

# Current Comments®

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## ISI's Master List of Title Words Provides a Special Perspective on Science and Scholarly Activity. Part 2. Comparative Etymology of Neologisms and Research Fronts

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Last week we explained how ISI®'s master dictionary helps us verify the source data entered into the *Science Citation Index*® (SCI®), *Social Sciences Citation Index*® (SSCI®), and *Arts & Humanities Citation Index*™ (A&HCI™) databases every year. We also discussed the different problems, such as those created by compound words, that we encounter when counting and listing these scholarly terms. This week we look at specific words that appeared in the Unique Word Dictionary (UWD) in 1981 and 1984; we also examine some terms that occur in selected 1984 ISI research fronts.

### Words and Citations as Indicators of Activity

By examining individual terms in the UWD, such as those listed in Table 1, we can see that current events—cultural, political, and scientific—usually affect the vocabulary we use. Clearly the use of many words decreased in 1984, as in any year, because they were discussed less often in scholarly journals. For example, the *medfly* was a major problem to California fruit growers in 1981.<sup>1</sup> That year *medfly* appeared in 13 titles. But after the infested areas were sprayed with *malathion*, the problem was brought under control;<sup>2</sup> in 1984 *medfly* appeared in only three titles. But *malathion* increased in 1984 titles compared with 1981, as researchers examined the effects of this insecticide on the environment.<sup>3,4</sup>

*Gasohol* decreased to just 4 titles in 1984; in 1981 it had appeared 33 times.

*Gasohol*, introduced to the public in 1977 as an alternative automotive fuel, is a blend of gasoline and ethyl alcohol. In 1980 it was in the news as legislators considered making ethyl alcohol (for use in *gasohol*) with the surplus created by the grain embargo to the Soviet Union.<sup>5</sup> In 1981 a controversy brewed over what effect the use of grain, specifically corn, for *gasohol* production would eventually have on food prices.<sup>6</sup> *Gasohol* never really caught on, however, and by 1984 it was hardly discussed in the literature.

The Iranian *hostage* situation, which began in 1979, dominated the news and prompted numerous research studies. These included psychological profiles of post-*hostage* behavior, long after the *hostages* were released in 1981, when *hostage* appeared in 55 titles. In 1984, however, the use of *hostage* decreased to just 11 occurrences in scholarly titles; in 1985 it appeared 15 times. But in 1986 we may reasonably expect that this number will rise in the wake of increased international *terrorism*. *Terrorist(s)* and *terrorism* appeared in 165 1984 titles, compared with 126 in 1981, 99 in 1982, 97 in 1983, and 128 in 1985.

Of course, there are temporary "trends" in the language of science just as there are in other areas. These may result from unexpected side effects of technology. For example, *toxic-shock syndrome* (TSS) was first used in 1978 by J. Todd and colleagues, Department of Pediatrics, Children's Hospital, Denver, Colorado, to describe "a new and severe, acute disease characterised by fever, ...hypotension, renal failure, and liver injury, and which has been associ-

**Table 1:** Selected terms from the Unique Word Dictionary (UWD) and the number of times they appeared in the titles of 1981 and 1984 source items indexed by ISI®. Where indicated, all word forms and spelling variants are included in the counts for each term. An asterisk (\*) indicates that the word appeared in a previous UWD study. (See references 9 and 10 in Part 1 of this essay.)

