STEEPLEJACKS


REGISTERED TRADE MARK
MARCO PRODUCT

M. MACDONALD & CO. (STEEPLEJACKS) LTD.

STEEPLEJACKS AND
LIGHTNING CONDUCTOR ENGINEERS

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96 Renfield Street
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STEEPLEJACKS

by

MALCOLM MACDONALD

Managing Director

M. MACDONALD & CO. (STEEPLEJACKS) LTD.


REG^D TRADE MARK
— OF A —
MANDCO PRODUCT
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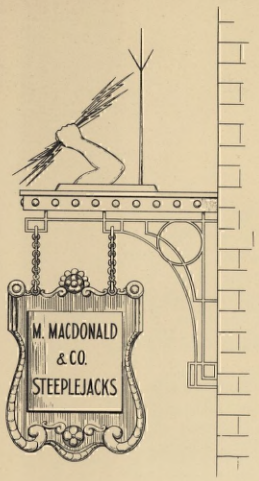
STEEPLEJACKS

STEEPLEJACKS! How often ordinary laymen watch from the streets the activities of men moving about, more resembling flies than anything else, on steeples or chimneys hundreds of feet in the air, or some building of dizzy heights. They stand and wonder, and in their wonderment, there is curiosity as well as admiration. They begin to ask themselves all kinds of questions, and finish with the conclusion that after all this task might well have been included as another wonder of the world. How can they remain steady and work at the same time at such heights—how do they steel their nerve—how do they establish poise?

To answer these and other questions is the purpose of this brochure. But let us first consider how the services of steeplejacks became so necessary that to-day they are quite common-place. It was the industrial revolution that brought this highly specialized profession into the forefront; factories and workshops began to spring up everywhere, and this brought into its train the problems of steam and a smoke-laden atmosphere. The obvious answer to smoke abatement—we had not then reached the present great heights in scientific research—was more lofty chimneys, and the face of Britain began to take on a new appearance although less attractive. First of all these chimneys of greater and greater heights had to be built, and as time went on they had to be repaired. He was no ordinary bricklayer or mason who was employed on this specialized task, and the calling of the steeplejack became increasingly important. Those engaged in the profession realized the necessity for the admission of trainees, and from the outset it was to the young they had to look. Most boys love climbing. In early youth there is usually the spirit of adventure, and this was the avenue the master steeplejack had to follow. Catch them young was his motto, for it was no use in a general way attempting to train people in adolescence. By that time, their nerve was not so strong, but if one had been trained from early youth—well the job became more or less second nature, though at no time must familiarity breed contempt.

INTEGRAL PART OF INDUSTRY. To-day the steeplejack is an essential and integral part of industry. Without him, catastrophies could happen. It is the steeplejack who is the "backroom boy" concerning the safety of high buildings, church spires, chimneys, and all those structures which lift their heads into the heavens. Like every other profession, advances have been made in technique in the intervening years from those early days when courage and a knowledge of building technique were the main essentials. Specialized knowledge gained from years of experience, the improvements effected in steeplejack equipment, which to-day carries the generally accepted term of "plant", have all played their part in the building of a system which must conform to the economics of the present generation and industrial requirements. No longer can the old-fashioned hold place. The steeplejack or the firm employing him must have marched with the times, otherwise restoration costs would be prohibitive.

Is the trade of a steeplejack hereditary? Yes, in some ways it is, but there are recruits to-day from families who have never had any previous experience of working



AN OLD TRADE SIGN

at great heights. Aeronautics have given to our young people a greater appreciation and perhaps a little less fear of heights, for so many of our sons have soared thousands of feet into the air, but always with the feeling they had something secure under them. Just in the same way, steeplejacks are made. Despite the great height at which they work, they feel secure no matter how narrow the platform. This is their security and in this, modern ideas of scaffolding and other devices mean so much. The climbing of chimney shafts, church spires and other buildings, is now made possible with the minimum of danger without the use of expensive scaffolding systems, yet there is added security, and one can readily appreciate that in such a manner costs are reduced.

And there is great variety in the work. It may be that a steeplejack is engaged one day in dealing with a dangerous chimney head, 300 feet or so high, and the next be travelling some 300 miles away to re-gild the clock dials of some famous cathedral church, or even advise upon foundations which have been thought to have become insecure. The need for thorough training is therefore very essential, for the class of work steeplejacks are called upon to perform, and even advise on, demands expert knowledge.

Speaking generally, it might be said that at the moment 80 per cent of the steeplejacks of this country have some former background in the industry. Tracing back the records of the house of Macdonald, we find that since the beginning of this century, there are representatives in our employ who have followed one after the other in the same family. There are others who have entered through some remote family association, but still there are others, and this is the vital point to the industry's future, who have come into the profession by their own special desire.

TRAINING. Psychology plays a very important part in the selection of candidates to join the apprentice group of our undertaking. First of all there is a thorough examination of each boy's background, especially in relation to his school report. We have found that the most suitable age to start an apprenticeship is 15. By then a boy has some ideas of his desires for the future, and his school

report is sufficient to indicate the lines of his development. For a whole year, they are placed under the personal supervision of the foreman, an employee of great experience. At the end of the year he makes a special report on each apprentice, from which we are able to judge his general reactions to the work, and the department, if any, to which he is most suited, and then we begin the "moulding" process, according to his own particular bent. It may be that a boy has a special aptitude for brickwork, and if this be so he would be given every encouragement to follow this line. He would be asked to spend four years, under expert guidance, on chimney building and repairing, two years on stonework, and one year in the lightning conductor department. In the course of his training, he would be placed in the charge of various foremen, so that he could inculcate the best from all, and at 22, providing he has been fully observant, he will become a first-class craftsman as a bricklayer steeplejack.

A thorough training is essential if the Macdonald organization is to retain its high reputation. The organization to-day has steeplejacks experienced in every class of work, both new and old. They are specialists, for every boy who comes to us is studied and eventually placed in the branch best suited to him, so that in the long run he becomes an integral part of the firm as a specialist. We pride ourselves on the fact that every contract placed with us receives personal supervision from an expert, and that the job is executed with the highest degree of skill. Our employees are only content with the best possible workmanship. That is to their credit and to the satisfaction of our clients.

It is perhaps only natural that the nature of the work detracts from a large number of entrants. Everyone knows it is a dangerous occupation. It is estimated to-day, apart from many semi-skilled men, there are only about 40 skilled steeplejacks in the country, and we employ over a quarter of this small number

ACCIDENTS. There is always a liability of accident in this, as in any other profession, but over a period of four decades our statistics show that the average is two fatal accidents a year. The cause of such accidents might be classified under three headings :—

(*a*) A dormant weakness in the structure of the building ;
(*b*) Defective plant ;
(*c*) Over-confidence.

