BUILDING SPECIFICATIONS

PRINCIPLES AND PRACTICE

Building Specifications

Principles and Practice

by

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FOREWORD

This book deals in the main with the manner of writing specifications; it describes how a specification ought to be written and how this may be accomplished.

Writing a specification has been represented by some as a dreary task. This need not be so; indeed, it can be made a pleasant one. The object here has been to point the way to the acquirement of the knowledge and skill which makes this possible.

Though the subject matter is technical, it has been presented in a readable form. In so far as it has been possible informative matter only has been included in the body of the book. By this plan it enables the subject to be studied dispassionately and without distracting thoughts.

Traditional Development

Although specifications are of a higher order today than what they were but a few years ago, the antiquated methods of preparation still cling to them. Before the invention of the typewriter architectural pupils were drugged with specifications as a remedy for a lack of knowledge of building construction, just as they are taught today by some to believe that taking off quantities will produce a like result. The copying of clauses page by page of old specifications was the lot of most pupils, and was part of their architectural training. Few, if any, alterations were made in what were then stock specifications, which became threadbare with usage, and pupils deteriorated with the senseless routine copying.

With the advent of specialization, such as heating and electric lighting and steel constructional work, something had to be incorporated for these works. A slight modification became necessary which took the form of the insertion of a mass of clauses about strength and testing of materials and what not. With these additions they again became stock specifications; thus the same specification could be used for a church or for a public-house.

Another feature of these specifications, which has persisted to this day, was the inclusion of another mass of clauses dealing with the conditions as to the manner in which the works had to be executed. These were as a rule more stringent than the conditions embracing the contract agreement.

Then there came a period, extending to this day, when a number of new kinds of materials were introduced in building, known as specialities, such as terra cotta, patent stones, composition flooring, hard wall plasters, asbestos roofing materials and a host of others. This necessitated a further revision of stock specifications, resulting in the inclusion of stock clauses relating to these works. But they could no longer be used as stock specifications, for now churches required a set of stock clauses and public-houses required another set of stock clauses, so a reshuffling became necessary. As neither pupils nor junior assistants could be relied upon to do this the work fell mainly upon their superiors.

Writing specifications became gradually more and more complicated as the varieties of the same kind of materials became greater and greater, such as the numerous qualities and kinds of bricks and roofing slates, and with the use of concrete. This brought about a sort of model or type specification for each kind of building—churches, schools, hospitals, public-houses and the like. Even these models or type specifications had to be revised and modified slightly from time to time and sometimes for each job.

The compilation of these type specifications makes an interesting study. Expertness in massing and scheduling and filing type clauses spelt success of a kind. A "card-index mentality" was a qualification, as was a keen scent for copy. The making of a specification was an accomplished art, for the stringing together of these type clauses with their erasures and amendments demanded a degree of skill to produce some sort of polyglot specification. That is where the typewriter and the typist came in useful for copying.

Scope of Chapters

A specification and drawings (working drawings and detail drawings) are indispensable in a projected building scheme and are interdependent. Chapter I has been devoted to the subject of drawings showing in what manner and how they can be made serviceable as an aid to a specification.

Like the draughtsman who is taught first how to use his implements, so does the specification writer need guidance and instruction in matters that would be of service to him in framing a specification. Chapter II furnishes him with all the information he needs for this purpose.

In the framing of a specification an outline of the scope of work is essential. Chapter III, which partakes of the nature of a work of reference, gives a list of the items likely to be required, and is all that is necessary once the art of specifying has been acquired.

The writing of a specification demands specific qualifications in the performance thereon. These are set forth in Chapter IV, which explains fully the method of approach to achieve this end.

The lay-out of a specification co-related to the other documents comprising the contract is of vital importance. Chapter V deals fully with this and distinguishes between general and specific matter in clauses of items of work, the type of contract and its significance in relation to a specification.

To distinguish between good and bad is a work of art, signifying knowledge of the subject and the mental capacity of discrimination. Some may be said to be more gifted than others in acquiring this art. Still, anyone may achieve a reasonable proficiency by the study of good examples. But in itself this would scarcely suffice to enable one to write a specification; the need is an understanding of the principle of specifying to suit the respective types of contracts. This is dealt with in Chapter VI.

The construction of clauses of items of work in a specification should be so framed that they fulfil the requirements. In the exercise thereof a good plan is the study of examples as to whether they meet these conditions. Chapter VII gives examples of faulty construction of clauses and their corrections.

Specifications is a subject that is fraught with perplexities. At the outset the specification writer may experience a difficulty for lack of data of the right kind, which ought to be—but is not always—available in manufacturers' catalogues and the like. Chapter VIII gives examples of the kind, and examples of the correct method of specifying specialities.

Chapter IX explains in detail how a "speciality" may be made to serve when the employment of a specialist is engaged to execute the work. It explains the differentiation between the letters P.C. (or words "prime cost") and provisional sums. Examples are cited of the care to be exercised in connection with specialists' trades.

Reports, many of which are closely akin to specifications, may, according to circumstances, call for a difference in treatment, such as in the case of reports on schemes and reports in competitions, which are dealt with in Chapter X.

Chapter XI gets down to the bedrock—the crux of the subject—the art of specifying. It sets out the requirements necessary to enable one to specify and how this may be accomplished.

There have been a number of innovations in the building industry. Some have made for progress but others have added to the cost without in the least modifying its construction. Chapter XII deals with these.

Dual Application

There is a limit to a specification. Within that limit it can be a very useful instrument. But it cannot be made serviceable in all manner of ways. Perhaps one of the earliest publications on specifications is that given in Gwilt's *Encyclopædia of Architecture*. It states:

> The primary and main object of a specification is to give, fully and clearly, all necessary and useful written explanations and instructions for the work, and for making due preparations for the effecting of a definite and clear bargain between the parties or company accepting an offer and the contractor offering to execute the work.

This idea of a specification still persists, in general, to the present time. This statement would apply to those contracts without bills of quantities and those contracts in which bills of quantities do not form the basis of the contract. In these cases, it is the drawings and the specification and the conditions of contract and the invitation to tender upon which the offer is made and the acceptance thereof. But there are occasions when this may be varied; that is to say, the cost of the work as executed may be more or less than the stipulated offer and its acceptance without modifying the contract. Then, again, the work as executed for these types of contracts may be more or less than that specified or shown on the drawings without in any way modifying the contract. Even in these types of contracts the scope of the specification is subject to and confined within the compass of its limits.

Irrespective of the completeness of the drawings and specification and conditions of contract and the invitation to tender, it is inconceivable that an estimate of the cost can be formulated without the aid of other means. Computations of kinds are essential in arriving at the quantities

of materials and labour that comprise the works, quite apart from incidental items such as workmen's compensation, health and unemployment insurance, third-party risk, and a host of others. It is for this reason that, with the exception of small works varying in different localities up to £1000 0*s*. 0*d*., estimates are no longer based upon these instruments alone, but are now formulated upon bills of quantities which form the basis of the contract and by which variations of any kind arising therefrom are adjusted. Further, as the estimates will be framed upon a uniform basis competition will be upon the sum total value only of the items of works of the respective contractors.

Neither a specification nor a specification together with bills of quantities suffices adequately the purpose in all cases. In the absence of drawings, from the very nature of dilapidations and restorations of properties to describe fully and clearly every item of work and its position in the building would require a very bulky specification. This would necessitate a visit to the property by each contractor tendering, making a careful and minute examination and the taking of particulars and very probably dimensions of the items in the framing of his estimate. When bills of quantities are supplied in addition to the specification the quantities would most likely have to indicate the positions of the items in the building to enable the contractor to frame his estimate. But there are complications by this method, for in all probability the quantities would contain many items that are termed "spot" items, meaning thereby the extent and value of these are to be determined by the contractor.

The pitfalls and shortcomings mentioned in the last paragraph may be circumvented by combining the specification and bills of quantities in one document.

The example given in Chapter XIII is an illustration of this method. It has been adopted in the cases of restorations of properties damaged by enemy action, restorations of dilapidated properties, conversion of shops into houses, and the conversion of houses into flats. It fulfils all the requirements in a satisfactory manner.

I should like to express my appreciation and thanks to the Urmston Urban District Council's Surveyor (Mr. E. L. Leeming) and the Chief Architectural Assistant (Mr. Alfred N. Potter) for permission to make use of the documents upon which Chapter XIII is framed, and for kindness in allowing the publication of the drawings.

Tabulation of Data

Many sources are available from which data may be gathered for specifying and for reference. In addition to those mentioned in the body of the book it would be a formidable list. Those bearing directly upon the subject may be consulted and made use of for reference. These would seem to fall into five sections: (1) Articles and other information in the technical press. I have in the course of my time collected thousands of these, indexed alphabetically under the title of technical information, and the same with press cuttings. (2) Specifications of actual works, if only for the purpose of noting what has been done and is being done, such as those issued by the War Office and other Government departments; Specification for a hospital, erected at West Chester, Penn-

sylvania, for the Chester County, York & Sawyer, Architects; Specification of works of fourteen houses, High Oak Road, Welwyn Garden City, Herts., C. H. James and F. R. Yerbury, Architects; (3) Books: *Specifications in Detail*, by Frank W. Macey; *Building Specifications*, by John Leaning; *Specifications and Specification Writing*, by R. W. J. Davis; *Specifications for Building Works*, by Wilfrid L. Evershead; *Specification*, issued annually by the Architectural Press; (4) Trade catalogues and works of reference, such as *White Lead Paints*, published by the White Lead Publicity Bureau. (I recently had occasion to consult this work to see if it recommended painting on papered walls, but nothing was given therein. I have had painting done several times on paper of a wool composition which is over sixty years old, with a flat oil paint, and this has given every satisfaction; also on paper of not quite this quality but which has nevertheless been successful. I have had plaster walls and papered ceilings, first with white lead paint and water colour paint, which has not been so successful.) (5) Specifications for specific trades: Installation of soil waste and ventilating pipes; fixing of cold water services; drainage work in connection with buildings; and installation of cold and hot water services—issued by the Institute of Plumbers. A standard specification for reinforced concrete work. These contain very valuable data. Reports prepared by the Manchester Architects' and Builders' Joint Consultative Board; specification of timbers; specification of cement concrete; specification of stone; specification of slating and roof tiling; specification of plumbing and glazing; and specification of painting. These little booklets are very practical and can be recommended in framing a specification; for example, in framing the specification given in Chapter XIII it was based upon the information contained in the booklet on painting.

The foregoing will be found useful as a guide, but the framing of a specification may demand a different viewpoint to meet modern requirements.

T. SUMNER-SMITH

Manchester, 1946.

CONTENTS

Chapter I

DRAWINGS

It is the duty of an architect, among other things, to supply all necessary drawings relating to the work to be performed. And this would appear to include those required for any special method of construction such as steel construction or reinforced concrete, whether prepared by the architect or consultant or nominated sub-contractor for the work.

The importance of accurate and complete drawings should not be overlooked, because with most building contracts it is expressly stated that: The works shall be carried out in accordance with the signed drawings, and in accordance with such further drawings and details as may from time to time be given by the architect.

And this would seem to imply that the contractor is bound not only to comply with the signed drawings but to such further drawings and details as may be given from time to time, inasmuch as building contracts make it a stipulation that: If any work shown on any such further drawings or details be, in the opinion of the contractor, extra to that comprised in the contract he shall, before proceeding with such work, give notice in writing to this effect to the architect.

Also it would seem that the onus rests with the contractor to obtain from the architect the requisite detail drawings, or otherwise accept responsibility, as most building contracts provide that: The architect shall furnish the contractor, within (a given number of) days after the receipt by him of a request for the same, any details which in the opinion of the architect are necessary for the execution of any part of the work in order to fulfil the contract.

Preparation of Drawings

Drawings, of course, are intended to be interpreted into materials for the structure. One of the functions of an architect is to make drawings such that they may be so interpreted.

The length of a specification will depend largely upon the information in the drawings, and should detail drawings have been prepared before the specification was written the number and length of descriptive clauses may be considerably reduced.

It is necessary here to emphasize that a specification is more likely to be complete in itself, as well as more lucid, if certain definite rules are observed in the preparation of the drawings. These should be:

1. Drawings should be drawn true to scale and carefully dimensioned.
2. The figured dimensions for openings to be clear of finishings.
3. The heights of floors from the top of the timbers of one floor to the top of the timbers of the next should be figured.
4. The various kinds of floors should be distinguished by different tints.

5. The bedrooms—and rooms of office blocks and hotels, etc.—should be numbered consecutively.
6. No two sets of numbers should be used for one building. If desired the rooms may be indicated alphabetically and the W.C.s numbered.
7. All the principal dimensions should be figured on the ground plan; these may be repeated on the floors above, care being taken that they agree.
8. The floor levels should be shown by lines of a distinctive colour on the elevations.
9. The sections should, as far as possible, indicate the staircases, which may also with advantage be shown by dotted lines of a distinguishing colour on the elevations.
10. Those parts of the brickwork which have to be built in cement mortar should be coloured with a different tint on the elevations.

If the various facings and dressings are denoted by a distinguishing colour on the elevations, trouble will be saved in specifying their positions.

All drawings as far as possible should be made to a uniform scale, and the elevations described by the points of the compass.

Plans of drains and roofs are desirable in all cases. A plan of the foundations will be found useful, and in any case their depths should be figured on the sections.

The positions of the roof trusses should be indicated by dotted lines either on the roof plan or that of the topmost storey, and the direction of the joists similarly shown on each floor plan.

The level of the ground should be indicated on the drawings and should state clearly whether it is the finished level or the original level. This surface should be referred to a datum—a bench mark, if possible—and should there be several surface levels, all of them, as well as the ground floor, should be referred to the same datum.

All pipe runs, whether for water, gas, electricity, or heating, should be shown upon the plans by lines of a distinguishing character or colour. The positions of fittings—brackets and pendants—should be indicated on the plans by a distinguishing mark. The diameters of water-pipes and the positions of taps, as well as notes of their several kinds, should be either indicated on the plans or stated in the specification.

Casement lights which are to open should be distinguished by an arc on the plans and by a cross on the elevations.

Each single-hung door should be shown by an arc in the direction in which it opens; a folding door by a double arc; and a swing door by a semicircle. As a general rule single-hung doors on being opened swing in the direction which shields from view the greater part of the room.

Where symbols are used to denote the various kinds of materials and which indicate the positions and the various types of fittings it is essential that a *key* to the symbols used should be shown on the plans or should accompany the plans.

Reproductions

It is now a common practice and custom to prepare the working drawings direct on tracing linen or on specially prepared tracing paper from which any number of copies may be taken. These copies may be the usual blue prints, or brown or black lines on white paper, or black lines on blue or white linen; those on white paper or linen may be obtained "true to scale", and when on transparent paper or linen may be used for reproduction purposes.

Copies of reproductions will be found to be very useful where it is desired to give additional information or particulars on the plans for special purposes, as in cases of heating, gas service, electric wiring, ventilation, water supply, hot water service, fire extinguishing installation, steel construction and reinforced concrete. Rather than overload the working drawings with too many particulars, and to avoid confusion, it is advisable that these works, as well as others, should be shown on separate plans; usually a separate plan is devoted to each; that is, these works are shown on the "true to scale" reproductions of the working drawings and a key to the symbols used shown thereon, from which any number of copies may be taken.

Detail drawings may be similarly treated and it is advisable, in so far as it is possible to do so, to use symbols instead of colour to represent the different kinds of materials, both in section and elevation, as the copies will be all alike.

Invention runs apace, for it is not even necessary to prepare the drawings in the first case on linen or specially prepared tracing paper for the purpose of taking copies therefrom. Copies true to scale may now be obtained direct from drawings prepared on ordinary drawing paper. This has decided advantages; it being much easier and better to prepare drawings on drawing paper than either on linen or tracing paper. It is advisable that greater use than formerly should be made of symbols on the drawings to represent the different kinds of materials, as this would ensure that all the copies (though supplied perhaps at different periods) would be alike.

Symbols

In making use of symbols, it is advisable to adopt where practicable only those of common usage to avoid misunderstanding, but in any event a key of symbols should be shown on the plans or accompany the plans. Unfortunately, no "standard" symbols in this country are in use. In America, standard symbols for wiring plans as adopted and recommended by the National Electrical Contractors' Association of the United States and the American Institute of Architects are in use, and copies may be had on application to the Secretary of the National Electrical Contractors' Association Offices, N.Y., and the Secretary of the American Institute of Architects, Washington, D.C. Kempe's *Engineers' Year Book* gives a few illustrations of materials. But none of these, though suggestive, goes to the real root of the matter, being far from comprehensive.

CHAPTER II

HINTS ON SPECIFICATIONS

A BUILDING SPECIFICATION is a written description of the materials and labour employed in or about the construction of a building.

The object of a specification is to describe the materials and labour not clearly defined upon the drawings, and any other matter and things that require to be specified, such as scaffolding and plant.

Sketches should not be used to illustrate a specification when the wording of the clauses admits of no ambiguity; when they cannot be so worded, but not otherwise, sketches may be employed as aids in the interpretation of the meaning.

To achieve its purpose a specification should clearly interpret the drawings, describe the various materials and their respective positions in the building, and give adequate instruction as to fixing.

The descriptions in the specification should harmonize and agree in sense and meaning with the drawings, bills of quantities, contract agreement, and conditions of contract. No more and no less should appear in a specification than is contained in the other documents comprising a contract.

Technical descriptions of manufactured articles as a general rule follow on the lines given in trade catalogues and circulars.

A specification should conform to the various Acts of Parliament relating to building works, also comform to the conditions and requirements of the Local Acts and By-laws. It should be in keeping and in agreement with Common Law and Statute Law, particularly Law of Contracts.

One purpose only should a specification for building works serve, and that a practical one. It should describe the actual materials and labour required in the execution of the works in the simplest and clearest language possible.

The value of a specification is in its explicit, lucid, and definite technical directions, rather than its literary work.

A tenor of evenness—whether of tone or fullness in detail—in the descriptions should be maintained throughout a specification.

APPROPRIATE DESCRIPTIONS

A specification should not contain descriptions that are of no real importance, such as lengthy descriptions of "Lighting" when the intention is clear that the work will be performed by a specialist. It should suffice by the inclusion of a "provisional sum" in the specification, to be expended at the discretion of the architect, who should stipulate the requirements when obtaining estimates from the specialists.

A specification should not describe materials and workmanship of a higher class for positions that are not likely to be insisted upon, and which it would be unreasonable to expect. For example: Plain and framed grounds and backings (where not seen) need not be of the same class or kind of timber and workmanship when the fittings are in hardwood and of superior workmanship.

A specification should describe materials and workmanship suitable and adaptable to its class of building. For example: A specification for a superior grade school must necessarily differ in many respects from that of even the best type of ordinary school.

A specification should not contain ambiguous phrases such as "carried out to the *entire satisfaction* of the architect", as it would be difficult to define what "entire satisfaction" means; "carried out in the best and most workmanlike manner", or words to that effect, should meet the case and satisfy any reasonable person.

Nor should a specification contain such words as "proper" and "sufficient", except where the meaning and intention are clear and definite; in all other cases it should describe what is *proper* and what is *sufficient.*

Nor should it contain words that can be used in more than one sense, such as the word "provide", unless it is used throughout in one sense only, but when it implies "supply and fix" these words should be used instead.

Nor should it leave any doubt in the mind of those concerned as to the meaning of a word when used in a *particular* way in describing work to be done, especially in the case of alterations and renovations. For example: the word "allow" when so used should be defined to signify that the work described has to be undertaken "at the contractor's risk", that is, at his valuation.

When there is a doubt as to whether a special work, before execution, may be modified or substituted by another kind, a "provisional sum" should be provided to cover the cost of such work. In no case should it be described and such words as "or similar" or "or equal" added. When a particular kind is described but it is desired to leave the matter of substitution, if need be, to be decided later, then the value should be stated and to the description should be added "or similar or equal in *quality and value* to be determined by the architect".

Referencing

Cross reference should be made in a specification in those cases where part of the work appears in different trades; thus, in Plasterer, write: "The floors to classrooms to be 5 in. thick (for concrete, *see* Concretor, Clause No. ....), screeded and floated up smooth with cement and sand in equal proportions, ½ in. thick, to receive wood block flooring (for wood blocks, *see* Joiner, Clause No. ....)"; and in Joiner write: "The floors to classrooms to be laid with 1¼ in. pitch-pine wood blocks p.c. .... per yard supl., supplied and fixed by a firm to be selected by the architect, and the blocks laid on concrete floated up smooth (for concrete, *see* Concretor, Clause No. ...., and for floating up, Plasterer, Clause No. ....)"; and in Concretor write: "Lay concrete 5 in. thick, to classroom floors, to be laid true and level and floated up (for flating up, *see* Plasterer, Clause No. ....), finished for wood blocks (for wood blocks, *see* Joiner, Clause No. ....)." Cross reference should also be made in those cases where a particular kind of material and labour is given in one description, and where ordinarily portions would have to be described under various clauses. For example: Describe in "Screens to Classrooms" the doors therein in that clause, and under "Doors"

state that "the doors in screens to classrooms are given in Clause No.....".

For clearness a specification should be divided into TRADE HEADINGS, and the descriptions of items of work into clauses, with Marginal Headings. Where the clauses are of considerable length and involve one or more detailed descriptions of kinds or parts of an item of work, sub-marginal notes may be adopted with advantage for each kind or part, such as in the case of "Doors", those of different kind of timbers may be denoted by sub-marginal headings, thus: "In Oak", "In Teak", and the like. The clauses may with advantage be numbered consecutively; it being much easier to refer to a clause by its number than by its heading.

However, no hard and fast rule applies to the division of a specification arranged in the order of trades. Although that is the general procedure, exceptions may be made in the case of an alteration to an existing building, and in the case of renovations. These may with advantage be divided into rooms or sections of the building as well as into trades. The prevailing conditions and circumstances in each case should be the guiding factor in determining the method to be adopted.

Marginal references may in a large number of cases form part of the clause, thus: "The brickwork shall be carried up in regular courses, etc., etc." The marginal reference should be put in capitals so as to stand out clearly.

INDEXING

A specification of any magnitude, especially one for an important work, is incomplete without an index, which may take one of the following forms: (*a*) An index of clauses, numbered seriatum, and arranged under their respective trade headings, thus:

Clause No. .... Page No. ....

Filling in and ramming solid.
Materials, description of.
Old drains, stopping up.
Planking and strutting.
Trenches, excavation to.

(*b*) An index with the first letter of each marginal heading and sub-heading in the order of the alphabet and arranged under each heading of the alphabet, thus:

Clause No. .... Page No. ....

Paths.
Pavings.
Payments and default of payments.
Piers.
Pipes.
Placing in position.
Plinths.

(*c*) An alphabetical index with cross references in the ordinary form of a book index, thus:

Clause No. .... Page No. ....

Adjoining property, damage to.
Completion, date of.
Concrete, drains laid on.
Date of completion.
Damage to adjoining property.
Defective work.
Definition of words.
Description of materials.
Drains encased in concrete.
Laid on concrete, drains.
Materials, description of.
Property, damage to adjoining.
Words, definition of.
Work, defective.

Contents

A bulky specification should be provided with a Contents of Trade Headings, and should give the page at which each trade commences, thus:

> Descriptions of materials—Stopping up old drains—Excavating trenches—Filling in and ramming solid—Planking and Strutting—Inspecting and Testing—Conform to requirements of Local Authorities—Drains laid on concrete—Drains encased in concrete—Drains laid to fall—Soil drains—Rainwater drains—Iron drains—Agricultural drains—Cleaning eyes—Gullies—Grease Traps—Manholes—Inspection traps—Ventilating and fresh air inlets—Connection to sewer—Afford facilities—Attendance—Clear away rubbish. Pages.....

