

monkey are now more variable than in the mainland variety. Although the possibility cannot be excluded that this complex of change has resulted from the direct action of a changed environment on an unaltered genetic constitution, parallels with complexes of change recorded in laboratory experiments with

lower animals suggest that the differences may have, as a basis, changes in systems of multiple genes. In this case, the observations would represent an example, at present unique, of the effect of selective forces upon a primate population.

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WOMEN IN ENGINEERING

PROBABLY the most persuasive case for the employment of professional women in industry has been made by the Women's Engineering Society. Unlike other women advocates who rely either on wistful laments or on emotional over-statements of unestablished truths, the Women's Engineering Society bases its case on hard-won knowledge of industry and on the records of those courageous and enterprising women engineers who have already made successful careers for themselves in industry. In a booklet prepared by members of the Careers Panel of the Society, it is shown that there is now no reason why a girl with talent and determination should not embark on an engineering career with every prospect of success (*Training and Opportunities for Women in Engineering*, 25 Fouberts Place, London, W.1. 3s. 6d.). She is advised, however, to equip herself fully with formal qualifications, like membership of professional institutions and those obtained by examination, such as a university degree in engineering or a Higher National Certificate. "Engineering training has two distinct components, theory and practice, and both are equally necessary to the would-be engineer. The former can be obtained in

Universities and Technical Colleges, while, for most branches of the profession, the best practical training is provided in industry." It is in obtaining this practical training that the girl student may find herself at a disadvantage compared with her brother. Entry into certain branches of engineering is easier than into others, and there is more prejudice against the employment of women in certain positions than in others. The new branches of engineering such as aeronautics, electrical and electronic engineering, or heating and ventilating, offer an easier entry to women than do the older branches such as marine or locomotive engineering, naval architecture or civil engineering.

There is still a prejudice against putting women in control of large numbers of men, and few firms the employees of which are mostly male would consider appointing a woman as works manager or foreman. There is far less prejudice against the employment of women in scientific work, design or research.

The booklet describes the training and qualifications required in many branches of engineering as well as the posts available when training is complete.

WATER POLLUTION RESEARCH, 1957*

MUCH of this tightly packed report will be of interest only to those who are directly concerned with sewage treatment and pollution, and the thirty-two papers published by members of the staff during the year have nearly all appeared in technical journals. Some of the work is of wider appeal, and merits fuller mention than the rest in a journal of general science such as *Nature*.

Various calculations have been made to find the most economical way of improving the Thames estuary. Aeration of some of the worst inflows has been suggested, but it is shown that the effect of this would not be great. An increase in temperature would lead to an immediately greater oxygen deficit but a corresponding amelioration farther down the river. It has been found that, especially at higher temperature, nitrate may be reduced before the concentration of oxygen approaches zero, a hitherto unsuspected complication in calculations of this kind. Even after the completion by the London County Council in about 1962 of alterations and extensions to its sewage works, the Thames will still be foul. Sulphide, perhaps, will no longer be formed in the central reaches of the estuary, but oxygen concentration will be low.

Fig. 13 of the report shows how oxygenation of water passing over a weir increases with the height of

the weir, rapidly at first but gradually more slowly, a 9-foot weir, the highest tested, being only slightly more advantageous than one 8 feet high. The effect depends also on the depth of the basin into which the water falls; with a 5-foot fall the concentration of oxygen increases quite markedly up to a depth of 8 inches, but thereafter is the same for all depths. Another experimental set-up of general interest is the channel for studying temperature gradients. It is 500 feet long and is made by setting baffles across a tank. The object is to study the behaviour of fish in a temperature gradient; but first it will be necessary to study the nature of the gradient under different conditions of flow, humidity and initial temperature. Some figures are presented here, but it is hoped that more will be forthcoming and their relation to the results of theoretical calculations discussed. The continuous recorder for dissolved oxygen, on its way to becoming a standard instrument, has been developed and improved by the incorporation of a device for automatic temperature compensation, which is described.

The amount of effluent necessary for a satisfactory test of toxicity is inconveniently large if the fish used is more than about 1 inch long, and foreign fish have been used since no British species is as small as this when adult. The apparatus designed for routine tests is described and figured. Zinc is shown to be toxic at lower concentration in soft than in hard water, rainbow trout, for example, dying in less than three days in 0.5 p.p.m. zinc in soft water and sur-

* Department of Scientific and Industrial Research. Water Pollution Research 1957: The Report of the Water Pollution Research Board with the Report of the Director of the Water Pollution Research Laboratory. Pp. iv+100+4 plates. (London: H.M. Stationery Office, 1958.) 6s. net.

viving ten days in six times that amount in hard water. Experiments with a radioactive tracer suggest that the effect of the zinc may be internal and not merely on the gills as hitherto believed.

