	Disturbance	1	*135	Restraint	1
*106	Efficiency	1	136	Self-sustenance	1
*107	Endurance	1	137	Shock	1
*108	Error	1	*138	Size	1
*109	Excitation	1	*139	Stagnation point	1
110	Expression	1	140	Stalling	1
*111	Flexibility	1	*141	State	1
*112	Geometry	1	142	Stress/Strain relation	1
*113	Gradient	1	143	Structure	1
*114	Increase	1	*144	Surge line	1
*115	Kink	1	*145	Temperature	1
*116	Lamina	1	*146	Thermodynamics	1
*117	Lift/Drag ratio	1	*147	Three-dimensional problem	1
*118	Limit	1			
119	Loss	1	*148	Thrust	1
120	Mach number	1	*149	Tumbling	1
121	Magnitude	1	*150	Vector	1
122	Mass-ratio	1	*151	Viscosity-temperature	1
123	Moment	1	*152	Yaw	1
124	Moment-response	1			
125	Momentum	1			
126	Onset	1		TOTAL	709

622 *Annotation*

1 The three terms 'Flow', 'Motion' and 'Flight' may be taken to denote seminally one and the same idea. Therefore, this idea had the highest incidence, about 26 per cent among the (1MP) isolates.

2 There were 77 (1MP) isolates with a frequency of incidence of 2 or more.

3 There were 76 (1MP) isolates with a frequency of incidence of 1.

4 Running down the list of (1M-P) isolates in Table 6, it may be noted that the

1 First 10 isolates accounted for an incidence of about 50 per cent;

2 First 20 isolates accounted for an incidence of about 62 per cent;

3 First 30 isolates accounted for an incidence of about 70 per cent;
4 First 40 isolates accounted for an incidence of about 77 per cent;
5 First 50 isolates (about one-third the total number of (1MP) isolates) accounted for an incidence of about 81 per cent; and
6 The remaining 102 isolates accounted for an incidence of about 20 per cent.

5 Following the method of grouping Property Isolates suggested earlier (4), a majority of the (1MP) isolates could be associated with the (BS) Mechanics and the (BS) Properties of Matter. The incidence of several General Property Isolates — that is, those likely to occur in a large number of Compound Subjects going with different (BS) — were also noted. Such isolates include the following:

Law	State	Magnitude
Theory	Condition	Size
Principle		
	Failure	Rate
Pattern	Defect	Cessation
Design	Damage	Onset
Structure	Deficiency	Nearness
	Deviation	Energy
Property	Disturbance	Solution
Characteristic	Error	Value
	Collapse	Similarity
Accuracy	Loss	Energy
Efficiency		
	Capacity	
Limit	Applicability	
Increase		

63 (1E) ISOLATES

Table 8 gives a list of the (1E) isolates occurring in the subject of the questions together with an indication of the incidence of each of them. The (1E) isolates occurring in the second phase of the Complex Subjects have not been taken into account. The isolates have been arranged according to their decreasing frequency of occurrence in the subjects of the questions.

631 *Table 8. Incidence of* (1E) *Isolates*

SN	(1E) Isolate	Incidence	SN	(1E) Isolates	Incidence
1	Analysis ..	19	14	Integration ..	2
2	Prediction ..	12	15	Simulation ..	2
3	Calculation ..	10	16	Blow ..	1
4	Measurement ..	9	17	Detection ..	1
5	Evaluation ..	8	18	Design ..	1
6	Determination ..	7	19	Ejection ..	1
7	Estimation ..	7	20	Inversion ..	1
8	Reduction ..	6	21	Observation ..	1
9	Test ..	6	22	Stabilisation ..	1
10	Control ..	5	23	Suction ..	1
11	Transformation ..	3	24	Supply ..	1
12	Correction ..	2			
13	Experimentation	2			109

632 *Annotation*

1 Practically all the (1E) isolates are common isolates likely to occur in many other Compound Subjects going with different (BS).