	1981	1984		1981	1984		1981	1984
AACR/2/II	63	5	*calmodulin	407	469	fractal/s	21	169
ABM/S	6	17	China	1036	1177	freedom	536	614
abortion	465	320	chiral	472	730	GaAs	732	1089
acetaminophen	131	138	cholesterol	1727	1271	GABA	508	476
acidification	146	191	cinema	344	397	gang/s	18	25
acquired	491	1065	*clone/s/ing/ed/al	1645	2258	gasohol	33	4
acyclovir	78	163	COBOL	43	14	*gene	2531	3808
Ada	86	133	*cocaine	93	132	Giacometti,	3	4
aerobic/s	283	316	coffee	200	219	Alberto		
*aerosol/s/ized	995	837	cognition	272	266	graffiti	6	16
AI	36	60	comet	44	111	grammar	254	358
AIDS	453	1116	competition	937	971	GUT	354	337
*algorithm/s/ic	2366	2464	computer/s	5165	7086	*hadron/s	179	186
allergen/s	233	183	conservative	309	355	Haiti/an	51	53
allergy/ies	570	515	crowd/ed/ing	113	116	Hall-effect	7	9
*alpha-fetoprotein	342	232	cytomegalovirus	399	974	Halley/s	24	50
Alzheimer/s	175	330	database	436	696	halogen/s	163	178
*amniocentesis	70	87	daycare	19	30	harmony	77	78
amorphous	1313	1719	defense	959	1318	*herpes	850	909
anorexia	267	316	deficit	228	291	Higgs	88	110
anthelmintic/s	137	82	depression	1401	1498	homeless	13	25
antibody	2392	2718	dexamethasone	297	431	hominid	49	49
antigen/s	4939	4882	digital-analog	4	6	*homosexual/s/ity	245	308
antitumor	621	673	dioxin	25	55	hostage	55	11
anxiety	564	628	disillusionment	15	3	HTLV	4	60
apartheid	27	40	dissonance	15	27	hydroponic	12	11
apheresis	3	59	diversification	82	112	immunoassay	620	678
arrhythmias	596	813	divestiture	3	7	immunodeficiency	209	713
asbestos	340	307	*DNA/deoxyribo-	5715	5585	individuality/	113	79
autoimmune	483	530	nucleic			ism/ist/istic		
ballistic	61	89	downloading	1	19	inflation/ary	537	421
BASIC	2312	1734	drought	133	158	informatics	60	92
Beckett, Samuel	23	84	duplex	91	116	information	4991	5143
benzodiazepine/s	421	613	ecstasy	10	27	inositol	43	81
beta-blocker	41	78	electrophoresis	778	570	interfacing	71	95
bioengineering	61	23	*endorphin/s	175	65	*interferon	1101	998
*biofeedback	242	168	enzyme	3373	2994	interleukin/	151	692
biotechnology	142	344	ergonomic/s	99	202	-1/-2/-3		
boom	72	120	Ewing/s	51	56	ion-beam/s	42	46
boson	109	164	*famine	54	43	irradiation	1803	1890
bulimia	15	95	fatigue	1020	1338	Kaluza-Klein	2	85
burnout	110	90	*fiber-optic/s	368	282	Kaposi/s	58	188
bypass	937	960	fluoridation	71	33	keratin/s	106	195
caffeine	253	340	FORTRAN	142	77	lasers	884	1106

ated with the presence of toxin-producing strains of phage-group I *Staphylococcus aureus*.<sup>7</sup> Their 1978 paper was published in the *Lancet* and is now a citation classic, having been cited over 300 times. By 1980 the majority of actual TSS cases had occurred in "previously healthy, young, white, menstruating women who were using tampons at the...onset of illness."<sup>8</sup> As suspected by Todd and colleagues, a toxin formed by the bacterium *Staphylococcus aureus* was confirmed as the cause of TSS by

1982.<sup>8</sup> Accordingly, while *toxic-shock* appeared in 53 titles in 1981, it was down to 14 in 1984, and 10 in 1985. But references to the Todd paper exceed these numbers.

Some topics and their related terminologies remain of interest over a long period of time. For example, three unrelated terms, *acetaminophen*, *hominid*, and *naturalism* remained at about the same levels in 1981 and 1984. In both 1981 and 1984 approximately 131 papers used the term *acetaminophen*, a crystal-