Tabs, instead of "Contents", may be attached to the first page of each trade. Their use may also enable various distinct sets of references to be made to particular parts of a specification.

Contract Documents

To every building contract there should be a specification. Its style should be governed by the other documents to the contract.

A specification is one of the documents which comprises a building contract, and as there are several kinds of building contracts the specification should, as a principle of equity, be in agreement with the meaning and intention of the contract. For example: to an Entire Contract for a lump sum based upon *drawings and specification only*, the descriptions of the items should be so drafted as to make it specifically clear that there will not be any variation in consideration (that is, in the amount), except by consent and agreement, whatever the conditions may be found to be, thus: though the drawings may show a stated depth of foundations the specification should make it clear beyond question that the depth shall be to, and conform with, the requirements of the Local or other Authority. This would apply in the case of an entire contract in which

there are *bills of quantities but which do not form the basis* of the contract. To an entire contract in which there are bills of quantities and which *form the basis of the contract*, these conditions do not apply, as any variation in the foundations is subject to an adjustment, the value of which would have to be ascertained at the schedule rates.

Provisional Items

A "Provisional Sum" should be provided to each of those items the amount of which is merely provisional; that is to say, which may or may not be the definite amount required, but which is to be expended at the architect's discretion, and is subject to adjustment at the completion of the contract. It is best to state in every instance, wherever possible, the actual sum to be expended. "Provisional sums" should be reserved for works of specialities only.

The specification should state whether a provisional sum is a charge payable to the supplier when the work is executed by the contractor, and by whom—the contractor or the building owner.

The specification should state explicitly the terms of payment in all cases, whether a net charge or subject to an overriding commission (profit) or a cash discount in the favour of the contractor.

The specification should state whether a provisional sum provided for a speciality includes the execution of the work by the specialist or the contractor; also whether it includes for contingent items, such as carriage to site, unloading, storing, taking responsibility therefor, and the cost of return of empty packages. It should also state, when the work is executed by the specialist, whether the contractor should attend upon and afford facilities to the specialist during that period, and whether and to what extent building work, if any, is to be performed by the contractor, such as cutting holes through walls for pipes supplied and fixed by the Heating Engineer.

The specification should state whether the contractor shall allow for the free use of his scaffolding and plant for the use of the specialist.

"Provisional Items" may be inserted in the specification in such cases where it is anticipated that an increased depth, beyond those shown upon the drawings, may be found to be necessary on execution, to provide for which items of a provisional nature in the form of so much, say, of excavation, concrete, brickwork, and the like, as is likely to meet the case specified, and which would be subject to adjustment on the completion of the contract.

"P.C.", or "prime cost", should be stated to any article of manufacture the definite cost of which is known. It should also state whether the price is for the article at the works, or whether it includes for packing and carriage to the nearest railway station or delivery to the site. It should further state whether the price includes the return of empty packages, if any, and the cost of carriage back to the works. Alternatively, the article should be described giving the maker's name and catalogue number. The specification should set out clearly the terms of payment, whether a net charge or subject to an overriding commission (profit) or a cash discount allowable to the contractor.

Order of Clauses

In the order of its clauses and trades a specification should be framed somewhat upon the manner hereinafter set out in Chapter III. The comprehensive marginal headings of clauses are all that are likely to be needed whatever the circumstances may be. Those clauses not pertaining to the particular class of work should be omitted from the specification.

Chapter III

ORDER OF A SPECIFICATION

A Specification should begin with a General Heading, then should follow a List of Drawings, a description of the Form of Contract Agreement to be adopted, and, if there be bills of quantities, it should then state whether the Bills of Quantities form Part of the Contract; also, it should state what are the Conditions of Contract. But such clauses as appear in the "Conditions of Contract" that might affect the cost of the works or describe the mode of carrying out of the work should either be copied in extenso or abridged and inserted in the body of the specification under "Preliminaries".

1. General heading.
2. List of Drawings.
3. Form of Contract Agreement.
4. Bills of Quantities—and state whether they form part of the contract.
5. Conditions of Contract.

PRELIMINARIES

1. Conditions of contract—to be read.
2. Acceptance of tender.
3. Inspect drawings.
4. Number of copies of drawings, specification and bills of quantities which will be supplied.
5. Position of site.
6. Visit site.
7. Nature of work.
8. Sand and gravel found on site—ownership of.
9. Date of commencement.
10. Directions as to the order in which parts of the work shall be done.
11. Directions as to the carrying out of the work.
12. Date of completion.
13. Definition of words.
14. Mode of measurement.
15. Drawings and specifications to be returned.
16. Priced bill of quantities (or schedule).
17. Quantity surveyors' fees.
18. Notices and fees.
19. New work to match old.

20. Setting out of the work—rectification of errors.
21. Materials and labour.
22. Materials to be equal to samples.
23. Vouchers for materials supplied.
24. Tests of materials.
25. Unloading and storage of sub-contractor's materials.
26. Responsibility for obtaining materials.
27. Contractor to return empties.
28. Protection of materials.
29. Protection of sub-contractor's work.
30. Protection of work generally.
31. Screens.
32. Hoarding.
33. Gantries.
34. Temporary cartways and roads.
35. Shoring.
36. Enclosure of site.
37. Temporary openings.
38. Scaffolding and plant and use of same by sub-contractors.
39. Insurances:
    (*a*) Fire.
    (*b*) Fatal accidents.
    (*c*) National health and unemployment.
    (*d*) Workmen's compensation.
    (*e*) Damage by aircraft.
    (*f*) Third party.
    (*g*) Covering guarantees required by the building owner.
40. Pulling down old work.
41. Adjoining property—damage to.
42. Making good roads and footpaths.
43. Maintain and protect public property.
44. Making good drainage.
45. Old materials may be re-used.
46. Credit for old materials.
47. General foreman.
48. Dismissal of workmen.
49. Water.
50. Supply of water for sub-contractors.
51. Watching and lighting.
52. Fuel and attendance for drying building.
53. Pumping and baling.
54. Sheds.
55. Latrines for workmen.
56. Office for "Clerk of Works".
57. Measures for materials.
58. Architect reserves the right to amend drawings.
59. Dimensions.
60. Omitted work—profit on.
61. Variations—method of adjustment.
62. Rejection of unsound materials and workmanship.
63. Right of entry to contractor's works.
64. Inspection of the work.
65. Maintenance.
66. Prime Cost Sums. "List Price".
67. Statement of items of work provided and paid for by the building owner.
68. Contingencies.

69. Vouchers for "day-work" accounts.
70. Relics, treasure trove, coins, etc., found on the site.
71. Sub-letting of the contract.
72. Contract not to be assigned.
73. Certificates for payment.
74. Payment and default of payment.
75. Adjustment of the contract.
76. Disputes—mode of settlement:
    (*a*) Architect to be sole judge.
    (*b*) Arbitrations.
77. Rates of wages, etc.
78. Scrub floors.
79. Clean windows.
80. Leave premises clean.
81. Clear away rubbish generally.

PROVISIONS

82. Provisional sums for specialist's works and work to be carried out by the local authorities.
83. Attendances upon special tradesmen.
84. Provisional sums for anticipatory requirements.

EXCAVATOR

1. Levels (definition of datum line).
2. Tip for spoil, or where directed.
3. Blasting, and permission to be obtained.
4. Remove vegetable soil.
5. Surface digging.
6. Levelling ground.
7. Hacking up and removal of concrete and other hard surfaces on site of old buildings.
8. Excavations for:
    (*a*) Cellars and basements.
    (*b*) Foundations and concrete.
    (*c*) Underpinning and cutting away existing footings.
    (*d*) Boundary walls.
    (*e*) Cuttings.
    (*f*) Tunnelling.
9. Pipe trenches.
10. Inspection of trenches and foundations.
11. Fill in and ram trenches.
12. Soft pockets to be filled in with concrete.
13. Clay puddle.
14. Foundations to be kept clear of water.
15. Planking and strutting.
16. Filling in to surfaces, etc.
17. Forming embankments.
18. Soiling, seeding and turfing surfaces.
19. Cleaning out old cesspools.
20. Grubbing up old drains.
21. Grubbing up shrubs, etc.
22. Afford facilities.
23. Attendance.
24. Clear away rubbish.

CONCRETOR

1. Description of materials:
   (*a*) Sand.
   (*b*) Lime.
   (*c*) Cement.
   (*d*) Aggregate.
   (*e*) Water.
2. Tests.
3. Method of mixing.
4. Stoppages.
5. Gauging.
6. Waterproofing of concrete.
7. Lime or cement concrete in foundations.
8. Lime or cement concrete in underpinning.
9. Lime or cement concrete in engine beds.
10. Lime, breeze or cement concrete over arches.
11. Lime, breeze or cement concrete under pavings.
12. Lime, breeze or cement concrete in floors.
13. Lime, breeze or cement concrete in hearths.
14. Lime, breeze or cement concrete in roofs.
15. Lime, breeze or cement concrete in tops and cheeks to dormers.
16. Lime, breeze or cement concrete in walls, partitions, etc.
17. Lime, breeze or cement concrete in tanks, cisterns, etc.
18. Lime, breeze or cement concrete in staircases.
19. Lime, breeze or cement concrete in kerbs.
20. Lime, breeze or cement concrete in channels.
21. Lime, breeze or cement concrete in lintels.
22. Lime, breeze or cement concrete in casing to stanchions.
23. Lime, breeze or cement concrete in casing to lintels, beams, girders and the like.
24. Hardcore filling.
25. Gravel paths.
26. Shingle paths.

CAST CONCRETE WORK

27. Moulds—include for.
28. Seasoning.
29. Cast concrete lintels.
30. Cast concrete steps and landings.
31. Cast concrete channels, kerbs and copings.
32. Cast concrete ornaments.
33. Breeze concrete fixing blocks.
34. Afford facilities.
35. Attendance.
36. Clear away rubbish.

PILING

1. General description of the work.
2. Conditions under which work is to be executed.
3. Time in which work has to be executed.
4. General description of materials.
5. Seasoning.
6. Nature of site—strata, records of bores, or trial holes.
7. Driving—weight of hammer and length of drop.

8. Set to which piles are to be driven.
9. Screw piles.
10. Wood piles.
11. Sheet piling—corner and junction piles.
12. Strutting and waling.
13. Metal heads.
14. Metal shoes.
15. Helices.
16. Afford facilities.
17. Attendance.
18. Clear away rubbish.

BRICKLAYER

1. Description of materials:
   - (*a*) Common bricks.
   - (*b*) Facing bricks.
   - (*c*) Purpose-made bricks.
   - (*d*) Glazed bricks.
   - (*e*) Fire bricks.
   - (*f*) Blue bricks.
   - (*g*) Lime.
   - (*h*) Sand.
   - (*i*) Cement.
   - (*j*) Fireclay.
   - (*k*) Water.
   - (*l*) Partition blocks.
2. Lime mortar:
   - (*a*) Hand made.
   - (*b*) Ground in mortar mill.
3. Cement mortar.
4. Fireclay mortar.
5. Wetting bricks.
6. Bond.
7. Walls—external and internal.
8. Footings.
9. Fender walls.
10. Sleeper walls, state if built honeycomb.
11. Walls built battering.
12. Brick backing to stonework.
13. Backing and internal quoins to rubble walling.
14. Cavities and ties.
15. Partition walls.
16. Flushing-up courses.
17. Internal pointing.
18. Pointing damaged by frost, etc.
19. Limewhiting.
20. Raking out joints of existing brickwork and hacking for key.
21. Arches:
   - (*a*) Trimmer.
   - (*b*) Relieving.
   - (*c*) Inverted.
   - (*d*) Fireplace.
   - (*e*) Brick on edge.
   - (*f*) Half brick on edge.
   - (*g*) Brick on end.
   - (*h*) Flat.

(*i*) Camber.
(*j*) Segmental.
(*k*) Semi-circular.
(*l*) Pointed.
(*m*) Elliptical.
(*n*) Special.

22. Vaulting.
23. Purpose made bricks (of all descriptions).
24. Work in cement mortar.
25. Party wall gables.
26. Underpinning.
27. Brick paving.
28. Heating trenches.
29. Plinths.
30. Sills:
    (*a*) Brick on edge.
    (*b*) Half a brick on edge.
    (*c*) Moulded.
31. Quoins.
32. Pilasters.
33. Piers.
34. Panels.
35. Niches.
36. Apertures.
37. String courses.
38. Cornices.
39. Oversailing courses.
40. Oversailing courses to stacks.
41. Oversailing courses to gables.
42. Copings.
43. Brick carving.
44. Forming chase for and cutting and pinning to edge of concrete floor, landings, roofs and the like.
45. Beam filling.
46. Squints, birdsmouths and rounded angles.
47. Cuttings; rough, fair, and neat:
    (*a*) Straight.
    (*b*) Raking.
    (*c*) Bevel.
    (*d*) Skew.
    (*e*) Circular—all kinds.
48. Cutting and fitting up to and around rolled steel joists, girders, stanchions and the like.
49. Tile Creasing:
    (*a*) Sills.
    (*b*) Heads.
    (*c*) Strings.
    (*d*) Gables.
    (*e*) Boundary walls.
50. "Fixing" bricks.
51. Wood pallets—fixing.
52. Bonding new works into old.
53. Making good and facing up to old walls taken down.
54. Preparing old walls for building upon.
55. Forming and pargetting smoke flues.
56. Chases for pipes, wires and ducts.
57. Brick fireplaces.

58. Setting grates, stoves, ranges, coppers and the like.
59. Fixing wood mantels (when given with this trade).
60. Damp-proof courses.
61. Boundary walls.
62. Facings:
    (*a*) External.
    (*b*) Internal.
    (*c*) Glazed.
    (*d*) Glazed hanging tiles.
    (*e*) Brickwork for carving.
    (*f*) Arches.
    (*g*) Vaulting.
    (*h*) Sills.
    (*i*) Plinths.
    (*j*) Piers.
    (*k*) Quoins.
    (*l*) Pilasters.
    (*m*) String courses.
    (*n*) Oversailing and set-back courses.
    (*o*) Dentil courses.
    (*p*) Panels.
    (*q*) Niches.
    (*r*) Aprons.
    (*s*) Apertures.
    (*t*) Cornices.
    (*u*) Copings.
    (*v*) Mouldings.
    (*w*) Corbels.
    (*x*) Tumblings to buttresses.
    (*y*) Purpose-made bricks; bullnoses, splays, angles and the like.
63. Boiler Plant:
    (*a*) Description of materials.
    (*b*) Description of workmanship.
    (*c*) Boiler seatings.
    (*d*) Economizer seatings.
    (*e*) Foundation for fan.
    (*f*) Foundation for engine.
    (*g*) Foundation for pumps.
    (*h*) Linings to flues, etc.
    (*i*) Coverings to flues.
    (*j*) Covering to boiler.
    (*k*) Chimney stacks.
    (*l*) Boiler house.
64. Sundries:
    (*a*) Hoop-iron bonds.
    (*b*) Wire and mesh reinforcement.
    (*c*) Air bricks and gratings (when given with this trade).
    (*d*) Cutting and pinning or building in ends of timbers, steps, steel joists, girders and the like.
    (*e*) Holes through walls for pipes and making good after.
    (*f*) Eyelets in walls for pipes.
    (*g*) Building in vent gratings, soot doors, etc., and forming openings in walls behind same.
    (*h*) Chimney pots.
    (*i*) Bed wall plates, etc.
    (*j*) Building in iron and steel windows and doors.
    (*k*) Fixing doors and frames of safes.

(*l*) Bed door and window frames.
(*m*) Rake out, wedge and point flashings.

65. Afford facilities.
66. Attendance.
67. Clear away rubbish.

ASPHALTER

1. Description of materials:
   (*a*) Asphalt.
   (*b*) Felt.
   (*c*) Wiring.
2. Horizontal damp-proof courses.
3. Vertical damp-proof courses:
   (*a*) Asphalt.
   (*b*) Angles.
   (*c*) Arrises.
   (*d*) Nogs.
4. Floors:
   (*a*) Asphalt.
   (*b*) Skirtings.
   (*c*) Angles.
   (*d*) Arrises.
5. Roofs: flat, to falls, raking and spherical:
   (*a*) Asphalt.
   (*b*) Skirtings.
   (*c*) Angles.
   (*d*) Arrises.
   (*e*) Gutters.
   (*f*) Channels.
   (*g*) Cesspools.
   (*h*) Spitters.
6. Dormers: bays and other similar small work:
   (*a*) Asphalt.
   (*b*) Skirtings.
   (*c*) Angles.
   (*d*) Arrises.
   (*e*) Gutters.
   (*f*) Channels.
   (*g*) Cesspools.
   (*h*) Spitters.
7. Lining to tanks:
   (*a*) Asphalt.
   (*b*) Angles.
   (*c*) Arrises.
8. Gutters: eaves, parapet and valley:
   (*a*) Asphalt.
   (*b*) Skirtings.
   (*c*) Angles.
   (*d*) Arrises.
   (*e*) Working over fillets.
   (*f*) Cesspools.
9. Pavings: areas, roads, footpaths, etc.:
   (*a*) Asphalt.
   (*b*) Gutters.
   (*c*) Channels.
10. Afford facilities.

11. Attendance.
12. Clear away rubbish.

DRAINLAYER

1. Description of materials.
2. Description of workmanship.
3. Stopping up old drains.
4. Excavating trenches.
5. Filling in and ramming solid.
6. Planking and strutting.
7. Inspection and testing.
8. Conform to the requirements of the local authorities.
9. Drains laid on concrete.
10. Drains encased in concrete.
11. Suspended drains.
12. Drains laid to falls.
13. Soil drains.
14. Rainwater drains.
15. Agricultural drains.
16. Iron drains.
17. Cleaning eyes.
18. Gullies.
19. Grease traps.
20. Manholes.
21. Interceptor traps.
22. Ventilating and fresh-air inlet.
23. Connection to sewer.
24. Method of disposal.
25. Afford facilities.
26. Attendance.
27. Clear away rubbish.

ARTIFICIAL STONE, TERRA COTTA, FAIENCE AND SIMILAR WORK

1. Description of materials:
   - (*a*) Artificial stone.
   - (*b*) Terra cotta.
   - (*c*) Faience.
   - (*d*) Sand.
   - (*e*) Lime.
   - (*f*) Cement.
   - (*g*) Water.
2. Finish of beds and joints.
3. Finish of exposed surfaces.
4. Colour.
5. Moulds.
6. Slurrying to face.
7. Reinforcement.
8. Concrete for filling voids.
9. Lime mortar.
10. Cement mortar.
11. Injuries to materials.
12. Cleaning down.
13. Grooves for lead flashings.
14. Grooves for leaded lights.
15. Pointing.

16. Temporary supports.
17. Protection of work.
18. Lead pads.
19. Dowels.
20. Cramps.
21. Keys.
22. Mortices for iron railings and the like.
23. Ashlar work.
24. Dressings:
    (*a*) Quoins.
    (*b*) Friezes.
    (*c*) Copings.
    (*d*) Binders.
    (*e*) Springers and arch stones.
    (*f*) Window sills.
    (*g*) Mullions.
    (*h*) Transomes.
    (*i*) Window and door jambs.
    (*j*) Entrances.
    (*k*) Columns.
    (*l*) Tablets.
    (*m*) Panels.
    (*n*) Niches.
    (*o*) Caps.
    (*p*) Cornices, strings, plinths and other similar work.
25. Staircases.
26. Ornaments.
27. Work left for carving.
28. Carving.
29. Notches and holes for pipes and the like.
30. Grooves, chases and the like.
31. Afford facilities.
32. Attendance.
33. Clear away rubbish.

REINFORCED CONCRETE

1. Description of materials:
    (*a*) Sand.
    (*b*) Lime.
    (*c*) Cement.
    (*d*) Aggregate.
    (*e*) Water.
2. System of construction.
3. Tests.
4. Method of mixing.
5. Gauging.
6. Workmanship.
7. Conveyance.
8. Placing in position.
9. Foundation layer.
10. Concreting in one operation.
11. Stoppages.
12. Stops in columns.
13. Restarting.
14. Bar ends—cover.
15. Holes for bolts, etc.

16. Wetting and protection.
17. Frost.
18. Defective work.
19. Shock and vibration.
20. Fair faces.
21. Filling voids.
22. Surfaces to be plastered.
23. Scrubbed surfaces.
24. Patching.
25. Concrete cast *in situ*:
    - (*a*) Foundations.
    - (*b*) Footings.
    - (*c*) Rafts.
    - (*d*) Grillage foundations.
    - (*e*) Walls.
    - (*f*) Floors.
    - (*g*) Roofs.
    - (*h*) Beams.
    - (*i*) Cantilevers.
    - (*j*) Braces.
    - (*k*) Piers.
    - (*l*) Columns.
    - (*m*) Pilasters.
    - (*n*) Strutts.
    - (*o*) Mouldings—plinths, strings, cornices and other similar work.
    - (*p*) Arches.
    - (*q*) Arch ribs.
    - (*r*) Flying arches.
    - (*s*) Vaulting.
    - (*t*) Domes.
    - (*u*) Niches.
    - (*v*) Arcades.
    - (*w*) Balconies.
    - (*x*) Galleries.
    - (*y*) Staircases.
26. Chases and grooves.
27. Holes and mortices.
28. Fittings and accessories:
    - (*a*) Form openings.
    - (*b*) Building in.
    - (*c*) Pipes.
    - (*d*) Forms.

Pre-cast Work

29. Concrete in pre-cast work—describe in detail and in a like manner as that given for Artificial Stone.

Reinforcement

30. Infringement of patents.
31. Consulting Engineer(s) Fees.
32. Manufacture.
33. Kind.
34. Medium carbon steel and cold-worked steel.
35. Properties.
36. Contraction of area.
37. Elongation.

38. Chemical properties.
39. Tests of each melt.
40. Bending tests.
41. Seams, flaws, etc.
42. Defects.
43. Procedure of testing.
44. Storage.
45. Calculated weight.
46. Ends of bars.
47. Cleanliness.
48. Coating.
49. Welding.
50. Bends.
51. Removal of damaged bars.
52. Cooling heated bars.
53. Helices.
54. Placing.
55. Binding wire.
56. Spacers and chairs.
57. Schedule of reinforcement for all positions (*see* items 25 and 28).

Formwork

58. Approval.
59. Strengthening or improvement.
60. Materials and workmanship.
61. Joints.
62. Removal.
63. Timber to be wrot.
64. Re-use.
65. Angle fillets.
66. Inclined work.
67. Cambering.
68. Sides of beam boxes.
69. Struts and shores.
70. Column moulds.
71. Examination before concreting.
72. Prevention of adhesion.
73. Ferrules.
74. Responsibility of removal.
75. Supervision of removal.
76. Time for removal.
77. Emergency props.
78. Frost and rain.
79. Schedule of formwork for all positions (*see* items 25 and 28).

Testing

80. Generally.
81. Crushing resistance of concrete.
82. Particulars to be taken or ascertained.
83. Test periods.
84. Loading tests.
85. Time for tests.
86. Arrangement of load.
87. Amount of load.
88. Arching of materials.
89. Recording of deflections.
90. Conduct of tests.

Piling

91. General description of the work.
92. Conditions under which work has to be executed.
93. Time in which work has to be executed.
94. General description of materials.
95. Seasoning.
96. Nature of site—strata records of bores or trial holes.
97. Driving—weight of hammer and length of drop.
98. Set to which piles are to be driven.
99. Moulds.
100. Strappings and bolts.
101. Casting piles on site.
102. Piles filled in or cast *in situ*.
103. Piles:
    (*a*) Trial piles.
    (*b*) Piles and handling, pitching and driving, or pouring or tamping.
    (*c*) Wetting.
    (*d*) Lengthening in position.
    (*e*) Cutting or breaking away heads of piles.
    (*f*) Lifting or rolling.
    (*g*) Damaged piles.
    (*h*) Bonding irons.
104. Heads.
105. Shoes.
106. Reinforcement.
107. Generally:
    (*a*) Afford facilities.
    (*b*) Attendance.
    (*c*) Clear away rubbish.

