

# The Woman Engineer

The Organ of the Women's Engineering Society (Incorporated 1920).

President: MRS. J. A. MOLLISON, C.B.E., B.A., HON. F.S.E

Hon. Secretary: MISS CAROLINE HASLETT, C.B.E.

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## "The Woman Engineer"

Office:

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All correspondence relating to this Paper should be addressed to THE EDITOR.

Items of interest and newspaper cuttings regarding the position of women in the Engineering World will be welcomed by the Editor.

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### THE CONFERENCE

The Conference this year threatens to leave a high-water mark that will be difficult to approach in later years, but to be depressed by that thought just now would be meeting troubles not half-way, but before they were hatched.

In the first place the setting is Yorkshire, and that is sufficient in itself to assure the Conference of a wealth of enjoyment.

Then the arrangements are being made in Sheffield too. Our own special Wizard of the Lamp has brought to the planning her personal touch, and a glance at the programme on another page shows that it is the touch of genius. We are to have a Civic Reception, a visit to the Repertory Theatre, an air flight and a unique conducted tour in three parts, first through the works of Messrs. A. G. Wild and Company, Limited, mechanical engineers, specialising in lamp case construction, then to the Wolf Safety Lamp Works,

and, finally, to the collieries of Messrs. Newton, Chambers and Co. We have been fortunate to be able to publish details of these visits before the Conference.

Finally, we hope to have Mrs. Mollison with us and to hear her presidential address. The W.E.S. has been honoured by the occupancy of its presidential chair by outstanding women, but in a special sense Mrs. Mollison is the woman of the moment. She came to office fresh from her early triumph in Australia and the Cape. Now in her second year she has repeated those first glorious feats, adding lustre to her already brilliant fame and to this Society which specially claims her. Her presence at the Conference will be a fitting crown to the very splendid programme.

### THROUGH AFRICA BY MOTOR CYCLE.

On May 26th a very large gathering of the Society's members and interested friends met to hear something of the adventures that befell Miss Teresa Wallach in Africa last year when she accompanied Miss Blenkiron in a motor cycle trip from London to the Cape.

Miss Wallach was introduced by Mrs. Mollison, who received a rousing reception, and who referred to many points of difference between her own London—Cape trips and those of the lecturer. In her remarks Mrs. Mollison mentioned the earlier motor cycle records gained by Miss Wallach and Miss Blenkiron and also by Miss B. Shilling, another member of the W.E.S. With that generosity that is typical of sportsmen, the President made light of the dangers and trials of her own hazardous adventures in comparison with those about to be described. She found one too obvious similarity, however, the definite and complete refusal of all financial backing on the grounds that support would be aiding in sending the enthusiasts to certain death.

(Continued on page 98.)



### THROUGH AFRICA BY MOTOR CYCLE—*continued*

Miss Wallach gave a racy account of her adventures, referring lightly to the endurance test of the Sahara, the wild beasts that approached sufficiently close for discomfort, though never for real fear, the snakes that became part of the day's experiences, the encounters with tribes in varying degrees of civilisation, the tackling of problems connected with the cycle, with water, with other provisions, including petrol, and, finally, to the enthusiastic welcome at Cape Town. The story was told in an easy and humorous vein, just as, without doubt, Miss Wallach and Miss Blenkiron met the incidents of the journey. A map with the route clearly marked gave an excellent idea of direction, and the film was a useful supplement to the tale.

Miss Wallach is to be congratulated on the successful conclusion of her tour and is to be envied that she escaped, if only for a time, from the smallnesses that loom so large in the narrow horizons of the majority.

### NEWS OF MEMBERS

We congratulate **Miss Beatrice Shilling, M.Sc.**, on being appointed to a post in the Royal Aircraft Establishment.

We have had a most interesting letter from **Miss M. Elsa Gardner**, in which she describes the joys of bachelor freedom and of possession of an establishment of one's own. Incidentally, she mentions that she has been received into full membership of the local Engineers' Club, an honour which she shares with one other woman.

**Miss Janet Harris, M.Sc.**, a member of the Council, who travelled to America a short time ago, had the pleasure of meeting many important American women through introductions from the International Federation of Business and Professional Women. Amongst the most interesting must have been the meeting with **Dr. Lilian Gilbreth**, the motion study expert and a member of the W.E.S. We are looking forward to having an account of her experiences from Miss Harris.

Percival "Gull" aeroplane, used by Mrs. Amy Mollison for her world record flights to and from Cape Town, was equipped exclusively with Callender Aircraft Cables.

### ON THE TERRACE.

In an endeavour to express publicly its pride in and admiration for the most recent achievement of its President, a Reception was arranged at the House of Commons, at the request of the Society, by the kindness of the women Members of Parliament. This somewhat unique function took place on 26th May. Mrs. Mollison, accompanied by Mr. Mollison, was greeted warmly by her hostesses and by the small but representative gathering. Members of the House who, accidentally or by design, found themselves on the Terrace at that hour availed themselves of the opportunity to greet Mrs. Mollison in person and to pay a tribute to her courage, genius and endurance.

Women Members of Parliament who were present were Miss Irene Ward, Lady Astor, the Duchess of Atholl, Miss Eleanor Rathbone, Miss Thelma Cazalet, Miss Megan Lloyd George, Mrs. L. C. Tate and Miss F. Horsbrugh.

Representatives of the British Federation of Business and Professional Women and the officers of the W.E.S. joined in this gesture of recognition of Mrs. Mollison's achievements.

### THE ENGINEERING AND MARINE EXHIBITION.

Members of the Society who have the happiest recollections of London Conferences and visits to the Shipping, Engineering and Machinery Exhibition at Olympia will welcome this early notice that the next exhibition will be held in 1937 from September 9th-25th. The exhibition will still be recognisable under its new name of the "Engineering and Marine Exhibition."

"Rallit" is the name given to an extremely useful new tool introduced by Henley's Tyre and Rubber Co., Ltd. It is a rubber mallet, with steel handle and super-tough rubber head, weighing 1½ lbs. As would be expected, it performs the usual duties of the wooden mallet, but more efficiently, with less noise and with less wear. Its value has already been proved by engineers, mechanics, carpenters, sheet metal workers, motorists, etc., but there is still much scope for its quiet, shock-absorbing qualities. It has the additional advantages of perfect balance and a non-slip head.



## THE PRESIDENT.

In these days of rapid and widespread communication there is little of news that a quarterly journal can impart to its readers, and the position is rendered quite impossible when the news relates to Mrs. Mollison, our President, whose name has been on all lips, in the head-lines of all papers, and on the soundwaves that emanated from broadcasting stations throughout the world during the past month.

Not only has this popularity deprived us of news, it has stolen all the descriptive adjectives and figures of speech, so that the only consolation for such poverty is that had we been wealthy beyond words we should still have been inadequate to the occasion. Those who know are filled with admiration and respect, and the many who have no conception of all that was involved are unrestrainedly thrilled, fascinated and laudatory.

The Society has, however, an overwhelming compensation for its handicap in having to express itself long after the first delirious applause, after the most fitting tributes have been most fittingly paid; it has the unique privilege of possession of Mrs. Mollison as its President. We yield pride of place to Mr. Mollison and then to her immediate family, but after that we assert our rights.

What "Amy" has done belongs in a special sense to the W.E.S., the fold, incidentally, of many other notable airwomen. We are joyfully conscious of reflected glory, and our own tribute has in it the glowing element of friendship and affection.

We should like to record in these pages the most recent triumph of our President. She left London for Cape Town on May 4th and returned on May 15th, having broken three records previously held by Flight-Lieutenant Rose. They are:—

	Miles.	Mrs. Mollison.		
		Days.	Hrs.	Mins.
London—Cape ...	6,500	3	6	26
Cape—London ...	7,500	4	16	17
Double journey ...	14,000	7	22	43



Mrs. J. A. Mollison, C.B.E.

The times taken by Flight-Lieut. Rose on a different route were:—

	Flight-Lieut. Rose.		
	Days.	Hrs.	Mins.
London—Cape ...	3	17	38
Cape—London ...	6	6	57
Double journey ...	10	0	35

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## L'ÉCOLE POLYTECHNIQUE FÉMININE.

A SCHOOL IN PARIS FOR THE TRAINING OF WOMEN AS ENGINEERS.

By NORAH M. JEANS.

Whenever I am introduced to French people as an engineer I am invariably told that no such thing as a woman engineer exists in France. Women chemists—yes, and doctors and surgeons and lawyers, but women engineers, certainly not!

I wasn't, however, very surprised when I received one day a copy of an English technical journal in which was a paragraph on the subject of the school of women engineers established at the Conservatoire National des Arts et Métiers, together with a request from the W.E.S. that I should go along and find out all about it. For French women have not our habit of forming themselves into clubs and societies to promote the interests of any particular group of professionals, and it is quite a common thing to find that one woman, although outstanding in her profession, is unknown to others of the same profession. After my visit I had the pleasure of introducing the name of Mlle. Paris, the founder of the school, to several of her compatriots in other professions.

Mlle. Marie-Louise Paris had trained as an engineer during the latter half of the war, and her first job after she received the diploma of Ingénieur I.E.G. was testing apparatus for electrical measurement. Later, she entered the design office of a signal engineer, and in course of time was herself responsible for the signaling system in the station of Loan; the responsibility involved needs no emphasis. After various other design office experiences Mlle. Paris began to wonder why more women had not found their way into the engineering industry since her own experience proved that there were many branches of engineering work that might well be done by them. This led her to consider the facilities available for training and after a very comprehensive survey and a good deal of discussion with the heads of various industries she decided that good though the French training centres were, they were more suitably adapted to the training of men than of women.

"Therefore," said Mlle. Paris, "it follows that we must have a training school of our own established by women for women, and if possible established on an international basis."

It required a good deal of courage to give up an assured position in industry to fight for a cause, but this is what Mlle. Paris did. By ceaseless argument and propaganda she eventually won the ear of a distinguished group of French academicians, amongst whom was M. Gabelle, honorary director of the Conserva-

toire National des Arts et Métiers. They listened to her with the respect due to one who not only *talked* of what women could do, but who had by her own work shown her claims to be justified. From the French press, also, she won support, and her battle cry, "if we were capable of being trained as engineers to meet a national emergency, as was the case during the war, we are capable of being trained in times of peace for no other reason than that we *are* potential engineers and desire to be trained," was accepted as sound reasoning.