	1981	1984		1981	1984		1981	1984
*lemming/s	19	13	oncogene/s	28	394	*self-help	94	99
lemon	22	28	online	1009	1201	semiconductor	817	1094
*lepton/s	136	121	open-heart	41	48	semiotic/s	163	208
leukotriene/s	90	233	orange	185	224	*sexism	50	27
liberalism	101	127	Orwell, George	28	95	shuttle	160	348
light-scattering	59	44	Orwellian	1	8	signifier	4	8
lipoprotein/s	1677	1344	osteoporosis	144	206	silicon	2143	3030
love	488	515	ozone	464	380	software	1088	1917
lumpectomy	1	9	panda/s	9	24	solar	3282	2932
lupus	1099	1137	PASCAL	142	125	solar-wind	2	5
lymphoma	1025	1176	pasta	8	19	solidarity	55	71
machismo	3	5	patriarchy	26	35	somatization	10	16
mainframe/s	24	91	PCB	51	91	sonography	210	258
malaria	477	388	peptide	1135	1309	spin-glass/es	69	105
malathion	59	79	*pharmacokinetic/s	1705	1772	squatter/s	11	21
medfly	13	3	phenomenology/	356	332	steroid/s	1903	1559
Medline	3	7	ical			string/s	203	295
melanoma	901	1019	phorbol	178	253	structuralism	44	86
meson	95	115	phosphorylation	925	964	success/ful	1184	1566
metonymy	5	7	piracy	13	31	suicide	370	430
metric	312	217	plaque	535	382	*superconductor/	721	607
micelle	121	110	plasmapheresis	186	240	s/ing		
microwave	1147	1089	pluralism	96	118	supergravity	68	220
modern/s	31	106	PMS	5	18	supersymmetry	43	208
monoclonal	1491	3541	polyacrylamide	254	242	syndrome	6309	6463
*monopole/s	144	317	polymer/ization	4527	5029	*T-cell/s	2160	2791
Monte-Carlo	367	494	polymorphism	509	548	technocrat/s/ic	8	18
morality	190	230	postmodern/ism	17	34	telescreen	3	0
MPP	1	5	prayer	25	58	tenure	60	75
MPTP	0	32	*prolactin	1483	1017	*terrorist/s/ism	126	165
MTV	2	4	PROLOG	1	80	thin-film	145	169
multimedia	22	49	psychoneuro-	4	3	third-world	250	452
mutagenesis	351	309	immunology/ic			TOE	81	69
MX	35	24	QCD	216	282	tofu	4	11
myc	0	43	rain	373	522	tomography	2046	1825
myelitis	15	27	Reaganomics	16	25	toxic-shock	53	14
naphthol/s	11	9	realism	213	264	translocation	512	502
naturalism	46	46	*recombinant	221	439	transplant	461	545
*neonate/s	666	580	retinoid/s	293	206	trauma	1095	1073
networking	39	100	retrovirus/es	195	215	trimethoprim	86	70
neuroleptic/s	316	306	Reyes	72	68	ulcer/s	1103	1073
neurolinguistic/s	11	16	*RNA/ribonucleic	3528	2324	*ultrasound	1271	1202
*neuropeptide/s	136	280	robotic/s	63	388	VDT/s	14	42
neutrality	49	65	Salle, David	3	7	venectomy	0	3
neutrino/s	311	315	sarcoma	836	766	video	406	634
NMR	2490	2948	SATCOM/s	7	71	*Vietnam/ese	229	298
nociception/ive	72	112	schistosomiasis	173	168	VLSI	244	787
oligoglycosides	6	5	schizophrenia/ic	973	722	volcano/es/ic	332	426
olive/s	78	111	SDI	4	12	*winter	618	799

line compound (C<sub>8</sub>H<sub>9</sub>NO<sub>2</sub>) used in chemical synthesis and in medicine to relieve pain and fever.<sup>9</sup> (p. 51) *Hominid*, which refers to the family of primates that comprises recent humans and their immediate ancestors,<sup>9</sup> (p. 578) and *naturalism*, which has several different meanings, including (1) the theory denying the supernatural significance of an event or object and (2) *realism* in art or literature,<sup>9</sup> (p. 788) each occurred only about 50 times.