So far as (*b*) is concerned, an experienced man will always check and re-check the strength of his ropes, boards, chains, etc., and never take for granted their supposed strength. Opinions on strength may differ and that which would be regarded as sound by one would be condemned by another. Thus experience counts, and we cannot emphasize too fully the importance of firms desiring the services of a steeplejack, to employ only a reputable firm, otherwise grave risks might be run. The weakness in the structure of a building might make itself apparent before the steeplejacks have even had a chance to complete their investigations, and what would then happen if the insurance figure was not adequate to meet the subsequent demand, or if there were no insurance policy in force at all. Such lack of business acumen does exist in some

quarters, and for your own safety we would advise clients to insist on every occasion on the production of insurance policies so as to avoid possible costly litigation at a subsequent time. There need not be any such doubts with the Macdonald Organization.

When we come to consider the third basic cause of accidents—over-confidence—that is a matter over which neither employer nor client has much control. This is sheer carelessness, because every steeplejack is taught, or should be, to take no personal risk, to observe and think clearly, and only perform one operation at a time. Such early advice is of the utmost importance, and we in our organization do everything in our power to impress the entrant into the profession of its essential nature. It is a second kind of safety belt which should never be disregarded. It is quite as bad as using inferior or doubtful plant, or for the mere handyman to take on the job of a professional steeplejack. That is asking for trouble, and much to our dismay there are those to-day who are prepared to take abnormal risks, men who are not thoroughly skilled in the profession and rely on gear which so often exceed most sanguine expectations.

An experienced steeplejack will judge every problem of his work with objective sagacity.

The line dividing genuine originality from a shallow affectation is sometimes a very thin one. The very complexity of steeplejack work tempts some tradesmen to take short cuts to conviction. These short cuts assume many dangerous forms and invariably result in a mediocre job being attained.

There can only be one path for any owner or custodian of chimneys to tread, and that is the one to safety. Periodical inspection and maintenance of all high structures are essential for they are far more exposed to the elements than ordinary structures. They have to bear greater stresses and strain, and it is certainly far more economical to have these inspections at given intervals. In this way, the expert can save enormous expense, for in so many instances the old adage of "A stitch in time" or to be more precise "The employment of a trowel in repointing" is all too true.

To many owners in the past, costs have been the predominant factor, but how often has it been proved that the cheapest is the most costly in the long run, and vice-versa. We say without hesitation, over a long experience, that a first-class job is always the best and the cheapest because faults are correctly diagnosed and many unseen dangers removed. And it is a lasting job. First-class workmanship should always be the main consideration, for so much is dependent on this particular class of work. Steeplejacks working for a reputable firm have a tradition to maintain and in the quality of their work they apply the hallmark of a firm's reputation. Remember what Ruskin said in this connection :

> "All works of taste must bear a price according to the skill, taste, time, expense, risk attending their manufacture. Those things called dear are, when justly estimated, the cheapest."

This treatise is explanatory rather than an effort to laudate any particular steeplejack, but we would advise owners and custodians of high and important building structures of the enormous responsibility they bear. That the best is the best is a

valuable dictum to follow because so many people who are penny wise and pound foolish often regret they acted without due regard to quality.

AN EXPERT'S VIEW. From the expert's view, chimney shafts such as are required for Power Stations, Gas Works, Coke Ovens, Blast Furnaces, etc., should be closely examined every three years, and factory chimneys irrespective of height should have a laddered inspection every five years. This is quite apart from casual ground observations. You will be surprised how maintenance costs can be kept at a minimum by these periodical inspections. With chimneys 15 years old and more it is usually found on examination that the surface mortar has disintegrated, thus allowing rain water to percolate to the core of the brickwork. This would soon cause a permanent weakness in the structure if it were not attended to, and is merely an instance where at small cost the defect can be remedied, but if unattended would eventually involve the owner in a very heavy expenditure.

Normally repointing is a simple operation, but it must be done correctly. It is no use merely filling in the fissures and open joints which have occurred. The first essential is to rake out all perished mortar and thoroughly clean all the joints, for without this initial process a sound job cannot be executed. Every owner of a tall structure knows how suddenly cracks can develop, either longitudinally or horizontally. To a layman, the causes are hidden, but to the professional steeplejack, a laddered inspection usually enables him to pinpoint the trouble. Sometimes a "list" occurs of alarming proportions, and in the majority of cases, it could have been obviated by periodical inspections.

We cannot stress too highly the value and importance of regular inspections. Their cost is saved over and over again in the retention of the solidarity of the structure. Decay is then checked, and major repairs more often than not prevented.

CHIMNEY BUILDING. Daily repetitive work is essential in the erection of a brick chimney, the height being decided by the amount of steam required. The prerequisite to a sound and effective structure is adequate foundations, and there must be a regulated daily rise, of the chimney in the building process. Speed must not enter into the contract, for there is always a danger of applying too much weight to the already "green" work below, which ultimately would create an inherent weakness due to the formation of settlement fissures and lead later to untold expense in maintenance. Then there is the question of the use of right materials. Experience has taught us that the ideal is a good quality engineering brick and lime mortar. Cement, which sets too rigidly, should never be used, as it would not allow of the required elasticity to enable the finished structure to respond to the laws of expansion and contraction.

And this brings us to another question which is frequently asked. Does a chimney sway, and if so, how much? The answer is that a chimney does move, the extent being governed by its height, design and location, and the prevailing wind

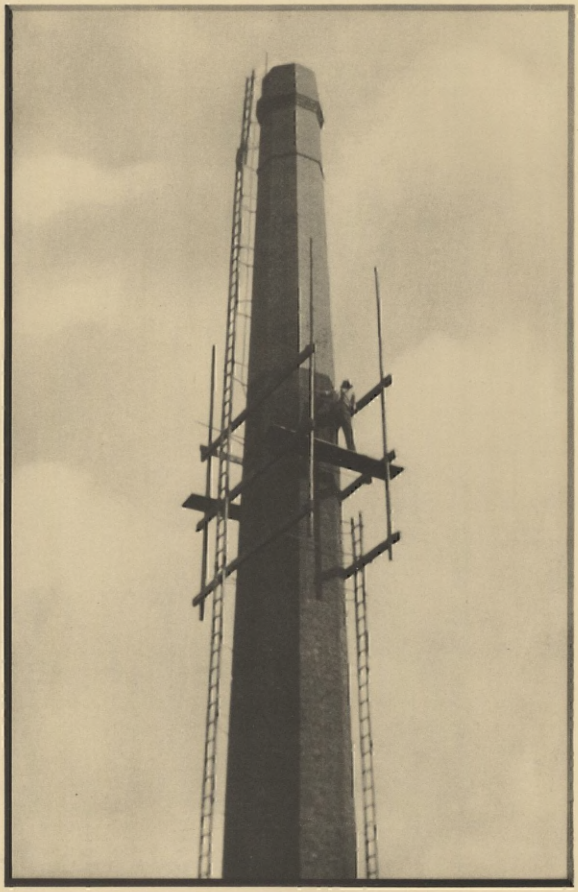
velocity. In open country, with the wind forty miles an hour, a 300 feet chimney will swing approximately four to five inches each side of the gravity line, but owing to the thickness of brickwork in the shaft, the momentum is lost over the upper two thirds of its height, that is why, when a chimney is observed to be swinging, no movement is felt as a hand is placed on the base. An excellent method to observe movement is to eye the chimney with a plumb corner of another building in close proximity, of course always taking care to discount moving clouds.

