

The Remarkable
Achievements of

Photography
in the WAR

A Story of the
War Effort of

ILFORD LIMITED

ILFORD, LONDON

ILFORD LIMITED AND THE WAR EFFORT.

During the course of the war, over six hundred employees left our factories, offices and laboratories to join His Majesty's Forces. Of these, twenty-seven lost their lives. Six employees were killed while still civilians working with us, three in air raids and three when a V-2 rocket fell upon our Ilford Factory. One of our Stokers in the Engineering Department lost his life after volunteering to fight a fire in the magazine of H.M.S. MALCOLM at Cardiff. Four members of our Staff were decorated with the M.B.E., one laboratory assistant won the M.M., and another the D.F.M.

CASUALTIES AND DAMAGE DURING LONDON BLITZ.

Situated in the London area, the Ilford, Brentwood, Park Royal, Cricklewood and Watford factories were subject to the full force of the enemy's aerial onslaught, and employees had to work through the original London blitz, through the flying bombs and the rockets. Apart from minor damage, the Brentwood factory escaped, although high explosive bombs and rockets had dropped within a few hundred yards. The Ilford factory was less fortunate, and in the early days suffered damage from incendiary bombs, which interfered with plate production for a time. Park Royal factory suffered serious damage from a flying bomb. Then, when the ordeal was almost over and after rockets had fallen all around the Ilford factory, one fell on the factory itself, killing three employees and wounding twelve. But this was the beginning of the end for Germany, and it was the last blow which we were called upon to take.

With all this trouble, and largely due to the fact that our manufacture is shared between our various factories, we were never put out of action. Quality was maintained at the highest level, and no defects reports were received in respect of our products. Our output was, in fact, higher than ever before, but practically none of it was finding its way into our usual markets. Roll films disappeared from the shops, and other products were supplied on a very restricted quota. All the Ilford output was going to the Services.

HOW AIR PHOTOGRAPHY CONTRIBUTED TO VICTORY.

It has been said that the recent war was won with cathode ray tubes and photographic materials working separately and in conjunction, and there is considerable justification for this point of view. Certain it is that without aerial reconnaissance our Forces would have been very much in the dark as regards the enemy's movements and intentions. After Dunkirk, aerial reconnaissance provided the only regular service of information from the Continent—our first knowledge of the flying bomb (and of the enemy's plans in respect of it) was derived from an aerial photograph taken over Peenemunde. It is now clear that Allied photographic equipment and techniques were far in advance of those of the enemy. The later successes of the Allied armies were made at

least much more certain because of this favourable balance of photographic achievement, and because, the importance of the photographic method having been recognised, good care was taken to ensure that whatever photographic equipment the enemy possessed he was unable to use it effectively. On the other hand, aerial reconnaissance provided the Allied Forces with up-to-the-minute information of the state of the defences on the Normandy beaches, over which the invasion was to take place, and of every inch of the ground over which the Armies were to advance.

COLOSSAL QUANTITIES OF FILM USED.

At the end of the war, the R.A.F. had a hundred thousand cameras in operation, and were using film at the rate of 25 million square feet per year. Seven tons of photographic prints were needed to prepare for the Africa landings, and in this area alone the subsequent consumption was at the rate of nearly one million prints per month.

The photographic method was also widely used for bomb damage assessment, for the briefing of aircraft crews, for instructional purposes, and in a wide variety of training devices.

At our Brentwood factory, we have made up to 18 miles of film 40" wide per week for the R.A.F. This material was supplied on special spools from 5½-9½" wide, and the total length put up in this way during the war amounted to 45½ million feet, or nearly 9,000 miles. In narrow width material, we supplied a further 5 million feet. At an early stage in the war it was found necessary to increase the operational height at which our reconnaissance pictures were being taken. Originally, aircraft films were pin driven in the cameras, and because of the very low temperature at high altitudes, the film base became brittle and inclined to crack, and it was decided that it would be necessary for films to be used in this way to be perforated. No machines capable of perforating films of this description were in existence, but in two months we had converted a number of cine perforators and were easily the first company to produce films perforated to specification. During the course of the war also, we made 32 million feet of film for aircraft gun cameras for the training of aircraft gunners, and also for the recording of actual aerial combats. It was upon the evidence supplied by these pictures that our pilots based their records of successes.

THE PRODUCTION OF NEW MATERIALS FOR THE SERVICES.

In the period immediately prior to the invasion of the Continent, we were called upon to produce a special film for use in map making, and after our break-through we had to supply this material at an ever-increasing rate, because the tanks were in danger of running out of the areas which had already been mapped. In all, we supplied nearly 1½ million square feet of this product.

