

PRIME MINISTER

Prime Minister

For information at this stage. We can expect a request later for you to be associated with a specific "WISE" event.

WOMEN INTO SCIENCE AND ENGINEERING YEAR - WISE '84

Done
15/12

David Young has recently pointed out that future skill shortages may be the factor which limits technological change and economic recovery in the later years of this decade.

2. The principal under-utilised skill resource in this country is women. A paltry 2 per cent of the scientific and technological workforce are women and even today women account for only 21 per cent of people taking first degrees in science and technology (of whom only one-third are in engineering).

3. It is against this background that Women into Science and Engineering, 1984 (WISE '84) has been formed as a joint initiative of the Equal Opportunities Commission and the Engineering Council. These organisations believe that science-based and engineering industry can no longer afford to neglect the talent and ability that women have to offer. Already there are skill shortages in electronics and a more general concern among employers over the quality of skilled workers available. The situation will worsen as the economic recovery strengthens.

4. The Equal Opportunities Commission attributes the under-representation of women in science and engineering to:

- i. a differentiated school curriculum where science is often regarded as a boys' subject
- ii. careers advisers not encouraging girls to pursue technical and scientific activity
- iii. attitudes of trainers and employers.

5. The WISE 1984 programme is to be launched on 17 January at the London Press Centre, when there will be presentations by Baroness Platt, Chairman of the Equal Opportunities Commission and Sir Kenneth Corfield, Chairman of the Engineering Council. The campaign will be aimed at teachers, pupils, parents and engineering employers, and will provide posters, leaflets and publicity in teachers' journals, teenage and adult magazines.

6. The programme will include school-industry link schemes, residential courses or conferences for schoolgirls at universities and polytechnics, lectures and seminars in schools, universities and professional institutions, and an 'engineering bus' to visit all local education authorities in 1984, to give advice to girls on engineering.

7. I believe that WISE '84 is a worthwhile initiative deserving encouragement. It is sponsored by reputable organisations, the programme is well planned and the objective accords with the Government's overall industrial strategy. I hope you will feel able to give some personal encouragement to WISE during 1984 and I would be happy to advise on specific requests which you receive.

ABN

ROBIN B NICHOLSON
Chief Scientific Adviser

Cabinet Office
12 December 1983

W.0839

12 December 1983

MR TURNBULL

WOMEN INTO SCIENCE AND ENGINEERING YEAR - WISE '84

- Attached is a briefing for the Prime Minister on Women into Science and Engineering Year - WISE '84. I leave it to you to decide whether it is best given to her now or at such time that she receives an invitation to speak at a major WISE event - I understand that such an invitation may arrive in the next few weeks.

RBN

ROBIN B NICHOLSON

GR

Have we any pps about WISE?

Not yet

attached

Dmb

14/12



Equal Opportunities Commission

WISE 1984 -

Women into Science and Engineering

WOMEN INTO SCIENCE AND ENGINEERING - WISE 1984

Women into Science and Engineering (WISE) is the title of an initiative by the EOC and the Engineering Council (EC) whereby, during 1984, a number of projects will be co-ordinated into an overall programme which will draw attention to career opportunities for girls and women in the engineering industry.

Of course many women are already employed by engineering firms but 94% of all women in engineering work as operators, as clerical staff and in unskilled grades. Only a very small number are employed as scientists and technologists, technicians or in craft occupations.

Female occupational percentages, April 1980

Occupational category	Female employees	Total employees	Females as a percentage of all employees
(1)	(2)	(3)	(4)
1. Managers	4 376	139 207	3.14
2. Scientists and technologists	1 790	67 767	2.64
3. Technicians	5 045	217 634	2.32
4a. Administrative and professional staff	21 072	157 249	13.40
4b. Clerks, office machine operators, secretaries and typists	226 576	316 006	71.70
5. Supervisors	10 008	142 693	7.01
6. Craftsmen	1 907	515 429	0.37
7. Operators	293 629	996 976	29.45
8. Other employees	45 563	296 878	16.14
Total	607 966	2 822 839	21.54

Source: EITB Statutory returns.

The EOC and the EC take the view that the engineering industry can no longer afford to neglect the talent and ability which women have to offer and this view is shared by an encouragingly large number of organisations and individuals.

The aims of the EOC and the EC are complementary: the EOC seeks to promote equality of opportunity (one of its statutory duties) and the EC is seeking to promote the opportunities offered by engineering. Both organisations, from slightly different standpoints, are concerned about the waste of women's potential contribution to an area of national importance.