In 1925 Mlle. Paris was able to open her school—l'Institut Electro-Mécanique Féminine—in premises placed at her disposal by the Conservatoire National des Arts et Métiers. Seven years later, when the school was soundly established and its diploma accepted as equal to a University degree, the name was changed to "l'Ecole Polytechnique Féminine," and so great is the demand for enrolment that a competitive examination has now to be passed.

## COMPETITIVE ENTRANCE EXAMINATION.

Until Mlle. Paris has carried her work a stage further and built for her school a large and well-equipped engineering training establishment, the number of students has to be limited to 30 in each academic year. The entrance examination is therefore far from simple. The candidate must have obtained the first part of her Baccalauréat and produce a satisfactory report of her scholastic attainments from the principal of the school from which she sat for it. Besides passing in mathematics, physics and chemistry, she must have reached a certain standard of general culture, must have a knowledge of elementary astronomy and must also have read Poincaré on "La Valeur de la Science" and "Science et Méthode," Claude Bernard on "l'Introduction à la Médecine Expérimentale," and Pascal on "L'Art d'Ecrire," together with fragments from his "Esprit Géométrique." The economics, logic and ethics of industrial life form an important part of the successful candidate's after training, and the entrance examination therefore includes questions in elementary philosophy.

## THE COURSE.

Only a woman used from her youth up to French educational methods would look without misgiving upon the amount of work that has to be done during the three years which is all the time allowed in which to win her diploma. A student who fails to pass the first



year's examination may not be allowed to continue her studies unless her year's work is of such high standard that the examining body consider a variation to this rule justified. There are no examination fees for the first and second years, but to sit for the finals at the end of the third year, the student must pay a fee of 150 francs. Her fees for each academic year are 3,000 francs (approx. £40 per annum), which is payable in three instalments, and her extras for books, etc., are extremely reasonable. A very satisfactory feature of the training is that all students who pass and receive their diploma *are guaranteed a job* immediately after leaving the school, for the students of l'Ecole Polytechnique Féminine are in great demand in certain branches of the engineering industry, and Mlle. Paris makes a point of keeping in touch with industrial chiefs who are able to employ her students.

The syllabus for the three years follows much on the lines of that for the English B.Sc., except that rather more time is taken up with mathematics and rather less with practical work in the shops. "Géométrie Descriptive" (projection on two planes) has also a great deal of time allotted to it, while the practical work during the first year is confined mostly to the drawing office and metallurgical laboratory. Machine construction and design is added to the syllabus of the second year and hydraulics and aerodynamics to that of the third. During the third year the student has the privilege of attending the laboratories of l'Ecole Centrale des Arts et Manufactures, a famous school of engineering in Paris, besides those of the Conservatoire National des Arts et Métiers, and makes visits to many factories for the purpose of obtaining an insight into modern factory methods. On these visits the student has to submit a written report as part of her diploma work, and it is very interesting to note that marks for these reports are awarded under two headings: those for the knowledge of engineering and economics displayed and those for the literary style of the French used, for at all stages in her career is the need for general culture impressed upon the student. After these visits to factories the third-year student is called upon to submit on paper a scheme planned by herself both in its technical and economic aspects.

Last year l'Ecole Polytechnique Féminine celebrated its tenth anniversary and was given a remarkably good press. I spent the greater part of an afternoon reading press reports which concerned themselves not only with the career and achievements of Mlle. Paris, the founder, but also gave up some space to the careers of some of the engineers who during ten years have won their spurs in industry. "The engineer works with his brains in the quiet of the laboratory and the drawing office and not in the noise and dirt of the factory,

where you say women should not be," Mlle. Paris had said in the early days of her fight to establish a school, and on the occasion of the tenth anniversary of that school there were designers, metallurgists, electrical engineers and, by no means least interesting, technical secretaries who could justify that contention and who with no uncertain voice acclaimed the courage and resourcefulness of Mlle. Paris, who had provided them with easier facilities for training.

At the present time l'Ecole Polytechnique Féminine is busily engaged on the design and construction of an entirely new type of aeroplane which is to be finished in time for exhibition at the International Exhibition in Paris next year. Any W.E.S. members visiting Paris during the Exhibition should make themselves known to Mlle. Paris, who will welcome them and show them everything of interest connected with her school. The desire of her heart is to establish her school as an international centre of technical education for women, and to this end she looks forward to receiving the co-operation of our own Society.

The question, whether the right of women to enter the profession (for which as individuals they are suited) is best served by setting up special training schools for them, is, of course, a debatable point. There would seem to be some danger of producing by this method two classes of engineers—"men" and "women" engineers—with the still greater danger of establishing a limitation upon the type of appointment assigned to the woman class. In France to-day there are already to be found a number of semi-trained women chemists who, working in clinics and laboratories, are permitted to rise so high and no higher. Such a situation would be insupportable to the average professional English woman, and while conditions of work in the industries of different nations vary in such ways as this, the probability of an international training school is less easy to envisage.

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## To Success





## FOURTEENTH ANNUAL CONFERENCE OF WOMEN ENGINEERS.

To be held at University Hall, Sheffield, from July 17th to 19th (inclusive), 1936.

Members will be staying at University Hall, Endcliffe Vale Road, Sheffield, 10.

### PROGRAMME.

#### FRIDAY, JULY 17TH.

Delegates assemble at University Hall.

7.0 p.m. Dinner, to be attended by the Lord Mayor and Lady Mayoress and other distinguished guests.

8.30 p.m. Presidential Address: Mrs. J. A. Mollison, C.B.E., B.A., F.S.E.

#### SATURDAY, JULY 18TH.

8.0 a.m. Breakfast.

9.0 a.m. Leave University Hall for visits to:—

9.15-10 Messrs. A. G. Wild's Works,

10.15-11.15 Messrs. Wolf Safety Lamp Co., Ltd.'s, Works,

11.30 Messrs. Newton Chambers and Co., Ltd.'s, Collieries.

1.30 p.m. Lunch at Messrs. Newton Chambers and Co., Ltd.'s, Canteen, by kind invitation of the Chairman and Directors.

Afternoon free.

4.0 p.m. Tea at University Hall.

4.45 p.m. Seventeenth Annual General Meeting.

6.15 p.m. Dinner at University Hall.

7.30 p.m. Sheffield Repertory Theatre—"Firebrand," by Leyer.

#### SUNDAY, JULY 19TH.

9.0 a.m. Breakfast.

Morning left free. A number of drives into Derbyshire can be arranged for members if desired.

1.0 p.m. Luncheon at University Hall.

Afternoon. VISIT TO SHEFFIELD AERO CLUB AT NETHERTHORPE.

Flights can be arranged for those members who wish at an extra cost of 5s. to 10s., depending on flight.

Tea at Netherthorpe.

8.0 p.m. Supper at University Hall.



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## ON LOOKING BACKWARDS.

Centenaries, anniversaries, the time of balancing of one's accounts, these are the recognised occasions for looking back, but there are a few others. When the difficulties ahead seem not to diminish it is good to turn and measure up the obstacles safely overcome, so to gain courage and renew faith in one's self. This occasion, however, has none of these reasons for retrospection but a series of incidents have mirrored the past and tempted a backward glance.

When our printers, Messrs. Cross Courtenay & Co. Ltd., were obliged to make changes in their organisation we found ourselves thinking almost automatically of our very first venture into print with the Women's Printing Society Ltd. What a thrilling picture it paints, of adventure, risk, apprenticeship, in a battle with ignorance, partly our own ; with time the editor's grim and persistent enemy ; and with tradition, not yet overwhelmed. So we return to the scene of earliest days, a little older, we hope a little wiser, certainly better equipped for our purpose, with old friends retained and new friends made.

Our greetings, on another page, to Their Majesties King George VI. and Queen Elizabeth, brought us back to Wembley, 1925, the most encouraging year, if the most strenuous that we had known up to

that time. To have organised the first International Conference of Women in Science, Industry and Commerce, was a triumph for the young Women's Engineering Society, and the Duchess of York, by presiding, put the seal of royal approval and recognition on the importance of women's work in these spheres. On the opening day Lady Astor was chairman, Viscountess Rhondda, J.P., spoke on "Commerce," Miss Ellen Wilkinson, M.P., on "The Industrial Organisation of Women," and Miss V. Hazlitt, M.A., on "Vocational Guidance." They were followed by Mrs. Wintringham, Miss Margaret Bondfield, Dame Millicent Fawcett and Mrs. Philip Snowden with five minute impromptu speeches. It is a great temptation to reproduce all of them in full but temptations are met to be mastered.

The Factories Bill just published had been anticipated hopefully and fearfully. It is regarded as a mediocre attempt at consolidation and much more as a legal recognition of average industrial practice than as a charter of liberties. The advances on the 1901 Act are for the most part rendered inevitable by the general development in technical knowledge. The Bill records progress rather than initiates it. There is, however, one minor clause which has so far escaped attention but which is of special importance to women engineers. Clause 76 states :

"The foregoing provisions of this part of this Act (relating to hours of work and overtime) shall not apply to women holding responsible positions of management who are not ordinarily engaged in manual work."

The Society has long contended that the position of women in managerial posts should not be prejudiced by general legislation and the new Bill recalls the struggle to have the Night Work Convention of the International Labour Office amended at Geneva.

Our photograph of Mrs. Davison on another page, turned up in transfer to our new printers, is not so remote as Wembley or Geneva. It goes no farther than September, 1933, when Miss Joy Muntz with a few others addressed the Conference on "What the Younger Women Engineers are doing." The lecture Mrs. Davison gave us on February 10th formed an attractive picture of what she herself is doing in spite of the inherent difficulties of aerial photography.

Retrospection carries sentiment in its train. 1919 and the Women's Printing Society inspire the hope that this is a slightly better WOMAN ENGINEER than the first one, even if there is less gilt on it. 1925 and Wembley are reminders of success and the promise of success. The President



of that Conference is soon to be crowned Queen, to be confirmed with her husband in the highest honour and the place of greatest responsibility in our Country and Empire. The Society has its honour and its responsibility to consider, entrusted to every member and every potential member. The new Factories Bill marks a stage of quiet development. "What the Younger Women Engineers are doing" must always be a matter of primary importance.

If we span forward as we have done backward we reach 1941, 1949, 1955. The first, even, is beyond our telling, and whilst there are grounds for hope, confidence and courage, there is none for complacency. In other countries of Europe women have lost many of their rights, in this they have not obtained the full measure of political and economic freedom. Those who have done much in the past look to the younger women engineers to safeguard what has been won and to go ever forward without allowing courage to cool or the pace to slacken.