WALLER

1. Preamble clauses:
    (*a*) Lime.
    (*b*) Sand.
    (*c*) Cement.
    (*d*) Water.
    (*e*) Lime mortar—hand-made or ground in mill.
    (*f*) Cement mortar.
2. Walling:
    (*a*) General description of stone, bond and setting.
    (*b*) Footings.
    (*c*) Facings.
    (*d*) Arches.
    (*e*) Quoins.
3. Rubble facings:
    (*a*) Description of stone, bond and setting.
    (*b*) Arches.
    (*c*) Quoins.
4. Flint facings:
    (*a*) Description of stone, how finished and set.
    (*b*) All adjuncts thereto.
5. Parpoints and the like:
    (*a*) Description of stone, bed, how dressed, bonded and set.
    (*b*) All adjuncts thereto.
6. For any other probable items *see* Bricklayer.

7. Generally:
   (*a*) Afford facilities.
   (*b*) Attendance.
   (*c*) Clear away all rubbish.

STONEMASON

1. Preamble clauses—*see* Waller.
2. Injuries to stone.
3. Stone to be set square.
4. Moulds.
5. Work stone on site.
6. Joints.
7. Beds.
8. Angles to dressings.
9. Jambs.
10. Preservation of stone.
11. Cleaning down.
12. Grooves for lead flashings.
13. Grooves for leaded lights.
14. Pointing.
15. Protection of stonework (casing in).
16. Lead pads.
17. Dowels.
18. Cramps.
19. Keys.
20. Mortices for iron railings and the like.
21. Bonding and setting.
22. Ashlar.
23. Dressings:
    (*a*) Quoins.
    (*b*) Friezes.
    (*c*) Copings.
    (*d*) Binders.
    (*e*) Springers and arch stones.
    (*f*) Window sills.
    (*g*) Mullions.
    (*h*) Transomes.
    (*i*) Window and door heads.
    (*j*) Window and door jambs.
    (*k*) Entrances.
    (*l*) Columns.
    (*m*) Tablets.
    (*n*) Panels.
    (*o*) Niches.
    (*p*) Caps.
    (*q*) Cornices, strings, plinths and other similar work.
24. Ornaments.
25. Work left for carving.
26. Carving.
27. Notches and holes for pipes and the like.
28. Grooves, chases and the like.

GENERAL MASONS' WORK

29. Description of stone, quality and finish to face.
30. Templates.

31. Cover stones.
32. Corbelling.
33. Thresholds.
34. Entrance steps.
35. Staircases.
36. Kerbs—to areas, etc.
37. Hearths.
38. Coal shoot.
39. Bases to stanchions.
40. Copings.
41. Codge and catch stones.
42. Window sills.
43. Door and window heads.
44. Pavings.
45. Kerbs to pavings, etc.
46. Afford facilities.
47. Attendance.
48. Clear away rubbish.

MARBLE MASON

1. Description of materials and methods of fixing.
2. Pavings.
3. Shelvings.
4. Enclosures, divisions, etc.
5. Wall linings.
6. Borders and margins.
7. Steps.
8. Hearths, kerbs, etc.
9. Chimney pieces.
10. Balustrades.
11. Pilasters, columns, etc.
12. Architraves and archivolts.
13. Bases to posts.
14. Keys.
15. Imposts.
16. Holes, mortices, notchings, etc.
17. Afford facilities.
18. Attendance.
19. Clear away rubbish.

SLATE MASON

1. Description of materials and methods of fixing.
2. Pavings.
3. Shelvings.
4. Enclosures, divisions, etc.
5. Channels.
6. Kerbs, fender and the like.
7. Sink stones.
8. Bases to posts.
9. Cisterns.
10. Enamelled slates.
11. Afford facilities.
12. Attendance.
13. Clear away rubbish.

SLATER AND TILER

Slater (including Asbestos or other patent roofing materials).

1. Slating.
2. Lap.
3. Nails and battens.
4. Eaves.
5. Verges.
6. Top edges.
7. Square abutments.
8. Skew abutments.
9. Valleys.
10. Hips and angles.
11. Hip coverings.
12. Ridge coverings.
13. Finials.
14. Hip irons.
15. Fixing soakers.
16. Torching or rendering to underside of slating.
17. Vertical slating.
18. All adjuncts thereto.
19. Glass slates.
20. Afford facilities.
21. Attendance.
22. Leave watertight.
23. Clean out all gutters.
24. Clear away all rubbish.

Roof Tiling

1. Tiling.
2. Gauge.
3. Nails and battens.
4. Eaves.
5. Verges.
6. Top edges.
7. Square abutments.
8. Skew abutments.
9. Valleys.
10. Valley tiles.
11. Hips and angles.
12. Hip coverings.
13. Ridge coverings.
14. Finials.
15. Hip irons.
16. Fixing soakers.
17. Torching or rendering to underside of tiling.
18. Vertical tiling.
19. All adjuncts thereto.
20. Glass tiles.
21. Afford facilities.
22. Attendance.
23. Leave watertight.
24. Clean out all gutters.
25. Clear away rubbish.

CARPENTER

1. Description of materials.
2. Sawing and scantlings.
3. Trimmers.
4. Distance apart of timbers.
5. Lintels.
6. Wood bricks and pallets.
7. Centering, formwork, casings and formwork; as set out for "Formwork" under Reinforced Concrete.
8. Fillets to casings to form panels:
   - (*a*) Ceilings.
   - (*b*) Beams.
   - (*c*) Lintels.
   - (*d*) Stanchions.
9. Fillets to soffits of trimmer arches.
10. Casings of stonework, artificial stone and the like if not described under their respective trades.
11. Arch centres.
12. Rough bracketing and firring.
13. Cradling.
14. Finished sizes.
15. Roofs:
    - (*a*) Wall plates.
    - (*b*) Principals.
    - (*c*) Purlins.
    - (*d*) Ridges.
    - (*e*) Valleys.
    - (*f*) Hips.
    - (*g*) Dragon pieces.
    - (*h*) Spars and trimmers.
    - (*i*) Roof boarding.
    - (*j*) Felt.
    - (*k*) Sprocket pieces.
    - (*l*) Spar and rafter feet, planing and shaping.
    - (*m*) Eaves boards.
    - (*n*) Fascias.
    - (*o*) Tilting fillets.
    - (*p*) Barge boards and finish.
    - (*q*) Gutters.
    - (*r*) Cesspools.
    - (*s*) Snow boards.
    - (*t*) Cat ladders.
    - (*u*) Runways (in roof).
    - (*v*) Ceilings.
    - (*w*) Scarfings, straps, bolts and the like.
    - (*x*) Plates to steel principals.
16. Flats complete with all adjuncts thereto.
17. Fleches complete with all adjuncts thereto.
18. Shingles:
    - (*a*) Description of.
    - (*b*) Gauge and nails.
    - (*c*) Eaves.
    - (*d*) Verges.
    - (*e*) Top edges.

(*f*) Abutments.
(*g*) Valleys.
(*h*) Hips and angles.
(*i*) Hip coverings.
(*j*) Ridge coverings.
(*k*) Finials.
(*l*) Fixing soakers.

19. Weather boarding.
20. Ventilating turrets (complete with all adjuncts thereto).
21. Dormers (ditto).
22. Lantern lights (ditto).
23. Skylights (ditto).
24. Trap doors (ditto).
25. Partitions:
    (*a*) Trussed.
    (*b*) Quarter.
    (*c*) Brick nogged.
26. Bridging pieces.
27. Bressumers.
28. Wall battening.
29. Half-timbering:
    (*a*) Description of timbers.
    (*b*) Sawing of scantlings.
    (*c*) Preparation to faces.
    (*d*) Framing.
    (*e*) Jointed with red or white lead.
    (*f*) Pegs.
    (*g*) Mouldings.
    (*h*) Carvings.
30. Verandahs:
    (*a*) Description of timbers.
    (*b*) All adjuncts thereto.
31. Hoods to doors:
    (*a*) Description of timbers.
    (*b*) All adjuncts thereto.
32. Pent roofs:
    (*a*) Description of timbers.
    (*b*) All adjuncts thereto.
33. Timber framed buildings:
    (*a*) Description of timbers, scantlings, framing and fixing.
    (*b*) All adjuncts thereto.
34. Floors (each floor separately):
    (*a*) Plates.
    (*b*) Joists.
    (*c*) Fillets or splines.
    (*d*) Girders.
    (*e*) Binders.
    (*f*) Strutting.
    (*g*) Sound boarding.
    (*h*) Pugging.
35. Fences:
    (*a*) Description of timbers.
    (*b*) Sizes.
    (*c*) Kind.
    (*d*) Preparation.
    (*e*) Fixing.
    (*f*) Gates.

36. Generally:
    (*a*) Afford facilities.
    (*b*) Attendance.
    (*c*) Clear away rubbish.

JOINER

1. Description of timbers.
2. Seasoning of timbers.
3. Glued joints.
4. Finished sizes.
5. Framed work.
6. Defective work.
7. Storing joinery.
8. Priming.
9. Grounds.
10. Secret fixing.
11. Flooring:
    (*a*) Description of materials.
    (*b*) Position.
    (*c*) Method of laying.
    (*d*) Cuttings of all kinds.
    (*e*) Mitred margins.
    (*f*) Boards over pipes.
    (*g*) Covering floors.
    (*h*) Cleaning on completion.
12. Skirtings.
13. Skylights.
14. Lantern lights.
15. Borrowed lights.
16. Hatches.
17. Windows:
    (*a*) Double hung shashes and frames.
    (*b*) Casements.
    (*c*) Yorkshire shashes.
    (*d*) Solid frames.
    (*e*) Bays.
    (*f*) Oriels.
    (*g*) Linings.
    (*h*) Window bottoms.
    (*i*) Architraves.
    (*j*) Weather tongues.
    (*k*) Shutters.
    (*l*) Furniture.
18. Doors:
    (*a*) External.
    (*b*) Internal.
    (*c*) Fanlights.
    (*d*) Gates.
    (*e*) Door frames and casings.
    (*f*) Dowels.
    (*g*) Linings.
    (*h*) Architraves and blocks.
    (*i*) Furniture.
19. Staircases:
    (*a*) Description of timbers.
    (*b*) Construction.
    (*c*) All adjuncts thereto.

20. Casings to beams.
21. Wall linings.
22. Panelling:
    (*a*) Description of timbers.
    (*b*) Method of framing.
    (*c*) All adjuncts thereto.
23. Cornices.
24. Dado moulds.
25. Picture moulds.
26. Angle beads.
27. Air grids.
28. Fittings:
    (*a*) Dressers.
    (*b*) Cupboards.
    (*c*) Wardrobes.
    (*d*) Linen cupboards.
    (*e*) Housemaid's sink.
    (*f*) Preparation for lead safes.
    (*g*) Plate rails.
    (*h*) Draining boards.
    (*i*) Seats.
    (*j*) Shelving.
    (*k*) Meter brackets and cupboards.
    (*l*) Cloak rails.
    (*m*) Pipe casings.
    (*n*) Pipe boards.
    (*o*) Wood partitions.
    (*p*) Lift enclosures.
29. Generally:
    (*a*) Wood blocks, nogs, plugs, etc.
    (*b*) Afford facilities.
    (*c*) Attendance.
    (*d*) Clear away rubbish.

IRONMONGER

1. Provisional sum (usually).
2. Return empties.
3. Storing.
4. Fixing (if not previously described with Joinery work).
5. Ironmongery supplied and fixed (if not previously given with Joinery work).

SMITH AND FOUNDER

Steelwork

1. Description of materials.
2. Tests.
3. Bolts.
4. Rivet holes.
5. Riveting.
6. Welding.
7. Planing.
8. Joists.
9. Channels.
10. Girders.

11. Distance pieces.
12. Connections.
13. Stanchions.
14. Columns.
15. Roof trusses.
16. Lantern lights.
17. Skylights.
18. Purlins.
19. Wind ties.
20. Vertical framing.
21. Louvres.
22. Ventilating shafts.
23. Revolving shutters.
24. Collapsible gates.
25. Fireproof and strong-room doors.
26. Staircases.
27. Railway metals.
28. Sundries in steel.

Mild Steel and Wrought Ironwork

29. Description of materials, quality and workmanship.
30. Tests.
31. Drilling holes.
32. Galvanizing.
33. Bolts and straps.
34. Flitch plates.
35. Chimney and bearing bars.
36. Mat frames.
37. Gratings.
38. Grilles.
39. Guard bars to windows and the like.
40. Balustrades.
41. Core and hand rails.
42. Railings and grates.
43. Staircases and ladders.
44. Snow guards.
45. Sundries in mild steel and wrought iron.

Corrugated Sheeting

46. Description of materials, quality and workmanship.
47. Galvanizing.
48. Gauge.
49. Nails.
50. Clips.
51. Lap.
52. Corrugated sheeting and all adjuncts thereto.

Cast Iron Work

53. Description of materials, quality and workmanship.
54. Tests.
55. Planing.
56. Patterns.
57. Stanchions.
58. Columns.
59. Beams.
60. Lintels.

61. Felt pads.
62. Lead pads.
63. Bolts.
64. Holing.
65. Shoes and heads to roof principals.
66. Rainwater pipes, and all adjuncts thereto.
67. Soil and ventilating pipes.
68. Eaves gutters.
69. Staircases.
70. Balustrades.
71. Railings and gates.
72. Brackets.
73. Gratings.
74. Ranges, stoves and the like.
75. Sundries in cast iron.

Steel and Iron Sashes and Casements, etc.

76. Sashes and casements.
77. Pavement lights.
78. Stallboard lights.
79. Water bars and channels.
80. Coal plates.
81. Generally:
    (*a*) Afford facilities.
    (*b*) Attendance.
    (*c*) Clear away rubbish.

ASBESTOS ROOFING, ETC.

As item 46, 48, 49, 50, 51, 52 and 66, under SMITH AND FOUNDER.

PLASTERER

1. Description of materials:
    (*a*) Sand.
    (*b*) Lime.
    (*c*) Water.
    (*d*) Laths.
    (*e*) Metal lathing.
    (*f*) Nails.
    (*g*) Hair.
    (*h*) Portland cement.
    (*i*) Keen's cement.
    (*j*) Special cements.
    (*k*) Plaster of Paris.
    (*l*) Hard plasters.
    (*m*) Wall boards and the like.
    (*n*) Granite chippings and the like.
    (*o*) Pebbles.
2. Counterlathing.
3. Screeds to moulds.
4. Dubbing out.
5. Coarse stuff.
6. Fine stuff.
7. Putty plaster.
8. Hacking to concrete.
9. Raking out joints.

Plastering internally

10. Ceilings.
11. Soffits of stairs.
12. Ceiling beams.
13. Cornices.
14. Scotch bracketing.
15. Enrichments to ceilings.
16. Ceiling ribs.
17. Coves.
18. Quirks, rounded angles, and the like.
19. Walls.
20. Partitions.
21. Plastering behind panelling.
22. Plastering behind skirtings and the like.
23. Reveals of windows and recesses and the like.
24. Mouldings and enrichments to walls.
25. Cement skirtings.
26. Slab partitions.
27. Ceiling slabs.
28. Pavings and screeds:
    (*a*) Granolithic.
    (*b*) Portland cement.
    (*c*) Floated beds for asphalt and other pavings and for wood blocks, jointless flooring and the like.
    (*d*) Floated beds for wall tiling.
    (*e*) Hearths.

Fibrous Plaster

29. Description of materials and workmanship.
30. Models.
31. Metal hangers and bars.
32. Ceilings—in detail.
33. Cornices and coves.
34. Enrichments and ornaments.
35. Beam casings.
36. Columns, pilasters and the like.
37. Arches.
38. Domes.
39. Groined soffits.
40. Consoles, overdoors, canopies and other similar items.

Floor and Wall Tiling

41. Wall tiling.
42. Skirtings.
43. Angles.
44. Cappings.
45. Mouldings.
46. Picked out bands and the like.
47. Floor tiling.
48. Borders and margins.
49. Special patterns.
50. Fireplaces and the like.

Plastering externally

51. Soffits.
52. Half-timber panels.

53. Reveals.
54. Wall surfaces.
55. Skirtings.
56. Mouldings.
57. Enrichments.
58. Ornaments.
59. Generally:
    (*a*) Afford facilities.
    (*b*) Attendance.
    (*c*) Clear away rubbish.

PLUMBER

External Plumber

1. Description of materials and workmanship.
2. Soakers.
3. Flats.
4. Hoods and canopies.
5. Domes.
6. Gutters.
7. Cesspools.
8. Valleys.
9. Hips.
10. Dormers.
11. Fleches.
12. Ridges.
13. Skylights.
14. Lantern lights.
15. Trap doors.
16. Stepped flashings.
17. Cover flashings.
18. Apron flashings.
19. Finials.
20. Spitter outlets.
21. Lead wedging.
22. Bedding edges of lead in white lead.
23. Burning lead into grooves.
24. Dressing over glass.
25. Dressing over mouldings and into hollows.
26. Copper nailing.
27. Bossed ends.
28. Flashing around pipes.
29. Lining to gutters.
30. Covering to strings and cornices.
31. Pointing lead flashings with cement.
32. Lead tacks.
33. Soldered dots.
34. Lead plugs.
35. Lead rainwater pipes, and all adjuncts thereto.
36. Lead eaves gutters and all adjuncts hereto.
37. Gratings to heads, cesspools, outlets, and the like.

Internal Plumber, Water and Gas Supply, Soil and Waste Pipes

38. Description of materials, quality and workmanship.
39. Strengths and weights of pipes.
40. Testing of pipes and taps.

41. Protection of pipes.
42. Bends.
43. Cuttings.
44. Soldered joints and the like.
45. Collars.
46. Clips and screws.
47. Cold water service:
    (*a*) Connection to main.
    (*b*) Stop cock and key.
    (*c*) Water meter.
    (*d*) Main to cistern or other position.
    (*e*) Branches to fittings.
    (*f*) Storage cistern with fittings complete.
    (*g*) Protection to cistern.
    (*h*) Stop cocks to outflow.
    (*i*) Safe to cistern.
    (*j*) Emptying tap.
48. Hot water service.
    (*a*) Cylinder and connections.
    (*b*) Flow and return.
    (*c*) Branches and valves.
    (*d*) Expansion pipe.
    (*e*) Stop cocks.
    (*f*) Boiler and connections.
    (*g*) Safety valve.
    (*h*) Branches to fittings.
    (*i*) Geyser, etc.
    (*j*) Testing.
49. Fittings:
    (*a*) W.C. apparatus and connections.
    (*b*) Lead soil pipes.
    (*c*) Connection of soil pipes with drains.
    (*d*) Balloon guards.
    (*e*) Iron stays.
    (*f*) Lead anti-syphonage pipes.
    (*g*) Inspection eyes.
    (*h*) Flushing cisterns (with ballcock, overflow, flushing pipe and connections).
    (*i*) Urinals and all accessories.
    (*j*) Sinks of all kinds and all accessories.
    (*k*) Coverings to drainer boards.
    (*l*) Lavatory basins and all accessories.
    (*m*) Baths and all accessories.
50. Pumps.
51. Water-softening apparatus.
52. Fire apparatus:
    (*a*) Description of materials.
    (*b*) Smith's composition.
    (*c*) Brackets.
    (*d*) Sluice valves.
    (*e*) Diameter of pipes.
    (*f*) Hydrants and their positions.
    (*g*) Pressure gauge.
    (*h*) Hose and reels.
    (*i*) Fire extinguishers.
    (*j*) Main to sprinkler storage tank.
    (*k*) Storage tank and all adjuncts thereto.

(*l*) Sprinklers, their positions and supply to.
(*m*) Testing.

53. Gas service:
(*a*) Connection to main.
(*b*) Stop cocks.
(*c*) Gas meter.
(*d*) Pipe—main to meter.
(*e*) By-passes.
(*f*) Regulating valve.
(*g*) Governors.
(*h*) Service pipes from meter to fittings.
(*i*) Fittings in detail and all adjuncts thereto.

54. Afford facilities.
55. Attendance.
56. Clear away rubbish.

ZINC WORKER

1. Description of materials and workmanship.
2. Tests.
3. Roofings.
4. Flashings, etc., in same order as that given for "External Plumber".
5. Pipes and all adjuncts thereto.
6. Gutters and all adjuncts thereto.
7. Ventilators.
8. Afford facilities.
9. Attendance.
10. Clear away rubbish.

COPPERSMITH

1. Description of materials and workmanship.
2. Tests.
3. Flashings, etc., in same order as that given for "External Plumber".
4. Copper roof tiles.
5. Vanes.
6. Dowels.
7. Copper pipes:
(*a*) Diameter.
(*b*) Gauge.
(*c*) Jointing.
(*d*) Clips.
(*e*) Service pipes as they occur and all adjuncts thereto.
(*f*) Branches to fittings.
(*g*) Connections to unions of fittings.
(*h*) For any other items *see* "Internal Plumber".
8. Brass pipes:
As set out above for "Copper Pipes".
9. Copper eaves gutters and all adjuncts thereto.
10. Afford facilities.
11. Attendance.
12. Clear away rubbish.

WIRE WORKER

1. Description of materials and workmanship.
2. Special patterns.
3. Hand-made work.

4. Wire work in detail as it occurs and all adjuncts thereto.
5. Afford facilities.
6. Attendance.
7. Clear away rubbish.

BELL HANGER

1. Description of bells and positions.
2. Pulls.
3. Speaking tubes.
4. Electric bells:
   (*a*) Description of materials and workmanship.
   (*b*) Position of bells.
   (*c*) Indicators.
   (*d*) Pushes.
5. Pneumatic bells.
6. Afford facilities.
7. Attendance.
8. Clear away rubbish.

VENTILATION

1. Description of materials and workmanship.
2. Ventilation systems.
3. Fans.
4. Belting.
5. Motors and starters.
6. Ducts.
7. Dampers.
8. Access doors.
9. Hoods.
10. Grilles.
11. Air gratings.
12. Afford facilities.
13. Attendance.
14. Clear away rubbish.

HEATING

1. Description of materials and workmanship.
2. Guarantees for a specific heat.
3. Testing.
4. Boiler and valves.
5. Automatic regulators.
6. Furnace fittings.
7. Coking tools.
8. Dampers.
9. Flue and cleaning eye.
10. Size and run of pipes.
11. Expansion joints and bends.
12. Non-conducting covering to pipes.
13. Air valves.
14. Brackets, slings, supports and the like.
15. Radiators and safety valves.
16. Shields to radiators.
17. Afford facilities.
18. Attendance.
19. Clear away rubbish.

ELECTRIC LIGHTING

1. Description of materials and workmanship.
2. Joints.
3. Conduit boxes.
4. Meters, switches and fuses.
5. Wire and cables.
6. Main cables.
7. Tubing and casings.
8. Distribution boards.
9. Switches and switch-boards.
10. Lampholders and lamps.
11. Fittings.
12. Positions and control of lights.
13. Dynamos, generators, gas and oil engines.
14. Tanks.
15. Straps.
16. Resisters.
17. Afford facilities.
18. Attendance.
19. Clear away rubbish.

LIGHTNING CONDUCTORS

1. Description of materials and workmanship.
2. Testing.
3. Conductivity.
4. Joints.
5. Clips and coupling sockets.
6. Earth plates.
7. Rods and points.
8. Insulators.
9. Afford facilities.
10. Attendance.
11. Clear away rubbish.