It is the Commission's firm belief that the under-representation of girls and women in engineering is largely due to:

- i) a differentiated school curriculum where science is often regarded as a boys' subject (see Annex 1 for examination results)
- ii) the disinclination of those giving careers advice to encourage girls to pursue technical and scientific activity, especially in industry
- iii) the assumption, on the part of too many trainers and employers that, in the engineering context, they will be dealing with boys (which leads to male-orientated courses and course information, and has the effect of discouraging even those girls who are qualified from using their qualifications in the engineering field).

The Commission also believes that unless positive steps are taken by all parties - educators, trainers and employers - we shall continue to perpetuate an irrational situation whereby girls and women with the potential to work in skilled engineering jobs are discouraged from doing so whilst engineering employers are short of qualified technicians, and of graduate engineers particularly in the electronic and electrical fields.

Many schools/colleges/LEAs/employers/professional institutes etc. are already undertaking initiatives which aim to encourage girls to take up science and technical subjects and it is hoped to encourage them to join in WISE next year. Organisations may wish to undertake a specific project for WISE and whilst the EOC and the EC cannot fund projects, they will hope to help in other ways. It may be possible to incorporate a planned, even a routine project, into the scheme. For example, school brochures/information to parents/prospectuses/information to students which are going to be revised could be considered carefully in relation to the images and messages they put across to girls and women in relation to science and technology. Organisations responsible for an annual lecture or a conference, may be able to use the WISE theme and a speaker associated with WISE for its 1984 event. Other projects under consideration by various groups include:

- teaching materials for schools
- posters for schools
- a drawing book for young children
- an 'engineering bus' to visit all local education authorities in 1984, with careers materials, videos, competitions, prizes etc.
- school-industry link schemes
- engineering 'events' in school, supermarkets, shopping precincts etc.
- national competitions for girls' engineering projects
- role-model booklets.

In promoting the importance of a scientific and technical education for girls it is important to stress that it is not intended to belittle the value of an arts education. There are, and always will be, young people who will choose to study the arts with purpose and enthusiasm, but statistics, observation and research indicate that many girls drift into the arts because they are regarded as "girls' subjects" and it is this drift which it is planned to affect. A balanced school curriculum is the aim, with equal opportunities for girls and boys to study arts and sciences and to leave school qualified to live and work in an increasingly technological society and also to enjoy a creative use of their leisure time.

The EOC's main contribution to WISE will be a major publicity campaign in teachers' journals and teenage and adult magazines. The campaign will be aimed at teachers, pupils and parents, and will provide posters, leaflets, booklets and a range of information for teachers and pupils. It is envisaged that the full WISE 1984 programme will be launched at a national conference in January.

WISE is one way of drawing attention to an important imbalance of opportunity, education and employment and the Equal Opportunities Commission and the Engineering Council hope it will have the support of, and a practical in-put from a wide range of organisations.

CSE (all models) England: numbers awarded grade 1Summer 1980

<u>Main subject groups and selected subjects</u>	<u>Total number awarded grade 1</u>	<u>% Boys</u>	<u>Girls</u>
1. Modern languages	29,840	29.4%	70.6%
of which: french	23,613	29.6	70.4
german	4,983	29.1	70.9
2. Other arts	153,311	38.9	61.1
of which: english	85,685	37.6	62.4
history	21,325	44.1	55.9
art and craft	31,090	43.6	56.4
3. Mathematics (incl arithmetic)	67,614	52.4	47.6
4. Other science and technical subjects	106,606	71.1	28.9
of which: physics	20,164	82.7	17.3
chemistry	16,252	62.6	37.4
biology	23,869	33.3	66.7
technical drawing	15,397	96.6	3.4
woodwork	7,580	98.3	1.7
metalwork	6,734	98.8	1.2
5. Social science and vocational subjects	80,615	31.9	68.1
of which: social studies	10,803	31.6	68.4
geography	25,866	60.6	39.4
needlework	6,095	0.3	99.7
other domestic subjects	15,693	3.1	96.9
commerce	6,615	28.4	71.6
business & office practice	5,329	3.2	96.8
TOTAL	437,986	46.9	53.1

Source: Table C25, Statistics of School Leavers, CSE and GCE, England 1980 (DES).