2 A number of the isolates denote the different steps in experimental work. For example, the 9 isolates (out of the total of 24) Experimentation, Estimation, Observation, Detection, Analysis, Determination, Measurement, Calculation, Prediction, account for an incidence of 62 per cent.

3 In another paper (5) it has been pointed out that determining whether an isolate is a manifestation of Energy or of Matter (Property) could be difficult sometimes, particularly when the isolate idea is associated with an "action". For sometime now, a guiding principle has been tried for the resolution of this problem and it has been found helpful. The helpfulness of this principle has been further recognised when it was used in the facet analysis of the subjects of the questions studied in this paper. The principle may be stated roughly as follows: If an isolate idea is associated with an action generating from within the entity or system under consideration, the isolate idea may be deemed a manifestation of Matter (Property); on the other hand an isolate idea denoting an action imposed from outside of the entity or system concerned, it may be deemed as a manifestation of Energy.

7 Qualifier

71 Qualifiers to (1P1) Isolates

Table 9 gives a list of the qualifiers to the (1P1) isolates of the subjects of the questions. In each block of entry, the first

term (in all capitals) denotes the idea to which the idea denoted by each of the terms listed under it (indented and in capital and lower case letters) is deemed to be a qualifier. The frequency of incidence of each qualifier and of the idea it qualifies is given. The qualifying ideas include quasi-isolates also.

711 *Table 9. Incidence of Qualifiers to* (1P1) *Isolates*

SN	Qualifier	Incidence
1	AEROFOIL ..	6
	1 Flap ..	2
	2 Plan-form ..	1
	3 Two-dimension	1
	4 Wedge ..	1
2	AILERON ..	2
	1 After-body ..	1
	2 Transonic ..	1
3	AIR	46
	1 Atmosphere 1000	2
	2 Density ..	1
	3 Enthalpy ..	1
	4 Steady state ..	1
	5 Temperature ..	1
	6 Temp 10000° K	1
4	AIRCRAFT	46
	1 Flight (Motion)	5
	2 Ground effect	1
	3 Heated ..	1
	4 Model ..	3
	5 V/STOL ..	1
	6 Velocity ..	5
5	BEAM ..	1
	1 Inelastic ..	1
	2 Temperature ..	1
6	*BENDING ..	..
	1 Wall ..	1
7	BODY ..	32
	1 Blunt ..	2
	2 Conical ..	1
	3 With boat-tail	1
	4 Without boat-tail	1
	5 Jet ..	4
	6 Motion (Flight)	1
	7 Mounted ..	1
	8 Revolution ..	1
	9 Slender ..	2
	10 Symmetrical ..	1
	11 Wind tunnel ..	1
8	COLUMN ..	4
	1 Load ..	1
9	COMPRESSOR	4
	1 Axial ..	5
	2 Multistage ..	1
10	CONE ..	12
	1 After-body ..	1
	2 Blunt ..	3
	3 Cylinder ..	2
	4 Short ..	1
	5 Vortex angle 10°	3
	6 Vortex angle 50°	3
11	*CORE ..	..
	1 Corrugated ..	1
	2 Elastic ..	1
12	*CORNER ..	..
	1 Free ..	1
13	*CROSS-SECTION	..
	1 Non-circular ..	1
14	CYLINDER ..	12
	1 Circular ..	2
	2 Core ..	1
	3 Cross-section	1
	4 Loaded ..	2
	5 Membrane ..	2
	6 Pressurised ..	2
	7 Ring ..	1
	8 Sandwich ..	2
	9 Stiffened ..	2
	10 Uniform ..	2
	11 Yawed ..	1
15	*DAMPING ..	..
	1 Non-linear ..	1
16	*DISTRIBUTION ..	..
	1 Uniform ..	1