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For the Army Microgram service, we supplied film for the making of 14,000,000 micro negatives.

At the request of Telecommunications Research Establishment, we made an extensive study of films for cathode ray recording instruments and, as a result, we were able to supply the Radar people with two new materials—5B52 and 5G91—which were faster than and generally superior to any materials previously available. These films were used for a wide variety of most secret work, and the fact that one of them in particular could be completely processed in a matter of seconds added greatly to their value. In this field we can claim to be definitely the leaders.

For the Intelligence Service we made film of extremely high resolving power for use by our agents in enemy countries, for the production of messages and reports in a form in which they might be smuggled into and out of enemy occupied countries.

We were approached to produce a mechanographic recording film, i.e., a film in which the sound track is not photographic, but is cut as in a gramophone record, for use in a listening device, and we have reason to believe that this particular machine and our film enabled our Forces to cope with one of Germany's most ingenious and dangerous weapons—the radio controlled aerial torpedo. No other manufacturer was making this particular film.

X-RAY MATERIALS EXCLUSIVELY SUPPLIED.

Our X-ray film production department was working to capacity throughout the war years building up stocks for emergency use in this country and satisfying the needs of the Fighting Forces in all the different theatres of war. We were the only makers of dental X-ray film in this country. X-ray intensifying screens are another specialty, and here again there was no other supplier on this side of the Atlantic. This particular work was done in our Watford factory.

18 MILES OF 40" BROMIDE PAPER PER WEEK.

On the Paper side, from our Mobberley and Park Royal factories, we supplied standard Bromide Paper in cut sheets and rolls to all the Services, but particularly to the R.A.F. for the Multi-Printers, each of which, fed with negatives and paper, produces 1,000 finished prints per hour, processed, dried and separated. We have made up to 18 miles of paper 40" wide per week in the form of Multiprinter rolls for these machines. In addition, we manufactured a special waterproof paper for quick processing in the field, and the production of this material involved a radical change in the set-up of one of our paper coating machines.

We supplied a special paper for use in the instrument which checked the correct functioning of the degaussing equipment with which our ships had to be hurriedly equipped at a time when the magnetic mine was a real menace. We also provided for this work

a special developer made and packed at our Watford Works, and our recommendations in respect of photographic technique became standard practice. Another of our special papers, also designed for quick processing, was used successfully, we believe, in apparatus designed to counter the flying bomb attacks.

From the Ilford plate factory we supplied plates to all Service departments and, in particular, our large Process Panchromatic plates 40" x 36" were used in conjunction with our films for the work of map-making already referred to.

EQUIPMENT FOR DAY TRAINING OF NIGHT FIGHTER PILOTS.

In addition to supplying our standard Light Filters and Safelights in very large quantities, and many special Filters and Wedges for war purposes, our Filter Department co-operated in the devising of techniques for training pilots in night flying by daylight. Many hundreds of special filters were supplied for this work, and it is fair to say that all the techniques employed were derived from the work done in conjunction with our Company. In addition, we supplied many thousands of emulsion coated discs from which graticules were made for reflector gun sights in aircraft. Similarly, large quantities of diffusing masks were made for night fighter pilots to counteract the variation in sensitivity across the visual field which exists when eyes are dark adapted.

In the laboratory we held a research contract for work done in conjunction with the Royal Aircraft Establishment, Farnborough, with special reference to night photography and the use of bomb flashes. Apparatus was devised and built in our laboratories for the purpose of determining the characteristics of the flashes themselves. Sometimes they were exploded electrically on the ground, sometimes dropped from aircraft. The trials necessarily took place at night at various aerodromes and open spaces from the Isle of Man to a bleak heath in Surrey.

FILM STUDIO TECHNIQUE PLAYS IMPORTANT PART.

Much of the work was, of course, done in our laboratories, and our Cine Studio at Brentwood proved of exceptional value. We were able to set up in this Studio an enormous photographic mosaic representing the countryside, and to move in front of it a structure carrying the camera, which represented the aircraft moving over the ground at any required velocity. The flashes themselves were made artificially, and could be placed in any position to illuminate the ground. We even went so far on some occasions as to fill the Studio with smoke in an attempt to simulate atmospheric conditions normally obtaining at high altitudes. This set-up was the only one in the country available for the purpose, and proved of great value in some of the experimental work.

DEVELOPMENT OF AERIAL NIGHT PHOTOGRAPHY.