## NEWS OF MEMBERS.

**Miss J. M. Harris, M.Sc.**, has lately joined the concrete section of the Engineers' Department of the London, Midland and Scottish Railway staff. She is engaged on the design of works in reinforced concrete and her first job in this connection was on the framework for small station buildings. This promises to be an interesting outlet and we both congratulate Miss Harris and wish her success.

**Miss S. E. McGuffie, B.Sc.**, who is now at Farnborough on Wind Tunnel tests, has become a student member of the Royal Aeronautical Society. If any member would like to attend any of the Royal Aeronautical Society meetings, Miss McGuffie would be pleased to obtain tickets for them.

**Miss H. Grimshaw, B.Sc.**, recently added to her honours that of Doctor of Philosophy. Our warm congratulations to Miss Grimshaw!

**Wanted.**—News of members, what they are doing, where they are going, and why. If members are too modest to talk of themselves, a short note about other members would be appreciated by all the others who are too far distant to have heard in any other way. The office likes news too.

**The Register** is an easy way to augment the news in this column, price 2s. post free anywhere.

**March 10th.**—In the Clubroom, 20, Regent St., S.W. 1, at 7.30 p.m., Lecture by Mr. M. L. BRAMSON, A.C.G.I., F.R.Ae.S., on "AIRCRAFT ACCIDENTS: Their Causes and Prevention."

Light Refreshments at 7 p.m., price 6d.

## LOYAL GREETINGS TO THEIR MAJESTIES.

THE WOMEN'S ENGINEERING SOCIETY,  
20, REGENT STREET, S.W. 1.

14th December, 1936.

THEIR MAJESTIES' PRIVATE SECRETARY,  
BUCKINGHAM PALACE.

SIR,

The Council of the Women's Engineering Society desire me to request you to express to Their Majesties on behalf of their President, Officers and Members their loyal greetings at the beginning of Their reign.

Their high hopes are placed on Their Majesties' life-long devotion to the public service and they recall many instances when it has been displayed, especially on the occasion of the International Conference of Women in Science, Industry and Commerce at Wembley in 1925, when Her Majesty presided over the Conference and when Their Majesties honoured it by their presence at lunch.

The Council pray for their health and happiness in the great responsibilities they have undertaken, that the unwavering loyalty and devotion of their people may continually sustain and strengthen them.

I am, Sir,

Yours faithfully,

(Signed) C. HASLETT,

Hon. Secretary.

ST. JAMES'S PALACE,

S.W.

December 15th, 1936.

The Private Secretary is commanded by Their Majesties The King and Queen to thank the President, Officers, and Members of the Women's Engineering Society for their loyal message of greetings and good wishes, which Their Majesties much appreciate.

MISS CAROLINE HASLETT, C.B.E.,

Hon. Secretary,

Women's Engineering Society,  
20, Regent Street, S.W. 1.



# TESTS FOR THE PROSPECTIVE WOMAN ENGINEER.

BY EDITH O. MERCER, M.A.  
National Institute of Industrial Psychology.

Despite the recent increase in the number of women engineers, the engineering profession is still a sufficiently rare choice among girls to suggest that those who do adopt it have some definite leaning towards the subject. The schoolgirl of no marked interests who is looking round rather vaguely for a career will not, as a rule, make engineering her choice, although occasionally it may be selected at random as "out of the common" and on that account alone desirable. In general, the women who purpose to become engineers are spontaneously attracted to this occupation.

Since women still have greater difficulty than men in establishing themselves in engineering, it is particularly necessary for them to be sure that, apart from interest, they possess in high degree the qualities needed for success. The vocational guidance examination of the National Institute of Industrial Psychology, for example, has solved this problem for many before they started an expensive training. Many things must be considered. In the first place, the woman engineer must be temperamentally suitable for her job. She must be happy in contact with things, directly by work with her hands, or indirectly through plans and calculations. The mechanic and the engineering draughtsman illustrate these two types. The electrical demonstrator must also enjoy contact with other people directly through the spoken word, while the engineering advertiser must be able to manage indirect contact with people through the written word. Among other more general virtues, she must be sufficiently enterprising, adventurous and pushful to overcome the prejudices which she may encounter at the outset.

Intelligence or general mental ability is a factor which enters into all mental operations and must be possessed by the engineer in varying degree according to the grade of engineering work which she proposes to undertake. In the higher branches of the profession, a high degree of general intelligence is as necessary as more specific aptitudes. It can best



*Timing a test for 'practical' ability.*

be determined by special psychological tests, since scholastic attainment is not always a reliable guide.

Apart from general ability, recent research has demonstrated the existence of certain independent special abilities, with two of which the present article is particularly concerned, as necessary to the engineer.

The first of these two special abilities is one which is generally designated "practical" ability, and is described as the ability to deal with non-verbal problems calling for planning with concrete materials. Many performance tests have been designed to measure this ability without calling upon special knowledge or experience, and estimating potentiality rather than achievement. Two of the most satisfactory tests for this purpose are the Cube Construction and the Formboard tests. In the Cube Construction test the material consists of three wooden models representing composites of small cubes, and painted on some surfaces but not on others. The candidate is required to build a model similar to each sample from a set of small cubes supplied to him. The Formboard test consists in arranging units of varying shapes in appropriate position in a board so that none shall be left over. Time taken and the number of moves made count in the scoring of both these tests.



The second ability very definitely needed in engineering is mechanical ability. Academically there is still some uncertainty as to whether it should be considered a separate ability or a particular manifestation of practical ability. For general purposes the fact is sufficient that a number of tests have been devised which will pick out those likely to prove competent in mechanical matters.

Some of the earliest tests of mechanical ability were those designed by J. L. Stenquist\* in America, and one of them in particular, the assembling test, is still widely used to-day. It has been modified for use in Great Britain by the National Institute of Industrial Psychology.† A box containing a screwdriver and the unassembled parts of ten articles, each in a separate compartment, is placed before the examinee, who is allowed 30 minutes to put together as many of them as she can. One of the disadvantages in this test is the variation of the candidate's familiarity with the objects, but the principle is sound, and in general the test has proved a satisfactory indicator.

In this country, Dr. J. W. Cox‡ has conducted an interesting inquiry into Mechanical Aptitude, and in an effort to avoid the extraneous influence of manual dexterity which is operative in the Stenquist assembly tests, he devised four groups of mechanical tests, which were tried out on schoolboys, apprentices and trained R.A.F. mechanics. Of these, the first uses mechanical models, devised to show only the first and last stages of a mechanical process of events. The examiner works the model and the candidate is asked to show by a simple sketch how the observed movements are brought about. The series is graded in difficulty. The second set of tests is entitled mechanical explanation, wherein the subject is given a paper showing several mechanical diagrams, each accompanied by a written description. He is required to answer a set of questions about each diagram explaining the manner in which various parts of the mechanism work. In a third series of tests the diagram is incomplete and the candidate has to sketch in the missing parts, while a fourth series shows diagrams of mechanically connected items, such as rods and wheels, the examinee being required to describe how the mechanism works.

Manual dexterity is to a certain extent involved in some of the tests which have been described, but special tests to estimate it more specifically are available. The amount of manual dexterity which the engineer will need in practice depends upon the particular nature of her work, but she should in any case be "good with her hands." Memory for design and appreciation of form and spatial relationships are also measurable.

Tests such as have been described are used

by the National Institute of Industrial Psychology in its vocational guidance work of advising individuals as to the career for which they are best suited. Batteries of tests have also been brought together for use in selecting candidates either for engineering in general or for employment in a particular firm.

In an experiment carried out by Allen and Smith for the City of Birmingham Education Committee in conjunction with the National Institute of Industrial Psychology, to prepare methods for selecting engineering apprentices, the report, published in 1931, recommended the use of the following group of seven tests:

1. Twenty-four mechanical models.
2. Six mechanical diagrams.
3. Form-relations tests, in which the candidate must be able to judge shape and size visually without manipulation.
4. A memory for designs test, wherein the candidate must reproduce on paper each of a series of designs in turn after it has been shown for a few seconds.
5. A tracing test, in which a continuous line must be drawn at a maximum speed between two points in such a way that it does not touch the sides of various small gaps through which it must pass.
6. A test of variable adjustment, where lines of varying lengths must be doubled in length as quickly as possible.
7. A mechanical explanation test.

All these tests may be administered to several candidates at once. They are now being used at the Junior Technical School of Birmingham experimentally in connection with the admission of students.

German industrial firms and municipal institutes of vocational testing have made much use of psychological tests of selection, as have also American and certain British firms.

The aim of practically all the work that has been described has been directed towards discovering from among those who have no previous experience those most likely to make good engineers, and whether the testing is done in the service of a firm desiring to eliminate the cost of training unsuitable people, or in the service of an individual who wishes assurance on suitability of career before undertaking expensive training, the value to the community is high.

The woman engineer of the future, in conjunction with her male colleague, is likely to find cause to welcome the design of such tests, not only to enable her to discover her own abilities at the outset of her career, but later in the selection of her assistants and staff.

\*"Measurements of Mechanical Ability," by J. L. Stenquist, Columbia Univ. Contributions to Education, No. 130, 1923.

†"Tests of Mechanical Ability," by F. M. Earle, A. Macrae and others, National Institute of Industrial Psychology. Report 3, 1929.

‡"Mechanical Aptitude," by J. W. Cox (Methuen), 1928.



## EXECUTIVE WOMEN IN THE ENGINEERING INDUSTRY. A Debate.

The British Works Management Association arranged a debate recently, on the motion "That women are not suitable for posts as productive and engineering executives."

**Mr. Hugh Quigley**, Chief Statistician of the Central Electricity Board, proposed the motion, but would prefer that his statements should not be published.

In opposing, **Miss Haslett**, said that she was a disappointed woman! She had come prepared to deal with arguments brought forward as to why women were not suitable for executive and productive posts, and had been given no arguments to confound.

She had expected Lack of Training to be mentioned; this, of course, could be remedied by time and opportunity; women have proved that they can manage office staffs, they enter the professions and do well in them, and during many stages of the history of England, women have had great influence in its development.

The difficulty of controlling mixed staffs was another argument that might have been used, but this again can be confuted by facts, many men, in fact, preferring to work for a "woman boss."

Tradition is, perhaps, the greatest obstacle; women have been trained since childhood to believe that men are better at this type of work than women; men have been taught to consider themselves superior in this respect, and the results of inferiority complex are obvious. The difficulty of defining the "feminine sphere" arose, however, when so many men took up dress designing, etc.

She had thought that Physical Strength and Endurance would probably not be raised, since so many women had shown their stamina in such feats as channel swimming, the King's Cup Race, Brooklands, and Miss Johnson's feats of flying.