SN	Qualifier	Incidence
17	*EDGE	..
	1 Adjacent	2
	2 Clamped	2
	3 Free	2
18	*ENERGY	
	1 Excited	1
	2 High	1
	3 Internal	1
19	*EXCITEMENT	..
	1 Surface	1
20	*FACE	..
	1 Thin	1
21	*FLAP	..
	1 Split	1
22	*FLIGHT (MOTION)	..
	1 Free	2
23	FLUID	57
	1 Compressible	5
	2 Heated	1
	3 Incompressible	6
	4 Magnetic field	1
	5 Super-heated	1
	6 Viscous	2
24	FOREBODY	1
	1 Ogive	1
25	*FREEDOM	..
	1 Single-degree	1
26	GAS	10
	1 Energy mode	1
	2 Perfect	1
	3 Rarefied	2
	4 Reacting	1
27	*HEATED	..
	1 Suddenly	1
28	HOVERCRAFT	1
	1 Channel-flow	1
29	JET	2
	1 Base radius	1
	2 Jet radius	1
	3 Reynold number	1
30	*LEADING-EDGE	..
	1 Sharp	1
31	LOAD	..
	1 Compression	2
	2 Corner	1
	3 Distributed	1
	4 Edge	1
	5 Uniform	1
32	*MEMBRANE	
	1 Pure	1
33	*MODEL	..
	1 Aeroelastic	1
	2 Flight	2
34	*MOUNT	..
	1 Sting	1
35	PANEL	4
	1 Aerodynamic	1
	2 Elasticity	1
	3 Heated	1
	4 Restrained	2
	5 Square	2
36	*PLAN-FORM	..
	1 Square	1
37	PLATE	10
	1 Clamped	2
	2 Clamped-edge	2
	3 Free-edge	2
	4 Isotropic	1
	5 Loaded	2
	6 Orthotropic	1
	7 Rectangular	1
	8 Sector	1
	9 Square	2
	10 Stiffened	1
	11 Unstiffened	1
38	*RESTRAINT	..
	1 Elastic	1
39	*RING	..
	1 Part	1
40	*SANDWICH	..
	1 Faced	1
41	*SECTOR	..
	1 Load	1

SN	Qualifier	Incidence
42	SHELL ..	28
	1 Circular ..	5
	2 Conical ..	4
	3 Core ..	1
	4 Cylindrical ..	8
	5 Isotropic ..	1
	6 Loaded ..	1
	7 Long ..	1
	8 Non-linear ..	1
	9 Oval ..	2
	10 Pressurised ..	1
	11 Revolution ..	2
	12 Shallow ..	1
	13 Stiffened ..	1
	14 Torispherical ..	1
43	SLAB ..	1
	1 Composite ..	1
44	SPACECRAFT ..	7
	1 Lifting ..	1
	2 Re-entry ..	1
45	SPHERE ..	1
	1 Sandwich ..	1
46	*SQUARE ..	1
	1 Nearly ..	1
47	STABILISER ..	1
	1 Vertical ..	1
	2 X-15 ..	1
48	*STATE ..	-
	1 Steady ..	1
49	*STIFFNESS ..	-
	1 Bending ..	1
50	*STREAM ..	...
	1 Energy ..	1
	2 Slip ..	1
51	STRUCTURE ..	9
	1 Continuous ..	1
	2 Large ..	1
	3 Noise-environment ..	1
	4 Pressurised ..	1
	5 Sandwich ..	1
52	SYSTEM ..	1
	1 Damping ..	1
	2 Dynamic ..	1
	3 Freedom ..	1
53	*TEMPERATURE ..	..
	1 High ..	1
	2 Non-uniform ..	1
54	TUBE ..	1
	1 Round ..	1
55	VEHICLE ..	1
	1 Blunt ..	1
56	*VELOCITY ..	..
	1 High ..	5
57	*VERTEX-ANGLE ..	..
	1 Semi ..	1
58	VESSEL ..	1
	1 Cylindrical ..	1
	2 Pressure ..	1
59	WALL ..	1
	1 Heated ..	1
	2 Metal ..	1
60	*WEDGE ..	..
	1 Double ..	1
61	*WIND-TUNNEL ..	..
	1 Supersonic ..	1
62	WING ..	22
	1 Air ..	2
	2 Cambered ..	2
	3 Cruciform ..	3
	4 Curved ..	1
	5 Delta ..	1
	6 Finite ..	2
	7 Non-uniform	1
	8 Ogee ..	2
	9 Plan-form ..	1
	10 Ring ..	1
	11 Rolling ..	2
	12 Slender ..	3
	13 Slip-stream ..	1
	14 Swept ..	1
	15 Swept back ..	1
	16 Tapered ..	1
	17 Thin ..	1