NB/ Includes students sitting exams held in connection with joint CSE/GCE 16+ feasibility and development studies.

CSE 'O' level England: numbers awarded grade A-C

Summer exam 1980

Main subject groups and selected subjects	Total number awarded grades A-C	% Boys	Girls
1. Modern languages	146,985	39.8%	60.2%
of which: french	99,285	40.5	59.5
german	30,910	38.0	62.0
2. Other arts	659,317	41.2	58.8
of which: english language	268,492	42.6	57.4
english literature	151,480	37.1	62.9
history	76,376	46.7	53.3
art	74,056	41.0	59.0
3. Mathematics (all subjects)	227,660	60.9	39.1
of which: computer studies	9,221	73.5	26.5
4. Other science and technical subjects	396,233	64.5	35.5
of which: physics	102,171	74.5	25.5
chemistry	82,570	65.9	34.1
biology	125,159	40.0	60.0
technical drawing	28,844	96.9	3.1
design & technology	5,352	96.7	3.3
woodwork	8,889	98.9	1.1
metalwork	7,633	99.5	0.5
5. Social science and vocational subjects	294,615	42.2	57.8
of which: economics	22,274	61.2	38.8
geography	110,028	57.3	42.7
cookery	31,893	2.0	98.0
needlework	11,442	0.1	99.9
commercial subjects	16,019	36.4	63.6
general paper	24,260	53.6	46.4
principles of accounts	9,730	36.7	63.3
TOTAL	1,724,810	49.2	50.8

Source: Table C28, Statistics of School Leavers, CSE and GCE, England 1980.
(A pack of tables published by DES replacing Statistics of Education Vol 2).

NB/ Includes students sitting exams held in connection with joint CSE/GCE 16+ feasibility and development studies.

GCE 'A' level England: passes

Summer 1980

<u>Main subject groups and selected subjects</u>	<u>Total number of passes</u>	<u>% Boys</u>	<u>Girls</u>
1. Modern languages	28,148	30.4%	69.6%
of which: french	17,724	28.8	71.2
german	6,547	32.5	67.5
2. Other arts	98,204	37.6	62.4
of which: english	44,237	30.7	69.3
history	24,941	48.6	51.4
art	16,684	38.1	61.9
3. Mathematics (all subjects)	57,390	74.2	25.8
of which: computer science	1,915	80.2	19.8
4. Other science and technical subjects	101,599	66.9	33.1
of which: physics	35,634	80.8	19.2
chemistry	30,797	67.3	32.7
biology	27,251	44.2	55.8
technical drawing	1,945	97.8	2.2
5. Social science and vocational subjects	98,799	56.1	43.9
of which: economics	25,478	69.6	30.4
geography	22,610	58.2	41.8
domestic subjects	3,425	0.4	99.6
general studies	23,140	59.2	40.8
principles of accounts	3,947	59.3	40.7
 TOTAL	 384,140	 55.0	 45.0

Source: Table C29, Statistics of School Leavers, CSE and GCE, England 1980 (DES).

Full-time undergraduates (UK domiciled) GB universities 1980-81

		Total number of under- graduates	% Men	Women
1.	Education	3,317	31.1%	68.9%
2.	Medicine, dentistry & health	26,470	57.9	42.1
3.	Engineering & technology	29,916	93.2	6.8
4.	Agriculture, forestry & veterinary science	4,966	63.6	36.4
5.	Biological & physical sciences	53,947	68.3	31.7
	of which: biology	5,433	53.6	64.4
	mathematics*	11,879	72.7	27.3
	physics	6,938	86.6	13.4
	chemistry	7,261	76.1	23.9
6.	Administrative, business & social studies	55,780	58.3	41.7
	of which: business management studies	3,562	71.1	28.9
	economics	5,837	76.3	23.7
	geography	6,005	55.2	44.8
	law	9,991	59.5	40.5
	psychology	4,095	33.3	66.7
	sociology	4,293	35.8	64.2
7.	Architecture & other professional & vocational studies	3,839	67.1	32.9
	of which: architecture	1,965	79.9	20.1
	home, hotel & institutional management	691	28.8	71.2
8.	Language, literature and area studies	31,609	32.1	67.9
	of which: English	8,999	34.3	65.7
9.	Arts, other than languages	11,907	45.9	54.1
	of which: history	7,688	51.5	48.5
	art & design	1,718	33.8	66.2
ALL SUBJECTS		231,751	60.2	39.8