Throughout the period we worked in very close liaison with the Royal Aircraft Establishment and other laboratories engaged on similar problems. At the beginning of the war, night photography had scarcely passed the experimental stage, and it was only possible to obtain photographs of indifferent quality from altitudes of several thousand feet. By the time the bomber offensive had reached its full intensity, practically every night bomber was fitted with night photographic equipment, with which was recorded ground detail showing the area in which its bomb load had been dropped. This was of great value in assessing the effectiveness of concentrated raids. By D-Day the quality of night photographs was such that they could be used for reconnaissance purposes, and considerable use was made of them during the campaigns in France and in the Low Countries up till the end of the war with Germany. Night photography in this role was particularly valuable in obtaining information on the enemy's movements at night. Work was also done on intensification, i.e., the intensification of photographic effect by means of subsidiary exposure. We also helped to devise a special exposure meter for use with cathode ray traces, and we carried out extensive lens testing and resolving power work, again in conjunction with the Royal Aircraft Establishment.

UNIQUE PHOTOGRAPHY FOR TRAINING ASSAULT PARTIES.

We devised a special technique for applying photographic images to the surface of relief models of beaches and the like for the training of assault parties, and we helped in the development of night bombing training techniques using infra-red sources invisible to the aircrew, but capable of affecting a photographic film in a camera operated by the pilot, who makes the exposure instead of dropping the bomb.

Our Engineers contributed also, not only by maintaining our plant under difficult conditions, but by making a large range of tools for Service purposes. We made, for instance, some of the first tools used for the quantity production of plastic anti-personnel grenades. We undertook also precision grinding of aircraft parts, including alignment test shafts and boring bars for the manufacture of Sabre engines for the Typhoon. We manufactured also camera magazines for the Admiralty.

PRODUCTION OF NOISE RECORDINGS FOR PERSONNEL TRAINING.

At Cricklewood we made thousands of records on glass discs of aero engines and machine gun noises for use as realistic sound backgrounds for the training of Wireless Operators and Navigators. We made dials and gauges for a wide variety of Service requirements, for gun sights and for many of the Radar instruments. We carried out a developing and printing service for the Directorate of

Aircraft Recognition Material, M.A.P., and all photographs of hostile aircraft appearing in the Aircraft Recognition Training Manual A.P. 1480 were produced by us. We made tactical view photographs embodying fifty views of every enemy aircraft for the U.S. Army Air Force. Similar recognition pictures of ships were made for the Admiralty and of all hostile fighting vehicles for the Army. Models of all types of enemy trains were also photographed, and our work was used exclusively by the American Training Manual of enemy train recognition.

MICRO ENLARGEMENT PRODUCTION.

We made for M.A.P. enlargements of single frames from 16mm. gun camera film embodying the first true photographic records of the Messerschmitt aircraft 410, 163, and 262. The Army microgram service had its beginnings at Cricklewood, and until multiprinters were installed by the War Office we made thousands of the 10 x 8 enlargements from the micro negatives. We also did a great deal of microcopying work. Work done by us for Fighter Command, Eighth Air Force, U.S., was used to decide upon the best form of camouflage for concealing the one aeroplane carrying the Radar Bomb sight in a formation of fifteen. We made a mosaic of 35 miles of the Ruhr, and from the negatives produced transparencies for the training of bomb aimers. We made test papers for testing the quality of Glycol in aircraft engines. We carried out all the photographic work in connection with the high flying test chamber at Farnborough.

COMPLETE SCORE OF SYMPHONY, PHOTOGRAPHED FOR CAIRO ORCHESTRA.

We produced for the British Council a complete photographic score of the Vaughan Williams Symphony in D at the shortest of notice to enable the Cairo Symphony Orchestra to put on this British composition when our prestige in Cairo was at a very low ebb.

In addition to all this, we made propaganda pictures, reproductions of radiographs, and did a great deal of work in connection with clinical photography.

At Tavistock House, we played a leading part in the development of mass radiography on miniature film, and in this work co-operated closely with the Ministry of Health.

CO-OPERATION OF EMPLOYEES WITH MANAGEMENT.

Throughout the War, our employees have stood shoulder to shoulder with the Management. They worked without slackening through all the dangers which confronted us, feeling that in doing so they were standing together with the Fighting Services. We expect to carry on in the same fashion in the post-war years, and

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we have no reason to doubt that we shall go on happily together, improving Ilford products and Ilford service and maintaining the reputation which we are proud to believe we possess.

The work which we did for the Services will have a very direct application to our normal products and, in fact, the discoveries which we made during these years of war are even now being incorporated in our range of products for normal use.