712 *Annotation*

1 There were a total of 178 qualifiers in [1P1], together occurring 266 times.

2 The total number of ideas qualified was 80.

3 Among the 80 ideas qualified, 48 have occurred as Basic Isolate Ideas in [1P1] (*See* Table 6, in Sec 611).

4 The 32 ideas which have not occurred as Basic Isolate Idea in [1P1] but have qualifiers attached to them, are marked with an asterisk in Table 9. Each of these ideas have themselves occurred as qualifiers to a Basic Isolate Idea in [1P1].

5 A total of 16 Basic Isolate Ideas in [1P1] have not had any qualifiers. They are marked with an asterisk in Table 6 in Sec 611.

6 The Basic Isolate Idea "Shell" in [1P1] had the largest number (30) of qualifiers.

7 The Basic Isolate Idea "Wing" had the largest variety (17) of qualifiers.

8 The qualifier qualifying the largest number of ideas was "load". It occurred as qualifier to five different ideas in [1P1].

9 The qualifier occurring the largest number of times (11) in [1P1] was "Cylinder", although it qualified only three different ideas.

72 QUALIFIERS TO (1MP) ISOLATES

Table 10 gives a list of the qualifiers to the (1MP) isolates of the subjects of the questions. In each block of entry, the first term (in all capitals) denotes the idea to which the idea denoted by each of the terms listed under it (indented and in capital and lower case letters) is deemed to be a qualifier. The frequency of incidence of each qualifier and of the idea it qualifies is given. The qualifiers include quasi-isolates also.

721 *Table* 10. *Incidence of Qualifiers to* (1MP) *Isolates*

SN	Qualifier	Incidence	SN	Qualifier	Incidence
1	*ADAPTATION ..	..	*4	ALTITUDE ..	..
	1 Noise ..	1		1 High ..	1
2	*AEROFOIL ..	..	5	ANGLE ..	3
	1 Leading edge	1		1 Incidence ..	3
	2 Oscillating ..	3		2 Large ..	1
	3 Thin ..	3		3 Small ..	1
				4 Zero ..	1
*3	AIR-DRAG ..	..			
	1 Atmosphere ..	1	6	*APPROXIMATION ..	