Source: Table 4, University Statistics 1980 Volume 1

* includes "mathematics with physics"

STUDENTS

	Total under-graduates	Fee-paying status		UK domicile		Over-seas domicile	Total undergraduates in			Per-centage change since 1979-80
		Home fees	Other fees	Men	Women		1970-71	1975-76	1979-80	
6. Administrative, business and social studies										
Business management studies	4005	3635	370	2531	1031	443	—	2759	3654	9.6
Economics	6417	5972	445	4452	1385	580	—	5451	6284	2.1
Geography	6069	6045	24	3315	2690	64	—	5500	6124	-0.9
Accountancy	2762	2439	323	1821	569	372	—	1288	2421	14.1
Government and public administration	2655	2576	79	1753	789	113	—	1745	2495	6.4
Law	10615	10115	500	5944	4047	624	—	9412	10331	2.7
Psychology	4233	4146	87	1363	2735	135	—	3745	4078	3.8
Sociology	4452	4313	139	1537	2756	159	—	3970	4355	2.2
Social anthropology	461	445	16	122	316	23	—	417	471	-2.1
Combinations within group 6	11276	10248	1028	6224	3757	1295	—	9728	11187	0.8
Combinations of group 6 with groups 7-9	6940	6741	199	3481	3162	297	—	5852	6970	-0.4
Total administrative, business and social studies	59885	56675	3210	32543	23237	4105	38624	49867	58370	2.6
7. Architecture and other professional and vocational subjects										
Architecture	2259	2016	243	1571	394	294	—	2531	2223	1.6
Town and country planning	1025	987	38	765	218	42	—	574	946	8.4
Home, hotel and institutional management	734	698	36	199	492	43	—	407	689	6.5
Other professional and vocational subjects	220	202	18	42	158	20	—	215	213	3.3
Total architecture and other professional and vocational subjects	4238	3903	335	2577	1262	399	2859	3727	4071	4.1
8. Language, literature and area studies										
English	9323	9172	151	3091	5908	324	—	8151	9122	2.2
Welsh and other Celtic languages and studies	217	216	1	74	142	1	—	207	204	6.4
French language and studies	4470	4412	58	889	3485	96	—	3776	4213	6.1
French/German languages and studies	2060	2038	22	613	1413	34	—	1693	1913	7.7
German language and studies	1868	1857	11	550	1278	40	—	1741	1777	5.1
Hispanic languages and studies	787	764	23	233	524	30	—	680	799	-1.5
Other and combined Western European languages and studies	2899	2817	82	622	2145	132	—	2070	2767	4.8
Russian language and studies	410	399	11	162	231	17	—	520	432	-5.1
Other Slavonic and Eastern European languages and studies	65	60	5	23	36	6	—	49	64	1.6
Chinese language and studies	134	125	9	58	66	10	—	124	104	28.8
Oriental, Asian and African languages and/or studies	441	394	47	173	209	59	—	377	437	0.9
Classical studies	1915	1881	34	989	868	58	—	1516	1882	1.8
Other, general and combined language, literature and area studies	2938	2883	55	960	1858	120	—	2170	2907	1.1
Combinations of group 8 with group 9	5206	5103	103	1704	3305	197	—	4378	5260	-1.0
Total language, literature and area studies	32733	32121	612	10141	21468	1124	23530	27452	31881	2.7
9. Arts, other than languages										
History	7862	7756	106	3960	3728	174	—	6626	7730	1.7
Archaeology	1002	954	48	430	521	51	—	673	1012	-1.0
Philosophy	1336	1314	22	930	367	39	—	1137	1304	2.5
Theology	2085	2018	67	1108	890	87	—	1979	2135	-2.3
Art and design	1786	1746	40	581	1137	68	—	1349	1698	5.2
Drama	459	448	11	187	261	11	—	182	364	26.1
Music	1752	1734	18	794	931	27	—	1553	1765	-0.7
Arts general, and combined other arts subjects	6711	6370	341	2058	4024	629	—	7632	6898	-2.7
Total arts, other than languages	22993	22340	653	10048	11859	1086	19013	21131	22906	0.4
All subjects	251154	235841	15313	139567	92184	19403	185872	211468	245093	2.5