The machine age initiated the final emancipation of women, as the days of hard physical labour are rapidly disappearing.

A definite handicap to women industrial workers was the existence of antiquated factory laws, which seek to protect women; as for Mr. Quigley's contention that women should be decorative, and cannot be so in a works, he must realise that women are there working in a man-made sphere, and when they have been in it longer, conditions will change.

Women's technical life is as yet too short to prove or disprove her ability—only since the war, less than 20 years in fact, has she had opportunity to obtain training and experience, while men's similar chance of training has extended over at least 150 years.

Miss Haslett then quoted some examples of women who had proved their executive ability



*This portrait of Miss C. HASLETT, C.B.E., COMPANION I.E.E., Honorary Secretary of the W.E.S., painted by Miss Dorothy Vicaji, has been presented to the Electrical Association for Women by Margaret, Lady Moir, O.B.E., the President.*

*By courtesy of "The Electrician."*

—Mrs. Maurice Hewlett, in her factory for aircraft and special parts; the Barrow Shell Factory, which had 2,000 employees—all women, with women manager, departmental heads, foremen and charge hands, setters up, shell and fuse inspectors—a first-class factory with a large and satisfactory output; women were also recognised as suitable for executive positions in the domestic trades—the production of tea, tobacco, biscuits, confectionery, etc., while in house-building, too, they had made their mark. In Russia women held such posts as engineer in charge of all electrical and line protection work in the state organisation, responsible for all planning and construction of extensions to the electricity supply system; engineer in charge of switchgear extensions on the sub-stations of the Moscow Network; engineer in charge of erecting all seven 35,000 V. distribution sub-stations in Leningrad and other electrical erection work. In America, a woman director is in charge of staff of the Detroit Edison Co.; a woman has been for many years president of the Brooklyn Borough Gas Co.; yet another woman, carrying on her husband's work after his death, trains men executives, and is a consulting engineer in technical training.



The President of the Women's Engineering Society is the managing director of a large Machine Tool Company, with International business, and another member is in charge of sales promotion and technical publicity for a large combine, and controls a staff of both men and women. The managing director of one of the largest and best-known Advertising Agencies is a woman, while in Domestic Productions, a large firm of confectionery manufacturers has many women on its staff, including those in the following capacities:—Head of Works Employment Department, Works Forewomen, Head of Girls' Offices, Head of Cardboard Box Department, with 300 girls employed, Head of Statistical Office, Assistant Head of Production Department, responsible for starting up new machines, etc., staffed by girls. Some of these, it was interesting to note, had entered the works at 14, and worked their way up, while others had entered as graduates, having had some training elsewhere.

In her own experience, Miss Haslett had found that if a woman were capable of doing the job she set out to do, she had no difficulty in being a successful administrator and inspiring loyalty among those who worked for her. Sex is of no importance if the worker can do the job, and it is inevitable that women will take an increasingly large part in production, whether in the engineering or any other industry.

In the discussion that followed, many of the men speakers took the attitude that they did not *want* women in Industry, and yet they made no contribution to the question of their suitability. Most of the arguments and queries brought forward were rather in the nature of "red herrings," having very little bearing on the question under discussion.

Miss Jeffrey, Commissioner of Crown Lands, queried the proposer's statement that women could not sacrifice themselves for the good of the cause, and instanced the sacrifices of comfort, wealth, and respect made by followers of the suffrage movement, whom we must admire, whether we agree with their ideal or not. His remarks about Octavia Hill were not founded on fact, since she was the only person who has approached slum clearance with a business method, and yet kept personal contact with all those who were affected by her schemes, and this system was increasing, spreading, quietly.

Miss Cecile Matheson, of the Industrial Court, etc., reminded the proposer of the International Council of Women, an organisation which had been founded in 1895, had branches in between 30 and 40 countries, and was a good example of loyalty to an ideal.

Miss McGibney spoke as an executive herself—running a factory in which she controlled 200 women and two men—and found

her greatest trouble in dealing with the two men. She had bought the business over from a board of eight men directors, who could not agree among themselves, and her work included the organisation, buying, selling, control of finance, costing, the creation of models, while many of her decisions have to be made months ahead, her business depending entirely on the results.

Mr. H. Bridge, of the Gramophone Co., said that the pace at which we travelled in these days was without parallel, and that the capabilities women lacked in enabling them to cope with this were mentality and balance rather than physique.

Mr. W. Slater and Mr. Pugh were both on the "but we don't want them" side, while Mr. A. P. Young, who supported the motion, thought that the matter hinged on a biological problem.

Miss I. H. Sloan disliked any generalisations which sought to take for granted any fundamental difference in male and female brain. Having worked with, for and over both men and women, she found remarkably little difference in their mental capabilities. The future towards which all industrialists were working was one which would provide adequate work for everyone, as well as adequate leisure.

The Chairman, Mr. F. H. Bullock, in summing up, exercised the prerogative of the Chair and refrained from putting the motion to the meeting.

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tic appliances, traction equipment and ignition systems. Owing to the urgency of the problem from the point of view of the broadcast public and the possible repercussion of delayed remedies on the Radio Industry, very concentrated research has been proceeding during the last few months to find suitable suppressor devices for each source of interference.

An important group of researches has been devoted to the study of materials used for various purposes by the Electrical Industry. The Association has served to co-ordinate the research on the wear of natural and synthetic jewels as used in integrating meters. Magnetic materials have also received attention, particularly in relation to their applicability for radio components.

The aging of transformer oils has also received attention, and specifications have been evolved for the detection of moisture in insulating oils. The Association has also been interested in the determination of the electrical and other physical properties of commercial glasses in relation to their composition, with a view to the adoption of glass insulators for high voltage power and telephone circuits as in continental practice.

In relation to dielectrics the Association has been concerned in investigating power loss phenomenon, in developing a technique for determining their true electric strengths, and in examining the fundamental nature of breakdown and assessing the various contributory factors. It has also been responsible for devising a method for the commercial testing of dielectrics. My own particular work has lain in this field; its object is a mathematical and experimental investigation of the voltage stresses to which reservoir condensers in rectifier equipment are subjected, so that specifications can be drawn up for the adequate commercial testing of such condensers.

The application of electrical technique to other industries has received some attention in the further development of X-ray analysis. Much interest has been taken in research on the physiological effects of infra-red radiation, whereby the alleged deleterious effects of dull-emitter fires as opposed to bright fires have been proved to be unfounded.

This somewhat cursory and necessarily incomplete review of the work of the Electrical Research Association would at least suggest that co-operative research is an integral part of industrial development. Industrial research can no longer be considered a luxury by any industry which values its prestige, but rather should be regarded as a most remunerative investment.

In conclusion, I wish to acknowledge my indebtedness to the Director of the British Electrical and Allied Industries Research Association for permission to publish the information contained in this article.

## WOMEN AND THE COMMERCIAL SIDE OF ENGINEERING.

By BRIGADIER E. L. YOUNG

Appointments Officer, London School of Economics and Political Science.

The entry of women into engineering is at a stage at which this career is still regarded as an unusual one for women. A start, however, has been made and the conviction seems to be spreading slowly that in engineering, as elsewhere, there is a place which women can fill naturally, and perhaps in some cases more suitably than men; for instance, in connection with house planning, domestic plant and appliances.

Appointments for women on the purely technical side are limited, as they are for men, by trade conditions and the keen competition for those vacancies which do occur.

This situation is helping perhaps to open up new lines of employment connected with engineering, particularly on the commercial side, and to provide candidates with much better technical qualifications than would have been obtainable, or even thought desirable, for similar posts a few years ago.



SIR WILLIAM BEVERIDGE, K.C.B., C.B.,  
Director of the London School of Economics.



Abroad, engineering firms were represented often by other firms who were agents, perhaps, for half a dozen different principals. These agents would not have the knowledge or authority to enter into more than the simplest negotiations with clients. In cases in which some special feature or some modification of a standard product were required to suit local conditions, much time would be lost in referring to headquarters in England before reliable information were obtained.

This state of affairs has been altered in many cases and a client deals now with someone who has authority and who understands the firm's interests and limitations.

Similar remarks apply to practically all posts on the commercial side. Some commercial training is needed obviously, and sufficient engineering training as well to give the requisite technical knowledge. Which training is to predominate depends on the particular appointment contemplated. At one end of the scale highly technical qualifications combined with some commercial knowledge may be wanted, and at the other considerable commercial experience with a little engineering.

An example is given by the case of a firm which makes electrical storage batteries. The big stationary batteries need a sponsor who can discuss a wide range of engineering practice, while the batteries for cars and wireless sets are better in the hands of someone who is not highly technical, but has a rather more "popular" line of approach.

Other openings of a like nature may be found in the demonstration of household and other appliances, particularly those with a special interest for women. There is a possible field in giving advice to householders, especially those who wish to build, with regard to the layout of water, gas or electrical systems, and the most suitable appliances which may be available in the market.

Then again there should be posts in engineering firms where liaison has to be maintained between the order department and the various sections in the works. Many manufacturing firms need a statistician with a technical knowledge of the products they are handling, for work on the administrative side. The drawback of the ordinary statistician is usually the lack of this technical knowledge. The firm after engaging him may have to train him in the works to make him familiar with its methods of production. The technically trained woman who has acquired a knowledge of business statistics should find an opening here.

There is also the range of administrative and secretarial posts, labour management, factory inspectorship, etc. In all these appointments some qualification together with engineering is essential or desirable, a knowledge of archi-

ture, perhaps, domestic science or commerce.

Since few people before they obtain employment can afford the time to take a degree both in engineering and also in, say, commerce, a decision must be made with consideration to the particular career or post in view as to what degree is to be obtained and what further training is to follow it. A degree in engineering might be combined with a course of studies in commercial subjects, or a degree in Commerce or Economics with a short course in engineering at a technical college or school.

The degree of Bachelor of Commerce, taken at the London School of Economics, gives a good theoretical grounding in commercial subjects, particularly in business statistics economics, commercial law, foreign languages, finance, business administration, trade, transport and industry. Students take a number of these subjects and specialise in one. The normal course of study is three years.

The degree of Bachelor of Science (Economics) also can be taken at the same School. It is intended for the student with a rather less specialised outlook and is not directed mainly towards Commerce.

For some who hold already an engineering or science degree the commercial training given by a secretarial course may be sufficient. For others who wish to study commercial principles more deeply the courses at the London School of Economics are specially designed. A course extending over a minimum period of one year can be arranged with regard to the special needs of each individual, and including such subjects as accounting, statistical method, business administration and the elements of economics, with banking and finance.