LIGHTNING CONDUCTORS. When one comes to consider the protection of chimneys and other tall buildings from lightning, it is a matter for individual treatment. There cannot be any stereotyped conductor system for chimneys which differ in height. The subject has to be considered in a scientific light, otherwise danger is unwittingly invited. Let us give an instance. The diameter of a factory chimney top may be 10 feet. It is against every rule to expect that a copper rod and discharge points protruding three or four feet above the top will offer adequate protection, although we have come across many cases where the impossible has been expected. A correctly installed system will perform its proper function, provided the ohmic resistance to earth is kept as low as possible in relation to the soil. So it will be seen that this is another job which should only be allotted to the trained man.

A steel chimney is a perfect conductor in itself when correctly earthed. From a long experience, we have devised many new lightning conductor systems. They have the registered trade name of "Mandco" and have been planned for every possible type of building.

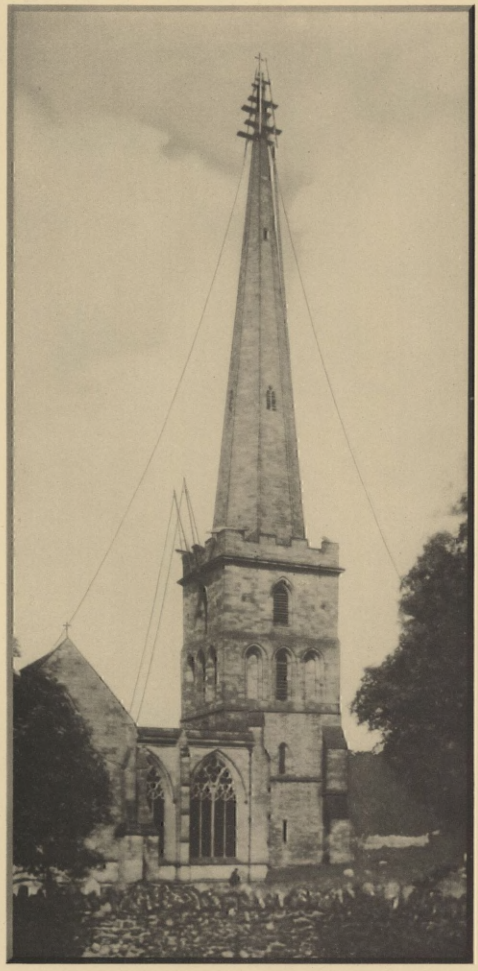
GENERAL. Our many business friends will, of course, readily understand that to describe fully the entire activities of the numerous specialized branches connected with the Steeplejack profession, such as straightening or felling chimneys, application of mathematical formulas in stresses and strains or the scientific restoration of our priceless cathedrals and churches, would of course require several volumes.

Therefore, if any of our readers have at any time a problem they would like to discuss, then the services of our Technical Advisory Department may be, as always, confidently prevailed upon, and of course without charge, for the Macdonald Steeplejack organisation is not unique merely because it is Britain's largest and foremost firm of steeplejacks who specialize in all classes of building work at high altitudes, but by reason of meticulous scientific acumen from the drawing-board stage to the completed contract—and still further—by inspections which are carried out annually, and reports submitted to our clients, which has enabled the sterling quality of a Macdonald contract to be wholly accepted as "worry-proof" by more than 7,500 users of its steeplejack services.



T. S. DONNE & SONS LTD., CASTLE CARY, SOMERSET

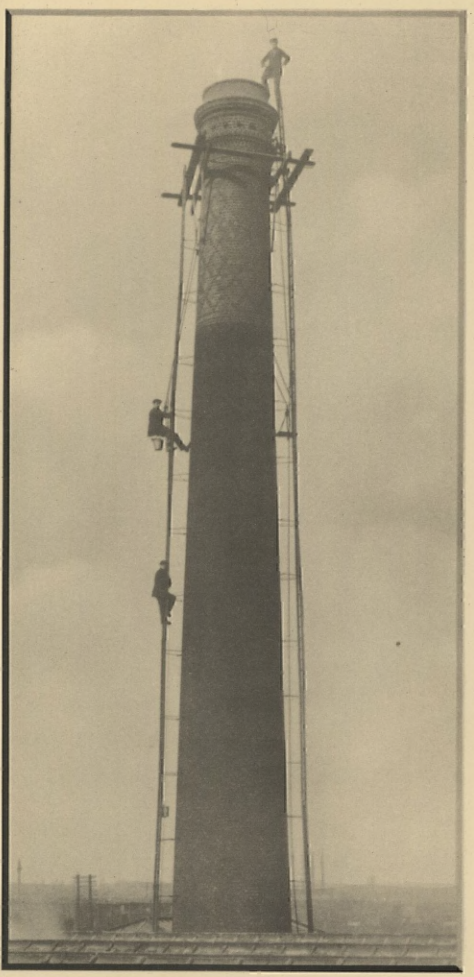
UPPER 40 feet rebuilt, remainder of chimney repointed and a modern "Mandco" Lightning Conductor installed.



LEDBURY PARISH CHURCH, HEREFORDSHIRE

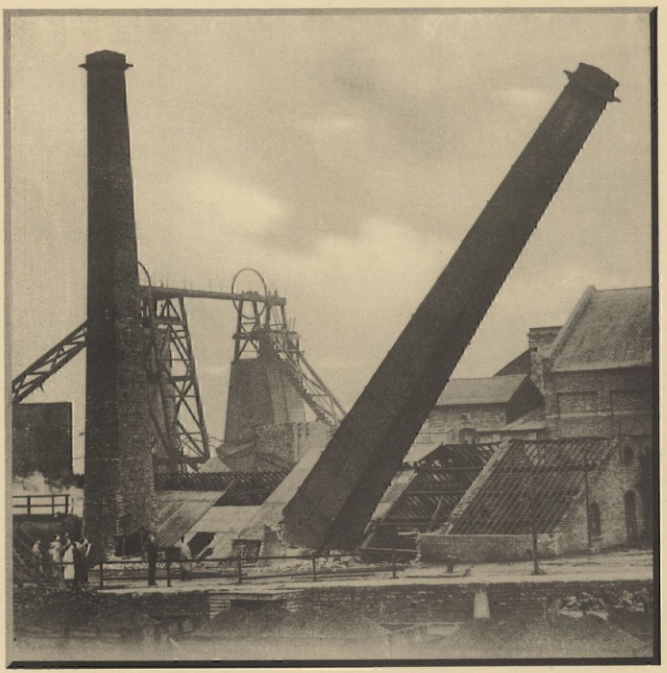
ARCHITECT: STRATTON DAVIES, Esq., F.R.I.B.A., GLOUCESTER

REMOVAL and rebuilding of upper 10 feet, repointing entire spire, erection of a 25 ton reinforced concrete belt to the top of tower, installation of a "Mandco" Lightning Conductor.