Source: University of York

STUDENTS

TABLE 4

**FULL-TIME UNDERGRADUATES
ANALYSED BY SUBJECT OF
STUDY, FEE-PAYING STATUS
AND SEX, 1970-81
(GREAT BRITAIN)**

	Total under- graduates	Fee-paying status		UK domicile		Over- seas domicile	Total undergraduates in			Per- centage change since 1979-80
		Home fees	Other fees	Men	Women		1970-71	1975-76	1979-80	
1. Education										
Education	2334	2040	294	560	1448	326	—	969	2363	-1.2
Combinations of education with other subjects	1341	1320	21	473	836	32	—	772	1342	-0.1
Total education	3675	3360	315	1033	2284	358	1554	1741	3705	-0.8
2. Medicine, dentistry and health										
Medicine	18749	18101	648	10952	6900	897	—	16549	18448	1.6
Dentistry	4159	4002	157	2620	1313	226	—	4048	4143	0.4
Pharmacy	2445	2285	160	894	1361	190	—	2345	2395	2.1
Pharmacology	560	520	40	276	234	50	—	476	519	7.9
Other studies allied to medicine and health	2029	1943	86	583	1337	109	—	1568	2124	-4.5
Total medicine, dentistry and health	27942	26851	1091	15325	11145	1472	20616	24986	27629	1.1
3. Engineering and technology										
Aeronautical engineering	1127	966	161	892	33	202	—	903	1093	3.1
Chemical engineering	3005	2659	346	2388	207	410	—	2088	2874	4.6
Civil engineering	6553	4874	1679	4468	206	1879	—	6780	6862	-4.5
Electrical engineering	8808	7331	1477	6915	265	1628	—	6840	8309	6.0
Mechanical engineering	6478	5398	1080	5089	176	1213	—	5033	6347	2.1
Production engineering	720	597	123	561	30	129	—	462	708	1.7
Mining	687	598	89	587	3	97	—	573	666	3.2
Metallurgy	1030	960	70	851	87	92	—	860	1049	-1.8
Other general and combined engineering subjects	4070	3621	449	3257	265	548	—	2798	3839	6.0
Surveying	459	364	95	326	30	103	—	182	435	5.5
Other technologies and combinations of engineering and technologies	1585	1354	231	881	429	275	—	1365	1604	-1.2
Combinations of group 3 with groups 4-9	2239	2010	229	1659	311	269	—	1617	2031	10.2
Total engineering and technology	36761	30732	6029	27874	2042	6845	30261	29501	35817	2.6
4. Agriculture, forestry and veterinary science										
Agriculture	2091	2063	28	1366	682	43	—	1565	2141	-2.3
Agricultural biology	830	816	14	443	366	21	—	726	821	1.1
Agricultural chemistry	53	52	1	35	17	1	—	45	56	-5.4
Forestry	442	429	13	334	90	18	—	217	451	-2.0
Veterinary studies	1663	1651	12	982	651	30	—	1473	1655	0.5
Total agriculture, forestry and veterinary science	5079	5011	68	3160	1806	113	3640	4026	5124	-0.9
5. Biological and physical sciences										
Biology	5610	5492	118	2910	2523	177	—	4171	5281	6.2
Botany	795	784	11	395	381	19	—	928	806	-1.4
Zoology	2174	2150	24	1241	886	47	—	2155	2134	1.9
Physiology and/or anatomy	1051	1012	39	524	468	59	—	891	966	8.8
Biochemistry	3347	3172	175	1826	1272	249	—	2950	3298	1.5
Other, general and combined biological sciences	2800	2724	76	1395	1295	110	—	2486	2691	4.1
Mathematics	12695	11518	1177	8107	3132	1456	—	9625	11450	10.9
Mathematics with physics	677	650	27	532	108	37	—	522	604	12.1
Physics	7338	7021	317	6006	932	400	—	5865	6951	5.6
Chemistry	7717	7335	382	5525	1736	456	—	6123	7450	3.6
Geology	2270	2240	30	1818	404	48	—	2145	2233	1.7
Environmental sciences (other than geology)	1223	1196	27	672	519	32	—	940	1134	7.8
Other, general and combined physical sciences	1298	1251	47	987	246	65	—	1733	1350	-3.9
Combinations of biological and physical sciences	5203	5004	199	2982	1914	307	—	5505	5427	-4.1
Combinations of group 5 with groups 6-9	3650	3299	351	1946	1265	439	—	2998	3815	-4.3
Total biological and physical sciences	57848	54843	3000	36866	17081	3901	45775	49037	55590	4.1