SN	Qualifier	Incidence
	1 Newtonian ..	1
7	*ASPECT RATIO ..	..
	1 Finite ..	1
8	*ATMOSPHERE ..	..
	1 Scale-height variation ..	1
9	*BODY	..
	1 Aerodynamic	1
	2 Aspect ratio ..	1
	3 Bluff ..	1
	4 Conical ..	5
	5 Cylinder ..	1
	6 Jet ..	1
	7 Revolution ..	5
	8 Slender ..	3
10	BOUNDARY ..	1
	1 Buffet ..	1
11	BUCKLING ..	22
	1 Circumferential	2
	2 Compression ..	1
	3 Creep ..	3
	4 Elastic ..	2
	5 Load ..	1
	6 Non-linear ..	1
	7 Plastic ..	4
	8 Shear ..	2
	9 Thermal ..	2
12	BUCKLING-STRENGTH ..	4
	1 Compressive ..	1
	2 Pressure ..	2
13	BUZZ ..	1
	1 Aileron ..	1
14	CAPACITY ..	1
	1 Load ..	1
15	CASCADE ..	1
	1 Between blades	1
	2 Supersonic ..	1
16	*CHANNEL	..
	1 Slender ..	1
	2 Straight ..	1
17	COLLAPSE ..	1
	1 Creep ..	1
	2 Deformation ..	1
18	COMPRESSION	1
	1 Axial ..	1
19	*COMPRESSOR ..	..
	1 Axial ..	1
20	CONDUCTION	7
	1 One-dimensional	1
	2 Two-dimensional	1
21	*CONICAL	..
	1 Quasi ..	2
22	CREEP ..	1
	1 Force ..	1
23	*CURRENT	..
	1 Induced ..	1
24	*CYLINDER	..
	1 Non-circular ..	1
25	DAMPING ..	1
	1 Aerodynamic	1
26	DEFECT ..	2
	1 Structural ..	1
27	DEFLECTION ..	3
	1 Large ..	2
	2 Non-linear ..	2
	3 Pressure ..	1
28	DEFORMATION	2
	1 Elastic ..	1
	2 Fatigue ..	1
	3 Load ..	1
	4 Plastic ..	1
29	DISTRIBUTION	15
	1 Lift-surface ..	1
	2 Upward ..	1
30	DRAG ..	2
	1 Interference free	2
31	*EDGE ..	..
	1 Elastic ..	1
32	EQUATION ..	8

SN	Qualifier	Incidence
	1 Similarity ..	1
	2 Three-dimensional ..	1
33	EQUILIBRIUM	2
	1 Chemical ..	1
	2 Instantaneous	1
	3 Thermodynamic	1
34	*EXPANSION ..	1
	1 Series ..	1
35	EXPRESSION ..	1
	1 Mathematical	1
36	FATIGUE ..	5
	1 Load ..	1
	2 Thermal ..	4
37	FLIGHT ..	10
	1 Free ..	1
	2 Non-steady ..	2
	3 Re-entry ..	2
	4 Velocity ..	1
38	FLOW ..	96
	1 Aerofoil ..	6
	2 Angle ..	6
	3 Behind shock ..	1
	4 Body ..	14
	5 Channel ..	1
	6 Compressible	1
	7 Conical ..	1
	8 Continuum ..	1
	9 Convection ..	1
	10 Couette ..	1
	11 Cylinder ..	3
	12 Distribution ..	1
	13 Duct ..	1
	14 Forebody ..	1
	15 Free ..	2
	16 Functional ..	1
	17 Generator ..	1
	18 Without heating	1
	19 Inviscid ..	1
	20 Irrotational ..	2
	21 Laminar ..	4
	22 Nozzle ..	2
	23 Plate ..	7
	24 Potential ..	2
	25 Without pressure-gradient ..	3
	26 Reynolds Number ..	5
	27 Shear ..	3
	28 Shock tube ..	1
	29 Slip ..	1
	30 Stagnation ..	1
	31 Steady ..	2
	32 Transverse ..	2
	33 Tube ..	1
	34 Turbulent ..	4
	35 Two-dimensional	1
	36 Unsteady ..	1
	37 Velocity	23
	38 Viscous ..	4
	39 Wind tunnel ..	1
	40 Wing .	2
39	*FLUID ..	..
	1 Flowing ..	1
40	FLUTTER ..	15
	1 Freedom ..	1
41	FORCE ..	9
	1 Distributed ..	1
	2 Gust ..	1
	3 Infection ..	1
	4 Side ..	1
	5 Static ..	2
	6 Turbulence ..	2
	7 Wall ..	1
42	FOREBODY ..	..
	1 Ogive ..	1
43	*FREEDOM ..	..
	1 Single-degree	1
44	FRICTION ..	3
	1 Skin ..	1
45	*FUNCTIONAL FORM ..	..
	1 General ..	1
46	*GAS	..
	1 Ionized ..	2
47	*GUST ..	..
	1 Sinusoidal ..	2
48	HEAT ..	23