STEPHENS (INKS) LTD., HIGHBURY, LONDON

REPOINTED in red mastic cement. Interior lining rebuilt. Complete "Mandco" Lightning protection system installed.



NATIONAL COAL BOARD, No. 6 AREA, EAST MIDLANDS DIVISION

CHIMNEY felling is a specialized branch of the Steeplejack profession and is shown to advantage in this photograph. The congested area in which these chimneys were situated for felling necessitated mathematical calculations in order they should fall within the narrow path as shown.

AXBRIDGE PARISH CHURCH, SOMERSET

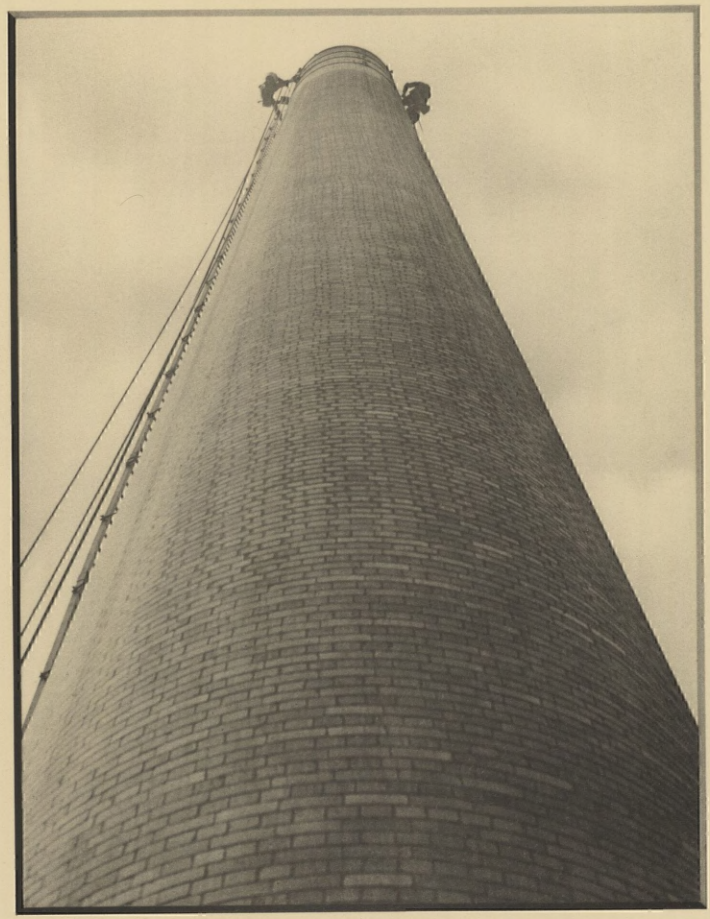
ARCHITECTS: MOWBRAY, GREEN & HOLLIER, F/F.R.I.B.A., BATH

COMPLETELY restored by us after severe lightning damage, work included new stone pinnacles, gargoyles, wood and stone carving, new stained glass windows, new lead roof and a "Mandco" Lightning Conductor system.

HOLY TRINITY CHURCH, STOCKTON-ON-TEES

ARCHITECTS : CORDINGLY & McINTYRE, DURHAM CITY

RESTORATION of the spire included total repointing and copper cramping of stone-work.

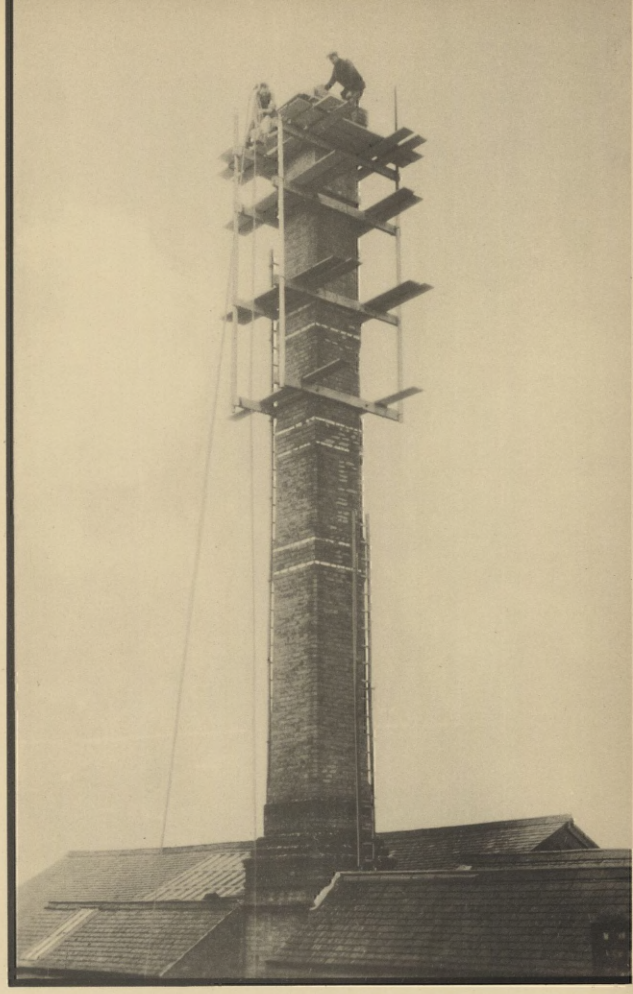


NESMILK PRODUCTS LIMITED, AYLESBURY, BUCKS.

THIS Chimney was repointed by our special method, eliminating the cost of expensive scaffolding for work of this nature.

SAPPERTON PARISH CHURCH, GLOS.

CONTRACT included removal of the upper 15 feet of masonry and rebuilding, fitting of a new copper Cross, repointing the whole spire and tower.



COX BROS. LTD., STRATFORD-ON-AVON

UPPER 10 feet of the chimney removed and rebuilt, the lower portion being repointed.

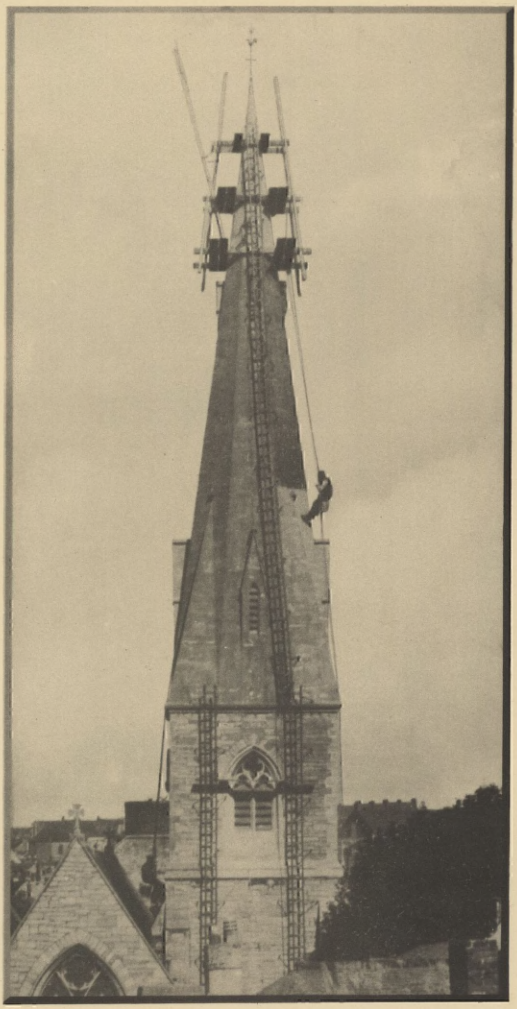
PARISH CHURCH, WESTBURY-ON-SEVERN, GLOS.