There are facilities also at the School for those already in employment to obtain a degree by evening study, or alternatively to complete a course in the Department of Business Administration. This Department has the support of a number of business firms and gives specialised training to selected students drawn from subscribing businesses or applying independently. That is to say, it would be practicable for an engineer already in employment to obtain a commercial training without leaving the firm, but leave of absence must be obtained for a minimum period of one year, to permit full-time study in the Department. In some cases the firm might think it well worth while to subscribe towards such training with a view to an increased range of activity for its employee.

It is difficult at present to be more precise with regard to the scope for women on the commercial side of engineering. This new territory is still largely unexplored. Enough has been said, perhaps, to indicate some directions for search and experiment.



## MISS E. M. KENNEDY,

*who has just been elected to a second year of Presidency, is notoriously camera-shy; we are pleased therefore to be able to publish, despite her protests, this typical portrait of a practical business woman, surprised at her desk by the wily photographer.*

*The Society is proud to have at its helm for a further year a woman who by her hard work and business acumen has worked her way up to the Managing Directorship of her Firm.*



*By courtesy of "The Vote."*

## WOMEN AND INVENTIONS.

By GEO. H. RAYNER, R.P.A.

In the course of obtaining some interesting particulars of the patents issued in this country, I have been struck by the low figures allotted to women in the matter of invention. While women have made great successes for themselves in general business and are taking an ever-increasing part in medical, legal and literary professions, they appear to have neglected the great art of invention in which they have so many opportunities open to them in connection with their daily life.

They have already proved that they have the brains, and there should be no doubt about their success if they steadily apply their intellect in the right way. Is it due to a lack of interest in inventions or that they have not realised the prizes that are easily within their reach?

There is no reason at all why women should not be equally successful as men and a very sound reason why they should be especially successful in matters where they know best what is wanted and upon which they are the sole judges, such as household matters and their own personal dress and adornments, designs of material, handbags and the like in which men take little real interest beyond the making of money from good ideas which could just as easily be earned by the woman, who certainly should be more likely to find the prizes than a man.

A woman may say, "But I have no inventive faculties," and the answer might be given

in "Have you ever tried?" It is true that there is no school to go to for learning how to invent, but there is no doubt whatever that women have instinct and imagination, and when these are allied with careful observation they come very close upon the realms of invention, and only require constructive intelligence to create important inventions which may bring valuable patents. I am sure that if the proper interest could be aroused in the minds of many women most interesting and profitable improvements would be forthcoming which would still further increase the conveniences of our modern households and enhance our pleasures which would appeal to as wide a field as the mere man can do.

It will, however, be appreciated that some patent or protection must be obtained in order to secure to the inventor the full rights of the invention, as without this the inventor will have no definite rights, and therefore cannot negotiate or sell. This procedure will be trifling in cost as compared with the possibilities that may accrue, but there are technicalities to be considered and it is best to place the matter for advice in the hands of some reliable person thoroughly conversant with the patent laws.

If any of our readers should require information on this subject they may obtain the same quite free by writing to the author of this article, c/o the Editor of this Journal, who will pass it on in strict confidence.



## FOURTEENTH ANNUAL REPORT.

CAROLINE HASLETT, C.B.E., Hon. Secretary.

It is a significant fact that during this period of world Industrial depression, women in the engineering world, having made good in the work they have taken up, have maintained their positions solely on the grounds of their merit, and the fact that their services are of definite value. As the Research Department of the International Labour Office recently stated, the Industrial world would be wise to realise that women have entered into this sphere of work and will keep their place there, this being the natural outcome of the industrialisation of the many productive operations which were once the whole-time duties of women in their homes.

The question of the position of women in Industry has been brought before the whole world by the recent discussions on the application of the Washington Convention concerning the employment of women during the night, and for the first time there has been a differentiation between the woman operative and the skilled administrative worker, many people realising, perhaps for the first time, that some of the women affected by the Convention are trained technical and administrative women, whose careers are threatened by this bar to their activities.

**THE TENTH ANNUAL CONFERENCE** of the Society which was held last year at Southampton University College was interesting in several new points which it emphasised. At the Annual General Meeting Miss E. M. Kennedy, a woman who has made good in the engineering business world, was elected President of the Society, and Mrs. J. A. Mollison, C.B.E., was elected Vice-President. Miss H. C. Hollands became Hon. Treasurer in place of Miss N. M. Jeans, who had served the Society in this capacity for several years. Miss Nora E. Miller, who holds a very important post in Technical Publicity, was elected to serve on the Council.

A *Discussion* on "Careers and Openings for Women in Engineering" was held on the first evening. Mr. K. H. Vickers, M.A., J.P., Principal of Southampton University College, welcomed the delegates. Miss V. Holmes, B.Sc. (Eng.), etc., the retiring President, who was in the Chair, opened the meeting with a paper on the possibilities of "Mechanical Engineering." Wing-Commander T. R. Cave-Brown-Cave, C.B.E., etc., head of the Engineering Faculty of the University mentioned his experience with women employed in aircraft construction and design. Miss Haslett, the Hon. Secretary, gave a general survey of the changed outlook of the engineering world towards women, in the last twelve years. Miss E. M. Kennedy spoke of the "Commercial Side of Engineering," and Mrs. Mollison,

C.B.E., speaking of "Aeronautical Engineering," suggested some of the careers to which such work might lead. Miss M. M. Partridge, B.Sc., A.M.I.E.E., considered that "Electrical Engineering" was the branch offering most future possibilities to women, Miss Nora E. Miller outlined the qualifications necessary for a career in "Technical Publicity," and Mrs. C. M. Shaw Scott, B.Sc., spoke of the outlook in "Metallurgy." In the discussion which followed, suggestions for training were put forward by Miss J. M. Harris, M.Sc., Miss A. M. Kennedy spoke of the work of the "Research Librarian," and among others who contributed were Miss I. H. Sloan of the Ministry of Labour, Miss E. J. Linford, Miss W. Hackett, and Miss M. D. Rowbotham, M.A.

On Saturday, visits were paid to the new Southampton Docks Extension, then in course of construction, when the party were conducted round the works by Mr. F. E. Wentworth-Sheilds, the Docks Engineer, and in the afternoon, to the S.S. "Homer," by courtesy of the White Star Line, whose representatives conducted members all over the ship.

The Dinner in the evening was attended by the Mayor and Mayoress of Southampton and other well-known people in the district. The Toasts of "Our Guests" and "Southampton's Engineering Enterprise," proposed by Miss E. M. Kennedy and Miss V. Holmes, were responded to by the Mayor of Southampton and Mr. F. E. Wentworth-Sheilds.

On Sunday morning many members accepted the kind invitation of the Dowager Lady Swaythling, to visit the beautiful house and gardens of Townhill Park.

The *Air Meeting* in the afternoon was the Society's first big venture in connection with its newly formed Aeronautical Section. The meeting was a splendid proof of the loyalty of aviators, for in spite of inclement weather, the Society was very gratified to be able to welcome the Hon. Lady Bailey, D.B.E., at whose suggestion the Aeronautical Section was formed, Mr. and Mrs. J. A. Mollison, the Hon. Mrs. Victor Bruce, the Master of Sempill, Mrs. Shelmerdine, Sir Alliott and Lady Verdon-Roe, Mr. and Mrs. Pender Chalmers, Miss D. Spicer, Miss Grace Aitken, Captain R. R. Bentley, M.C., Mrs. Micklethwaite and many other friends interested in aviation who flew, or drove down to the Southampton Municipal Air Port, Atlantic Park, for the afternoon. Commander Cave-Brown-Cave very kindly acted as announcer throughout the afternoon, Lady Swaythling received the guests, Miss Grace Aitken was responsible for the very long list of joy-riders, and Miss Mollie Olney undertook the arrangement of events for the interesting programme.



TWO INTERESTING VISITS.

## NEWSPAPER MACHINERY.

**"THE NEWS OF THE WORLD" PRINTING WORKS.**

Two of our winter visits to works of engineering interest have now taken place, and show that this new enterprise of the Women's Engineering Society promises to be very successful.

On the evening of Saturday, October 28th, a party of members visited the "News of the World" printing works, in Bouverie Street, Fleet Street, and for one hour were initiated into the mysteries of newspaper production. The party was introduced to the Linotype type-casting machine, and instructed in the mechanism of operating this most complicated machine. They were then shown how the assembled type compositions were used to prepare the papier maché impressions, which in turn were employed in the casting of the stereotype cylinders used for the actual printing process. The most impressive sight of the whole visit was that of the rows of huge rotary printing presses, turning out about 8,400 finished copies of the "News of the World" per minute throughout the night. An insight into the organisation for packing and despatching the huge quantities of newspapers, and the presentation of a copy of the next day's paper, concluded a most interesting visit.

**THE MONOTYPE CORPORATION, REDHILL.**

The second visit was made to the works of the Monotype Corporation, Ltd., at Redhill, Surrey, on Wednesday afternoon of November 29th. These works are situated in unusually beautiful rural surroundings, and constitute a model factory, employing about 670 hands. The factory is engaged in the production of the Monotype type-casting and setting machines, which involves some of the most accurate machine work to be found.

The party arrived about 2.30 p.m., and for two hours were guided round the numerous shops by members of the staff, who explained the details of all the complicated processes. The Monotype system consists of two machines, the keyboard and the caster, which latter simultaneously produces and assembles type for every kind of printing job. The keyboard, like a large type-writer in appearance, contains some 250 keys. A roll of paper, 4½ inches wide, is drawn over a system of lugs. Striking the keys operates these lugs and perforates the paper, which is drawn and wound on a second spool ready for the caster. In the

caster machine compressed air, passing through the perforations in the paper, operates a mechanism which brings the correct bronze face or matrix into position over the top of the mould in which the type is cast, and, at the same instant, molten type metal is forced into the mould and a single letter is cast. These letters, or type, are automatically ejected and collected in proper order ready for printing, thus eliminating hand composing. The parts of both machines, numbering some 6,000 in all, are made, assembled and tested in the works.

A large part of the factory is engaged in the design and manufacture of the bronze matrices which are supplied to all users of Monotype machines. Our members were shown the type-drawing office, with its elaborate Zeiss apparatus for copying actual type and printed characters, the pattern-making process, in which a copper pattern is prepared from the finished drawing, the punch shop, with its wonderfully precise punch cutting machines and its own bench hardening shop for correctly hardening the steel punches, and the matrix shop, where the bronze type faces, or matrices, are prepared from the steel punches. They were also shown the power house, the large machine shop, paint shop, chromium plating plant, hardening and grinding shops and paper cutting plant. The tour also included a visit to the laboratory, which is one of the best equipped of its size and kind in the country, and is responsible for the testing of all the raw material used in the factory, and for a large amount of research work in connection with the various processes used.