SN	Qualifier	Incidence
	1 Aerodynamic	5
	2 Current ..	1
	3 Drag-polar ..	1
	4 Surface ..	1
49	*INDUCTION	
	1 Shock ..	1
50	INTERFERENCE	5
	1 Aerodynamic	2
	2 Jet ..	1
	3 Second order	1
	4 Wing-body ..	1
51	*IONIZED	..
	1 Partially ..	2
52	KINETICS ..	2
	1 Chemical ..	2
53	LAYER ..	33
	1 Boundary ..	28
	2 Forward ..	1
	3 Heat transfer ..	4
	4 Induced ..	1
	5 Laminar ..	7
	6 Pressure-gradient	1
	7 Separated ..	1
	8 Shock ..	1
	9 Turbulent ..	1
	10 Viscous ..	1
	11 Wave ..	1
54	LAW ..	2
	1 Similarity ..	1
55	*LEADING EDGE	..
	1 Round ..	1
	2 Sharp ..	1
56	LIFT ..	7
	1 Gust ..	1
	2 Unsteady ..	1
57	LOAD ..	4
	1 Acoustic ..	1
	2 Aerodynamic	1
	3 Beyond-critical-value ..	1
	4 Buckling ..	1
	5 Edge ..	1
	6 Maximum ..	1
	7 Mechanical ..	1
58	LOSS ..	1
	1 Material ..	1
59	MACH NUMBER	1
	1 High ..	1
60	MOMENT RESPONSE ..	1
	1 Gust ..	1
61	MOTION ..	78
	1 Attitude ..	1
	2 Angle-of-attack	1
	3 Asymmetry ..	1
	4 Body ..	2
	5 Channel ..	2
	6 Fluid ..	15
	7 Free-stream ..	1
	8 Gas ..	2
	9 Helium ..	8
	10 Leading edge-bluntness ..	1
	11 Magnetic field	1
	12 Non-viscous ..	1
	13 Nose-region ..	1
	14 Pump ..	1
	15 Sphere ..	1
	16 Velocity ..	33
	17 Viscous ..	1
	18 Vorticity-absent	1
62	OSCILLATION	5
	1 Fluid ..	1
63	*PLATE ..	..
	1 Flat ..	7
64	PRESSURE ..	29
	1 Base ..	5
	2 Bending ..	1
	3 Circumferential	1
	4 Deformation ..	1
	5 External ..	3
	6 Hydrostatic ..	1
	7 Internal ..	2
	8 Non-uniform	1
	9 Static ..	2
	10 Surface ..	3
65	*PRESSURE-GRADIENT ..	..
	1 Arbitrary ..	1

SN	Qualifier	Incidence
66	PRINCIPLE ..	2
	1 Biot ..	1
67	PROFILE ..	1
	1 Stable ..	1
	2 Wave ..	1
68	PROPAGATION	1
	1 Gas ..	1
69	RATE ..	2
	1 Exponential ..	1
70	REACTION ..	2
	1 Gust ..	1
71	RE-ENTRY ..	6
	1 Atmosphere ..	1
	2 Velocity ..	2
72	RESTRAINT ..	1
	1 Elastic ..	1
73	*REYNOLDS NUMBER ..	..
	1 Low ..	6
74	SEPARATION ..	5
	1 Induced ..	1
	2 Laminar ..	4
75	SHAPE ..	8
	1 Deflection ..	1
76	SHOCK ..	1
	1 Induction ..	1
77	*SLIP ..	..
	1 Side ..	1
78	SOLUTION ..	21
	1 Analytical ..	2
	2 Approximate ..	2
	3 Blade-to-Blade plane ..	1
	4 Closed ..	2
	5 Inner ..	1
	6 Mathematical	2
	7 Outer ..	1
79	STABILITY ..	10
	1 Longitudinal ..	1
	2 Static ..	1
80	STAGNATION-POINT ..	1
	1 Velocity ..	1
81	Stalling ..	1
	1 Stage ..	1
82	STRESS ..	12
	1 Circumferential	1
	2 Discontinuity	2
	3 Pre-buckling ..	1
	4 Thermal ..	3
83	STRESS-STRAIN RELATION ..	1
	1 Plastic ..	1
84	STRUCTURE ..	1
	1 Adapted ..	1
	2 Simple ..	1
	3 Support ..	1
85	THEORY ..	11
	1 Incremental ..	1
	2 Linear ..	1
86	TIME ..	5
	1 Collapse ..	1
	2 Instability ..	1
87	TRANSFER ..	19
	1 Convective ..	1
	2 Forced ..	1
	3 Down-stream	1
	4 Zero ..	4
88	TRANSITION .	5
	1 Flow ..	1
	2 Turbulence ..	1
89	*TUBE ..	..
	1 Nitrogen ..	1
	2 Shock ..	1
90	*UNDER-EXPANDED ..	
	1 Highly ..	1
91	VALUE ..	5
	1 Asymptotic ..	1
	2 Boundary ..	2
	3 Three-point ..	2
92	VARIATION ..	4