ARCHITECT: STRATTON DAVIES, Esq., F.R.I.B.A., GLOUCESTER

THIS shingled spire, noted for its singular beauty, was entirely rebuilt by Macdonalds' craftsmen. The work comprised of insecticide spraying, the fixing of new oak beams, together with 35,000 cleft oak shingles, gilding of clock dial, the installation of a "Mandco" Lightning Conductor system. This contract was carried out with only the scaffolding as shown, and is regarded amongst architects and engineers as the largest contract of its kind ever attempted in modern times. Truly a tribute to our craftsmen.

PARISH CHURCH, WESTBURY-ON-SEVERN, GLOS.

THE restoration completed, the church was flood lit for a week and will long be remembered by the inhabitants in the Forest of Dean by the magnificence of such a spectacle. The 14th century Preaching Cross in the foreground made its splendour complete.



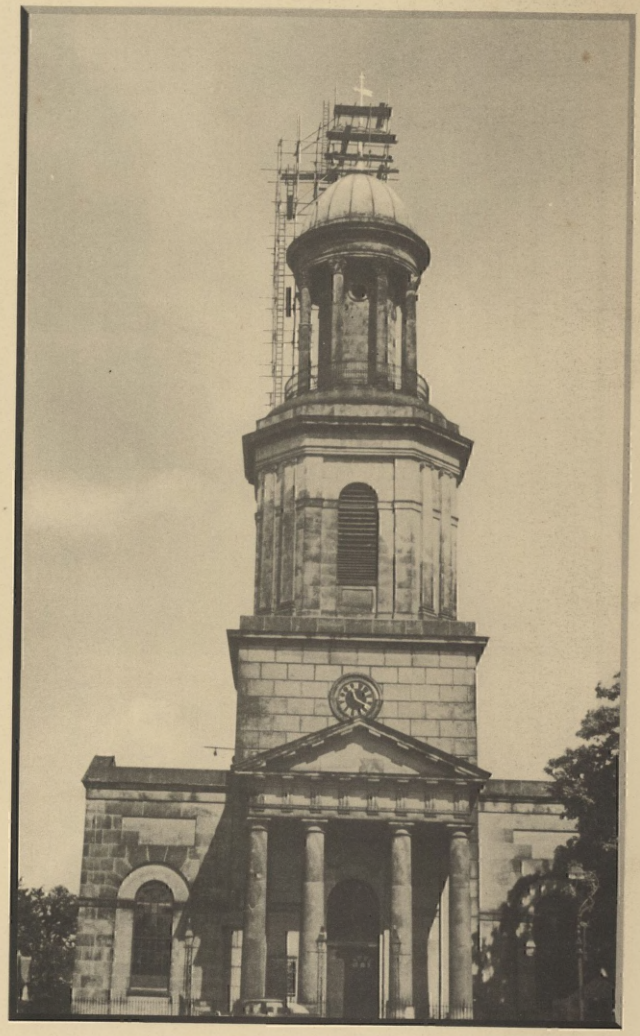
ST. JOHN'S CHURCH, PLYMOUTH

ARCHITECT: W. MAY, Esq., F.R.I.B.A., PLYMOUTH

CONTRACT included rebuilding the upper fifteen feet of new masonry, new weathervane. Restoration of the entire stonework of both tower and spire and erection of a "Mandco" Lightning Conductor system.

CINDERHILL BRICKWORKS, NOTTINGHAM

THE first of seven chimneys felled for the brickworks by our patent method which does not require the use of explosives or burning props.



ST. CHAD'S CHURCH, SHREWSBURY

ARCHITECTS : SHAYLER, BUTLER & DILKS, F/F.R.I.B.A., SHREWSBURY

THIS second largest circular church in the country has been completely restored by Macdonalds' craftsmen, the contract included the cleaning by suction of all timber and spraying of death watch beetle liquid, all lead roofs stripped, the lead recast on site and relaid, 65 tons in all. The entire stonework of the church being repointed and refixing and regilding the famous cross which surmounts the dome.

CROSS OF ST. CHAD'S CHURCH, SHREWSBURY

THE ornate beauty of this cross is not visible from the ground but as seen from this illustration the excellent craftsmanship is shown to advantage.

THOMAS FORMAN & SONS LTD., NOTTINGHAM

REPOINTING 60 feet, rebuilding stone head. Installation of a "Mandco" Lightning Conductor system.

TAVISTOCK CONGREGATIONAL CHURCH, DEVON

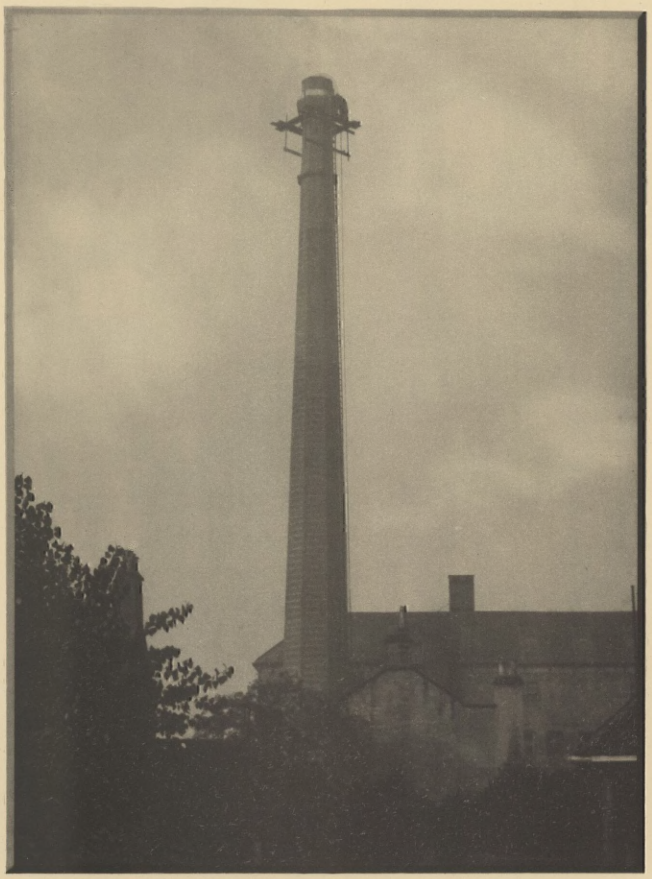
RENEWAL of the top eighteen feet of the spire, general repointing, new weathervane, and the installation of a "Mandco" Lightning Conductor system.