LIFT ENGINEER

1. Motor and other source of power.
2. Gears.
3. Coupling.
4. Speed.
5. Capacity.
6. Switches.
7. Wiring.
8. Controller.
9. Guides.
10. Brake.
11. Safety appliance.
12. Sheaves.
13. Counter weight.
14. Car.
15. Doors and gates.
16. Preparing lift well.
17. Testing.
18. Afford facilities.
19. Attendance.
20. Clear away rubbish.

GLAZIER

1. Description of materials and workmanship.
2. Putty.
3. Sprigs and clips.
4. Washleather, indiarubber and flannelette.
5. Templates.
6. Bending glass.
7. Sheet glass.
8. Fluted sheet glass.
9. Cathedral, Muranese and other ornamental glass.
10. Patent plate glass.
11. Rolled plate glass.
12. Rough cast plate glass.
13. Wired rolled glass.
14. Wired rough cast glass.
15. Polished plate glass.
16. Chequered plate glass.
17. Polished wired plate glass.
18. Grinding and embossing.
19. Brilliant cutting and the like.
20. Bevelling.
21. Silvering.
22. Leaded lights.
23. Copper glazing.
24. Patent glazing.
25. Pavement lights.
26. Stallboard lights.
27. Glass slates and tiles.
28. Replace all damaged or defective glass.
29. Afford facilities.
30. Attendance.
31. Clean all glass at the completion of the works.
32. Clear away all rubbish.

PAINTER AND STAINER AND FRENCH POLISHER

1. Description of materials and quality:
   - (*a*) Mixed paints.
   - (*b*) Ground colours.
   - (*c*) Driers.
   - (*d*) Raw linseed oil.
   - (*e*) Boiled linseed oil.
   - (*f*) Turpentine.
   - (*g*) White lead.
   - (*h*) Red lead.
   - (*i*) Oxide paints.
   - (*j*) Enamels.
   - (*k*) Distempers.
   - (*l*) Whitening.
   - (*m*) Lime white.
   - (*n*) Size.
   - (*o*) Knotting.
   - (*p*) Stopping.
   - (*q*) Stain.
   - (*r*) Creosote.
   - (*s*) Wood preservatives.
   - (*t*) Varnish.

2. Workmanship.
3. Testing samples.
4. Work executed for approval.
5. Rubbing down.
6. Lining walls.
7. Brick and stone walls.
8. Plastered walls.
9. Concrete ceilings.
10. Plastered ceilings.
11. Decorations on walls.
12. Decorations on ceiling.
13. Ironwork and steelwork.
14. Woodwork.
15. French polishing.
16. Fuming and wax polishing.
17. Touch up at completion.

WRITER AND GILDER

18. Letters, figures, stops and the like.
19. Gilding on surfaces.
20. Gilding lines, mouldings and enrichments.
21. Gilding ornaments.
22. Afford facilities.
23. Attendance.
24. Clean all floors and clear away rubbish.

PAPERHANGER

1. Description of materials.
2. Stripping existing papering.
3. Preparation of surfaces.
4. Battening and canvas.
5. Wall papers.
6. Ceiling papers.
7. Lining papers.
8. Relief papers.
9. Borders.
10. Afford facilities.
11. Attendance.
12. Clear away rubbish.

CHAPTER IV

SPECIFICATION WRITING

A SPECIFICATION WRITER should have a thorough knowledge of materials and details of building construction, and a knowledge of the value and properties of materials; he should have some acquaintance with the process of manufacture and workshop practice; a knowledge of the various Acts of Parliament relating to building works; and be conversant with Local Acts and By-laws, Statute Laws—Statute of Frauds, Arbitrations, and more particularly the Law of Contracts—as well as an understanding of Common Law.

An essential qualification is to be able to write clearly. Be precise; be concise; but do not attempt brevity at the expense of clearness. And to remember always above everything that a specification is not a précis: a reference to other matter: it is the matter.

To illustrate the foregoing we will take as an example a simple article, a bolt. We should say first that that which will be said in regard to a bolt is a principle in specification writing, and it also expounds the principle which should govern specification writing.

What do we know about a bolt, or rather what do we wish to know about a bolt from the specification writer's point of view? We are bound to know or must know something—not necessarily everything—about a bolt before we can attempt to specify it. The first thing, then, is to thoroughly master the subject about which we are going to specify. That is the bed-rock—the foundation upon which we are to build our specification. The next thing is to express what we have to say about the subject in the simplest and clearest language possible, but above all we must be exact and brief.

The specific things we should know or wish to know about a bolt that answers to our requirements we will put in the form of questions. What is a bolt? Are bolts obtainable of the same size for a given quantity? And are they made to different sizes? We may say that we know or should know that "a bolt is of three parts: head, shank and nut; a round piece of metal having either a square or hexagonal head at one end and threaded at the other upon which a threaded nut may be fitted". That "any given number of bolts may be made to a pattern and size". And that "bolts are made to various diameters and lengths".

These answers do not cover the whole ground, because nothing has been said that the threads are made to standard gauges, that the heads and nuts are made to standard sizes and the shanks to standard lengths, and also, as a consequence, the bolts and nuts to standard weights. We may take it for granted that we know or should know these things, or at least we are aware of them. This suffices to show that we have a knowledge of the properties of these materials, but it was not necessary to mention them, as our answers dealt specifically with the things we should know or wish to know to suit our requirements.

Let us now change the nature of our questions. What size of bolt do we require? Why do we require that particular size of bolt? Do we require a bolt of a particular strength? And what guarantee have we that the bolt we may select will satisfy our requirements? Before we can answer these questions we must know for what purpose we require the bolt. We will say we require it along with three others to make a fish-plate connection to two 7 in. by 4 in. rolled steel joists. First, as the thickness of the webs of these joists will be $\frac{1}{2}$ in. and the thickness of each of the two fish-plates will be $\frac{3}{8}$ in., that is 1 in. in all, which together with the thickness of the nut—say $\frac{3}{4}$ in.—hence a bolt 2 in. long is required. Secondly, we require it of that size because a less size would not very well answer our purpose, and it is not necessary to have it longer even if we also use washers. Thirdly, we certainly do require a bolt of an adequate strength because the security of the connection will depend entirely upon the strength of the bolt, and we will say a $\frac{3}{4}$ in. diameter bolt will suffice. Lastly, the bolt we have selected will answer our requirements, and we

may be assured of the strength because it will have been made to a standard which has been derived from tests for bolts of that diameter. This goes to show that we know or should know something of the value of the material. But unless we know the source from which it is obtained we must not be too sure of the quality and finish of the bolt, because all are not reliable makers, so that as a protection we should stipulate it to pass a standard and finish, or leave that matter to inspection, to be approved or rejected as the case may be. But in either case it shows that we are quite aware that there may be a difference due to the process of manufacture and workshop practice and dealing. It also shows that we have some knowledge of the Law of Liability, which naturally puts us on guard against defective work to prevent disaster; also that the Local or other Authority will require to be satisfied as to the strength of materials; and that in trading we may, to say the least, if we are not careful, be misled, to our undoing. What may all this have to do with a fish-plate connection? Everything! Not only so, but the example would go to show that this applies in nearly every instance with reference to materials.

A bolt is a necessary and useful article. True, it is a simple and a common article. But on account of its very simplicity and commonness we are apt to overlook its importance—very important in a steel framed building. Surely, you may ask, is it necessary to specify all this in reference to a bolt? No, but you should know all about it all the same. The specification writer should know how to discriminate between what should be specified and what should not. To specify a bolt in detail is not necessary because it is common knowledge that it has been standardized in every particular; the only thing to guard against is that of quality and finish, and these are matters that may be safely left to inspection. Similarly, what applies to a bolt applies in general to a fish-plate and also to a rolled steel joist, the principle in each case being the same. And whether the connection will be properly made is also one to be left to inspection.

It is reasonable to believe that the $\frac{1}{8}$-inch scale drawings would give no indication that such a connection would be required, and it is here that our knowledge of construction comes in, because the detail drawings would most likely not be so far advanced at the time the specification would be written. We know or should know that such a connection would be necessary, that it would be subject to a shearing force, and our knowledge of the value of materials would tell us that fish-plates and bolts were the most suitable materials for the purpose. Therefore, the point we would have to consider before we began to specify this item would be whether the preparation for this connection would have to be made *in situ*, or whether it would be of a standard kind ready prepared. Assume for the moment that it could be done by a standard connection ready prepared, that is to say, that the joists and fish-plates would be delivered with holes ready prepared for the bolts, and the fish-plates were of standard or stock sizes. The item of description for this would therefore be as follows:

Form connection to 7 in. by 4 in. R.S.J.s over stanchion with a pair of fish-plates, size 13 in. by 4 in. by $\frac{3}{8}$ in. thick, four $\frac{3}{4}$ in. diameter bolts, 2 in. long, having hexagon heads and nuts, and large washers.

No reference is here made with regard to drilling holes in the joists and fish-plates, nor does it state the number of washers. But the description is complete, as we must know that we cannot "form a connection" without holes in the webs of the R.S.J.s and corresponding holes in the fish-plates, and that as there are four bolts there will be required eight washers. Hence, there is nothing to be gained by overloading the description with these. Nor would it add to its clearness by stating that the fish-plates are of stock sizes, as this is implied. It describes the kind of work to be done, its position in the building, the materials required, in a clear, exact and concise manner. And that is all that is necessary.

Classification of Types

The type of specification will depend upon the type of building contract. It should be remembered that a specification is a document forming part of a contract. Building contracts may be divided into two general types. (*a*) Those in which bills of quantities *form part* of the contract; and (*b*) those in which bills of quantities *do not form part* of the contract, and where there are *no* bills of quantities. In the case of (*a*), it may be said that as the bills of quantities embody all the particulars contained in the other documents comprising the contract, they, the bills of quantities, constitute in themselves all that is necessary to enable an estimate to be prepared; and in the case without bills of quantities, it is the drawings and specification and the conditions of contract upon which the estimate is based legally, and it is so even in those cases where bills of quantities are supplied but which do not form part of the contract. Thus the specification is not so important in the former as in the latter cases, and may be treated differently. Hence, in the case of (*a*), since the specification need not be considered as an instrument by which an estimate is based, the subject need only be dealt with in the manner of technical directions for the carrying out of the work, whilst in both cases of (*b*), the subject in addition to that must be dealt with in a manner which, together with the drawings and conditions of contract, will enable an estimate to be formed therefrom. The following examples will show how and why items should be treated differently.

(*a*) Excavate trenches for walls to the *depths shown upon the drawings.*
(*b*) Excavate trenches for walls to the *required depths.*

In the former case, should there be found to be any variation in depths between the drawings and the work as executed the same would be adjusted at the completion of the contract and computed and valued on the basis of the quantities; whilst in the latter case the *required depths* are the *necessary depths* as circumstances may warrant or demand and which will have no effect on the amount (cost) on the contract.

Strictly speaking, the bulk of the clauses usually inserted under "Preliminaries" and many other clauses might with advantage be omitted entirely from the specification, but it is difficult to break away from what has become an established custom. Further, the specification ought really to be relegated to a less important position in those cases in which quantities form the basis of the contract to that of its proper function; that is, to merely technical directions in the carrying out of

the work. Instead of the specification in these cases being, next to the contract agreement, the predominate document embracing all the other documents, the specification ought to be relegated to a more subordinate position, take its proper place along with the other documents. A specification is a legal document so far as it goes; there is no need to make it go further than is intended.

Bearing in mind the distinction between these two types of specifications, the length of a specification will depend upon the amount of particulars given on the drawings. For example, if the drawings are fully dimensioned and detailed—that is to say, excellent working drawings in every particular—then the descriptions of the items may with advantage be curtailed, describing only such of the special features not readily to be gathered from the drawings. Thus, for a staircase, of which there is a fully dimensioned detail, it is only necessary to refer to the staircase and to mention the class of wood of which it is formed, or, if there be different classes of wood, state which refers to which, and describe that it shall be "framed together, glued, blocked, bracketed and wedged", along with any special feature or finish and the descriptions of whatever painting and polishing, if any, required.

Copying

Copying whole clauses and trades direct from another specification is not the best practice. Buildings of a similar character may be found to differ in many details. Nor is it good practice to alter a specification of a similar work by making corrections therein, for there is always a possibility, even when the greatest care is taken, of a mistake occurring; it may be but that of a figure, or a word, or a phrase, but which may nevertheless render the meaning obscure, and very likely lead to misunderstanding. It is better that the specification writer should write the specification entirely in his own words from beginning to end. But when in doubt upon any point, then a specification of a similar work may be consulted with advantage, and, for the same reason, reference may be made to other clauses or descriptions in other specifications or works on the subject. These, however, should only be consulted as a guide or studied for the matter they contain, then when mastered the specification writer should describe the subject about which he is writing in his own phraseology in keeping with the rest. There may be grounds for exceptions in copying direct in the case of "general conditions" and "preambles" to the trades, but, here again, these are not always identical, though the bulk of the clauses may be. Hence, care should be taken in copying such clauses only as apply and rewriting those clauses that require modification. What has been here recommended may not be found to be easy of accomplishment at the first few attempts, nor may the results be satisfactory. But with practice, ease and perfection may come. Anyhow, it is better to be just "ordinary" than merely a copyist or a jobber. Further, by writing specifications in your own words, you may soon come to know the style best suited to you in presenting the matter and which would be the manner you would adopt in future works.

Every care should be taken in copying or remodelling or revising or making an abridgement of a clause or an item from another document

which constitutes part of the same building contract so as not to alter its sense or meaning. If the sense or meaning differ between two documents it may lead to a misunderstanding and probably end in a dispute.

Separate Parts

For convenience and to facilitate reference it is advisable when there are several blocks of buildings comprising the contract to divide the specification into several parts, in general to correspond with the number of blocks. Also it is advisable in the case of small contracts that works of outbuildings and the like should form a separate part.

The positions which certain classes of work occupy in the building may with advantage be referred to by letters or numbers in the specification. Thus the various rooms may be designated by "letters" or "numbers" on the plans, and such works in those rooms as floor joists, floor-boards, skirtings, picture rails and the like, the respective positions of which reference should be made thereto in the specification to correspond with the letters or numbers on the plans. This method may save considerable time in the writing of the specification, particularly when works of a like kind are fixed in different parts of the building.

For example:

Floor Coverings of Parquetry	Lay to rooms marked A, B, C on the plan parquetry flooring.....
Of Oak	Lay to rooms marked D, E, F and G oak floor-boards.....
Of Deal	And lay to rooms marked H, I, J, K, L and M white deal floor-boards.....
Skirtings of Oak	Run to rooms marked A, B, C, D, E, F and G on the plans, 11 in. by 1¼ in. wrot and moulded oak skirtings.....
Of Columbian Pine	And to rooms marked H and I. 9 in. by 1¼ in. wrot and moulded Columbian red pine skirtings, and to rooms marked J, K, L and M. 7 in. by 1 in. wrot and torus moulded ditto.....

Similarly, the positions of openings, doors and windows may be distinguished by letters or numbers on the plans, and also the works in connection therewith dealt with in a like manner in the specification.

Specification writing offers considerable scope and resource in these matters, which are quite permissible so long as they are effectively employed and do not destroy the clearness of reference.

Again, in large contracts in which there are a number of blocks of buildings, these may be "numbered" or "lettered" on the block plan, a general specification written and any item in the respective blocks referred to the number of the clause to which it is in agreement.

Thus, in Block C, say:

Doors of Red Deal	To positions marked A, B, C, D, E, F and G, supply and fix doors similar in every respect to Clause 450 of the general specification.

Arrangement of Items

There is no rigid rule as to the order of arrangement of items in a specification, though it is usual to follow as nearly as possible in the same order

as the work will be executed. This is only possible (and then not in every detail) in so far as it applies to trades when the items are arranged in the order of trades. But scarcely otherwise would this be so, for whilst brickwork was being executed, other items of work would most likely be being done, such as door and window frames, fixing lintels and floor joists and the like. Again, during excavation part of the concrete work and brickwork would most likely be being carried out at the same time; and also drainage may be being done, when many other items of work in other trades and unassociated with drainage would be in process of being carried out. It is better to adhere to a uniform and customary method, as any departure therefrom may lead to confusion, but in departing therefrom it is a matter for the discretion of the specification writer as to what he thinks best the order of the arrangement of the items should be to suit the purpose.

Work in various trades may be grouped together in one item, but only in those cases when the whole of the work will be executed by one and the same contractor. As an example: In specifying the roof, specify the work in all trades in connection with its construction CARPENTER, JOINER, SLATER or TILER, IRONFOUNDER, PLUMBER and PAINTER. Again, in the case of dormer windows, specify the work in connection with CARPENTER, JOINER, IRONMONGER, PLUMBER, GLAZIER, PLASTERER, PAINTER, SLATER or TILER (if such) and IRONFOUNDER. This possesses an advantage, inasmuch as that all the work in all trades associated with its construction would be grouped together in one item, and any reference to its construction would be found under that item, which should make it easy to follow and be understood by those carrying out the work. But this method possesses a serious drawback when the work is carried out by different tradesmen, for their work would be here and there and everywhere in the specification. In that event it would require a very elaborate and careful index and profuse cross references.

An exception to this rule is in the case of a manhole, when all the work in all trades should be specified in the item of manhole.

There are certain cases when work in more than one trade should be mentioned in an item for the sake of showing the method of construction. For instance: steel roof trusses that are set on stone templates; it is advisable to mention the stone templates in the description of the item of roof trusses, otherwise in the fixing of roof trusses the templates may be overlooked, as they are not part thereof but only associated with them and not dependent upon them; it is the method of construction that brings them into service. Therefore, to the description of roof trusses should be added "and set on 18 in. by 9 in. by 6 in. padstones (for padstones *see* Clause No. .... in 'MASON')", and in the MASON to the description of padstones add "(for positions *see* Clause No. .... in 'IRONFOUNDER')".

No hard and fast rule applies as to which trade an item should belong. This may depend upon circumstances and the custom in vogue in the locality in which the building is to be erected. For example: constructional steelwork, principally steel joists and the like other than steel-framed constructional buildings, may be inserted in "BRICKLAYER" as being the trade mostly concerned in the fixing thereof, but those used in conjunction with "CONCRETOR" may be inserted in that trade. Roof gutters and the

like in some localities are fixed by the JOINER, therefore they should be inserted in that trade. Tile pavings and the like in some localities are carried out by the CONCRETOR; also "floating-up" and "granolithic finishings and the likes to concrete floors" are done by the CONCRETOR; therefore these items should be included in that trade.

ALTERATIONS TO BUILDINGS

In the cases of alterations, renovations and extensions to existing buildings, there is no recognized method to be adopted. The items may be arranged in the order of trades, or the items may be arranged in the order of constructional pieces of work, such as a dormer, and all the work in all trades relating thereto grouped together in one item, or the items may be arranged in the order of sections such as all the work in each room, or in roofs, and all the work in the various trades relating thereto may be grouped together in one item. These are the most usual and general, but the conditions appertaining to the work should be the guide and determine the method to follow.

If the method of arrangement of the items be the order of trades, particularly in the cases of alterations and renovations, where the conditions are such as will be of the nature of jobbing work, then there will be much repetition of items and length of the specification may be out of all proportion to the size of the job. As an instance in point: take the breaking of an opening through a brick wall for a new doorway; there will be an item of a jobbing character in BRICKLAYER to include shoring and propping and making good jambs, etc.; in CARPENTER an item for the supplying and fixing wood lintel or wood beam, or an item in IRONFOUNDER for steel beams and may be as a consequence an item in MASON for stone padstones; an item in JOINERY for door and door furniture, door casings, architraves, and the like, and these really ought to be separated into items under their respective heads in that trade; an item, say, in CARPENTER for making out to floor-boards and making good to old; most likely an item in JOINER for cutting away and making good to skirtings; a jobbing item probably in PLASTERER for making good; an item in PAINTER for painting, and maybe another for touching up to old work. To each item, of course, will have to be added a description of the position of the new doorway. And if there be a number of door openings, some slightly varying in size and treatment, many new window openings, doorways and window openings built up, old doors and windows refixed requiring perhaps certain repairs or new parts and maybe new furniture, and as there may be other items of work—some of a jobbing character and others of new work—it will be seen that to trace in the specification all the work in connection with the doorway before mentioned it may necessitate reading through the whole of the specification to find what is required, and the same would apply in general with regard to any other piece of jobbing work.

In the case of extensions to existing buildings in which the items of alterations may play but a minor part, and especially in the case where but few of these are of the character of jobbing work, then the items should be arranged in order of trades, and works of alterations, restorations and those of a jobbing character follow at the end of each trade.

The method that meets with general acceptance in most cases of alterations and renovations is that in which the items are arranged in the order of sections, and the work in various trades, grouped together in one item. That is to say, all the work in one room may constitute a section, as, for instance, "work in Dining Room" and the like; all the works in the Dining Room should be put under that heading, and the work in all trades in connection with the before-mentioned new doorway would be grouped together, for example, and appear under that heading as an item. For the sake of reference this new doorway may be given a sub-marginal heading, thus: "New Doorway". This method has the advantage of "localizing" the work, so to speak, and the construction of each class of work is given a distinct and separate identity. There are variants to this method; the work may be "sectionalized", yet the items arranged in the order of trades, thus, all items of Bricklayer, Carpenter and Joiner, etc., would appear in their respective trades and each under a heading: "Work in Dining Room". This, however, is not so distinctive as the former as regards reference to the items in the specification.

It is usual in this method to deal separately with outside and inside work, beginning with the former and commencing with the roof, and the latter by starting at the top floor.

Whatever method is adopted a certain amount of repetition work is inevitable; this may be eliminated to a certain extent by a clause in the Preliminaries to this effect:

Descriptions are not given fully in every instance, the detailed descriptions appearing previously; apply to similar work specified later in an abridged form.

Procedure

A set manner of procedure in writing a specification may not appeal to all, nor may it suit every individual's taste and method of working. There are, however, many things that should be common to all, i.e. write on one side of the paper only, be not sparing with the paper, and do not cramp the work. But whether you should begin with the heading of a specification and go straight on clause or item after item in regular sequence to the end, or write up in the trades the whole of a section of the work, or first make a draft of a section of the work in all its trades in one item, afterwards separating them into their respective trades in their proper order of arrangement, are matters which experience alone should guide you in your choice, and naturally, of course, you would decide upon that which suits you best.

As everyone in these days is more familiar with "type" than other forms of writing, a specification should either be typewritten or printed. These should be carefully examined to see that they agree with the original.

Chapter V

ON MATTERS IMPORTANT

Building contract documents usually consist of the following:

Drawings.
Specification.
Bills of Quantities.
Invitation to Tender.
Tender.
Acceptance of Tender.
Contract Agreement
and
Conditions of Contract.

The arrangement of a specification, in general and in common, should follow some systematic order in conformity and in agreement, where practical, with the other documents comprising the contract.

Heading

A general heading is the first in the order of importance, which should describe the class and scope of work, the type of building, the situation and locality, give the name of the owner, mention the kind of contract agreement and prescribe the conditions of contract, state that the work shall be carried out in accordance with the drawings and under the general supervision of the Architect(s), giving the Architect's(s') name and address, and date and year the specification was prepared (*see* page 123 for Form of Heading).

Drawings

A list of drawings is the second in order of importance, and should, if they are the signed drawings, be given thus:

List of Contract Drawings — The following is a list of signed Contract Drawings:

No. 1. Block Plan.
No. 2. Drainage Plan.
No. 3. Foundations and Basement Plans.
No. 4. Ground, First and Attic Floor Plans.
No. 5. Roof Plan.
No. 6. Elevations.
No. 7. Sections.
No. 8. Details.

Contract Agreement

The contract agreement is the third in the order of importance. The kind of contract agreement that will be adopted should be specified. If it is a standard one, such as that known as the Royal Institute of British

Architects' Building Contract Agreement, then it should state whether the bills of quantities form part, or do not form part, of the contract. If any other Form of contract agreement be adopted, then any special features which it contains—such as whether securities and the like are required—should be stated.