The visit concluded with tea in the beautiful reception room attached to the canteen.

F.D.H.

**THE PRODUCTION OF GAS.**

The next W.E.S. visit will take place on Saturday afternoon, January 20th, when members have an opportunity of visiting the large Gas Works in King's Road, Fulham.

Those who hope to attend any of the visits arranged are asked to notify the Secretary in good time; they will then receive a post card reminding them of the fixture a day or two beforehand, giving them time and place of meeting, bus routes, fares, etc.



# THE POSITION OF PROFESSIONAL WOMEN IN FINLAND.

By AINO WUOLLE, Mag.Phil.

*The Editor met Miss Wuolle when attending the World Power Conference, held this year in Scandinavia. Miss Wuolle, who is one of the outstanding professional women in Helsingfors, is the daughter of the Head of the Technical College there, and helped him with much of the organisation of the World Power Conference Delegates' visit to Finland, including the Hydro-electric Scheme in Imatra. She holds the degree of Mag.Phil.*

In outlining the position of professional women in Finland, it is useful to recall the fact that the women of Finland have possessed the parliamentary vote since 1906; before this time, the first woman doctor qualified and obtained the right to practise in 1878, the first woman teacher at the University of Helsinki (Helsingfors) was appointed in 1894, and the first woman factory inspector in 1903.

Practically every field of occupation is now open to women, except the army and the church—a woman can study theology and graduate, but not become a preacher. The medical profession seems to have appealed especially to Finnish women; there are now hundreds of women dentists and doctors—among the latter I should like to mention the Professor of Gynaecology on the Helsingfors University, Laimi Leidenius; there are also remarkable women authors and teachers and several women lawyers, the first woman judge being Miss Lyly Lukander. Miss Emma Irene Eström, born in 1847, became the first woman "Phil.Cand." (M.A.) in 1882; she took up teaching, has published several books, became an Honorary Doctor of Philosophy in 1927, and her memoir is to be published before Christmas.

Women working in the practical field include Kommerzienrat Hanna Parviainen, who manages her large saw-mills; Miss Fanny Bonn, timber seller, who is Office Manager of the Kemi Timber Company; Miss Helny Bergbom, the first woman factory inspector; Miss Miriam Ekholm, second in command of the Statistical Department of Finland's National Bank; Miss Lydia Heliä, Kamrer or Superintendent in the Kansallis-Osake Bank in Helsingfors; Mrs. A. Voipio-Nylund, editor of the "Uusi Suomi," one of the largest daily papers of Helsingfors, and President of the Business and Professional Women's Association. The splendid work done by Miss Elli Björkstén, who has worked out her own system of physical training for women—a modification of the Ling system—must not be forgotten.

## Social Work and Women's Organisations.

There are several outstanding women social workers whom I should like to mention; Miss Vera Hjet, born in 1857, and a factory inspector from 1903 to 1918, is the founder and superintendent of the Permanent State-supported Exhibition for Workers' Protection, founded in 1909, and re-named the Social Museum in 1921. This exhibition contains every possible appliance and means for the prevention of accidents and diseases connected with trade; it also includes a Children's Welfare Exhibition, and gives all information concerning Public Health. The number of visitors in 1930 exceeded 25,000.

Mrs. Tilma Hainari is a prominent temperance worker, and was the only woman to serve on the State Commission which considered Finland's position with regard to prohibition. She has been President of the Finnish Branch of the International Council of Women since 1914, and is Finnish delegate to some of the League of Nations General Meetings.

The name of Mathilda Wrede, "the Friend of Prisoners," who died a few years ago, is known to some extent beyond the boundaries of Finland.

*The Martha Organisation* in Finland corresponds to the rural Women's Institutes of other countries. It was founded in 1909, and was originally a political society; it now numbers 97,000 members, and works as an organ of culture for the home, and for the restoration of old Finnish crafts.

*The Lotta (Lotta-Svärd) Organisation* or the women of the Civil Guard, has about 70,000 members. The women wear uniforms of grey homespun, and their duties include the work of camp sewing and sanitation, the organisation of field kitchens, etc.

## Women Architects and Engineers.

Before the year 1897 Finland had six women architects, who, however, had to have a special licence to study at the Polytechnical



School, founded in 1849. The first woman to qualify from this school was the architect Signe Hornborg, who qualified in 1891 at the age of 29. Then follow the most prominent among the women architects of Finland: Signe Lagerborg-Stenius, in 1892, for many years a member of the Town Council of Helsingfors, and Vivi Lönn, in 1896, still a productive architect, her speciality being schools. Between the years 1898 and 1908 ten more women architects qualified, several of whom found employment on the State Public Buildings Department. In 1908 the Polytechnical School became the Technical University of Helsingfors, and since that time the number of women architects has steadily increased. Now, as a rule, not less than 30 per cent. of the students of architecture are women. Among the well-known younger women architects may be mentioned Elsi Borg, who planned the beautiful Jyväskylä Church; Aili-Salli Ahde, Eva Kuhlefelt-Ekelund, Elna Kiljander, Annikki Paasikivi, and many others.

Many of our women architects specialise on interior decoration, and on kitchen planning.

It seems that women engineers are not very common in Finland. Only two qualified from the Polytechnical School, that is, before 1908: Mrs. Jenny Markelin-Svensson in 1905, and Mrs. Ragnhild Sergelius in 1906. Mrs. Jenny Markelin-Svensson was what we call a "road and water constructor," building roads and bridges (civil engineer); she studied factory inspection and workers' protection in England and Germany, became State Factory Inspector in 1908, Inspector of Working Places in Helsingfors in 1913, and from 1918 till her death, in 1929, she held the position of Assistant Chief Factory Inspector under the Ministry of Social Affairs.

From the Technical University, no women mechanical engineers qualified before 1922. Mrs. Liisa Vesa, textile engineer, was for some time teacher in a Boys Trade (Industrial) School. Later she held the post of District Factory Inspector for the Tammerfors and Lahti district. At present she is lecturing on "The protection of workers from dangers connected with their work" in the Helsingfors Institute for the Promotion of Trade.

Miss Meri Aamutähti, who qualified in 1926, was also originally a textile engineer; she was for some time employed by an electrical firm, but since 1928 she has held a position on the State Public Buildings Department, as their specialist on water pipes and central heating. She does much travelling in connection with her work, and receives equal pay with the men engineers doing the same kind of work.



*The entrance façade of the church at Jyväskylä, designed by Elsi Borg.*

[From "Finnish Architecture."]

Greta Nygård, who qualified in 1926, later studied the textile industry in Chemnitz, Germany, but she married, and is not known to have continued her technical work.

It appears that there are only five qualified women chemical engineers in Finland. The first woman chemical engineer, Linda Melander, qualified in 1915 at the age of 24. Anita Grönvik and Ingeborg Lauren have posts as laboratory assistants, the former in the Central Laboratory of Helsingfors, and the latter in the State Laboratory for Agricultural Chemistry; of the other two, one, Miss Olin, is known to be in Canada. In addition, there are two women students who will soon complete their studies and take their degrees. Most women, of course, who wish to study chemistry, enter the University and take the degree of M.A. (Mag.Phil.).

NOTE.—The Proprietors of the WOMAN ENGINEER are pleased to publish articles, etc., which come within the scope of the work carried out by the Women's Engineering Society, but they cannot be held responsible for all opinions expressed in these articles.



## THE WASHINGTON CONVENTION.

Concerning the Employment of Women During the Night.

Some years ago, a diligent factory inspector caught a girl apprentice in a small country power station after ten o'clock at night, and informed her that she was transgressing not only the British Factory Laws, but also the Washington Convention concerning the employment of women during the night, which was drawn up by the International Labour Organisation, and had been adopted by this and many other countries. By this information, the H.M.I. let loose a hare, which has been running round the world ever since!

Following certain representations made to the British Government, a representative, Miss H. Martindale, was sent from the Home Office to Geneva, to ask the International Labour Conference that a clause might be inserted in the Washington Convention excluding women holding "posts of management and supervision . . . and not ordinarily engaged in manual work," from its scope.

The suggestion was very well supported, but, owing chiefly to the fact that several countries, interpreting the Convention in their own way, did not consider that it affected such women, the proposal, which had passed the plenary session, did not secure the necessary two-thirds majority in the final meeting.

At the request of the British Government the Governing Body of the I.L.O. then got the Council of the League of Nations to ask the Permanent Court at the Hague to give their opinion as to whether such women were included in the scope of the Convention, and in November of last year the opinion was given that they were.

The British Government then asked the International Labour Office that the question of the revision of the Convention might be placed on the Agenda once more, for discussion in the light of this new opinion. The I.L.O. accordingly wrote to all the countries and states concerned, asking whether they had objection to its being placed on the Agenda. Twenty Governments wrote, either supporting the proposal or making no objection to its being placed on the Agenda; only one country, Chile, raised any objections, these being "not merely for reasons of a physiological character, which tell in favour of excluding women from night work—seeing that such work must be considered incompatible with the physical weakness of the female sex—but also for reasons of a moral nature, since a woman ought to devote at least the night hours to her domestic obligations, and since her employment during those hours exposes her to

dangers from which she ought to be protected." They added, also, a clause concerning the interests of the male workers.

At the second sitting of the Sixty-fourth Session of the Governing Body of the International Labour Office, the question of placing this revision on the Agenda was discussed. The British Government had already agreed to omit the word "supervision" from its proposed clause, and the general feeling of the meeting was that as it actually stood, and was interpreted by the Permanent Court, the Convention had much wider scope than had ever been intended, covering to the detriment of her position the professional as well as the technical woman, instead of protecting merely the manual worker. The British Labour representative objected to the proposed revision, because he felt it to be a feminist agitation which was not supported by the workers themselves; it was emphasised, however, that a definite line was drawn between manual and non-manual workers, and that the proposal referred solely to persons engaged in management.

By 20 votes to 2, the Governing Body decided to place the question of the revision of the Convention concerning the employment of women during the night on the agenda of the 1934 Session of the Conference, and here the matter rests until May! E.M.W.