FELLING OF ELECTRICITY WORKS 180 FT. CHIMNEY
FOR THE BOROUGH OF COLNE, LANCS.

OWING to the number of flue apertures in this chimney, the felling site was greatly restricted and had to be felled parallel with the adjoining power station, having only ten inches margin for the chimney to fall in safe limits. The precision of such an accomplishment will be appreciated Work of this nature can only be entrusted to steeplejack engineers with proven experience.

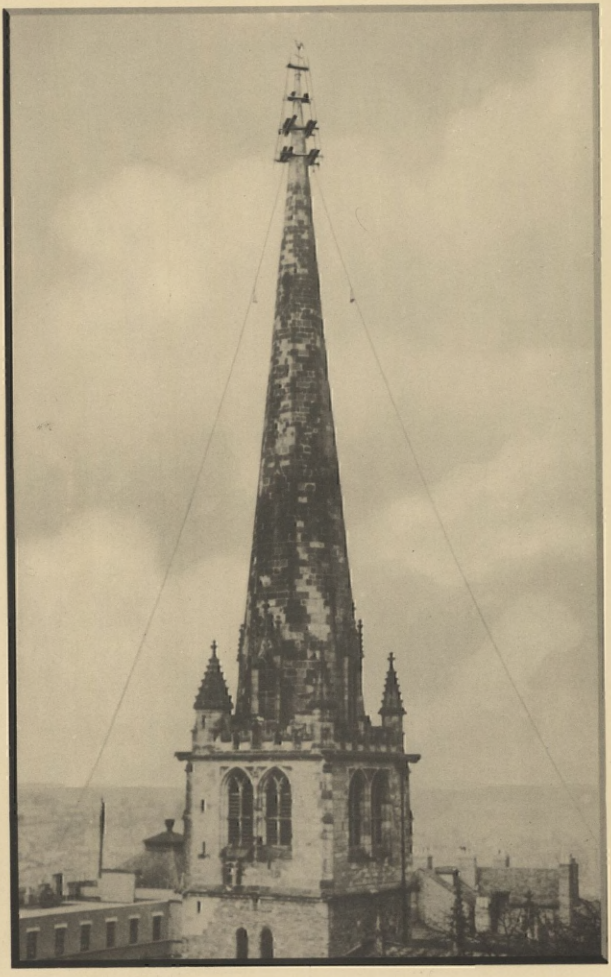
Illustration shows method of commencement, the longitudinal stick is a preliminary tell-tale.

CHIMNEY weighing 750 tons falling in successive stages.



HEXORAN LTD., BELPER, DERBYSHIRE

REBUILDING the head, total repointing, the installation of a "Mandco" Lightning Conductor system.



ST. MARY'S CHURCH, SHREWSBURY

ARCHITECT: W. BALFOUR, Esq., SHREWSBURY

THIS spire 225 feet high restored throughout by us. Contract comprised general repointing, cleaning and regilding weathercock and fixing of new stonework and Lightning Conductor repairs.

NATIONAL COAL BOARD

No. 6 AREA, EAST MIDLANDS DIVISION

YET another instance where "The old order changeth, Yielding place to new . . ."

GOOLE PARISH CHURCH, YORKS.

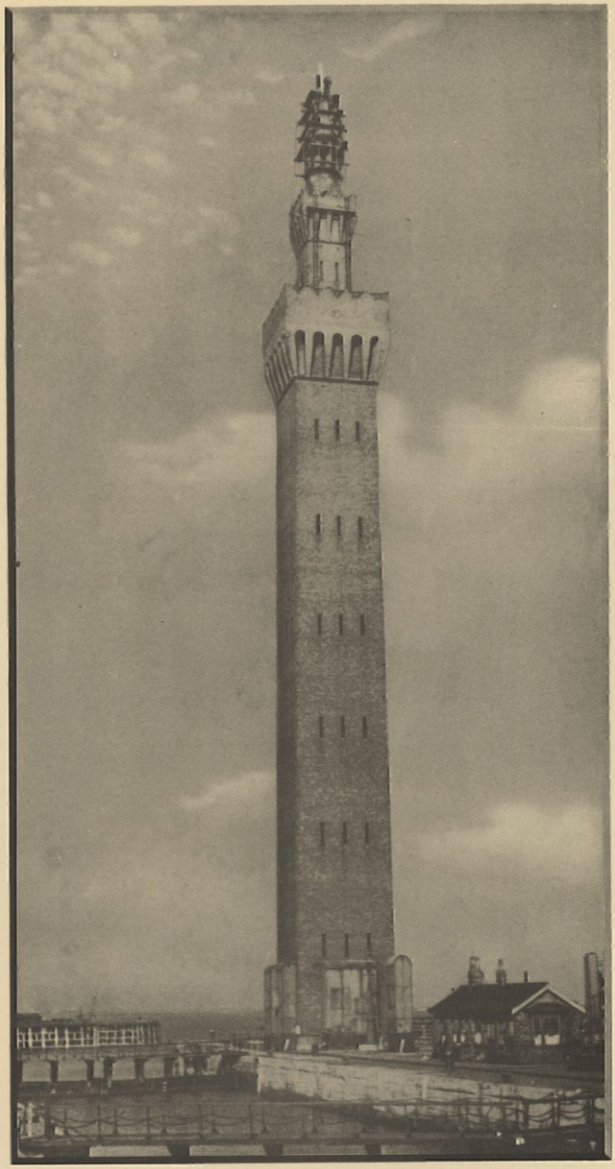
ARCHITECT: EDMUND OAKLEY, Esq., F.R.I.B.A., NEWCASTLE UPON TYNE

COMPLETE restoration of tower and spire, also pinnacles of the whole church. The interior decorations were also carried out by Macdonald craftsmen.

SHERBORNE PARISH CHURCH, GLOS.