These are four matters of great importance which ought to be mentioned in connection with the contract agreement but which, strictly speaking, are dealt with as a rule, and always in the case of the R.I.B.A. Building Contract Agreement in the "General Conditions". Nevertheless, as they may weigh considerably with the contractor and may influence the cost they ought to be stated here, particularly if they have been decided and determined upon. These are: (*a*) the name of the quantity surveyor(s), (*b*) the name of the party who will adjust the contract on completion, (*c*) the name of the clerk of works, and (*d*) the name of the arbitrator in the event of dispute(s).

Another matter of great importance, which also, strictly speaking, belongs to the "General Conditions", but which nevertheless ought to be mentioned here, is the mode of payments, for this may have an influence on the cost.

Some of the above matters are not as a rule determined upon until after the acceptance of the tender, and, as is sometimes the case, lead to a misunderstanding and a disagreement, particularly when certain parties, against the express objection of the contractor, are adhered to.

The principle of equity would seem to demand that the bills of quantities should not be prepared by the architect, for, however honourable he may be, he is almost certain to be biased, apart from any other consideration, in the favour of the building owner; nor should the contract be "squared up" by the quantity surveyor, for however honourable he may be, he is almost certain to be biased in the favour of the architect in the squaring-up and adjustment of the contract. The clerk of works should be chosen upon the basis that he will act impartially in the discharge of his duties, and so should the arbitrator.

General conditions of contract is the fourth in the order of importance. These are conditions that apply generally for the whole of the works, and which should be headed thus:

General Conditions of Contract

If the contract agreement is that known as the R.I.B.A. Contract Agreement, then this embodies certain general conditions, and these should either be copied *in extenso* or abridged, taking care to retain the sense and meaning thereof, or a note inserted stating that the "General Conditions" of the contract agreement should be read, or by copying the marginal headings only and a reference made thus: "For reference to these clauses *see* General Conditions of Contract". Then any further clauses of conditions suitable and applicable to the works may be added.

Some authorities—Education Authorities and the like—have their own set of "General Conditions" for all their works, and in such cases they should be treated in a like manner.

Preliminaries is the fifth in the order of importance, and should be headed thus:

Preliminaries

The "Preliminaries" deal with matters of a general nature, that is to say, that though the whole of its provisions may not apply specifically to each and all trades, they apply generally to all trades. Being "general", and by inserting them here instead of repeating such of those that apply specifically to the particular trade, say at the beginning of each of the trades, it saves recurrent repetition (*see* page 21 for Order of Preliminaries.)

Provisions is the sixth in the order of importance, which are sums provided for special works, i.e. works of specialists, or they may be amounts of items of work as "provisions" to meet probable and may be anticipated requirements. These should be put under a heading, thus:

Provisions

Or they may be put under their respective trades, and in that event a special heading would not be required.

Trades

Trades, though they are stated here to come last in the order of importance in the specification, are not the least in importance, in fact they are the most important, but in the order of arrangement of the specification they come last. The items of work are dealt with under "trades", and which should be put under the trades to which they belong. As there is a recognized standard of order for trades for bills of quantities, and as the documents comprising the contract should be in agreement wherever practical, the specification should conform therewith to simplify reference. The following is a list of trades in their order:

1. Excavator.
2. Concretor and Cast Concrete Work.
3. Piling.
4. Bricklayer.
5. Asphalter.
6. Drainlayer.
7. Artificial Stone, Terra Cotta, Faiences and Similar Work.
8. Reinforced Concrete.
9. Waller.
10. Stonemason.
11. Marble Mason.
12. Slate Mason.
13. Slater and Tiler.
14. Carpenter.
15. Joiner.
16. Ironmonger.
17. Smith and Founder.
18. Plasterer.
19. Plumber.
20. Zincworker.
21. Coppersmith.
22. Wireworker

23. GLAZIER.
24. PAINTER AND STAINER, FRENCH POLISHER, WRITER AND GILDER.
25. PAPERHANGER.

For items of work under their respective trades, *see* Order of a Specification, page 21.

The customary practice is to begin each trade, except in the case of very small works, with a separate page, particularly so where there are several tradesmen or sub-contractors engaged upon the works. The advantage of this is that each tradesman or each sub-contractor may be supplied with a copy that deals specifically with his own work, and for the "general conditions" and "preliminaries" touching upon this work he could refer to the general specification, a copy of which in all cases should be supplied to the general contractor. This invariably facilitates working arrangements between the parties engaged upon the works.

In whatever form of writing the specification may be written and whether written on both sides of the paper, on large works for the purpose of convenience of all parties it will be found to be an advantage if the trades are made up into separate specifications. Then, if necessary, copies of these may be bound together in one volume, thus forming one general specification for use, say, on the job for the general contractor and the like.

PREAMBLES TO TRADES

Preambles to Trades are clauses of a "general" character inserted at the commencement of the trades as an introduction to the subject proper —i.e. the items of work; the principle being that the matters mentioned in these clauses, besides being of a general character, have in themselves no monetary value but are merely to elucidate or define, or give significance to, some point common to all the items, or a number of items, or maybe to a single item only. By these means items of work are freed from such matters as descriptions of kind and quality of materials, constituent parts of which they are composed, and methods of execution. As examples: descriptions of concrete and brickwork. Without the use of preamble clauses these would be as follow:

(*a*) Lay in trenches to foundations to the widths and depths shown upon the drawings, cement concrete, composed of four part ballast or broken stone, to pass a 2 in. ring and to be retained on a 1½ in. ring, two parts clean sharp river or pit sand free from loam or other impurities and washed if required, and one part Portland cement of an approved brand and to British Standard Specification. The aggregate to be measured in approved checked bottomless boxes and the proportions strictly adhered to, the materials are to be turned over twice in a dry state on boards, clean water is then to be added through a rose head with fine holes and the materials to be twice turned over whilst in a wet state and immediately deposited into position, well tamped and beaten down with the spade so as to fill in all interstices and finished with a fairly even surface.

(*b*) Construct the walls to the various thicknesses and heights shown upon the drawings, of hard, well burnt, square-made and uniform size "wire cut" kiln bricks, free from all defects and obtained from an approved manufacturer. The bricks to be wetted if required. The walls to have footing settings on quarter brick at a time to double the thickness of the walls at the bottom. The brickwork to be set in lime mortar, composed

of one part of freshly burnt hydraulic lime from an approved kiln and stacked into a heap and sprinkled over with clean water and covered with sand and allowed to remain thus until thoroughly slaked, and two parts clean sharp river or pit sand free from loam or other impurities and washed if required, thoroughly well incorporated together and mixed only insufficient quantities for one day's consumption. The brickwork to be laid to garden wall bond, also known as old English bond—three courses of stretchers to one course of headers—except 4½ in. walls which are to to be laid to stretcher bond; all courses to be well bedded and jointed and flushed up with mortar as the work proceeds, no four courses to rise higher than one inch beyond the height of the bricks laid dry, and no joints in the exterior elevations to be more than ½ in. thick and all joints in internal walls (to be plastered and the like) to be fair struck with the trowel as the work proceeds. The whole of the brickwork to have level beds and true perpends and plumb faces, and to be carried up regularly throughout; no brickwork to be carried up more than scaffold height, or about five feet, above the adjoining brickwork and that portion so carried up shall be raked back and not toothed. No soft or inferior bricks shall be used, and no broken bricks or bats shall be used except as closers. All headers shall be full length unbroken bricks.

The foregoing two clauses may be said to be rather cumbersome, and if great care is not exercised might lead to confusion. Furthermore, each item of work dealing with concrete or brickwork would have to be dealt with in a like manner, which would result in a more lengthy specification than is necessary or desirable, without any accruing advantage. Therefore, for clarity, all matters in these or similar items that are common or general can be dealt with to better advantage by a preamble clause or clauses applicable to each. Again, for the sake of clearness, it is advisable to split up an item where possible into two parts, (*a*) "general or common" and (*b*) "particular" matter. By separating the mass of matter in these clauses and treating those which are general or common as preamble or introductory clauses, and those which are particular to the work as items of direction, the preamble clauses for the concrete work would be as follows:

WATER	Only clean water to be used throughout the works.
SAND	The sand to be clean sharp river or pit sand, free from loam or other impurities, and washed if required.
BROKEN STONE	The stone to be obtained from an approved quarry and of approved quality, to pass a 2 in. ring and to be retained on a 1½ in. ring.
PORTLAND CEMENT	The Portland cement to be of an approved brand and to be to British Standard Specification.
CONCRETE	The concrete to be composed of four parts ballast or broken stone, two parts sand and one part Portland cement. The aggregate to be measured in approved checked bottomless boxes and the proportions strictly adhered to. The materials are to be turned over in a dry state on boards, water is then to be added through a rose head with fine holes and the materials to be turned over twice in a wet state and immediately deposited into position.

And those for the brickwork would be as follows:

WATER	Only clean water to be used throughout the works.
SAND	The sand to be clean sharp river or pit sand, free from loam or other impurities, and washed if required.

LIME — The lime to be freshly burnt hydraulic lime from an approved kiln. The lime to be stacked into a heap and sprinkled over with water, then covered over with sand and allowed to stand until thoroughly slaked.

LIME MORTAR — The lime mortar to be composed of one part lime to two parts by measure of sand, thoroughly well incorporated together in sufficient quantities for one day's consumption.

COMMON BRICKS — The bricks throughout to be hard, well burnt, square-made "wire-cut" kiln bricks of a uniform size, free from all defects, and obtained from an approved kiln.

No soft or inferior bricks to be used in the works, and no broken bricks or bats to be used except as closers. All headers to be full-length unbroken bricks.

WETTING — All bricks to be wetted before being laid if necessary and the contractor is to provide sufficient water-butts for the purpose.

WALLING — All brickwork to be set to the various dimensions shown or figured upon the drawings, and laid to garden wall bond, also known as old English bond—three courses of stretchers to one course headers —except 4½ in. walls, which are to be laid to stretcher bond, set in lime mortar; all courses to be well bedded and jointed and flushed up with mortar as the work proceeds.

HEIGHT OF COURSES — No four courses to rise higher than one inch beyond the height of the bricks laid dry.

JOINTS — No joint in the exterior elevations to be more than ¼ in. thick; and all joints in internal walls to be plastered and the like, to be fair struck with the trowel as the work proceeds.

RAKING BACK — The whole of the brickwork to have level beds, and true perpends and plumb faces, and to be carried up regularly throughout; no brickwork to be carried up more than scaffold height, or about five feet above the adjoining brickwork, and that portion so carried up to be raked back and not toothed.

FOOTINGS — All walls to have footings as shown upon the drawings, setting off quarter brick at a time to double the thickness of the walls at the bottom.

Items of work are those items which describe the materials, the method of construction, the manner of carrying out the works, and the position or positions they occupy in the building.

These may to a large extent in a number of cases be simplified by the omission of those matters or particulars of materials, construction and the like that are "general" or "common" to their respective kinds by inserting those matters or particulars in the preamble clauses. For example: Our items of work of concrete and brickwork (under article Preambles to Trades) would now read as follows:

CONCRETE FOUNDATIONS — Lay in trenches to foundations, to the widths and depths shown upon the drawings, Portland cement concrete, well tamped and beaten down with the spade, to fill all interstices, and finished with a fairly even surface.

WALLS — Construct the walls to the various thicknesses and heights shown upon the drawings of common bricks set in lime mortar.

Significance of Bills of Quantities

Strictly speaking, the specification influences qualitatively the nature of the items in a bill of quantities and should, as a consequence, take precedence thereto as a document of greater importance. But in those cases where a bill of quantities forms the basis of the contract, the bill of quantities is the instrument that determines the amount of consideration in the contract; that is to say, the sum the building owner shall pay and the sum the contractor shall receive for the due performance of the contract, also the basis upon which any variation of any description from the contract the value of which shall be ascertained and determined. Regarded in this sense, the bill of quantities is the more important document of the two, inasmuch as the function of the specification in regard to the monetary value of the works represented therein has been transferred to the bill of quantities. Again, in this sense, in these cases the bill of quantities ranks of higher importance because the perfectness or imperfectiveness of the specification is immaterial, but not so in the case of the quantities. Hence, in contracts of this kind, from the "consideration" point of view, the specification takes a subordinate position to that of the quantities.

Where, however, a bill of quantities does not form part of the contract the specification must take precedence thereto, for in a legal sense it is the specification and the drawings alone that show the amount of work to be done, and so long as the work is specified or shown by these documents or implied (not necessarily expressed) as being absolutely necessary to the due performance of the contract, no extra can be claimed for any shortage in the quantities or for any omitted items therein. In such cases, unless stipulated in the contract, there cannot be any variation except by the consent of the parties.

Significance of Specifications

Similarly, what applies to a contract in which there are bills of quantities, but which do not form the basis of the contract, applies with equal force in those cases in which there are no quantities.

From this we gather that the importance or significance of a specification is dependent upon the kind of contract agreement. That being so, a distinction should be made in a specification between one kind of contract and another; the type of specification should be in keeping with the kind of contract agreement. Where bills of quantities form the basis of the contract the description of the items of work may be best in the form of *technical directions* for the carrying out of the work, and in those cases where bills of quantities do not form the basis of the contract as well as in those cases where there are no quantities, as a matter of equity, all the items of work should be given and described in full to enable an estimate to be formulated therefrom in conjunction with the drawings and the conditions of contract.

The order of the items of work should, wherever practicable, follow in the same order as that given in the bills of quantities, as this facilitates reference between documents. The principle governing these documents is not the same in both cases, for whereas the order of the items of work in bills of quantities is to some extent determined upon by

the principle of facilitating pricing that of the specification is based upon the principle of distinguishing quickly the positions of the items of work. Despite this difference in principle the order of the items generally may be made to coincide, the bills of quantities taking predominance as the one to follow because their order of arrangement of items is now common to a large extent throughout the country. As for examples in point: Take Concretor: Those items of work describing concrete in foundations, concrete to floors, pre-cast concrete and finishing to floors may with advantage follow in almost the precise order the bill of quantities, as it separates these into kinds; similarly, it differentiates between "ordinary" and "reinforced" concrete work. What has been said in regard to this trade may in general be said to apply to the other trades, although perhaps not in all cases to the same marked degree.

Specialities

The name of the manufacturer of a speciality should not as a rule be mentioned in a specification unless it is absolutely necessary. If so, the manufacturer may, knowing that his product is specified, raise the price for the occasion. Even when a price has been obtained beforehand by the architect it should be compared with that quoted later by the manufacturer to the contractor, because a manufacturer may raise his price, or the contractor may endeavour to put in an inferior article at less cost to himself or seek advantages in other ways. A description of the kind and quality is generally all that is required, but if a certain kind and quality with a patented or monopoly control is essential, and one is prepared to pay the price, then the name of the manufacturer and the manufacturer's description should be given.

Building Owner's Materials

When certain materials are supplied by the owner, particular attention should be paid as to whether they will be delivered upon the site, and in whose keeping and care they are to remain, and at whose responsibility and risk. A clause to meet the case should be given in the specification stating that the contractor shall, if he so desire, add his price for these services and risk as well as add his profit, if any.

When materials are to be obtained on building owner's ground it is of importance that they should be described, giving full particulars of conditions upon which they may be obtained and all the information necessary, so that their value may be ascertained and allowed for by the contractor. The materials usually so obtained are sand and gravel, and sometimes stone.

When old materials are to be re-used, say in the cases of alterations and repairs, it is of importance that they should be fully described, stating whether they are to be cleaned and repaired and whether at the contractor's expense, and whether to be stored by him, if necessary, until the same are required for re-use, so that their value may be ascertained and allowed for by the contractor, more particularly so in those cases where the bills of quantities do not form part of the contract and where there are no bills of quantities.

When old materials are not to be re-used, in the cases of alterations and repairs, it is of importance to state whether they are to remain the

property of the building owner and whether the same are to be stored or stacked where directed, or whether they are to become the property of the contractor and removed by him from the premises, so that whatever value possess they may be ascertained and allowed for by the contractor, or he may ascertain the cost of the performance of such work and include for the same in his estimate.

In taking down existing premises it is of importance to state whether the materials arising therefrom are to become the property of the contractor, or howsoever dealt with should be described, so that their value, if any, may be ascertained and allowed for by the contractor.

Specialist's Estimates

Separate estimates for certain parts of the works, such as steelwork and the like, when competitive prices may be required, involve a separate specification, and it is of importance to state therein in each case where the specialist's work begins and ends and to take the precaution of binding him by penalty to complete in a convenient time relative to that of the general contract. Although each is a subordinate specification, it should form part of the general specification, so that the contractor may judge as to the amount of work involved, and this may be best met by including the amount as a provision to be paid, either by the contractor or the building owner direct. Separate estimates for certain classes of work are best on the basis of a separate bill of quantities in each case, as variations are more conveniently adjusted by this means than in any other way.

Alternative Estimates

When alternative estimates are required, as in the case of the substitution of plaster work for that of ashlar facings to interior church work, it is of importance to specify the items that will be superseded or omitted, and to state in what way they will be modified so that a correct value of the alternative may be ascertained by the contractor.

Schedules

When Schedules are required, particularly in those cases where bills of quantities are not supplied, it is of importance that these should be so framed that the extras and deductions, if any, arising as a consequence of a variation (by consent only) from the contract, or a variation as provided by the provisions in the contract, or for additional contract work, may be ascertained upon equitable basis. There is always a danger in this, as the schedule rates may bear no relation to the original work.

In these cases, instead of schedules, it is far better to supply approximate quantities, after the manner of approximate estimates, then there can be no question as to the correctness or otherwise of the schedule rates, as they bear actual relation to the original work.

A schedule should make provision for such work that cannot be measured to be ascertained and valued at day-work rates; this may be met by the insertion of a list of rates of pay of craftsmen and labourers together with a price list of materials. The prevailing practice is to allow day-work prices for these works in accordance with the local day-work Schedule of the Building Employers' Association in the district.

Stereotyped Clauses

Stereotyped clauses and specifications are best avoided. Where, however, they are made use of it is of importance that they should apply in meaning and intention for the works for which they are to be used. Any alterations and additional matter thereto, where required, should be in the same tone as the rest so that the specification will not appear to be patched work, and it should be, as a matter of course, retyped or printed.

Arbitration Clause

The Arbitration Clause should not contain the name of the architect who is architect of the works: it would be tantamount to making him sole arbitrator, thus defeating the object of this provision.

Endorsement

Endorsement of a specification, when required, may take the following manner:

Front Page
(*In centre*)

Specification

OF

PROPOSED HOUSE

AT

WILMSLOW

FOR

..... Esq.

Mr.....

.....

Architect .....

.....194 .

BACK PAGE
(*Right-hand half*)

Specification
OF
PROPOSED
HOUSE
AT
WILMSLOW

ALL TRADES

Mr. .....

Architect.....

.....

.....

.....194 .

CHAPTER VI

TYPICAL EXAMPLES

THESE typical examples of descriptions of items of work are given merely to illustrate the principle of specifying rather than typical examples to be copied.

The descriptions of items of work should be governed by certain other documents of the contract and should be framed accordingly and be in keeping therewith.

It is as well to note at the outset what these documents constitute, and what bearing they have upon the specification.

An axiom is that the drawings should show the work drawn true to scale or be fully dimensioned, whilst the specification should specify the work to be done. The amount of detail—fullness of description of items

of work—in the specification will depend upon the amount of detail shown on the drawings.

Again, for reasons stated in the previous chapter, where bills of quantities form the basis of the contract the descriptions of items of work may with advantage be curtailed in many instances to merely technical directions for the carrying out of the work.

The nature and character of the contract will influence to some extent the kind of descriptions of items of work. The principal building contracts in general use may be classified as follows:

(1) Contracts *without* Bills of Quantities.
(2) Contracts:
  (*a*) With Bills of Quantities but which *do not* form the basis of the Contract.
  (*b*) With Bills of Quantities in which they form the basis of the Contract.
(3) Contracts based on a Schedule of Prices.
(4) Contracts, the amount ascertained upon a *quantum meruit.*

and in addition to these, those based upon Prime Cost plus a stated profit or fee.

All building contract agreements are on the lines of one or other of these. They differ in kind and may vary in detail. Variation in detail may not be of importance, whereas difference in kind may be. The essential point of difference is that in the cases of (1) and (2*a*) contracts the specification is of prime importance, for it—together with the drawings—interprets the amount and quality of value of the work, also to a certain extent in the cases of (4) and prime-cost-plus-profit contracts, whereas in the case of (2*b*) it is the bills of quantities, and in the case of (3) it is the schedule of prices which determines the value and ultimate cost. Hence, the specification is not of the same importance in cases of (2*b*) and (3) as in the cases of (1), (2*a*), and (4), though it may or should govern them in the first instance. As a matter of fact, in the cases of (2*b*) and (3), contracts are often executed without a specification. In the other cases it would be difficult to conceive of a contract being executed that would give satisfaction without a specification.

But it is in the general conditions governing the contract where important differences occur as a rule in written contracts, and these may and often do have a great effect upon the specification. As an illustration: where the architect is made sole arbitrator in cases of contracts (1) and (2*a*) he may interpret the drawings and specification as he wills, provided, of course, he does not come within the Statute of Fraud, that is, defraud either party to the contract deliberately or by gross negligence. Again, in the case of contracts (4) and prime-cost-plus-profit contracts he may bring his influence to bear against either of the parties to the contract. In the case of contracts (2*b*)and (3) where he is made surveyor for the purpose of the adjustment of the contract he may act detrimentally, particularly if he be sole arbitrator as well, to either party to the contract; especially may he be tempted if he prepared the bills of quantities or the schedule in the first instance, as the onus would rest upon the dissatisfied party to prove negligence, which in Law means

fraud. Contracts which include clauses containing matters of the above nature are best avoided, as well as those which contain clauses that make it difficult or next to impossible to carry out the work.

The drawings and specification together with the contract agreement and the general conditions governing the contract constitute the important documents of a contract, and in those cases where bills of quantities form the basis of the contract it is also another important document.

The specification, therefore, should not be dissociated from the other documents of a contract, but should be considered and framed in relation thereto. The descriptions of items of work should be governed accordingly and should be in keeping with the nature and character of the contract.

. . . . . .

In the light of what has been said concerning the other documents of a contract in relation to the specification and the descriptions of items of work, a few examples upon the points should prove of interest.

Let us take as our first illustration an item of excavation to trenches, thus:

EXCAVATION TO WALL TRENCHES	Excavate trenches for foundations to walls to the required widths and depths as shown on drawings.

This description considered in relation to the first type of contract (1) is too vague and indefinite.

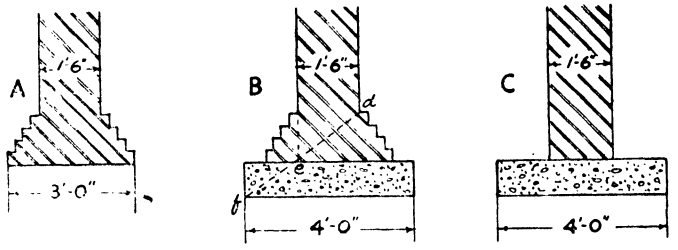
The foundations, irrespective of what may be shown on the drawings, would have to be carried down to such depths as circumstances may warrant and as may be required by the By-laws. They may be more, or they may be less, than those shown on the drawings. But were it required that they shall not be less, then the specification should state: "to minimum depths as shown on the drawings". This, however, does not relieve the contractor of his liability under the contract agreement to take down the foundations to the *required depths*. And if they exceed those shown on the drawings he would have no redress because of the nature of the contract. It would not constitute a variation, as he had undertaken to build a building (which might be rendered insecure by defective foundations) and it is presumed he did obtain the necessary particulars which would enable him to formulate his estimate. In fact, by the contract agreement it is obligatory upon him to do so, or take the risk. Therefore it is only equitable that the specification should conform to the contract, hence the description should be:

EXCAVATION TO WALL TRENCHES	Excavate trenches for foundations to walls to the minimum widths and depths as shown on the drawings or to the *required widths and depths*.