SN	Qualifier	Incidence	SN	Qualifier	Incidence
	1 Axial ..	1		1 Shock-generated	1
	2 Reynolds Number	1			
	3 Temperature ..	1	96	WAKE ..	3
				1 Vortex ..	1
93	*VELOCITY ..	..			
	1 High ..	3	97	WAVE ..	6
	2 Hypersonic ..	22		1 Blast ..	1
	3 Mach number	2		2 Bow ..	2
	4 Mach number 5	5		3 Moving ..	2
	5 Mach number less than 15 ..	1		4 Pressure ..	1
				5 Shock ..	2
	6 Subsonic ..	4			
	7 Supersonic ..	4	*98	WING ..	..
	8 Transonic ..	12		1 Conical ..	1
				2 Delta ..	1
94	VORTEX-SHEET	2		3 Leading edge	1
	1 Leading edge	1		4 Motion ..	1
	2 Trailing edge	1		5 Slender ..	1
95	VORTICITY ..	2	Total incidence of qualifiers		577

722 *Annotation*

1 There were a total of 274 qualifiers in [1MP], together occurring 577 times.

2 The total number of ideas qualified was 98.

3 Among the 98 ideas qualified, 65 have occurred as Basic Isolate Ideas in [1MP] (*See* Table 7 in Sec 621).

4 The 33 ideas which have not occurred as Basic Isolate Idea in [1MP] but have qualifiers attached to them are marked with an asterisk in Table 10.

5 A total of 88 Basic Isolate Ideas in [1MP] have not had any qualifiers. These are marked with an asterisk in Table 7 in Sec 621.

6 The Basic Isolate Idea "Flow" in [1MP] had the largest number (117) and also the largest variety (40) of qualifiers.

7 The three (1MP) isolates "Flow", "Motion" and "Flight" denoting more or less the same idea, together had 63 qualifiers (out of the total of 274 qualifiers), altogether incident 198 times (out of the total incidence of 577 of all the qualifiers taken together).

73 COMPARISON OF [1P1] AND [1MP] ISOLATES

Table 11 gives summary data, derived from Tables 9 and 10, on the isolates in [1P1] and [1MP].

731 *Table* 11. *Consolidated data on* (1P1) *and* (1MP) *Isolates*

SN	Idea	In [1P1]		In [1MP]	
		N	% 80	N	% 185
1	Host Isolate ..	48	60·0	153	82·7
2	Other ideas with qualifier	32	40·0	32	17·3
3	Host Isolate with qualifier	30	37·5	65	35·1
4	Total number of ideas with qualifier ..	62	77·5	97	52·4
5	Host Isolate without qualifier ..	18	22·5	88	48·1
6	Total ideas (Host isolate + Other ideas with qualifier) ..	80	100·00	185	100·0

732 *Annotation*

1 The percentages of Host Isolate ideas with qualifiers in [1P1] and [1M-P] were nearly the same.

2 The percentage (22·5) of Host Isolate ideas without qualifiers occurring in [1P1] was much lower than the percentage (48·1) of such ideas occurring in [1MP].