ARCHITECT: STRATTON DAVIES, Esq., F.R.I.B.A., GLOUCESTER

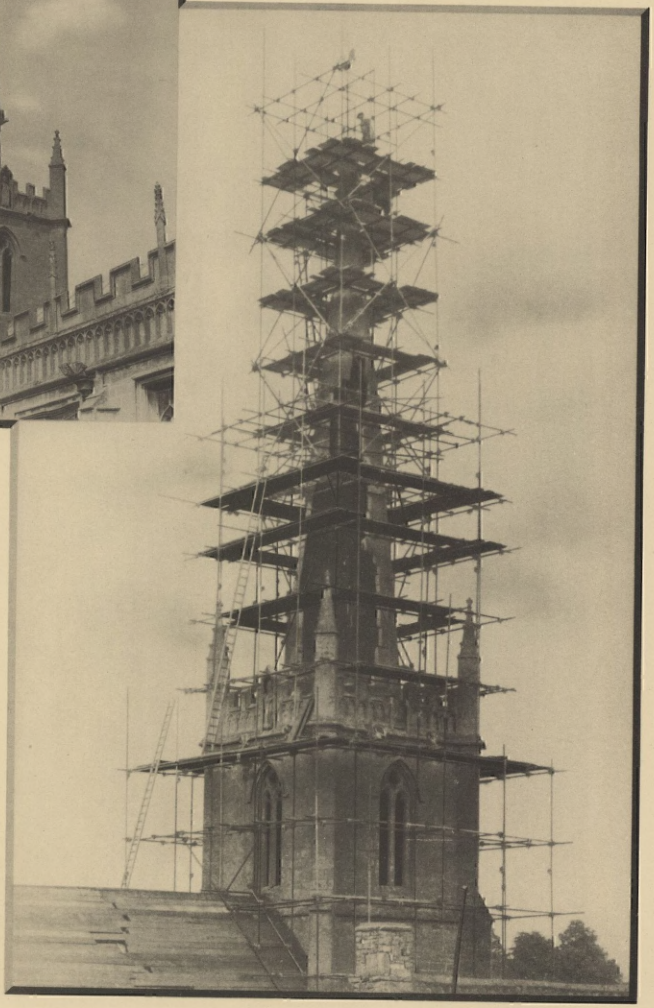
STRUCK by lightning. The uppermost 45 feet of this spire was totally destroyed; it was not fitted with a lightning conductor. Contract comprised rebuilding the spire, new weathervane. Installation of "Mandco" Lightning Conductor.



THE HYDRAULIC TOWER, 320 FT. high, GRIMSBY DOCKS, LINCS.

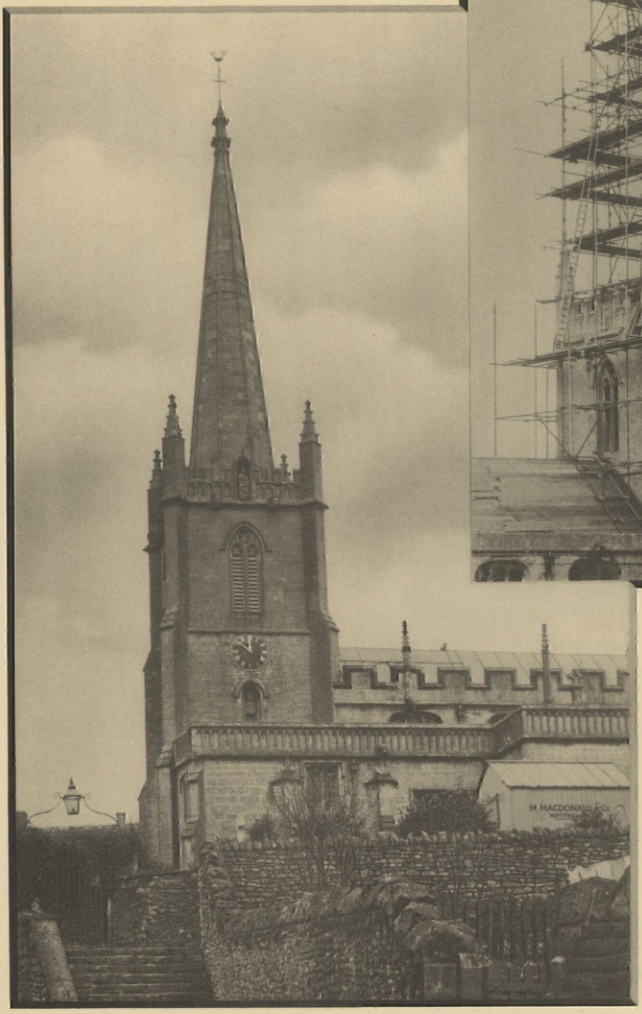
THE tallest structure of its kind anywhere in Britain was restored by Macdonald's steeplejacks for the British Railways. Contract included reconstruction of metal work, rebuilding battlements, painting and Lightning Conductor repairs.

THIS spire received an exceptionally heavy lightning discharge, causing immense damage and was in danger of immediate collapse when we were consulted. The work of scaffolding was commenced and proceeded day and night, literally a fight against time. Fortunately, we were able to prevent the whole spire from collapsing to the roofs below. The spire was dismantled,



PARISH CHURCH
CROSCOMBE,
SOMERSET

leaving the scaffolding in position preparatory to rebuilding. Photograph No. 3 shows the spire after rebuilding by us. Contract included general masonry work, stone and wood carving, gilding, glazing, asphalting, painting and decorating, and the installation of a modern "Mandco" Lightning Conductor system. The whole of this work was carried out by our own craftsmen.



ARCHITECTS:
CAROÉ & PASSMORE, F/F.R.I.B.A., LONDON

HOOD'S MONUMENT, BUTLEIGH, SOMERSET

HOOD'S MONUMENT, BUTLEIGH, SOMERSET

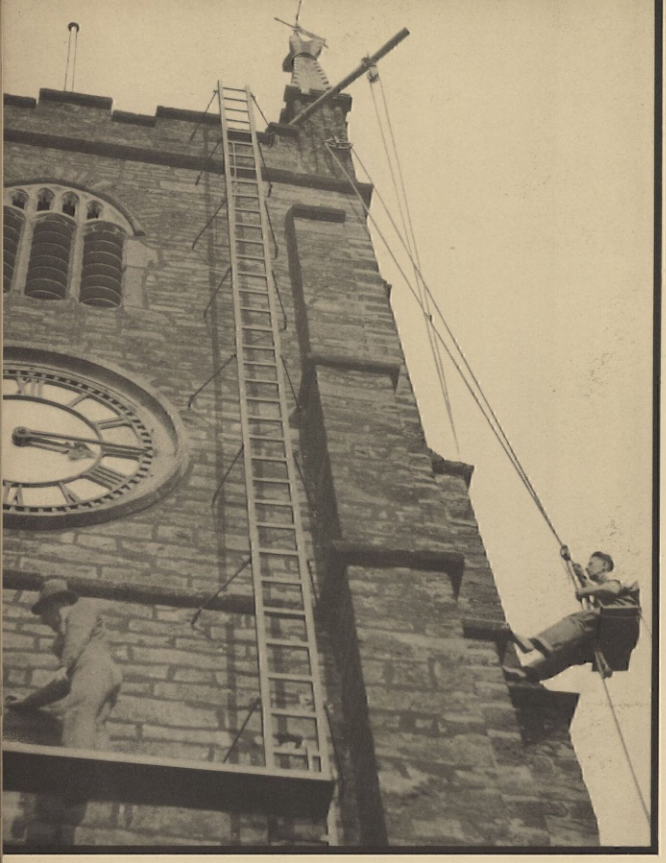
ARCHITECTS & SURVEYORS : WAINWRIGHT & HERD, SHEPTON MALLET

THE choice of Macdonalds as Steeplejack Contractors for this important restoration was solely by experience.

The monument, undoubtedly an architectural gem, is considered as being the pride of Somerset.