The insertion of the words in italics make clear without doubt what is required and what may be demanded of the contractor. "Required" here means with reference to the depths at the request of the architect or by demand of the local authority. It is, as it were, contingent upon what may be found to be required and necessary to meet the conditions and circumstances of the case. In this form of contract the absence of this word may tend to mislead the contractor into believing that *no*

further depths will be required beyond those shown on the drawings, because that is what is implied. Done intentionally and deliberately to mislead would be construed as false representation, provided, of course, no responsibility rested upon the contractor to investigate and ascertain for himself the conditions of the foundations. A further explanation is necessary to make clear the words *required widths*. An increase in widths may be necessary if the foundations were taken down to such depths as would necessitate an increase in the widths of the walls, for strength or to comply with the By-laws.

The description as now amended is still imperfect. Before completion, first let us examine and consider the methods of construction of footings to brick walls. There are three methods. These are as shown in figures A, B and C as follows:



"A" method as shown has as many offsets as there are half bricks in the thickness of the wall, setting off quarter brick at a time and one course high on each side of the wall, so that the bottom course of footings is double the thickness of the wall itself. "B" method has in addition a concrete foundation 6 in. wider than the bottom course of brick footings to each side of the wall, that is, 12 in. wider than the bottom course of footings. The thickness of the concrete foundation is determined graphically by drawing a line from point *d*, at the junction of the wall with the top course of footings, through a point *e* in the base of the footings in a line with the other face of the wall, and produced until it intersects a line representing the outer vertical edge of the concrete foundations at *f*. "C" method is similar to "B", with the brick footings omitted. These are the usual methods of construction, but in each case no hard and fast rule applies. These may be varied to suit circumstances at the behest of the architect, he being arbiter in the matter. In the case of "A", though the drawings may show the footings and be fully dimensioned, the widths of the trenches are rarely, if ever, shown. It is maintained by some that for shallow trenches in the case of "A" method of construction the width of the trench need only extend 3 in. on each side beyond the width of the bottom course of footings, that is, 6 in. wider than the bottom course of footings; others maintain that 6 in. on each side beyond the width of the bottom course of footings is little enough working space. There would seem to be some justification for the latter contention in the cases of $4\frac{1}{2}$ in. and 9 in. walls, as the respective widths of trenches would be 15 in. and 24 in. For deeper trenches, it is quite obvious, the widths of these trenches would have to be increased. Even in the case of 14 in. walls, whose trenches would only be 2 ft. 10 in. wide, these may also

have to be increased. Again, in the case where planking to the sides of the trenches is necessary an extra width of about 6 in. is required; that is, an extra width of 3 in. on each side. Some contend that for this an extra width of 6 in. on each side is little enough. These differences are matters of opinion and speculation. In determining which to adopt it is as well to bear in mind that though the widths may be shown with mathematical accuracy on the drawings, in practice or in the actual performance of the work it is only in certain soils that it is possible to adhere to them with any degree of accuracy and regularity. In the cases of "B" and "C" the widths of the trenches would be the full widths of the concrete foundations, except that an allowance should be made for increased width where planking is necessary.

Provided always that the concrete foundations in the cases of "B" and "C" are shown on the drawings and correctly drawn to scale or fully dimensioned, the description would hold good. But in the case of "A" the description would have to be modified as follows:

EXCAVATION TO WALL TRENCHES — Excavate to trenches for foundations to walls, 6 in. wider (or 12 in.) than the bottom course of footings, which in all instances will be double the thickness of walls, and to the minimum depths as shown on the drawings (or stated depths if not shown) or to such further depths and widths as circumstances may require.

For type (1) contracts this description may be said to be complete in every sense. It should be noted there is no mention therein of any planking and strutting to trenches as may be required. The reason being that, as this is common to all manner of excavations in trenches, the particulars are usually given in the preamble. But of course, if it be known that planking and strutting would be required, then this should be described or an item for the same specified.

The description would also be the proper one for type (2*a*) contracts, e.g. Lump Sum Contracts with Bills of Quantities but which *do not form* the basis of the contract. The reason being that the quantities in these types of contracts may be said to have been prepared merely to assist the contractor in formulating his estimate; the priced quantities to act only as a schedule of prices in the case of additional or omitted work, and determining the value of such variations, if any, that are provided for in the contract. Except that the priced quantities form a schedule of prices, the documents constituting the contract are the same as in type (1) contracts, as also is all else.

As regards type (2*b*) contracts, e.g. Lump Sum Contracts with Bills of Quantities in which they *form the basis* of the contract. The first description (*see* page 71), provided the drawings show the foundations drawn true to scale or are fully dimensioned, would suffice, since it gives the necessary technical directions for the carrying out of the work. And that is all that is required with this type of contract; the reason being that any deficiency or excess in quantity in the bills of quantities or a want of descripton or fullness of description in items in the bills of quantities constitutes a variation just as does a modification in the work due to an alteration in the drawings or a modification arising from any legitimate cause, irrespective of whatever may be described in the specification.

This means that the value of a variation, whether of a deficiency or excess in quantity, a want of description or fullness of description in items in the bills of quantities, a modification due to an alteration in the drawings, or a modification of the work arising from any legitimate cause, may or shall be ascertained on the basis of the bills of quantities and the value arrived at on the basis of the schedule rates; thus the bill of quantities with the schedule of prices determine, without reference to the specification, the value of the executed work.

And in effect it means that the specification has no bearing upon the cost of the work with this type of contract, except that the specification determines the class of work given in the items of description in the bills of quantities.

It is perhaps because of this that many presume that the specification is rendered partially useless with this type of contract. This is erroneous. The function of a specification with this type of contract is totally different from that of bills of quantities. Its function is to specify how and in what manner the work should be performed and describe the positions which the respective materials should occupy. This is not the function or purpose of bills of quantities. Hence, every building contract should have a specification. To make the bills of quantities perform these separate and distinct functions, as is sometimes done in the North of England, is to produce results far from satisfactory. The function therefore of a specification cannot be relegated to the bills of quantities.

As regards type (3) contracts, e.g. Lump Sum Contracts based on a Schedule of Prices, what has been said in regard to type (2*b*) contracts applies in these cases also. The schedule of prices acts in the same manner as the schedule rates in bills of quantities. The actual cost of the work is ascertained from the executed work. But in these cases the question of variations does not arise. Any work done that is not provided for in the schedule of prices is valued at an analogous rate thereto.

As regards type (4) contracts, e.g. Lump Sum Contracts, the amount ascertained upon a *Quantum Meruit*, what has been said in regard to type (1) contracts applies in these cases also. The actual cost of the work is governed (but not necessarily determined) by what is specified and shown on the drawings.

As regards the other forms of contract, e.g. those based upon Prime-Cost-Plus (some stated) Profit, what has been said in regard to type (1) contracts applies in these cases also. The actual cost of the work is governed to some extent by what is specified and shown on the drawings. The cost of work should approximate somewhat to those in type (1) and (4) contracts, no matter by what means it is ascertained.

The foregoing explains in detail the principle upon which clauses and items of description in specifications should be treated in relation to the type of contract, the example cited being a typical case in point.

. . . . .

We will now cite as an illustration one of those items that appear in a specification for which, as a rule, no corresponding work is shown on the drawings. For example: planking and strutting to trenches. In some instances, little, if any, planking and strutting may be required or even necessary. In deep trenches it is almost certain that some form

of planking and strutting will be required. Again, for bulk or mass excavation for basements and the like, close boarded sheeting may be required, and in some instances an elaborate system of planking and strutting. Only in exceptional cases, and then only in the latter instances, would these be shown on any drawings.

Except in special cases, planking and strutting to trenches, mass or bulk excavation, need not be described in detail, nor their positions defined. It would suffice to give a general description applicable to all forms of excavation, thus:

PLANKING AND STRUTTING — Perform as required all planking, strutting and staging to excavations, and maintain same as long as shall be necessary.

It is not desirable to overload the description with words such as: "to prevent the sides of the trenches or excavations from falling in". Planking and strutting is for that purpose, therefore it is implied.

But this description would scarcely suffice for those contracts without bills of quantities or where they do not form the basis of the contract, particularly if the foundations were such as would necessitate timbers being left in the ground, which is not an uncommon occurrence. In such contracts, to the description should be added: "any timbers deemed necessary are to be left in", or words to that effect.

Items such as "planking and strutting" are difficult matters to define or to give to them the precise descriptions. Nor is it necessary to do so in the specification; for they may be considered on a par with "scaffolding and plant", and, like them, are things contingent mainly upon the method of carrying out the works, and are at the best temporary, though they may be necessary measures expedient to the execution thereof, and as a consequence are the contractor's affairs and risks, who is the person to determine, and rightly so, the nature of the requirements to suit the conditions and make provisions accordingly by whatever method and by whatever means he has at his disposal. Adequate safeguards are, as a rule, provided by the contract to ensure these being done and in a reasonable and satisfactory manner. In all other instances, which may be termed special cases, precautions are absolutely necessary, such as shoring up to roadways and the like in basement foundations, shoring to adjoining property or properties, needling and propping in alterations to buildings, when it may be advisable to prepare drawings of the works to be done, or describe them fully in the specification, or after the manner given in the next illustration.

. . . . .

For this next section we will now cite as an illustration one of those items which are not necessarily part of the structure, nor of any practical service in the carrying out of the work, as is "scaffolding", but which may be described as necessary convenience in the execution thereof, or desirable on other grounds. Such works are not indispensable—in fact, their use is not called for in a good many cases.

We will take as our example: Hoardings to site, gangways, coverings to footpaths, and temporary roadways. Be it noted, these may not be

shown on the drawings; but they require careful consideration as they are items of measure in a bill of quantities, and in other types of contract (those without quantities) they are items of cost. These items are not of a contingent nature, like planking and strutting, hence the contractor requires the information in one form or another, first to enable him to formulate an estimate, and, secondly, technical directions as to construction and location.

Either detail drawings may be supplied for the purpose or they may be fully described in the specification, giving the dimensional sizes of the scantling as well as all incidentals thereto, and the position or positions where they are to be fixed. Here again, in contracts where bills of quantities form the basis of the contract, and particularly where fully dimensioned detail drawings have been prepared beforehand, or when it may reasonably be expected that the quantities can be prepared from particulars of similar works (frequently the case), without the aid of detailed drawings (not an uncommon practice), then the descriptions may take the form of technical directions only, thus:

HOARDINGS, ETC. Erect hoardings 8 ft. high along the boundaries of the site, as follow:

On North and South side, each with one pair of gates.

On West side, with one pair of gates, and form wicket door therein.

On East side, with two pairs of gates.

Lay sleeper or other approved roadways to all gate openings, as directed.

The contractor shall maintain these in a sound condition and in a good state of repair during the progress of the works, and shall remove the hoardings, etc. on the completion of the contract, and make good after.

The contractor shall not let any part of the hoardings for advertisement or other purpose.

It is not absolutely necessary to include the last two paragraphs in the specification, for these items would be included in the bills of quantities in this type of contract. Still, on the score of authority of control it may be a good reason for retaining them, but not on any other grounds. Though these are in the nature of temporary works, nevertheless, it may be desirable (in the building owner's interest) that the hoardings should be kept in a sound condition during the carrying out of the contract; but to maintain them in sound condition during this period may necessitate some expenditure on the part of the contractor, and yet not to do might otherwise involve him in costs of other kinds, which is his risk. However, as it is a matter which affects costs, and on a point of equity, down it must go in the quantities. Similarly the letting of the hoarding, which if left solely to the discretion of the contractor he might and probably would be prepared in certain cases to supply and fix it for nothing, and no doubt under the circumstances he would desire nothing better than that the hoarding should remain standing for an indefinite period. Again, as this is a matter likely to affect cost, down it must go in the quantities.

With the exception of the two paragraphs in the specification referred to in the last paragraph, the information and directions as to location contained in this brief specification would not appear in the bills of

quantities. Hence, the clauses in the specification would be supplementary to the items in the bills of quantities. That is all that is necessary with this type of contract.

Summarizing this section:

The aim, when this type of contract is used, should be to make the bills of quantities and the specification complementary to one another, and such that betwixt them they contain all the information necessary; in the first instance, particulars in a comprehensive form that will assist the contractor to arrive at an estimate confidently and with reasonable despatch, and, in the second instance, technical directions as will enable him to facilitate the execution of the works. These and clear and accurate and fully dimensioned working drawings together with the requisite detail drawings are all that he needs.

. . . . . .

We will now give as an illustration one of those items which are, with few exceptions, common to all classes of buildings—namely, windows. But as there are several kinds of windows, all differing, we must make a selection; for our purpose we shall take a sash window. One reason for so doing is that the construction of a sash window is alike in its essential parts in all cases. There is, on that account, not the same necessity to prepare a detail drawing showing the construction, so long as its component parts and their sizes are adequately described in the specification.

Before proceeding further with our observations we shall now set down a typical example:

SASH WINDOWS

Construct boxed frames of red deal; consisting of 1¼ in. inside and outside linings; ½ in. back linings, 1¼ in. pulley stiles with pockets formed therein; 1¼ in. head; ¼ in. parting beads; ½ in. slips, all tongued and grooved together with stiffening brackets at head; 6 in. by 4 in. twice sunk, weathered, twice check throated, and twice grooved oak sill; 1½ in. by ⅞ in. rebated and moulded bead fixed with screws to sill on inside and 1 in. by ⅞ in. moulded beads fixed with screws to inside lining.

Hang in boxed frames 2 in. moulded and rebated sliding sashes having 2 in. by ⅞ in. moulded, twice rebated, glazing bars to form small squares; bottom rail splayed and rebated and check throated and meeting rails splayed and rebated. Sashes hung with fine twine sash cords to iron weights (balancing sashes) and brass-faced ball bearing axle pulleys. Sashes to have brass sash fasteners p.c.....

Fix 1¼ in. by ⅛ in. galvanized weather bar to sill, bedded in red lead.

Fix to inside (7in.) by 1¼ in. rounded nosed window bottom, tongued to sill and returned at ends; ¾ in. by ¾ in. scotia mould under, returned at ends; (6 in.) by ¾ in. wrought linings, tongued to frames; and 3 in. by 1 in. architrave moulds, mitred at angles.

We may remark here that as this is but a description of one window, which would be an exception rather than the common practice, in the specification the description would require to be slightly modified to embrace all the sash windows, and also the positions defined that they would occupy in the building, especially and more particularly when there are other kinds of windows, or if the drawings show *all* the positions

and indicate clearly the respective kinds, then a note would suffice to the effect: "to the positions shown on the drawings".

We may further remark that the descriptions would have to be amplified to the extent of giving the sizes of windows unless these could be either "scaled" from the drawings or the drawings gave the dimensional sizes.

It will be observed that the description includes the furniture to the sash window as well as the weather bar. The practice is to specify the former along with the article to which it is fixed where they are closely associated; but in the case of the latter, though the same idea prevails, it may be given a separate clause, particularly when it is common to all kinds, and should there be any exceptions, as in some instances, where they are not required, these can just as well be enumerated therein. One other point should be noted, and that is that the P.C. is specified. This would not be necessary in the case where a Provisional Sum was provided for Ironmongery, and given a separate clause. But, as we have observed previously, it should be identified with the article to which it is closely associated, and in such a case, described as "fixing only", or "fix only", for be it remembered that the word *fix* includes *supplying and fixing*.

Again, let it be observed that the description includes other pieces of work: window bottom, linings and architraves. Now these, as well as those referred to in the previous paragraph, are closely associated with the sash window to which they are identified. But should there be a number of sash windows, or even windows of different kinds, then these might, as is the general practice, be given a separate clause and their positions defined. In such cases the sizes of the members could very well be omitted, provided, of course, they could be obtained from the drawings.

Our analysis is not as yet complete. By sifting this from that, what is now left are the essential parts—boxed frames and sashes. Can we by a further application of the process of elimination reduce the amount of matter it contains? It all depends upon the surrounding conditions. We said at the outset in introducing this section that a sash window is alike in its essential parts in all cases and on that account there was not the same necessity to prepare a detail drawing provided that the dimensions of its component members were described in the specification. That is one condition. In a case where fully dimensioned drawings are prepared or will be prepared, then the first paragraph could be curtailed to read: "Construct boxed frames of red deal as shown on the detail drawings", and go on to denote the positions when more than one sash window or different kinds of windows and the requirements demand such. But that is a matter of detail depending upon circumstances. In any event, there would be no necessity to describe the parts as "tongued and grooved together" as these would be shown upon the detail drawings, and to a large extent is akin to process work, like planing timbers and laying bricks. And the second paragraph of the description could be curtailed to read: "Hang in boxed frames, sliding shashes hung with . . .".

In bringing this section to a conclusion we need only to say that nothing has been said herein with regard to types of contracts or bills of quantities. In no way are they concerned in what we have written. We would point out, however, that a specification in certain types of

contracts we have mentioned previously performs two functions—for the purpose of arriving at an estimate, and for the purpose of carrying out the work; but in those types of contracts with quantities which form the basis of the contract though the specification may be useful in the preparation thereof, the first is not a part of its function and should not be written with that object in view.

. . . . . .

We will cite as a final illustration one of those items whose construction is rarely shown on the working drawings, nor in the vast majority of cases is a detail drawing prepared.

We will follow our usual custom of giving a typical example—in this case a manhole—and comment upon it afterwards.

MANHOLE Construct manhole, size internally 3 ft. 6 in. long by 2 ft. 8 in. wide by 6 ft. 5 in. deep, and in the position shown upon the drainage plan.

Excavate to the required area and depth, and afterwards fill in and ram solid behind the walls and to top of vaulting; cart away surplus materials.

Build the walls of common brickwork 9 in. thick, set with cement mortar, having two courses of footings setting-off quarter brick at a time. Turn vaulting (or arch) over portion of top consisting of two half-brick rings set with cement mortar, and neatly perform all cuttings to skewbacks and extrados. Corbel out to each side of opening to finish 24 in. by 16 in. at top, with oversailing course, two course deep. The inside of manhole to be faced with selected common bricks and neatly flat-pointed as the work proceeds; the joints in the soffit of vaulting, after removal of centring, to be raked out and flat-pointed.

Build in strong 8 in. cast-iron foot irons at distances of 18 in. and set staggered.

Lay Portland cement concrete foundation 12 in. thick and 6 in. wider than the outside course of brick footings.

Lay at bottom to inside of manhole concrete benching, average 8 in. thick, with quick slopes to sides, floated up smooth on top with Portland cement and spar chippings in equal proportions, finished 1 in. thick

Form channels in benching, laid to falls.

Fix in benching 4 in. diameter half-round, white glazed channel pipes, junctions and long bends, bedded and pointed with cement mortar, two to one.

Run skirtings at base of manhole to inside, 1 in. thick, trowelled smooth and with splay to top edges, of Portland cement and spar chippings in equal proportions; neatly perform all mitres.

Neatly make good to brickwork around pipes to manhole.

Fix approved strong cast-iron manhole cover and frame to opening, 24 in. by 16 in., and bed and point frame with cement mortar. Bed cover in cart grease and sand.

Apply two coats limewhite on walls to inside of manhole.

First, we will clear up a few points. Let it be noted that this is not a typical specification for manholes in general, but a typical specification of a type of manhole. We may prefer a manhole with a stone or concrete cover in the place of vaulting; we may prefer glazed brick facing to the inside, and so on. All this is immaterial to our study.

What, however, is material is that we have not described the quality and the like of some of the materials used in the construction—water, sand, cement, aggregate, spar chippings, mixing, cement mortar, bricks, wetting bricks, planking and strutting, and centring. Now, of course, as has been pointed out in a previous chapter, these things are best dealt with in the preamble clauses, except such as planking and strutting, and centring, which would be dealt with separately in their respective clauses. So we can dismiss these without further comment.

It will be quite clear that this specification could answer to any of the types of contracts we have stated. But as this is a lengthy specification for so small a work, the question naturally arises: Can any portion be deleted? Obviously, if there be no detail drawing, the answer is No! not with any of the types of contracts. Let us re-state the function of a specification—to describe the materials and labour not clearly defined upon the drawings. It is self-evident that these would not be clearly defined upon the drainage plan. We are left with no alternative but to describe them fully in the specification.

One point more. In contracts with bills of quantities all that is described in the specification, with the possible exception of the first paragraph, may appear in the quantities, and in the main may be traceable and identifiable, so the question arises: Is it necessary to duplicate them, since the contractor could obtain the information from the quantities? The answer is an emphatic Yes! In replying, we were not concerned with any point of view or any subtle argument one way or the other. Our answer was founded on the fact that the quantities are not for this purpose. Our knowledge of the functions of quantities—to formulate an estimate and for use in the adjustment of the contract—makes it clear to us that in any attempt to make quantities function as a specification is erroneous, and must inevitably lead to confusion and impose a task upon the contractor contrary to the intention of the contract. To think otherwise is fallacious.

Summarizing this section, the aim should be to make the drawings and specification complementary to one another, such that betwixt them they contain all the necessary information for the carrying out of the items of work. That is the crucial test to apply in every instance in framing items in a specification. If it does not answer to this test, then it should be rejected and replaced by another that will.

Chapter VII

THE CONSTRUCTION OF CLAUSES

In commencing this chapter we must have an eye to an end, as we could quote examples in bushelfuls. Of necessity, we are limited to a few in number.

Taking the first case. This presents a difficulty in that we are confronted in reconciling two apparently irreconcilable views. On the one hand there are those who consider that the clauses of a specification should be so vaguely worded that they permit the architect to interpret them at will. Whilst on the other hand there are those who consider

that the clauses should be so framed that the contractor will be compelled, if need be, to do all manner of things, if he is to escape the penalty of being hanged, or, alternatively, drawn and quartered. Are not both these views at fault? We give examples: one of each kind, with reference to "Work to be opened up at the request of the architect."

(*a*) Should the architect require for his more perfect satisfaction, the contractor shall at any time during the continuance of the work, or within the period of maintenance, cut into, across, down, to, or under the land or premises in or under which the work or any part of the work is, or is to be, executed, and make such openings into or through and lay bare or expose, the work, or any part of the work to such extent as may be directed by the architect, and the contractor shall make such land and premises and the work good again to the satisfaction of the architect.

(*b*) The contractor shall at the request of the architect within such time as the architect shall name open for inspection any work covered up and if the contractor refuses or neglects to comply with such request the architect may employ other workmen to open up the same....

With regard to (*a*) we would say we do not know what is meant by "*more* perfect satisfaction", but if it means something beyond perfection, if there be such a thing, then it is outside the range of our intelligence. But it is probably a slip, accidentally thrust in amongst this legal jargon. Even then the wording leaves us in doubt as to whether he has once or a number of times to be satisfied, or how many times he may have to be satisfied before he attains perfect satisfaction, if ever. Only himself can interpret the word *perfect*.

As regards (*b*) we are forced to admit that the contractor has no option but to comply. It matters not whether he be paid for the work; do it he must and as often as he is requested or else suffer the penalty.

We recognize that some safeguard is necessary, but is not that usually provided for in the "conditions of contract" to which these rightfully belong? And we give it as our opinion that all such matters should be excluded from the specification. For that reason we say that both these viewpoints are at fault, and that the clauses in a specification should be framed on definite and specific lines that admit of no ambiguity. If such clauses are found to be necessary, then let them set out clearly in unmistakable language the requirements, and after all, let them be fair and reasonable and equitable and within the meaning of the contract:

If in the event of any contravention of the Contract, the contractor shall at the request of the architect . . .

This means that the contractor will not be asked to do anything for which he is not held responsible, nor does it provide loopholes of escape for those who fail in the exercise of their duties.