### ACCIDENTS AND HOW TO PREVENT THEM.

We have received from H.M. Stationery Office two interesting publications, namely, "**Electrical Accidents**," 1932 (price 4d.), and "**An Illustrated Series of Abstracts from Reports of Industrial Accidents**," Volume I (price 3d.).

The intention of these pamphlets is to enable employees and others to become acquainted with the circumstances which have led to accidents in connection with their own work, in the hope that this knowledge will go some way towards enabling them to eliminate the chances of such accidents recurring.

A publication by Messrs. Evershed and Vignoles, Ltd., "**How to Avoid Electrical Breakdowns**," takes the form of a pocket book on insulation testing. Modern factories depending for their output on the electric motors driving the machines realise the importance, besides safe-guarding their workers, of safe-guarding their machinery by ensuring that the insulation of the motors is at all times in perfect condition. The electrical engineer must be constantly alert for faults which may be brought about by accidental damage, through deterioration due to damp, dirt, or other causes, and this pocket book is designed to assist the maintenance man in making his regular routine tests, which ensure that the plant is kept in good order.



## THE HON. LADY PARSONS, J.P.

### FOUNDER OF THE WOMEN'S ENGINEERING SOCIETY.

By CAROLINE HASLETT, C.B.E.

With the death of Lady Parsons, the world of women has lost a great pioneer and a stalwart champion. Lady Parsons was the founder of the W.E.S., and she had a great faith and belief in women's ability to master the technique of scientific work. She herself had a keen interest in, and knowledge of, engineering, and was never happier than when in the workshop with all its noise and bustle of machinery.

The fact that oil and its accompanying dirt was a necessary part in workshop production was no deterrent to her, for she revelled in creating things, putting them together and making them work.

It was a great idea to originate a body such as the Women Engineers, and a great practical achievement to place on its feet the new society for its embodiment. In the matter of war-time organisations, it says much for Lady Parsons prescience that this one should have remained to continue energetically to preserve its initial principles and impetus.

Lady Parsons had a great love of reality. Her manner to those of whom she did not approve might appear arrogant and overbearing, but she could be the kindest of friends and the most charming of hostesses. I remember with affection many happy days spent at Ray Desmone, Lady Parsons' beautiful home in Northumberland, and the countryside, rugged and a little sombre, which we explored together with great spirit and energy. Lady Parsons was an expert motor driver, a very good horsewoman, and exceedingly energetic. She thought nothing of spending a strenuous morning cantering on horseback over the farm, would then take a long motor journey of 100 miles or so, and be back home at night entertaining a party at dinner.

Lady Parsons was therefore no mean exponent of the rights of women, and she showed her sincerity by generously backing her opinions by financial help during the early years of the establishment of the Society.

The help thus given was considerable, and enabled the W.E.S. to be maintained at a time when it was impossible for it to support itself independently. Arising out of its pioneer work the writer favoured the setting up of an engineering workshop, which later became known as Atalanta, Ltd., and herself personally secured the good-will of Lady Parsons and the Hon. Lady Shellev Rolls in the venture. With the financial help and backing of many women, and men interested in women's work for en-



*The Hon. Lady Parsons, J.P.*

gineering, the project was started with high hopes and a great endeavour. It is regrettable that a venture started with such wonderful support should not have fulfilled its early expectations.

Lady Parsons was made an Hon. Fellow of the North-East Coast Institution of Engineers and Shipbuilders, and the ceremony in 1919, when she was received, in company with Field Marshal Foch and with Lord Weir, was most impressive. She was the first woman to be admitted a member of the Shipwrights' Association.

To many of us it has always been a matter of the keenest regret that Lady Parsons should never quite have realised the great potential which lay in the Electrical Association for Women. It is true that she favoured the project, for the very first public meeting was held in her house in Upper Brook Street, when she presided over the meeting which inaugurated



the new movement. It was a delightful setting for a very important development in women's work and activity, and the writer pays her tribute to one who did a good deal to make it possible.

Lady Parsons was a keen feminist, and, during the period of greatest struggle, was a militant suffragette. She had strong convictions, and the tremendous energy which flows from them. To all who knew her it will come as no surprise that Lady Parsons bore with stoic fortitude the unkind buffet of fate which brought her years of suffering and finally robbed her of life; with her passing goes a great woman!

But what remains is more than a memory, for the abiding work which Lady Parsons herself did, and inspired others to do, goes on.

We of the Women's Engineering Society pay our tribute of affection and gratitude to the woman whose inspiration gave us birth, and whose qualities of permanence and faith will serve not only as guide, but as a spur to us in carrying on.

We have received from the University of Birmingham the Third Edition of their "**Register of Graduates**," which is a welcome addition to our reference shelves.

## THE WOMAN ENGINEER'S BOOKSHELF.

"**Radio Upkeep and Repairs for Amateurs**," by A. T. Witts, A.M.I.E.E., Chartered Electrical Engineer. Published by Sir Isaac Pitman and Sons, Ltd., London. Price 5s.

The author himself describes this little handbook as "Radio First Aid," and from the average radio receiver owner, who has neither the technical knowledge nor the time or patience to study theoretical principles, it will receive a very sincere welcome. It is a simple, non-technical book of straight-forward instruction, enabling the ordinary owner to find out what has gone wrong with the radio, and then, if it is within his powers, how to put it right. Clear and explanatory diagrams explain every point throughout the book, and a list of the very few electrical terms used, with their meanings, is given at the beginning. Eight chapters are devoted to the upkeep of the set, to tracing faults and clearing them, care of batteries, accumulators and components, and to going over to all-mains valves, and at the end a particularly useful chapter explains the fitting of a gramophone pick-up. The book should meet a very popular need.

"**Rubber in Chemical Engineering**," by H. P. Stevens, M.A. (Oxon), Ph.D., F.I.C., and M. B. Donald, M.Sc., A.R.C.S., etc. Issued by the Rubber Growers' Association, Inc., 2, 3 and 4, Idol Lane, Eastcheap, E.C.3, and obtainable from them on receipt of 1½d. for postage.

In recent years there has been a considerable development in the use of soft rubber in chemical engineering, and this handbook describes and sets out the present position of rubber as applied to the chemical and allied industries. It makes interesting and informative reading, and is well illustrated, both with photographs and tables of statistics.

## Some Ideas on Electrical Engineering as a Profession for Women.

By Professor J. K. CATTERSON SMITH, M.Eng., M.I.E.E..

William Siemen's Chair of Electrical Engineering, University of London, Kings College.

The fact that the Engineering Industry has not absorbed very many women in the technical and executive branches is often interpreted as an indication that there is neither room for them nor inclination, on their part, to enter the industry. That this view is erroneous may be confirmed by a very slight enquiry into what is happening, indeed, it must be taken as representing the outlook of a past generation. Opposition to women entering the heavy engineering industry is but natural, and this, in the past, has been one of the factors barring the way. It is to electrical engineering industry that women now are turning, because in the course of its extremely rapid progress and development there are numerous openings for practical or technically trained women in the varied forms of light engineering which the industry embraces.

One of the largest manufacturing firms in Lancashire employs several women designers in their motor department, who deal with the calculation and design of electric machinery. A woman member of the staff of a well-known firm of consulting engineers in London re-

cently read a paper, before the Institution of Electrical Engineers, of which she was joint author. This paper has been read at several centres in the country and has been awarded the Institution Premium on account of its excellence and importance to the engineering industry.

Such instances as these are encouraging, but they reveal, because of their exceptional character, the fact that women have scarcely begun to enter the electrical engineering industry, although when they have done so they have been most successful and that they have, somewhat diffidently, seized the first opportunities offered and in so doing probably have displaced men. There is little to gain and much to lose by any endeavour to displace men, and it is to be hoped that great care will be exercised in exploring new avenues for the employment of women in order that harmful competition with men may be avoided altogether.

The rapid expansion of electrical activities in many of the most useful and paying spheres, offers openings for the employment of



trained women, that is to say, women possessing a practical bent and women who have undertaken the more scientific study of technical branches. It is now generally recognised that the future success of the national electric supply system, or "Grid," depends to a very great extent upon the widespread utilisation of electricity by women and they ought to see to it that facilities are provided to enable them to understand all about the practical applications of electricity to everyday purposes. Listening to lectures or reading pamphlets will not suffice; it is essential that women should handle electric apparatus in specially arranged laboratories or workshops in order that they may utilise with success the appliances designed for household or other purposes. It may be regarded as obvious that women should undertake the design and development of electrical appliances intended for household use, for it is really unfair to expect men, who have little or no experience of cooking, to design an electric cooker which is not only beyond reproach as regards its capacity for cooking, but is not open to criticism as regards cleaning. It is high time that women took a hand in arranging such details as the position of supply points in the house, for these usually are placed in almost inaccessible positions such as are most inconvenient to the user.

The light electrical industry includes manufacture, selling and maintenance services in connection with the following:—

- i. Electric lighting, cooking, heating and ventilation.
- ii. Radio, sound-film, photo-electric, electro-medical, etc., apparatus.
- iii. Small power machinery for sewing machines, household appliances and small factory purposes.
- iv. Electric measuring instruments of all kinds.

There may be included with the above list the openings there will be for teachers in schools and colleges, and also the openings which may be found in the offices of Patent Agents.

The main thing to do is to strive towards the creation of new ways of utilising electricity in order that new manufacture and thus new chances of employment of a kind most suitable for women may be developed. It must be realised that much electrical manufacturing is not engineering at all, and yet it is frequently much more likely to be commercially successful than heavy engineering. Associated with the selling and service sides of the industry there exist two important side lines, viz., research and development work and legal and patent work, which offer a field that is relatively small, but at the same time most important. Women are already engaged in the former branch, but, so far as I am aware, not

in the latter. In order to ensure success it is desirable that girls at school who show some interest in things mechanical should be given a chance to develop this bent, and by the example of teachers they may be encouraged to become proficient and capable of taking advantage of the various technical courses already provided in technical colleges.

Vocational training in properly equipped trade schools would provide the training required by the majority of young women and for those who wish to proceed to higher studies leading to research there are the Universities which offer training and research facilities. The first essentials are (i.) a realisation that it takes a considerable effort and much concentration to earn a pound in engineering work, and (ii.) that success in industry depends ultimately upon the possession of health, ability and enterprise, and, finally, upon knowledge and imagination. The training of the mind to achieve invention or the introduction of new and better ideas, or even to make small improvements in existing arrangements, is a matter which demands immediate attention by teachers, for it has been neglected almost altogether in the past.