On the other hand, *neutrino(s)* were popular—over 300 titles contained the term in both years. A *neutrino* is a stable subatomic particle with no electrical charge and a mass approaching zero that carries away energy in the course of nuclear reactions.<sup>10</sup> Not affected by the strong and electromagnetic forces, *neutrinos* “are almost oblivious to matter and [can] pass right through it...”<sup>11</sup> (p. 83) Since 1956 physicists have had proof that *neutrinos* exist, but recently

**Table 2:** Ranked list by percentage for words that increased in the UWD at least 100 percent from 1981 to 1984. A = word. B = 1981 frequency. C = 1984 frequency. D = percent increase. E = actual increase.

A	B	C	D	E	A	B	C	D	E
PROLOG	1	80	7900	79	leukotriene/s	90	233	159	143
Kaluza-Klein	2	85	4150	83	networking	39	100	156	61
apheresis	3	59	1867	56	comet	44	111	152	67
downloading	1	19	1800	18	solar-wind	2	5	150	3
HTLV	4	60	1400	56	AIDS	453	1116	146	663
oncogene/s	28	394	1307	366	cytomegalovirus	399	974	144	575
SATCOM/s	7	71	914	64	biotechnology	142	344	142	202
lumpectomy	1	9	800	8	piracy	13	31	139	18
fractal/s	21	169	705	148	monoclonal	1491	3541	138	2050
Orwellian	1	8	700	7	pasta	8	19	138	11
bulimia	15	95	533	80	divestiture	3	7	133	4
robotic/s	63	388	516	325	Medline	3	7	133	4
MPP	1	5	400	4	Salle, David	3	7	133	4
supersymmetry	43	208	384	165	prayer	25	58	132	33
interleukin/-1/-2/-3	151	692	358	541	technocrat/s/ic	8	18	125	10
mainframe/s	24	91	279	67	multimedia	22	49	123	27
Beckett, Samuel	23	84	265	61	monopole/s	144	317	120	173
PMS	5	18	260	13	dioxin	25	55	120	30
modem/s	31	106	242	75	shuttle	160	348	118	188
immunodeficiency	209	713	241	504	acquired	491	1065	117	574
Orwell, George	28	95	239	67	acyclovir	78	163	109	85
Kaposi/s	58	188	224	130	Halley/s	24	50	108	26
supergravity	68	220	224	152	neuropeptide/s	136	280	106	144
VLSI	244	787	223	543	ergonomic/s	99	202	104	103
SDI	4	12	200	8	MTV	2	4	100	2
VDT/s	14	42	200	28	postmodern/ism	17	34	100	17
ABM/S	6	17	183	11	signifier	4	8	100	4
tofu	4	11	175	7	venetomy	0	3		3
ecstasy	10	27	170	17	MPTP	0	32		32
graffiti	6	16	167	10	<i>myc</i>	0	43		43
panda/s	9	24	167	15					

*neutrinos* have been in the news because the Nobel Prize was awarded to Carlo Rubbia and Simon van der Meer for the discovery of the W and Z particles that transmit the weak force. *Neutrinos* played an integral part in this discovery.<sup>12</sup>

### Ranking of Words

The occurrence of other words increased greatly in 1984 titles as compared with 1981. Table 2 lists in descending order by rank those whose occurrence in titles increased at least 100 percent. The life sciences are represented by *apheresis*, "the use of a procedure to separate components of the blood followed by removal of one or more of these components," often for therapeutic reasons,<sup>13</sup> which increased 18-fold, and *HTLV* (human *T-cell* leukemia virus), which went up 1,400 percent. *Oncogene(s)*, genes that cause the malig-

nant transformation of cells,<sup>14</sup> increased 1,300 percent; *lumpectomy*, the removal of a breast tumor and only a limited amount of associated tissue,<sup>9</sup> (p. 709) 800 percent; and *interleukin (-1, -2, -3)*, a protein produced by the body in minute quantities and used to stimulate the body's disease-fighting immune system, particularly against cancer,<sup>15</sup> 350 percent.

Other subject-specific words whose usage increased are in the earth and space sciences. For example, *comet* and *Halley(s)* both increased as the world prepared for the 1985-1986 appearance of this periodic comet. *Shuttle*, which doubled in 1984 compared with 1981, may or may not increase in the wake of the recent US disaster. *Dioxin*, a toxic chemical that will be discussed in an upcoming *Current Contents® (CC®)* essay on hazardous waste, and *solar-wind*, the continuous ejection of plasma from the sun's surface into and through interplan-

etary space,<sup>9</sup> (p. 1121) also both doubled.