. . . . .

Bearing on this point, and as examples of loosely worded specifications, we give two examples of "Filling in".

(*a*) Fill in and ram to all footings, drain pipes, etc.

(*b*) Fill in and ram solidly, in 6 in. layers, the best of the excavated material about the foundations of walls, etc. as soon as the walls are above ground level; water to be used to assist in consolidating the earth if necessary when so directed, and remove surplus.

And we would echo the words of the Litany—"That it may please thee to succour, help and comfort, all that are in danger, necessity, and tribulation". For, by substituting synonyms for some of these words, we see that contractors need aid, support and encouragement, and are in great peril under compulsion of an acute trial.

The first of these examples belongs to the category of vaguely worded specifications that the architect may interpret to mean whatever he chooses, for what other purpose is "etc."? If it means further work of filling in, then the specification should be definite on the point and say so. We can imagine the trying ordeal of the contractor soliciting information from the architect as to whether the remaining portion of the trenches are to be filled in; he is certainly in need of aid here, because such is not described in the specification. He would be in need of support and encouragement were he to act upon the literal meaning of the specification—fill and ram the drain pipes. He would be in grave peril—well, in suggesting, however delicately, that it would be better for the job that the drain pipes should not be filled in and rammed, and, if we understand the purpose of these works and his obligations under the terms of the contract, he must undergo the compulsion of this acute trial. Of course, he may as an alternative elect to take other risks—burn the specification, for example.

The second example belongs to that class or category which overreach themselves in an endeavour to compel the contractor to do all manner of things.

Fill in with the "best" of the excavated material "about" the foundations of the walls "etc. as soon as" the walls are "above" ground level. What are we to make of the words *best*, *about*, *etc.*, *as soon as*, and *above*. We wonder what would happen if in the opinion of the architect there were only a spadeful of "best"; would the contractor have to distribute it evenly "about" the foundations and leave it at that? We note filling in is to be done "as soon as" the walls are "above" ground level. The absurdity of this will be apparent when we say that part of this was executed in bog land and the trenches in several instances more than 20 feet deep.

But let us proceed. Here is another choice example:

> Excavate for and fill in trenches after the drains are approved and tested, exercising great care not to disturb the drains, using the finest and best of the excavated materials for packing around the pipes; the whole of the filling to be carefully rammed and thoroughly consolidated, and all depressions in the finished surface over or near the drains to be filled in to the proper level.

"Excavate for" and fill in the trenches "after" the drains are approved and tested. We know of no special way in which drains may be approved and tested before they are laid; we frankly confess ignorance of the use of excavating *after* the drains are laid. But this should be read in conjunction with the remainder of the paragraph, and it will be seen that it deals exclusively with the "filling in". The sentence needs recasting to make its meaning clear; thus: "Excavate trenches for the drains, and after the drains have been approved and tested, fill in the trenches." Even now it is anything but satisfactory, mixing up the *excavation* as well as the *filling in* with *approval and testing of drains*, and this quite apart from

the fact that in the same specification we read—"The drains to be tested and proved capable of resisting a water test under a head of not less than two feet of water." Applying common sense, it is not likely that a contractor would risk filling in the trenches before the drains had been approved and tested, knowing full well that if he did so he may be requested to "open up".

Then again, there is ambiguity in the way the words *approved and tested* have been used here. Approval might mean as to the method of laying—falls and directions—and testing as to quality and soundness of pipes. But as there is nothing in the specification about these, and as "tested and proved capable . . ." can but mean something totally different, we are left in doubt as to what they do mean, nor can we say when the "filling in" should begin.

As for the next—"Exercising great care so as not to *disturb* the drains, using the *finest* and *best* of the excavated material for packing around the pipes"—we have no doubt as to what is meant, but have very great doubt as to its practical use. We think such instruction could have been omitted, and trusted to the honesty of the contractor; besides, he is a practical man—and there's the penalty aforementioned. We are confident he would not disturb the drains knowingly and out of pure devilment, and that he would exercise great care that only *suitable* material was used for the purpose. Similarly, we think the rest of the paragraph could also have been omitted.

Much more could be said, but we think we have said sufficient to show that instructions should be precise and definite.

. . . . . .

We could not do better at the commencement of this section than by quoting from the Preface: *The Writing of Clear English*, by F. W. Westaway:

> He who desires to write correctly must train himself to review with a critical eye what other people have written . . . to feel a desire to track down the faults of construction in the books he reads . . . so that he may at length feel hopeful of becoming a ruthless critic of his own composition.

We give a few examples:

The first is "A Plea for Staircases", by D. B. Wyndham Lewis, in *Pall Mall Magazine*, October 1928. It is interesting, and—besides illustrating our point—we have something further to say about staircases in a later chapter:

> A staircase (I tell no lie) is a flight of stairs with their supporting framework casing, balusters, nowels and knops. . . .
>
> Beatrix Esmond came down the staircase at Walcote House, with a wax candle in her hand, wearing scarlet stockings and shoes.

By the way, what are "nowels" and "knops"? Misprints for *newels* and *knobs*, or what? And did Beatrix Esmond wear scarlet shoes with her scarlet stockings? Perhaps it was from the point of delicacy that shoes were mentioned, for had she been wearing riding boots—well, anyhow, scarlet stockings, if we understand human traits, would demand a choice of colour in shoes.

To come to the main point of our observation, and so that we can

understand the criticism, we quote first from *Modern Practical Joinery*, by George Ellis (1902 Edition), Chapter XV:

STAIRCASES	The complete construction in one or more successive flights of stairs.
STAIRS	A number of steps connecting two floors and closed in underneath, which differentiates them from a ladder which is open between the steps.
STAIRWAY	The aperture provided for the stairs.

We note D. B. Wyndham Lewis told no lie about a staircase with the exception of nowels and knops and that a staircase may have more than one flight of stairs. We should, however, have been left in doubt as to how Beatrix Esmond came down the staircase (?)—tumbled down head first, or slid down the handrail like a naughty girl—had not a full page illustration shown her in the act of descending the stairs.

And whilst on the subject of staircases we give a further example culled from another source:

> Provide all materials and labour in cutting, fitting and framing staircase, complete in three short flights of three steps and six steps and two sets of winders, three feet from outside to outside of strings.

It is conceivable that a staircase could be constructed without newels and balusters and handrails, but when we have said that we have said all that can be said in its favour. This was in a specification for a house, and the contract was based upon the specification and $\frac{1}{8}$ in. scale drawings only. From the stairway shown on the drawings, newels and balusters and handrail would be required, so it is not so much what this specification contains as what is omitted that points to its defects. Even apart from these, how many winders are there in each of the "two sets of winders"? And what are the scantling sizes of the timbers? Now, as to the faults of the construction of the specification. What is "three feet from outside to outside of strings", the staircase, or the steps or the winders? It cannot be the staircase, nor can it be the winders. And ought we to describe the staircase with winders and no landings as having more than one flight? One might just as well describe a continuous circular staircase as such.

"Three short flights of three steps and six steps and two sets of winders" reads more like a flight of fancy in jingle than a specification of a staircase.

To conclude this section we shall quote from a work on Specifications.

> Practically all civil engineering work of any magnitude is carried out by contract, and care should be taken in the drawing up of this document to avoid the inclusion of unreasonable and oppressive conditions.

What is the principal thing it is here sought to convey? Is it that in drawing up the contract care should be taken . . . or that all civil engineering work . . . is carried out by contract, or that only work of any magnitude, and then not always, is carried out by contract, or that for work other than these there is no contract?

We cannot conceive, for otherwise we have been misled, that this book was written around works to be executed by direct labour, so we do not see the necessity, by inference, to make any reference to them.

It only leads to confusion. Again, we cannot conceive of any works of whatever magnitude being executed, except in the cases before mentioned, without a contract of some form. Surely, this ought to have been made clear.

The words *practically* and *magnitude* are puzzling, but we think we know what is meant: "In Civil Engineering work—more particularly large work—the general rule is that the work is carried out under a *written* contract."

As for the rest, we can readily understand, if the contractor was entrusted to the drawing up of the contract, a hint to him not to include therein unreasonable and oppressive conditions might be of service. But we don't see that the Engineer need be burdened with such a care, except of his own making. When framing the contract he may like to feel that he is straining every point to the advantage of his client, but after the contract is signed he is no longer an agent and must act in a *quasi* judicial capacity, so that he will be compelled to enforce the conditions. We think the following would meet the case reasonably: "To be fair to all parties, the contract should be drawn up upon an equitable basis."

As we have before remarked, the clauses in "the conditions governing the contract agreement" should be in keeping in intention and in fact with the specification.

. . . . .

In this section we shall deal with the setting out or display of the matter, and in doing so we shall follow our usual custom of giving examples and commenting upon them afterwards.

Provide and lay Macadam or other approved material broken to pass a 2½ in. mesh steam rolled to pass a 5 in. thickness laid dry topped with ..... granite 2 in. thick laid in layers the first layer to be laid on Macadam well rolled to well fill all interstices and sprinkled for topping with sharp sand and gravel and a little sharp sand and well moistened and continuous rolled in soft state, well consolidated to a hard even surface having a 4 in. crown with contours.

That, as you will have observed, is a fine exhibition piece; for crudity it is unsurpassed; its quality on first inspection may not be apparent, but it possesses marked characteristics not to be found in anything of its kind. Put shortly, it is a gem worthy of a resting-place in any of the great museums of the world.

Well, it is difficult to take it all in with but one stop, a comma, but mark its purpose—how well it emphasizes what follows—"well consolidated to a hard even surface . . ." Not merely consolidated, but well consolidated.

Macadam, after the name of its inventor, is the name given to a type of construction of roadway. It does not mean or stand for the stone only, although it is now used by many in this loose fashion.

"Form Macadam roadway" would have been more precise and to the point, and then have gone on to state the kind and quality of stone. Again, stone broken to pass a 2½ in. mesh may have any sizes of stones from 2½ in. downwards to small grains, which would defeat the object; hence an amendment would be necessary.

But nothing short of reconstruction will serve to make it clear, and then it will have to be presumed that the formation—excavation and pitching of the roadway—is specified elsewhere. Thus:

Carefully spread Penmaenmawr granite from an approved quarry, broken to pass a 2½ in. mesh and to be retained on a 2 in. mesh, to be laid dry and well rolled with a 10 ton steam roller and consolidated to a 5 in. thickness.

Afterwards spread, in two 1in. layers, fine Penmaenmawr granite chippings, and bind with fine gravel and sand to fill interstices; each layer to be watered and well rolled.

Dress with a sprinkling of well moistened, fine sand, and roll continuously until thoroughly consolidated to an even, hard surface.

The roadway to be contoured having a 4 in. crown.

That is the best we can do, but we lay no claim that it is the only way to make a water-bound Macadam roadway.

In the attempt to make this clear we have, it will be noted, split the matter up into paragraphs after the manner of the following example:

Carefully spread and roll 2 in. broken limestone, the material to be rolled dry to correct cross section and required thickness (3 in. consolidated).

After dry rolling cover the whole with ¼ in. fine limestone chippings which are to be carefully brushed over the surface to fill interstices.

Give the whole road a further rolling and then grout with .... cold emulsion, at the rate of one gallon of material to every superficial yard of road surface.

Dress the surface with fine chippings as before, and finally roll about two hours after.

On completion of the work, surface dress the road with ..... cold emulsion at the rate of five yards to the gallon, and dress with ⅜ in. clean chippings.

And this, as the Americans would say, shows what a successful man can do; so model yours on that if you wish to succeed. Respectfully, we would say, it could be improved by the insertion in the first paragraph of a note stating the weight of the roller; in the second paragraph by the insertion of commas after rolling and chippings, or a comma after rolling and add "to fill interstices", with a comma following; in the third paragraph, a note giving the minimum number of rollings; and a slight amendment, for clearness' sake, to the fourth paragraph after the words as before; thus: "and then finally roll for about two hours".

We suggest that this may now be taken as a clear and definite specification. Its clearness is due in the main to its economy in the use of words and the simplicity of its language and the absence of long involved sentences; its definiteness is due in the main to its precision in defining the specific requirements. There is no mistaking its meaning and its requirements, and it is aided in these by grouping each particular piece of work in a paragraph, and in the order and internal arrangement of the paragraphs—first things come first and so on to the end. Its value lies in the fact that it does not weary one in the reading; one is not confused in understanding its meaning as in the case of the previous example, one can grasp each section of the work without undue mental effort, and visualize the whole by the skilful blending and arrangement of its parts in a series of ordered paragraphs that run like a rippling brook.

Robert Blatchford, in *English Prose and How to Write It*, has something

to say, harmonizing with our point of view, on paragraphs, which we quote:

PARAGRAPHS: Keep your paragraphs short. They will be easier to read and easier to understand. Stop a paragraph when it is full. Do not allow it to slop over.

Here are some paragraphs about the mixture of races:

The Londoner is a mixture of all these races, and more. From every part of England, Ireland, Scotland, and Wales; from most parts of Europe, from many parts of America and Asia, even from Africa foreign blood has flowed in to make the Londoner.

In Yorkshire there are several distinct races though none of them are pure. There is one type bearing marks of descent from the Norseman, another showing descent from the Flemish and French immigrants, and another from the Norman invaders.

In Ireland there are Irishmen from Denmark and Norway, Irishmen from ancient Mongolia, and Irishmen of almost pure Ibernian type.

The Ibernian Irishman is short, dark and acquiline with black hair and eyes and leechy tartan-like moustaches. The Viking Irishman is big and burly, with blue or grey eyes and reddish hair and beard. The difference between the two types is as striking as the difference between a Spaniard and a Dane.

We have there [he says] four paragraphs. The first treats of the Londoner, the second of Yorkshiremen, the third treats of Irishmen, and the fourth treats of the Ibernian and the Viking. It seems to me that the division of these paragraphs is natural and logical. They may be said, indeed, to have divided themselves.

Read again the specification of manhole in the last chapter and see how it conforms therewith; the first describes the size of manhole, the second deals with the excavation, the third with the brickwork, the fourth with the building in of foot-irons, the fifth with the concrete foundation, the sixth with the concrete benching, the seventh the channel pipes, the eighth the skirtings, the ninth the making good around pipes, the tenth the cast-iron manhole cover, and the last with the lime-whiting on walls. They have, as it were, divided themselves into sections of work, which form part of a whole; and the whole in a logical order of arrangement: size and position of manhole, then as near as possible in the order in which the work will be executed, and last, the finish: the limewhiting on the walls.

As a further study in Paragraph Writing we would recommend the Chapter on Paragraphs in *The Writing of English*, by Professor Wm. T. Brewster, as it treats of the internal arrangement of paragraphs.

. . . . .

There is, technically, a shade of difference in meaning between brick-work set in lime mortar and set with lime mortar. This will be more apparent if we alter the expressions slightly to brickwork "bedded and jointed in lime mortar and bedded and jointed with lime mortar". The former means for the full bed and joints, whilst the latter may mean only partially bedded and jointed. Hence, if in the latter we want it to mean what the former implies, we should have to add the word "solidly" to the words "with lime mortar".

This difference, like many more of its kind, is not always recognized or given due consideration in specifications.

If we want a thing done in one way and one way only, then we should say so. When there is no other way but one way of doing a thing there is no need to specify how it is to be done, as it would be either implied or understood.

In writing a specification the chief aim should be clearness. We give, as an illustration, two examples with their corrections. For "All brickwork not otherwise specified to be built in English bond" write "All brickwork to be built in England bond, unless otherwise specified", and for "Turn arches over drain pipes where passing through or under walls" write "Turn arches in walls over drain pipes".

Also, as an illustration, an example of a note on construction, as follows:

Close mitred hips looked well, soakers preventing any water percolating through the joints; secret lead gutters may be used instead of soakers. Valleys can be treated in a like manner;

with its correction:

Close mitred hips look well, and lead soakers prevent water percolating through the joints; secret lead gutters may be used instead of soakers. Valleys can be treated in a like manner.

Here are a few examples whose meanings are obscure:

(*a*) Panel the walls of rooms . . . to details supplied, with oak, or deal, or whitewood, as specified, with friezes, square columns and pilasters.

(*b*) Cleft chestnut and wire fencing, to be from the best selected hard-grown sweet chestnut tree from an approved maker.

(*c*) The balusters to be the p.c. value of .... one or two per step and on landings to be similarly spaced, to be let into ends of steps, etc., and run with lead and screwed to core rail.

(*d*) Line the housemaid's and butler's pantry sinks, with 8 lb. bottom and 7 lb. lead sides, with soldered angles.

(*e*) Inspection covers to junctions, sight holes, and bends to cast-iron drains are to be secured with $\frac{5}{8}$ in. gunmetal screws and jointed with $\frac{1}{2}$ in. blanket-felt washers, cut to shape and saturated with hot tallow or asbestos washers, to form a watertight joint.

. . . . .

A common fault with specifications is that they are understopped or overstopped or badly stopped.

Punctuation is claimed by some to be a highly technical subject governed by definite rules, whilst others maintain that punctuation is largely a matter of taste; but all agree that stopping of any kind is no remedy for faulty construction, and as regards these we have given numerous examples and shown that the only remedy is re-drafting.

By no means of "stopping" could the example of "cleft chestnut and wire fencing" be made to read sense. Even the stop employed only heightens the absurdity.

Admitting that punctuation is a difficult matter, still, as some kind of stopping is necessary, if only to give the mind a momentary rest, it is worthy of serious attention. Paragraphing is one form of stopping, without which reading would be deadly monotonous, particularly with the use of the plague stop (full stop) only, as is so often the case in specifications.

For those who would prefer a further study in the subject, we recommend the Chapter on "Punctuation" in Beadnell's *Spelling and Punctuation* and the Chapter on "Punctuation" in H. W. and F. G. Fowler's *The King's English.*

Chapter VIII

SPECIALITIES

There are matters with which a specification writer may have to deal, and these are descriptions of specialities. We can sympathize with him when, after wading through catalogues, leaflets, and circulars, in search of definite particulars, he gives it up in disgust. And more so, should he apply for specific information from the specialist, which invariably results in a request to grant an interview to a representative—more often than not an agent—who, as a rule, is unable to furnish any better particulars, but with an urbanity born of long practice and in the scheme of things invites an inspection of their work executed at Chowbent or Checkerbent.

Nine times out of ten a visit to Chowbent or Checkerbent will prove abortive, because it is not texture, colour, use and merit, nor any advantage the thing may possess over another thing of its kind, nor its advantage in relation to cost alone, that he requires in specifying. And, at the most, this is all he could reasonably expect from an inspection, assuming, of course, he did not know all this beforehand. Knowledge acquired in this way may be useful in the understanding and judging of the aforementioned things. Now, the specification writer is exactly in the position of one who imparts instruction or describes how to do a thing or how it should be done, hence he must be informed on the subject before he is able to pass on the knowledge. There are so many things he requires information on, and no matter how efficient his methods of acquiring this information may be, it is not likely that he will have all the data concerning everything in use and data of everything about some particular thing. The collection of data is not a simple matter; it is a lifetime's job. Anyhow, when he is called upon to specify some speciality he requires the requisite information to enable him to pass it on in descriptive form to the contractor, who needs the particulars to execute the work.

It is unfair to the contractor if he is furnished with only indifferent or partial information, as it may put him to no end of inconvenience. Further, if the particulars be incomplete it may lead to a dispute or the contractor may have a legitimate claim for an extra.

Though catalogues, leaflets and circulars may be deficient in information, vague as to meaning, and otherwise unsuitable from the specification writer's point of view, it does not relieve him of his responsibility. Nay, they add to his responsibility for, in accepting them for what they are worth, he at least is morally liable either to the contractor or the building owner for their defects and shortcomings. Any rate, they do not lighten his burden, they increase his task.

We shall now proceed to give examples, Our first illustration is a specification of materials for copper pipes for hot water.

The diameter of pipes shall mean the internal diameter or bore of pipes.

The copper pipes to be obtained from Messrs. ..... or Messrs. ..... or other approved maker, and to comply with the following sizes, gauges and weights:

½ in. bore	:	19 w.g.	0·26 lb. per linl. ft.
¾ in. „	:	19 w.g.	0·38 „ „ „ „
1 in. „	:	18 w.g.	0·61 „ „ „ „

The joints for copper pipes to be those known as ..... joints, and to be obtained from Mr. .....

In making the joints, the copper tubing is to be expanded by means of a proper expanding tool, such as that shown on page .... Price List.....

The bends on copper pipes are to be made by means of ..... Patent Bending Machine, as shown on page .... Price List .....

Supply and fix all requisite pipe brackets, screws, plugs and clips.

Lest it be thought that this was dashed off by inspiration we hasten to add that it was wrought by much sweat of the brow, and after a few "failures". We have known cases where the diameter of pipes have been interpreted by contractors as the *external* diameter of pipes; we have known cases where the weights have been interpreted as the weights for *external* diameter of pipes; we have known cases where *elbows*, interpreted as "joints", have been used for *bends*; and we have known cases where heavier gauge copper pipes have been used on the plea that fittings with only screwed joints could be obtained to suit the diameter of the pipes. Then again, the requirements of Local Authorities differ as to the gauge of copper pipes.

It will be clear from this that advantage may be and usually is taken of the slightest remiss or defect in the specification. Everything that tells against the specification writer will come back upon him like a boomerang.

In citing any particular article, we wish it to be clearly understood that it is not in the nature of an advertisement nor is it a publicity stunt; we have no such ulterior motive, nor to praise or discredit any article. Our only object is to make use of them as examples to illustrate what is typical and general.

But we do say it would be in the interest of trade generally were specifications of specialities given in the manner we have shown, not only for the purpose of specifications but to assist in the execution of the work.

A grave defect with most catalogues is the lack of definite information as to how to specify the materials and how the work is to be executed. They invariably mix up the specification with instructions to the craftsmen in the use of the materials. We are always at a loss to understand

the object of so doing. However, we think that instructions, if necessary, as to use should be separate and distinct from the specification.

We shall now give, prior to an example of hard wall plaster, a circular letter dealing with a similar kind of material.

We have pleasure in enclosing herewith some printed matter dealing with "....." which is the ideal cement plaster for internal decoration. ..... has the distinct advantage over any other material in that it sets hard throughout, will not crack or craze, can be applied directly on to panel heating, no condensation, germproof, and final decoration can be applied within 48 hours of the application of .....

Permanent coloured effects can be obtained by addition of colouring matter to ..... in which case no painting is required, and the surface which is polished like marble can be washed down giving a beautiful appearance.

By virtue of the spreading capacity ..... costs no more than common hard wall plaster.

We shall be pleased to give you further details, and get our representative to call upon you.

Some of the users of ..... include ..... and large contractors.

It will be observed that the name of the article appears three times in the first paragraph: once in quotation marks, once in parenthesis, and once as an emphasis. It appears again in the second paragraph and again in the third paragraph, used quite ordinarily, and finally in a special manner in the fifth paragraph. This repetition acts as a magnet —to draw the reader's attention in the hope of stamping the name indelibly on his mind. It is a good form of publicity, and when skilfully done, and presented in the taking manner as in this instance, generally attains its purpose—arouses interest. It hints subtly how you may pursue this interest—all in the scheme of things to which we have referred previously; catalogues, leaflets, personal attendance, and a visit to Chowbent or Checkerbent, to inspect work executed.

We now give an example of a specification of hard wall plaster, or rather the preamble clause. It bears on the subject matter we have just discussed, and although the materials differ, this difference is no greater than, say, the difference between one brand and another of hard wall plasters on the market. Nor do these differences affect our illustration, which, broadly speaking, would apply to all cases.

The plaster to be "....." (or other approved) hard wall plaster and obtained from Messrs. ..... The first coat for walls to be composed of three parts of sand to one part of "....." unhaired plaster; the first coat for lathed ceilings and the like to be composed of two parts of sand to one of "....." haired plaster; the second coat for walls and ceilings to be composed of two parts of sand to one of "....." unhaired plaster; and the finishing coat to walls and ceilings to be neat "....." unhaired plaster. The proportions to be by weight.