It takes considerable experience and a decided gift to invent anything useful or even novel, but much can be done to stimulate the mind in such directions. There is no real evidence that women cannot invent, and it will be a matter of great interest to watch the patent records after women have seriously taken to engineering. Progress in industry is bound up with the capacity for invention, and the electrical industry depends particularly on the imagination and enthusiasm of those engaged in it. Women should take part in the activities of the professional Institutions and Societies which look after the progress of that branch of the industry with which they are concerned and the well-being of their members. Girls might well be encouraged at school to take up craft work and to learn the properties of metals and other materials and the use of tools and processes. I believe that they ought to make models in the same way as their brothers. I do not see many girls sailing model yachts on the Round Pond in Kensington Gardens although those who like it make very good yachts-women.

It might be advisable to consider the provision of special training colleges for women engineers, because technical colleges and university courses have been developed to suit men, and therefore are rather of a make-shift for women. Courses of training arranged to suit women could be arranged easily, and such courses would provide a far better training, as far as the technical side goes, than those which exist at present. A women's engineering college would be arranged to suit women, and much time could be saved and unnecessary subjects left out of the courses.

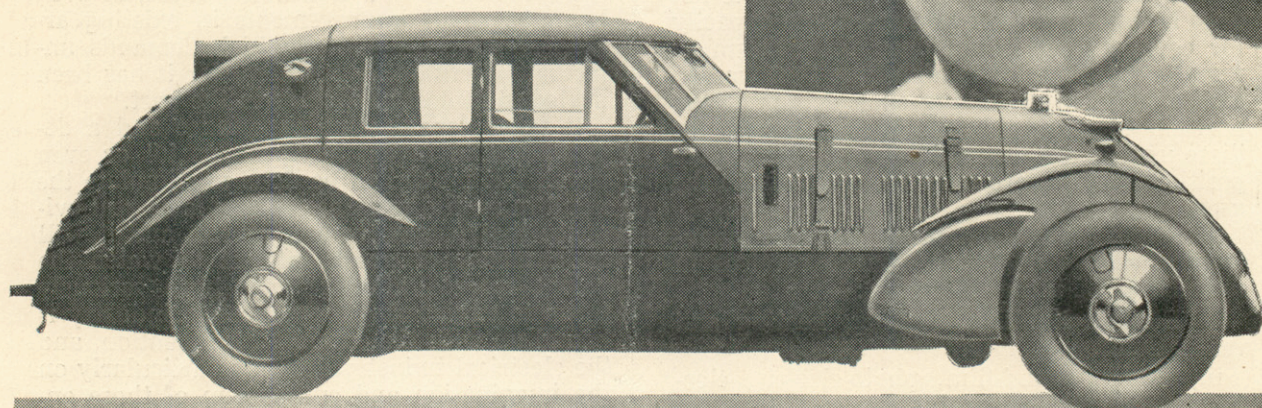


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# 104 M.P.H!

## World's Fastest Diesel Car Speed



At Brooklands on Oct. 27, Capt. G. E. T. Eyston attained this speed, exceeding the speed previously achieved by America. The A.E.C. engine used heavy oil as fuel instead of petrol and was lubricated with

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**Castrol**  
AA

**"If there were a better oil than Wakefield  
Castrol I should use it"**

*Serge Eyston*

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# Electrical World

## NEWS ISSUE

Volume 117, Number 1

January 3, 1942

### Home Front Morale Held Important in England

*Government asks utilities to foster normal home life "behind the blackout"—Generating stations protected, staffs carefully trained for emergencies*

*As told to HENRY G. DOOLEY, Associate Editor*

Keep the home lights burning, Miss Caroline Haslett, president of the Women's Engineering Society in England and director of the Electrical Association for Women, said in an interview last week with ELECTRICAL WORLD just before her departure for England via clipper to Portugal.

"In England we live in a permanent black-out," Miss Haslett said, "and homes, stores, generating stations as well as other buildings are blacked out all night, every night.

"Yet people must keep on living and plant engineers must continue to perform their duties. As a result, the people are now encouraged first to equip their homes properly for complete blackouts for the duration and, second, to resume their normal lives as far as possible, behind the blackout, in their homes.

#### **Power Plants**

"Generating stations and other utility structures are under military control and protected by armed guards. Barbed wire and other protection are provided so that nobody even gets in the vicinity of the station without first being challenged and presenting proper credentials."

As a result the utilities do not find it necessary to install floodlighting systems to forestall sabotage, which would

at the same time provide guides to enemy bombers. From the outside the stations appear to be completely dark and in the daytime are cleverly camouflaged, Miss Haslett says. Even though utility facilities, including generating stations, have escaped substantial damage so far, new steps are being taken particularly with respect to new construction to make these facilities even safer.

"Inside the stations lighting intensities have been decreased somewhat and plant workers perform their normal

duties, except when spotters on the roof announce the proximity of enemy planes," Miss Haslett continued. "Then each employee goes to his war station and knows just what his own duties are, as well as other special duties should a designated co-worker be unable to perform his duties.

"These men are trained to a high degree for these tasks, many long hours having been devoted to this training work.

"Power plant crews are trained and completely equipped to take care of attack by incendiary bombs, by poison gas bombs, and by high explosive bombs. Among other equipment they have fire helmets, full-length asbestos suits, complete degasifying equipment, stirrup pumps, sand bags, etc. But the important point to remember is that these crews are particularly well trained."

Excellent service has been maintained by the electric companies, Miss Haslett commented, as cables and overhead distribution have not been disrupted by bombing anywhere near as much as have gas mains. Furthermore, repairs

### Blackout Briefs

The War Department announces that interceptor commanders and their designated agencies now have sole responsibility for initiating orders for blackouts, radio silence and discontinuance of other activities which might assist in enemy attacks. False rumors to alarm the people it was pointed out, are a recognized form of fifth column activity.

Police Commissioner Valentine of New York has forbidden air raid wardens to interfere with the city's 16,000 traffic lights; with 200,000 wardens now enrolled it was reported unofficially that as many as 60 percent of the applicants will have to be weeded out.

San Francisco's newly formed Civilian Defense Council has assigned defense tasks to 35,400 volunteers.

Puget Sound Power & Light dispatchers estimate blackout has reduced usage by 350,000 kw.-hr. daily, about 12 percent. The loss was twice that amount before industrial plants blacked windows and skylights.

Governor Langlie of Washington has asked state financial aid for an armed guard of several thousand men to protect Seattle utilities.

The National Park Service has extinguished the main light in the Gettysburg, Pa., peace memorial.

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**AIR RAID PRECAUTIONS**—New England Power System's Northern Berkshire employees practice first aid as part of the company's "be prepared" policy

to electric facilities are made more quickly.

Utilities are beginning to use women for meter testing and meter reading, Miss Haslett said, and women are doing a great deal of the large volume of appliance repair work necessary on washers, cookers and all domestic appliances. These are usually newly hired employees, as it was found better to leave billing clerks, cashiers and others at their regular tasks. Under discussion is the matter of trying out women for substation work, such as for record keeping and for light maintenance work on distribution systems, she said.

#### Home Economists

"Home economists in the United States should not rush off to war service," Miss Haslett stated, "because they have most important duties to perform in helping customers maintain morale of their families by maintaining cheerful homes behind the blackout, preparing nutritious meals and by showing customers how to get more wear from properly using their electric washers.

"Home economists have very useful missions to perform if evacuees are moved into the company's territory. Their living arrangements must be set up, with used appliances. Demonstrations for recently arrived evacuees and residents of the area are continuously necessary to keep customers abreast of the new improvised ways of preparing food, of keeping up the home and of best ways to protect the home under all circumstances.

"If air raid shelters are constructed

home economists are of great help in setting up electric food service facilities for the occupants as well as electric space-heating arrangements.

"They should make themselves experts in the art of home blackouts, especially at reasonable cost to customer.

"People stay at home more under blackout conditions and our government wants the homes to be cheerful, occupied by people living as normally as possible. Therefore the home economists must help on blackout procedures, with proper lighting in the home and proper cooking for the family. Our government considers this very important work and utility electric company employees have been classified as in a reserved occupation." It is probable that the "reserved occupation" status of utility employees will be modified, she added, and some non-essential employees will be transferred into the army or into war plants.

#### Home Lighting to Be Key

Anticipating a gradual tightening in the supply of ranges, refrigerators and other electric appliances during 1942 the sales department of the Public Service Co. of Indiana, Inc., will place major emphasis on residential lighting sales. In a series of meetings held last month Merchandise Supervisor H. A. Millbern announced that light conditioning would be the foundation of all residential load building activity during the year.

## NEWS BRIEFS

**LITTLE POWER WASTED** when Henry Ford tests new airplane motors. Each is connected to a Westinghouse 1,250-kva., 720-r.p.m. synchronous generator through a hydraulic slip coupling. At engine speeds above 720 r.p.m. the generator runs at constant speed and delivers power to the plant's a.c. bus.

**THERE ARE SOME 750** cathodic protection units defending some 3,000 miles of transmission pipe line, according to a recent estimate, says the Bureau of Standards.

**STATE COUNCIL OF DEFENSE** in New York has issued orders to six utility companies to post signs "No Entry Without Permission" and three companies are being permitted to close portions of public streets adjacent to generating plants.

**TIME OUT FOR BLACKOUTS** taken by employees covered by the wage and hour law need not be paid for where no work is done, according to Baird Snyder, administrator of the wage and hour division, Department of Labor.

**PRACTICE BLACKOUTS** are expected for the entire state of Wisconsin. The blackout committee for Milwaukee consists of S. B. Way, president Wisconsin Electric Power Co.; R. H. Pinkley, president Milwaukee Electric Railway & Transport Co., and Howard Ilgner, superintendent of city electrical service.

**TWO-POUND BOXES** of cookies are being prepared by the home economics division of the Westinghouse company at the Mansfield Ohio plant to be sent to the 930 employees of Westinghouse plants now in the Army, Navy, Marine and Air Corps.

**IN ST. LOUIS** they are preparing home wiring plans in which the number of outlets conforms to OPM limitations. The complete specifications are used in the negotiations with the FHA, OPM and the wholesaler. The plans are so arranged that later on the entire installation can readily be brought up to full adequate wiring standards.

**SIX ROAD COMPANIES** are now playing one-night stands to capacity houses of appliance salesmen from coast to coast, throughout Easy Washing Machine Corp.'s fifteen sales divisions, in a two-act playlet, "Double Your Money Back" (Or How to Sell Easy Spindriers). The demonstration, in one easy lesson in two acts, has met with enthusiastic response from the dealers and salesmen who have witnessed the performance, according to W. Homer Reeve, sales manager.