Several *computer* terms also increased over 100 percent, including *mainframe(s)* and *modem(s)*. *PROLOG*, a relatively new *computer* programming language, increased 7,900 percent, while *Ada* grew 55 percent. *PASCAL*, on the other hand, decreased in 1984 as did *BASIC*, *COBOL*, and *FORTRAN*. (See Table 1.) *Robotic(s)*, technology concerned with the design, construction, and operation of robots in automation,<sup>9</sup> (p. 1019) and *downloading* are among the top 15 words in Table 2.

*Networking*, combining computing and communications,<sup>16</sup> increased 156 percent. A recent issue of *Science*, partially devoted to the use of *computers* in the scientific research community, included a discussion of the recently developed *networking* program of the National Science Foundation (NSF). NSFnet is "expected to be a general-purpose computer communications network for the whole academic research community and associated industrial researchers." By September 1986 over 60 major research universities should be networked on NSFnet.<sup>16</sup>

The use of *SDI* also went up. *SDI* until recently was an unambiguous acronym for selective dissemination of *information*. Now it also means strategic *defense* initiative, a US military plan to develop *defenses* effective against *ballistic* missiles.<sup>17</sup> *Ballistic*, *defense*, and *SATCOM(s)* (a type of communications satellite launched in 1975, 1976, and 1981) all increased in 1984. *SATCOM* also stands for scientific and technical communication but is rarely used these days. Literature on *MX*, a type of missile, decreased in 1984. Other technological terms that increased were *lasers*, *semiconductor*, *sonography*, and *video*.

Human behavior is well represented in our sample of terms. *Schizophrenia(ic)* decreased in 1984, but *depression*, *anxiety*, and *suicide* increased. *Self-help* stimulated about the same number of papers in 1981 and 1984—about 95. *Cognition* also remained stable at about 270.

Not much is written directly about *metonymy*, a figure of speech in which the name of one thing is used for something else with which it is associated, as, for example, "lands belonging to the crown."<sup>9</sup> (p. 748) But *semiotic(s)*, which deals with the theory of signs and symbols and their function in artificial and natural languages,<sup>9</sup> (p. 1070) was quite popular in 1984. *Semiotic(s)* papers grew to 208 occurrences in 1984, compared with 163 in 1981.

It might interest arts and humanities scholars to learn that *Samuel Beckett* was the subject of about 23 papers or reviews in 1981 and over 80 in 1984. *Beckett* won the Nobel Prize for literature in 1969, prompting the publication of several biographies about him. And 1984 marked the 30-year anniversary of the publication in English of *Beckett's Waiting for Godot*.

### Research Fronts

ISI's research fronts provide a more comprehensive measure of the literature represented by a particular topic. Core papers in these fronts are linked by content through the co-citations of researchers, rather than just by title words. In this way, then, a paper that uses a synonym for a particular term will still be grouped with the papers that use the specific term, enabling researchers to identify a much broader sample of papers on a particular topic. As long as they cite one core paper, current articles will be retrieved regardless of the title words chosen.

For this study we examined 1984 *SCI/SSCI* research fronts that had a large percentage of recent papers (1982-1984) in their core. Remember that 1984 research fronts consist of core articles from any year and the 1984 papers that cite them. In many cases these core papers are not recent. The 25 fronts listed in Table 3 have the greatest "immediacy" for 1984 because they contain so many current core papers.

Not surprisingly, 3 of the 25 research fronts are associated with *acquired im-*

**Table 3:** The top 25 1984 research fronts ranked by immediacy. A = research-front number. B = core/citing documents. C = number of core documents published in 1982-1984. D = percent that 1982-1984 core documents are of all core documents in that research front. E = research-front title.