Work by our steeplejack craftsmen included the removal of all decayed masonry, renewal of stone carvings, preservation of the whole stonework, repointing, cement grouting under pressure, and the installation of a "Mandco" Lightning Conductor system.

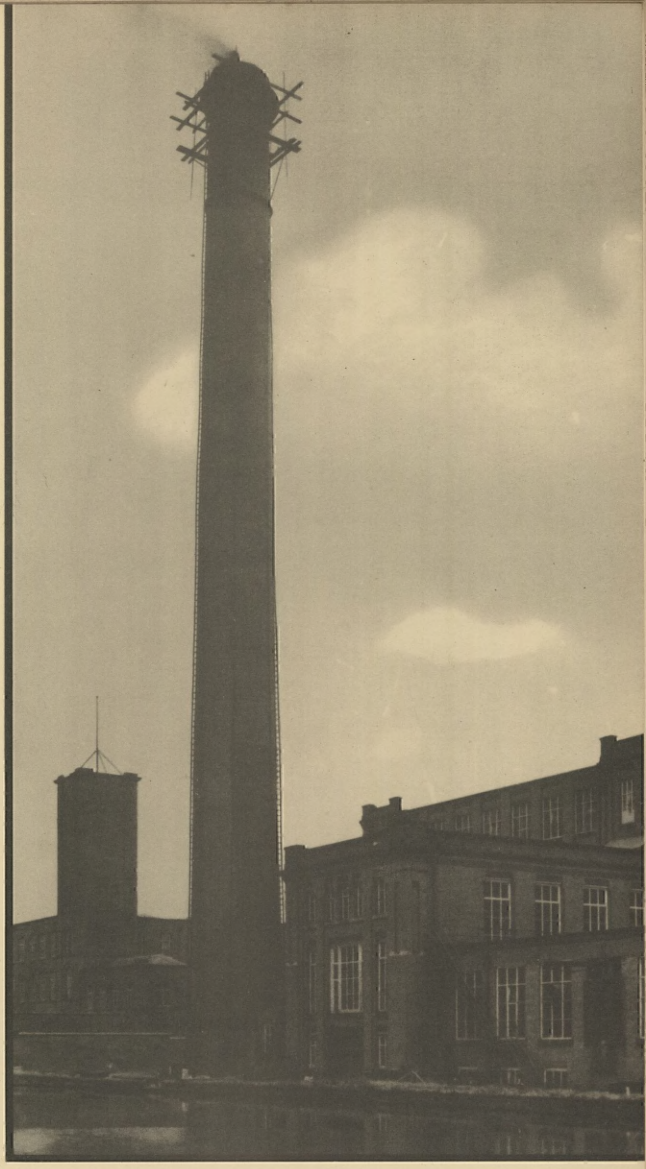
The handsome carvings at the apex of the structure, details which are self-explanatory after restoration by us are revealed in the above picture.



TAVISTOCK PARISH CHURCH, DEVON

CONSULTING ARCHITECTS : RICHARDSON & GILL, F/F.R.I.B.A., LONDON

THIS tower was restored by us without the use of expensive scaffolding. Contract included general masonry, whole tower repointed, and Lightning Conductor repairs.



PARK AND SANDY SPINNING MILLS LTD., ROYTON, LANCS.

CHIMNEY 225 feet high repaired by Macdonalds' steeplejacks. Contract comprised the removal and rebuilding of the stone head, shaft completely repointed, and the installation of a modern "Mandeo" Lightning Conductor system.

UNIVERSITY OF NOTTINGHAM

MACDONALD'S steeplejack craftsmen were chosen to protect this famous Tower from lightning by the erection of an improved design of discharge points.

This illustration also shows repointing of the masonry being carried out, without the use of expensive scaffolding.

LEAFIELD PARISH CHURCH, OXFORD

ARCHITECT: LAWRENCE DALE, Esq., F.R.I.B.A., OXFORD

THIRTY feet of this spire removed and rebuilt, new weathervane, general repointing to the whole tower and spire.


REG^D TRADE MARK
— OF A —
MANDCO PRODUCT
M M

PERSONAL

SOME fifteen years ago I first ventured, at the request of many friends and clients, to write a short treatise on the Steeplejack profession. I did so with great trepidation, little thinking that in a short time the first modest issue would be exhausted. It was twice reprinted with the same result, and now there is a greater demand, so I have endeavoured to extend it, the reason being that probably my own experience in the industry will be of benefit to those who come after me.

Having now completed almost forty years in the trade and serving the usual apprenticeship with other executives and workmen of the firm I trod a course just like the apprentices of to-day, though they have the benefit of knowledge gained and the progress of the intervening years. Advances have been made in methods of working and one of the penalties of progress was a necessity to re-organize.

I had not been in the business very long when the firm was obliged to take over adjoining premises, and in the next decade it was proved that even the generous provisions made for expansion at that time were not sufficient. To-day plans are in hand for the erection of a modern and composite building which will permit of greater research and production of our lightning conductors, as well as provide amenities for the work-people, commensurate with present day ideas.

I should not like this opportunity to pass without expressing my appreciation of the loyalty of all employees, and the continued support of our clients. It has been our endeavour to give complete satisfaction, and it is heartening each year to welcome new customers who must have been convinced of the soundness of the Macdonald contract, and the excellence and reliability of workmanship.

It is the firm's aim constantly to maintain an unimpeachable standard, and towards this end I would ask for the fullest co-operation of our clients, assuring them that our entire steeplejack service is always at their immediate command.

M.M.

A few well-known names of Firms who avail themselves of the

MACDONALD STEEPLEJACK ORGANIZATION

Bristol Aeroplane Co. Ltd.	Bristol
Fairey Aviation Co. Ltd.	Stockport
General Electric Co. Ltd.	London
A. V. Roe Ltd.	Manchester
Joseph Rank Ltd.	London
Harland & Wolfe Ltd.	Belfast
Lockheed Hydraulic Co. Ltd.	Leamington Spa
Anglo-Scottish Sugar Beet Corporation Ltd.	Newark
Standard Motor Co. Ltd.	Coventry
Lagonda Motors Ltd.	Staines
Laurence Scott & Electromotors Ltd.	Manchester
Crossleys Ltd. Diesel Engines	Manchester
Spillers Ltd.	Hull
Goodyear Rubber Co. Ltd.	Wolverhampton
Darwen Paper Mills Ltd.	Darwen
Skefco Ball Bearing Co. Ltd.	Luton
Stewart & Lloyds Ltd.	Bilston
Clarks Ltd.	Street, Somerset
Star Paper Mills Ltd.	Blackburn
Boots Pure Drug Co. Ltd.	Nottingham
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Lakeland Laundries Ltd.	Barrow-in-Furness
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Unity Mill Ltd.	Heywood
Olive Mill Ltd.	Oldham
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W. Symington & Co. Ltd., Market Harborough	Leicestershire
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The Admiralty
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H. M. O. W.

Numerous Corporations and Local Authorities.

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