Various mixtures likely to be produced by coke ovens are more toxic than pure phenols, and their effects are enhanced by low oxygen concentration. Biological treatment is sometimes successful, but not when substances containing much ammonia are present. Cyanide, too, has been successfully broken down in a biological filter, and experiments have been

carried out on an anaerobic digestion process for certain trade wastes. It has been found a satisfactory method of dealing with the effluents from slaughterhouses and whisky distilleries.

The nature and concentration of the constituents of domestic sewage, about which little is known, are under investigation. It now seems clear that synthetic detergents reduce the rate at which oxygen is absorbed in the activated sludge process, and this may account for reports of decreased efficiency of certain plants in recent years. T. T. MACAN

CHEMICAL DESTRUCTION OF MATURE PERITHECIA OF *MYCOSPHAERELLA PINODES*

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RECENT research work with dinitro-ortho-cresol, pentachlorophenol (and their sodium salts) and phenyl mercury compounds as eradicant fungicides has been aimed mainly at preventing the normal maturation of ascocarps of various fungal pathogens, as distinct from destroying mature ascocarps. Pathogens in which ascospore discharge has been controlled successfully by the application of these compounds prior to maturation of the perithecia apparently all belong to the group of Ascomycetes which complete their life-cycles during a long over-winter saprophytic phase in fallen leaves, mummified fruits, or branch cankers, for example, *Venturia inequalis*¹, *Pseudopeziza ribis*², *Sclerotinia* spp.³, *Nectria galligena*⁴.

In South Australia, where large areas of garden peas for fresh marketing are grown under sprinkler irrigation in districts of low natural rainfall (12 in. or less per annum), extensive damage to crops by *Mycosphaerella pinodes* is common. Under optimum conditions, mature perithecia of this fungus may be

produced within two weeks from the time of infection: there are thus many generations of ascospores during a single pea-growing season.

Phenyl mercuric chloride was found to be ineffective in destroying mature perithecia of *M. pinodes* when applied at a concentration of 0.1 per cent, as used for autumn spraying for eradication of *V. inequalis*.

In the first series of laboratory tests with pentachlorophenol, an oil-and-water emulsion containing 0.75 per cent of the chemical was applied by means of a 'Rega' hand atomizer to a series of 5-10 gm. samples of heavily infected pea straw from the 1957 crop, collected from the field in February 1958. Control samples were treated with distilled water. Beginning two days after the treatments were applied, and at weekly intervals thereafter for the next seven weeks, ascospore discharge was tested by immersing each sample in water for 5 min., draining for 5 min., and suspending in a wire basket under a bell-jar 6-7 in. above the orifice of a Hirst-type spore impactor⁵, which was then operated for 1 min.

Table 1. NUMBERS OF ASCOSPORES* OF *Mycosphaerella pinodes* DISCHARGED FROM PEA STUBBLE SAMPLES AFTER TREATMENT WITH 0.75 PER CENT PENTACHLOROPHENOL

Days after treatment	Control (water only)					0.75 per cent pentachlorophenol				
	1	2	3	4	5	1	2	3	4	5
2	869	1,056	1,159	622	327	68	3	17	12	3
9	155	1,999	1,625	1,126	711	40	1	0	12	0
16	488	637	2,003	1,129	489	4	2	2	0	1
23	2,056	3,612	8,622	5,672	808	9	0	2	7	4
30	843	850	840	2,310	345	9	2	0	3	2
37	1,272	1,758	1,559	1,365	792	10	9	0	79	0
44	813	977	1,881	706	992	4	0	0	11	0
51	286	1,517	248	206	34	2	1	1	2	0
Totals	6,782	12,406	17,937	13,136	4,498	146	18	22	126	10

* Each count is the sum of 10 traverses across the zone of spore deposit on a microscope slide, using a magnification of 480

Table 2. NUMBERS OF ASCOSPORES* OF *Mycosphaerella pinodes* DISCHARGED FROM PEA STUBBLE SAMPLES AFTER TREATMENT WITH PENTACHLOROPHENOL AT VARIOUS CONCENTRATIONS

Days after treatment	Control (water only)			Pentachlorophenol (per cent)																
	1	2	3	1			2			3			1			2			3	
2	598	2,006	392	39	68	34	3	0	0	0	0	0	0	0	3	0	1	0	0	
9	8,180	2,510	1,860	125	2	37	0	0	0	0	0	0	0	0	0	0	0	0	0	
16	Not counted			27	3	1	0	0	0	5	0	0	0	0	0	0	0	0	0	
23	3,988	> 10,000	4,094	0	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
30	> 10,000	> 10,000	> 10,000	0	4	5	0	0	0	0	0	0	0	0	0	0	0	0	0	
Totals	> 22,000	> 24,000	> 16,000	191	81	77	3	0	0	5	0	0	0	3	0	1	0	0		

* Each count is the sum of 10 traverses across the zone of spore deposit on a microscope slide, using a magnification of 480