A	B	C	D	E
84-0712	57/597	33	58	Unified theories of supergravity and supersymmetry
84-0752	37/594	33	89	Clinical aspects of acquired immunodeficiency syndrome and Kaposi's sarcoma
84-0555	42/389	32	76	Use of contrast agents in nuclear magnetic resonance (NMR) imaging for the evaluation of multiple sclerosis and other disorders
84-0319	58/1119	31	53	Phosphorylation and calcium binding of phorbol and inositol: stimulation of protein kinase release
84-1032	54/593	30	56	Relationship of DNA restriction site polymorphism on x-chromosome and other gene sites to beta-thalassemia, muscular dystrophy, and other genetic diseases
84-1914	41/608	29	71	Association of human T-cell leukemia virus (HTLV) and other retroviruses with leukemia lymphoma, acquired immunodeficiency syndrome, and related immune disorders
84-0171	47/1206	26	55	Clinical aspects and characterization of human T-cell subsets
84-4046	28/465	26	93	Characterization of human and murine cellular oncogenes
84-0548	41/451	24	59	Application of fractal models to percolation clusters and related problems
84-1752	52/541	24	46	Lattice gauge theories, Monte Carlo methods, chiral symmetry, renormalization groups, and finite temperature QCD
84-1681	42/397	23	55	Acyclovir and other antiviral agents in the treatment of herpes simplex and other virus infections
84-0770	59/700	22	37	Dexamethasone suppression test and other clinical tests of neuroendocrine function in the study of depression, anorexia nervosa, bulimia, and other psychiatric disorders
84-1033	41/932	21	51	Role of polypeptide growth factors and protein kinases in normal and transformed epidermal cells
84-3110	58/670	21	36	Pharmacological studies of benzodiazepine receptors and GABA binding sites in rat brain
84-2014	57/1152	20	35	Receptor mediated endocytosis and intracellular processing of transferrin and other substances in cultured cells
84-0021	41/386	20	49	Eleven-dimensional Kaluza-Klein supergravity
84-0099	49/503	19	39	Theory of the quantized Hall effect in two-dimensional localized potentials
84-1737	38/878	19	50	Factors regulating gene transcription and expression in human and animal cells
84-0989	25/157	19	76	Gonadotropin levels and other biological aspects of human <i>in vitro</i> fertilization and embryo transfer programs
84-3623	42/336	19	45	Immunology and molecular biology of <i>Plasmodium falciparum</i> and other malarial parasite infections
84-2161	46/312	18	39	Efficacy and serological aspects of hepatitis-B vaccine in the prevention of hepatitis virus infection
84-0156	31/211	18	58	Structure, optical properties, and other characteristics of GaAs and other quantum-well heterostructures prepared by molecular beam epitaxy or metalorganic chemical vapor deposition
84-0578	31/132	18	58	Percutaneous nephrostomy and other techniques for the removal of renal and ureteral calculi
84-0265	58/771	18	31	Chiral anomalies, magnetic monopoles, and bag model in QCD
84-0103	48/266	17	35	Degenerate 4-wave mixing and quantum squeezing in lithium-niobate and other photorefractive crystals for optical devices

*immunodeficiency syndrome*, abbreviated as *AIDS*. This disease was first identified in mid-1981;<sup>18,19</sup> that year the acronym appeared in the titles of 453 *SCI* articles. By 1984 *AIDS* had more than doubled to over 1,100 occurrences in titles; in 1985 it appeared 1,267 times. These are in addition to titles that used the full term—*acquired immunodeficiency syndrome*—and related terms, such as

*Kaposi('s) sarcoma*, *retrovirus(es)*, and *T-cell(s)*. Some of these terms frequently co-occur in article titles with *monoclonal*, *antibody*, and *leukotriene(s)*.