3 The percentage (40·0) of ideas other than Host Isolate ideas occurring in [1P1] was comparatively much higher than the percentage (17·3) of such ideas occurring in [1MP].

4 The ratio of the average for "idea", "qualifier" and "frequency of qualifier" was:

1 In [1P1] 1:2·8:2·1

2 In [1MP] 1:2·8:1·5

74 QUALIFIERS IN LATER ROUNDS OF [P] AND [MP]

As has already been mentioned (*See* Sec 44, category 5) the number of isolate ideas occurring in the second and later Rounds of [P] and [MP] was small. The number of qualifiers to each of these isolates was also quite small. The following points are, however, worth mentioning:

1 Several of the isolates and qualifiers to them occurring in [1P1] have also occurred in [2P1]. Similarly, several of the isolates and qualifiers to them occurring in [1MP] have also occurred in [2MP].

2 In [2P] the isolate "Method" had a high incidence. The different "Methods" — 19 of them — were taken as qualifiers to it.

75 PHASE RELATION

All the Phase Relations occurring in the 76 subjects of the questions were treated as Inter-subject Phase Relation. The incidence of the different kinds of Phase Relation was as follows:

SN	Relation	N	% of 76
1	General relat on ..	9	11·8
2	Comparison relation ..	10	13·2
3	Differentiation relation ..	1	1·3
4	Application (Tool) relation ..	4	5·3
5	Influence relation ..	52	68·4
	Total ..	76	100·0

The "Influence relation" had the highest incidence in the subjects of the questions.

8 Further Work

81 ANALYSIS OF DOCUMENTS

The subject of documents (articles in periodicals and Technical Reports) reporting the research carried out to answer the questions used in the (ACRP) and facet analysed in this paper, can be facet-analysed. The patterns of the resulting facet structures can be examined in relation to the facet structure of the subjects of the search questions. Similarly, a comparative study of the pattern of incidence of facets and of Kernel Ideas in the subjects of the search questions and of the documents may be useful.

82 VERBAL PLANE

Studies on the Verbal Plane — the formulation and expression of the questions and of the titles of the documents — from the point of view of factors such as the

1 Extent of matching of the terms used in the questions and in the documents;
2 Occurrence of synonyms;
3 Occurrence of non-standard terms;
4 Morphological variations of words; and
5 Linguistic syntax in relation to the Absolute Syntax of Ideas (18), in the search questions and the documents, will be useful.

83 KERNEL IDEAS TO BE ACCOMMODATED

The following are some of the ideas that have occurred frequently in the subjects of the questions:

On	Around	At
Into	Between	Through
Outside	Against	Behind
Over	Towards	In Front
Along	Near	

Example:

1 Air-flow *around* a body.
2 Air-flow *over* a wing.
3 Gas transport *along* the sides of a tube.
4 Conditions just *outside* the laminar boundary layer.
5 Cascade *between* blades.

An idea of this kind may occur as an isolate in one subject-context and as qualifier in another subject-context.

Example:

1 Cleaning the inside of a tube.

Here "inside" is an isolate idea.

A question for consideration is: In relation to "tube", is "inside" an organ, in the same way as the "surface" of the tube is taken as an organ of the tube ? If it is taken as an organ, it can be deemed a manifestation of "Personality". If it is not an organ could it be deemed as a manifestation of the Fundamental Category Space ? Could it be a Level of Space ?

2 Gas flow inside a tube.

Here "inside" is not an isolate idea. "Inside-a-tube" may be taken as a qualifier to "Flow". The Quasi-Isolate such as "By positional relation" on the basis of which it may be derived may be correlated with "Space" (4).

Such questions arise with the other ideas listed above. For depth classification these ideas have to be accommodated in their appropriate places in the schedules.

91 **Bibliographical References**

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