One of the two research fronts in Table 3 having the highest immediacy is "Clinical aspects of *acquired immunodeficiency syndrome* and *Kaposi's sarcoma*" (#84-0752). It contains 37 core papers, 33 of which were published be-

tween 1982 and 1984. Interestingly, each component word of *Kaposi(s) sarcoma* had very different individual growth rates. *Kaposi(s)* increased from 58 occurrences in 1981, 144 in 1982, and 132 in 1983, to 188 in 1984. But *sarcoma*, a more general term, decreased from 836 in 1981 and 1982, and 762 in 1983, compared with 766 in 1984. This does not necessarily mean that the overall literature on *sarcoma* decreased but rather that it was described by other terms. The 594 papers published in 1984 that are collected under the rubric of research front #84-0752 outnumber those that would be found by word search alone. This is true for most any research front. Incidentally, the figures for *Kaposi(s)* dropped to 137 in 1985, while *sarcoma* went up to 796.

Immediacy is one way of describing fast-moving fields. Not surprisingly, "Unified theories of *supergravity* and *supersymmetry*" (#84-0712) is one of the two most active fields for 1984. *Supergravity* "provides the only conceivable theoretical framework that allows for a possible unification of gravitation with the other fundamental forces of particle physics, that is, the electroweak and the strong interactions,"<sup>20</sup> while *supersymmetry* centers on the concept of spin as it is understood in particle physics<sup>11</sup> (p. 143-4). *Supersymmetry* unites all known forces in nature by a common highest symmetry.<sup>21</sup> Separately these words increased dramatically in 1984 titles compared with those from 1981. *Supergravity* also occurs with the eponym *Kaluza-Klein* in research front "Eleven-dimensional *Kaluza-Klein supergravity*" (#84-0021). *Kaluza-Klein* refers to Theodor *Kaluza* and Oskar *Klein's* now updated unified theory of electromagnetic and gravitational forces that describes an eleven-dimensional universe.<sup>11</sup> (p. 159-61) The term *Kaluza-Klein* was used in only 2 titles in 1981, 11 in 1982, and 37 in 1983, but in 1984 it appeared 85 times, and in 1985, 96 times. The corresponding 1984 research front listed above, incidentally, consists of 41 core papers cited by 386 1984 articles. Apparently, over 300 of these citing pa-

pers do not include *Kaluza-Klein* in their titles.

It is interesting that the subjects of the research fronts in Table 3 are from diverse areas of the life, physical, and social sciences. Oftentimes, as our recent 10-part analysis of most-cited *SCI* papers from 1961-1982<sup>22</sup> demonstrated, the life sciences dominate studies of the *SCI* database. Of course if we were to examine the 1984 *SCI/SSCI* research fronts ranked by size, that is by the number of citing documents they contain, rather than by immediacy, the five largest fronts would all be in the life sciences. These fronts discuss *monoclonal-antibody* research, messenger *RNA* and *DNA* structure and *gene* expression, *enzyme* characteristics, and *T-cell(s)*. The research front on *T-cell(s)* (#84-0171) also appears in Table 3.

### Conclusion

A look at the words used in a particular year or years can provide a historical perspective of the peaks, valleys, and plateaus of various subjects covered by the academic and scientific print media. If a term is carefully chosen, the UWD can be used to watch trends; however, in many cases terminology changes drastically, requiring more reliable methods of measurement. But it is interesting that several of the words listed in Tables 1 and 2 in this study also appeared in the titles of 1981 articles that were most cited in 1981 and 1982.<sup>23,24</sup> For example, *toxic-shock* was used in three of the titles of the 100 most-cited 1981 life-sciences papers. These 3 papers were cited by 26 papers in 1981. Of these, 23 titles included the term *toxic-shock*.

Later this year we will be able to observe whether the titles of the most-cited 1984 papers contain any of the highly ranked 1984 terms listed here. These studies for the life and physical sciences will be published in *CC* later in 1986.

Incidentally, in Part 1 of this essay we contrasted words from *George Orwell's*

novel 1984<sup>25</sup> with terms that increased in our databases that year. Not surprisingly, *Orwell's* futuristic theme was discussed by numerous 1984 articles; *Orwell*, *George* and *Orwellian* both increased in 1984 titles as compared with 1981. Of course, only a careful analysis of the literature could tell us whether these increases were welcome develop-

ments. There are those who feel that *Orwell's* predictions of newpeak have indeed been realized here and abroad.

\* \* \* \* \*

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