No advantage would be gained by overloading such a clause with instructions as to methods of mixing, applying, and scratching; nor would it serve any useful purpose to give information on the questions of prices of materials, covering capacity, weight and so forth. We can foresee cases in which it would be a decided disadvantage to insert these particulars in the specification. The contractor should satisfy himself as to

what these particulars are, which he ought to be able to obtain either from the catalogues, leaflets and the like or direct from the manufacturer or the merchant. And these are matters which invariably the contractor desires to divulge to only a limited number of his staff.

In our example we have sifted the grain from the chaff—the indigestible mass in the catalogues, leaflets and the like. We did not achieve perfection at the first attempt. We had to experiment with this and other hard wall plasters. We had "failures", but by cuffing and pummelling and hoofing we got it eventually to our liking.

. . . . . .

We now give an example of plaster wallboard. We shall quote from that part of the leaflet from which one would hope to extract the information necessary to specify the article.

CEILINGS. New construction. Space studs and joists 16 in. or 18 in. on centres. Be sure that the centre of a stud or joist comes 32 in. or 36 in. or a trifle over.

WALLS. New construction. All studs and joists must be straight in line and level. Straighten any that are out of line. Erection of ..... on surfaced 2 by 4 saves labour. Provide double studs at intersections of walls or corners of rooms.

FILLING JOINTS WITH ..... JOINT FILLER. In all cases ..... Joint Filler must be applied neatly and evenly.

From our experience with similar materials we should not care to hazard an attempt to frame a specification from these particulars alone. Borrowing language from another source, we should require "further and better particulars".

. . . . . .

To wind up this chapter we shall now give five examples of texture and colour and finish of rough cast and stucco work as an illustration in specifying, where (*a*) ordinary materials are to be used, and (*b*) with the addition of proprietary materials.

1. ROUGH CAST. Cement on external walls in two coats, the first coat of coarse stuff of one part of Portland cement to two parts sand, the second coat of Portland cement and sand and lime in equal proportions, and rough cast the surface whilst wet by dashing with white marble chippings of approved size; the whole to finish one inch thick.
2. Cement on external walls with a coat of Portland cement and sand in the proportions of one and three, and finish with a rough cast of Portland cement and sand in the proportions of one and three, which is to be dashed immediately after laying with well-wetted pebbles (to pass a 1 in. ring) until the whole surface is thoroughly covered.
3. Cement on external walls with a rough coat of Portland cement one part to three parts sand, and dash on a second coat of ..... cement (no sand to be used), with 3 per cent. ..... waterproofing added thereto and small limestone chippings (free from dust), all thoroughly mixed together in the proportions of one part cement mix to two parts limestone chippings; the whole to finish not less than 1 in. thick.
4. Cement on external walls in two coats; the first coat a rough coat, ¾ in. thick, of one part Portland cement to three parts sand; the second coat, finished a thin layer, of one part ..... white cement and one and a half parts approved white sand or crushed white spar chippings to

No. 30 gauge, and followed immediately by a spatter dash of the same mixture thrown on with a wisk broom or a bundle of twigs and, before this has set, the projections lightly trowelled down with a steel trowel held flat against the surface.

or—

Cement on external walls in two coats; the first coat "doubled" of coarse stuff—one part Portland cement to three sand—¾ in. thick; the second coat finished a thin layer of one part ..... white cement and three parts approved white sand or crushed white spar chippings to No. 30 gauge, and followed immediately by a spatter dash of the same mixture thrown on with a wisk broom or a bundle of twigs, and, before this has set, the projections lightly trowelled down with a steel trowel held flat against the surface. Aggregate, texture and colour to be approved.

5. EXTERNAL STUCCO. Render on external walls between half-timber work with one part Portland cement to three parts sand, and set with one part ..... cement and two parts white sand, finished smooth; the whole to finish one inch thick.

CHAPTER IX

SPECIALISTS' TRADES

"P.C.", or "Prime Cost", and "Provisional Sums" are terms that play a very important part in specifications, particularly the latter.

"P.C." or "Prime Cost" belongs rightly to the previous chapter and deals mainly with specialities, such as, say: "Supply and fix rainwater heads, p.c. 60/- each, to all downpipes", meaning thereby that the prices to be paid for these articles is to be 60/- each. This price may or may not include the cost of carriage, packing, a certain percentage for cash payment, and the cost of return of empty packages, all depending upon the definition given to these letters or words, usually set forth and defined in the general conditions of the contract, and sometimes in the specification itself under Preliminaries.

Of course, if the amount expended be greater or less than the sum stipulated, then the difference is adjusted at the "squaring-up" of the contract, added to or deducted from the contract amount. But this applies only in cases of certain contracts to which we have referred to previously and at length; in all other cases it is fixed sum, unless and only when the contract states to the contrary. We need not traverse this ground again.

But these letters "P.C." or words "Prime Cost" are sometimes used in connection with specialists' works. For example, "Wood block flooring, P.C. 12/- per yard superficial, to be supplied and fixed by a firm to be selected by the architect(s) or deducted in part or full as he/they may decide", meaning thereby that the work will be executed by a specialist, or, alternatively, the whole or part may be substituted by another or other materials at the discretion of the architect(s) and dealt with as he/they may determine.

Now a change alone in the form of words may transform this into a

"Speciality" item, thus: "Supply and fix wood block flooring, P.C. 12/- per yard superficial, to be expended at the architect(s) discretion or deducted in part or full as he/they may decide", which bears the same meaning and construction as the example of "rainwater heads". Hence the architect(s) will deal with this and the rainwater heads as specialities.

Specialists' Estimates

There is, however, a difference between the method here of treating a speciality and that described in the last chapter, inasmuch as we need not describe it at length in the specification. The general practice is for the architect to obtain estimates from specialists to his requirements, and pass on the particulars of the one he selects to the contractor. But this necessitates one of two things: either the writing of the specification of the requirements when obtaining estimates or the acceptance of the specialists' specification—usually accompanying or embodied in the estimate.

The specification writer, particularly the beginner, should note well the differentiation of use of the letters "P.C." (or words "Prime Cost") and "Provisional Sums", for what would appear sometimes to be a "Prime Cost" is nothing other than in principle a "Provisional Sum".

Provisional Sums may stand for two totally different things. One pure and simply for specialists' works, such as "Heating", whilst the other may be for certain works which need not be in the nature of specialists' works, such as a sum provided by way of a contingency to meet probable increased depths of foundations. Also, as a provision for another kind of work, not really in the nature of specialists' work, which will be executed by the local authority, such as a connection to sewer.

But it is specialists' works alone with which we are here concerned. The sum provided in each and all such cases may be greater or less than the actual amount expended. This difference, if any, in each case is added to or deducted from the contract amount on the termination of the contract (provided it is not one of those contracts which admits of no variation, for in such cases, to be effective, it must specially stipulate in the contract that this shall constitute a variation).

Quite a host of things are now classed as specialists' work which formerly were merely specialities and executed by the contractor. Steel construction, reinforced concrete, heating and special joinery work are instances in point. These are constantly increasing, the need and plea being that the workmen employed by the contractor are not capable craftsmen or sufficiently expert to be entrusted to carry out these special works.

Hence, a specification may contain a number of items of this kind:

Provide the Provisional Sum of £..... for Heating and Ventilation to be executed by a firm to be selected by the architect(s), or such sum may be deducted in part or full as he/they may decide.

The contractor shall attend generally upon the Heating and Ventilation Engineer.

The contractor shall add his profit or commission.

These works may represent anything up to 50 per cent. of the value

of the contract work. Hence, for a large portion of the works, the specification writer's task is a simple one—a repetition of a number of identical items.

This was not so formerly when specifications were given in full, including the specialists' trades; of course, specialists' trades were not so numerous then.

To illustrate this point further, and, no doubt, make it clearer: the annotation of page 242 of Specifications for a Hospital erected at West Chester, Pennsylvania, for Chester County (Messrs. York and Sawyer, Architects), issued by the Pencil Points Press Inc., New York, states: "We have arrived at the strictly mechanical trades," and which are specified in detail—pages 243 to 468 inclusive. Thus it will be noted that nearly half this specification is devoted to these trades, corresponding to the specialists' trades in this country. Again, this specification in the first 243 pages contains much matter that we should class as specialists' works, for instance, reinforced concrete, metal work, tiling and marble work, terrazzo, steel stacks, and other works, which are given in great detail.

As we have said, our specifications contain nothing beyond the "Provisional Sum" clauses with regard to specialists' trades, and though this is the general rule and the practice, it does not end at that. It is only a delaying action; we are putting off till tomorrow what we should do today. In other words, it means that this has to be done subsequently, which may take one or two forms.

First, as in the case of "Prime Cost" items, a specification or particulars of the requirements are sent out when inviting estimates from specialists, for instance, Heating and Ventilation, as our example. The second method, and a very common one, is to supply drawings—maybe sketch drawings or one-sixteenth inch scale drawings or one-eighth inch scale drawings, as circumstances may necessitate—to the specialists when inviting estimates, together with a brief outline of the requirements. Each specialist may then prepare a scheme and a specification, which he submits along with his estimate.

As more than one specialist may be invited to compete for the work, it follows that all will be competing alike by the first method, and by the second method each on the basis of his own scheme.

Obviously, the second method is the simpler. Nor does it require the same skill, for instead of being a writer of specification one is merely an examiner of specialists' specifications.

By the first method, it calls for skill of the highest order, for no specification writer will attempt to prepare such specifications without first knowing his subject; that he must know or he can't write, as in the case of one of the examples given in a previous chapter:

> Cleft chestnut and wire fencing, to be from the best selected hard-grown sweet chestnut from an approved maker.

Before we proceed to give an example we have a few comments to make with regard to our example itself, beginning with the second paragraph, which reads:

> The contractor shall attend generally upon the Heating and Ventilating Engineer.

It will be noted that all that this clause requires of the contractor is general attendance not specific or special attendance upon the Heating and Ventilating Engineer. General attendance here means notifying the Heating and Ventilating Engineer when the works are sufficiently advanced for the commencement of the Engineer's work, affording him facilities for the storage of materials and in the carrying out of the work, and suchlike. Specific or special attendance means cutting holes through walls, floors, etc., and making good after.

It would be asking too much from the contractor to estimate beforehand for these works; that is, before the heating and ventilation scheme was prepared. His task would be next to an impossibility. Nor can we set out these works in the specification except in an indefinite way, as we ourselves would not know what these special attendances might be, and it is against the very principle of specifying to be indefinite. So what happens in practice is this: the Provisional Sum includes an estimated amount over and above the specialist's estimate by way of *a contingency to meet these probable costs*. The actual costs of these contingent works may be greater or less than the estimated probable costs, and this for the reason that these vary so, as anyone with experience knows too well.

As to the first paragraph of our example, the "Provisional Sum" must provide for other probable contingencies. Most specialists' specifications contain works other than those included in their estimate and outside these special attendances. For instance, cartage of materials to site, storage of materials and responsibility for, use of scaffolding and plant, hoisting of materials, fuel and lighting, and sometimes one or more labourers to be in attendance upon them, as well as the return of their special plant and the clearing away of all rubbish by the contractor. It does not always end at that. Sometimes the contractor has to supply and fix materials, such as rolled steel joists to carry machinery for lifts, wood plugs, grounds and what not, and in other cases he supplies materials: water, mortar, lead and zinc and copper flashings, and so on.

Conditions in Specialists' Estimates

There is still another important point with regard to these specialists' specifications, and that is that they are usually fenced around with all kinds of conditions; one of these conditions being, as a general rule, that payment up to within about 50 per cent. of the value of the work must be made upon the delivery of materials upon the site and the balance within one month of the completion of the work. This bears hardly upon the contractor who is subject to a retention of a percentage of the money—including all specialists' amounts—for a period beyond the completion of the whole of the works, and who must make good any damage or defects, including specialists' works, should any arise within a period after the completion of the work; further, his liability for defects does not end at the termination of that period, whereas the specialists, not being parties to the contract, usually get off scot free. Another of these conditions is that the specialists do not hold themselves liable for defects in their own work that may be due to, or caused by, or arise from, the

consequence of defects in other works. For instance, should terrazzo flooring, wood block flooring, and jointless flooring develop defects, it is usually after, rather than before, the period of one month from the date of completion of these works, and they usually put these defects down to causes arising from other works—"green" concrete for solid floors, and to the shrinkage or expansion of concrete of specialists' suspended floor, who in turn will claim it to be due to the deflection and the like of the steel constructional engineer's work, and the latter will naturally repudiate such an assertion and decline responsibility. However, as we have said, the contractor is responsible for the specialists' work.

Contractors as a rule have no say or control in these matters, and it is this absence of control that is sometimes provocative of friction between the contractor and the specialists, and as the contractor has little or no power over the specialists it results, as is sometimes the case, in delay in the completion of the works. When there is delay it is due more from this lack of control than to anything else.

We have said sufficient to show that the second method is far from satisfactory, and the first method, to give absolute control to the contractor, should specify everything in detail and leave the selection of specialists to him, who would then be held responsible for the work being up to specification.

Coming to the example; we give a typical illustration of the "Terms and Conditions of Contract" which usually accompany estimates for Heating and Ventilation schemes.

Payments to be Strictly Nett, and payment to be made by instalments of 80 per cent. of the value of the work executed to date and the balance within one month after completion.

This estimate is exclusive of Builders', Joiners', Masons', Plumbers', Painters' or any other trades work, and the Builders' or other work necessary to this contract shall be carried out in proper time so that we are not hindered or delayed in our erection.

Fuel for testing and other purposes to be provided free of cost to us.

Plans and illustrations give a general outline of our proposals and are not binding to detail.

The price is given on the understanding that a proper water supply is available to the tank.

The acceptance of this estimate would over-rule any conditions or requirements other than those set out in the specialists' specification.

Nothing is here said as to quality of materials and workmanship, nor is anything said as to maintenance or making good defects; nor is there any guarantee as to these.

It stipulates that final payment shall be made *within one month after completion.*

The scheme is not binding as to detail, hence they leave themselves free to modify it in detail.

They are not to be hindered or delayed as a consequence of the works they exclude from their estimate, which works are vital and necessary to the execution thereof, and to stipulate that they shall be carried out in proper time. They are not concerned who does these works or how they are done, but insist that they shall be done to suit their convenience. They must have free and unfettered control, be waited on hand and foot,

be provided with fuel for testing and other purposes—other purposes might mean anything, even to the cooking of meals for their workmen.

If the architect has not made other arrangements he must see to these things being done.

Practically, it amounts to the contractor being ordered by the architect to do them at the behest of the specialists.

Instead of having charge and control of the job, the contractor is under the control of the specialist, he is nothing more than merely an odd-job man paid by the hour at day-work rates, and if he has nothing on hand at the time he must stand by with his tools and without pay until his services are required.

Goodwill

Nor has the architect really any more control. His authority is limited under the "terms and conditions of the specialists' contract", but he can, of course, under the "conditions of contract" to which the contractor is bound, order the contractor to attend upon the specialist. His supervision is limited to inspection and approval; he cannot modify the scheme without the consent of the specialist, and even this would necessitate a new contract, but additional work may take the form of an order for "extra work", which is tantamount to a new contract. He cannot vary the specification, nor substitute one material for another. His powers are circumscribed; to the extent only of the stipulations set forth in the specialists' specification and terms, and as a consequence cannot insist upon work being "opened up". Anything to the contrary and for "smooth working" is dependent entirely upon the goodwill of the parties.

The specialists' trades comprise in most contracts a fairly large proportion of the building works. The constructional (which constitutes the major) works are carried out by the contractor, and although there may be a tacit understanding of goodwill, to ensure success the contractor is under contractual impositions and obligations and penalties. We fail to see any valid reason for this discrimination, and suggest there should be uniform treatment in both cases.

Chapter X

REPORTS

Reports can hardly be classified in the same category as specifications. There are, however, certain reports which approach those of specifications. We shall name and deal with two:

(1) Reports on Schemes.
(2) Reports in Competitions.

The first, a general description of the works, but containing little, if any, technical phrases or terms for clients; and the second, also a brief

description of the works, but containing a sprinkling of technical phrases or terms to assist the assessor.

There would appear so little difference betwixt these two as scarcely to warrant a distinction in classification, or in their application. But there is a need for differentiation, as we shall see, and a need for a difference in treatment.

Let us clear the ground before we begin work on our foundations.

It may be asked: What is amiss with the specification for the client? We see no objection if you are prepared to risk spending the rest of your days enlightening and instructing your client in technicalities.

Irrespective of that, there is a serious drawback to this course, inasmuch as a lay person is not as a general rule conversant with the technicalities of building as expressed in a specification. Furthermore, a specification fulfils, as we have before stated, a definite purpose and in a like manner as do working drawings and detail drawings.

Besides, there is a precedent in that it is customary to supply clients with sketch drawings only of the proposal, suitably coloured and the like to his needs. Working drawings, details, specifications, and bills of quantities are likely to create only confusion in the mind of the average lay person. Again, these documents are instruments of a highly technical character, and are best left in the hands of technicians to manipulate. They represent the tools of the trade and the methods employed in the production of a building, not unlike the tools and methods employed in the production of these documents; they are understood only by those skilled in these arts. A wise client would be well advised to leave these alone. In the same way, no one would dream of asking a general practitioner, after an expert opinion had been sought and, say, an operation agreed upon and consented to, to explain the tools and methods to be employed by the skilled surgeon in performing the operation; nor do we imagine that the surgeon's fee would include instruction to the general practitioner in this. Certain instructions of a kind would be given, no doubt, and certain information would be imparted, we doubt not; but these instructions mean conveying technicalities peculiar to the medical profession in carrying on its practice, and the information imparted for the guidance of the general practitioner. To change the illustration: the commissioning of an artist to paint a picture does not carry with it instruction or explanation in the use of the tools and materials and the method employed in painting the picture. There might beforehand be an understanding and an agreement, to be broadly interpreted, as to the kind of picture to be produced, just in the same sense as work executed by artists and special tradesmen—sculpture, for example: "DAY" and "NIGHT".

What is more, a client should not be troubled with these documents. A wise client would leave these affairs to his advisers. But should he desire to peruse them, which he is entitled to, then it is his affair if he is worried in the understanding of them. What he is concerned with is the result and not the details by which the result is obtained. Anyway, this is a matter between the client and his adviser(s).

Are not these documents perpared for a definite purpose—for use in the execution of the works? Yes! Furthermore, is not the architect the client's agent, and is he not a technician? Yes! Then we see no reason

for the slightest modification of practice to accommodate the client, for his agent—the architect—the technician—is, for all intents and purposes in respect to these, the client.

Can we not compare the architect and the client with "I" and "me" —the subconscious mind! They may differ on points but they are one and the same person. What "I" propose to do concerns "me" alone; what "I" do is for "me" alone to say whether it is *right*. But when "we" —"I" and "me"—come in contact with each other—"we" find that a *right* carries with it a *duty*. In the case of a contract, if "we" want to exercise our *right* "we" must also do our *duty* to the contractor—give him adequate and satisfactory documents to enable him to carry out the contract.

The point is, is it possible by some document other than a detailed specification which will be in perfect harmony? Yes!

Such a document must, of course, exclude abstruse technical terms; indeed, it must exclude all technical terms that are not easily comprehended; and must exclude such matters as can only reasonably be expected to be understood by technicians.

With regard to abstruse technical terms we will cite an illustration from the leading article in *The Builder* for July 20, 1928:

> That quantity surveyors should have had some architectural training is most advisable, and the more complete separation of recent years is already producing a gap in that direction. It is a fact that some of the younger quantity surveyors whose training has been intensive but rather narrow, are uncertain as to *architectural terms and descriptions*. In a case known to the writer, a young surveyor did not understand the meaning of the word "clerestory". With another, the word "triglyph" was a mystery.

The italics are ours. We gather from this that these carefully nurtured and intensively cultivated hot-house plants do not blossom forth in all the glory of architectural terms and descriptions, and if intensive training and careful selection of promising youngsters do not give the results, nothing less than a magical plan for the lay-person will achieve anything like success. To subject the uninitiated to the test of a specification might shock his nervous system.

We might be prepared to pass the word *clerestory* had we not put it to the test: which bore out the above statement. But in this they might plead extenuating circumstances, for, out of four dictionaries we have before us, two spell it "clearstory" and in one there is no reference to the word.

But if the young jacaknapes failed at the first hurdle, what about triglyph? They might boggle over the pronunciation, some dictionaries give it as *tri-glif*, and others *trig'-lif*.

We have said sufficient to show that a specification is not quite the thing for a client. A description of the scheme of some kind is desirable. What manner or form should this take? We have nothing really tangible or definite to work on. But we suggest it might partake of several forms, or might be an adaptation of one or more forms. The style of the novelist is one; the essayist is another, and that adopted in first-class guide books is another.

The novelist would seem to make the running, as instance the attrac-

tion of the works of Thomas Hardy; the essayist a good second, as instance John Ruskin; and guide books have their special appeal, especially if well illustrated, corresponding to the sketch drawings. Of guide books there are legion, and though covering a wide range of subjects, buildings are generously dealt with, and very probably on that account they attract interest. In fact, some guide books are devoted exclusively to buildings.

The point of our observations is this: that these works make the descriptions about buildings interesting reading, and we strongly recommend that one could not do better than study them as a model to work on.

With regard to Reports in Competitions we shall now give an example:

Particular attention has been paid to the levels of the site in planning, and the best and most economical means for the approaches and entrances to the various departments. Thus the Church approach and entrance is at the higher level of ..... Road; the approach to the School Hall, etc., is from the proposed New Junction Roads and on a level with the same.

A special feature is the planning which gives imposing elevations from ..... Road and at the junction of the cross roads. A chief characteristic of the front elevation is the large scale tracery window and vestibule with a base of stone steps. It will be observed that the building piles up well as seen from the junction of the roads.

The essential part of the scheme is that the floor of the Church is approximately on a level with the higher ground, and the School at the lower level of the ground. This has been achieved by planning the School, as desired, beneath the Church, which gives well lighted rooms and excellent inter-communication.

The primary object of accommodation has been accomplished—Church seating for 450; School Hall about 450 with platform and ante-rooms, Church Parlour for about 50, and senior and junior and primary departments by aid of transepts and vestibule taken down to School level.

Particular attention has been given to the planning of the School Hall, as it will be observed that the necessary class-room accommodation is provided independent of this and without the use of sliding partitions in this hall.

The question of the arrangement of the Choir has been solved by placing the seats at an angle in a shallow Chancel, thus it will be noted that the Choir is in full view of the Congregation and the Minister.

The Minister's Vestry and Choir Vestry are approached by separate entrances, which also form exits from the Church. It is especially emphasized that the staircase to Choir Vestry is the main connecting link between Church and School, and could be used by the Scholars as an ingress to the Church after morning Sunday School.

The Church Parlour has been planned so as to be of easy access for the Church and School, and the separate entrance provided will permit of this room being used for week-night meetings without the necessity of using or lighting any other portion of the building.

The Kitchen is easy of access from the School Hall, and has been arranged so that it may be used by Tennis Players.

Easy access from the Tennis Court will permit of the players using the Lavatories as Dressing-rooms.

A Lantern Room has been provided as a mezzanine between the ceiling of the vestibule and the floor of the choir. It is approached by a staircase off the School Entrance Vestibule, and, having a fire-proof concrete floor and ceiling and a window, is in accordance with L.C.C. requirements.

The Infants' Room is of the size required and has its separate Entrance, Assembly-Vestibule, and Lavatories, and through communication to School Hall.

The School Hall will be well lighted from both sides, and an efficient ventilation is assured in all rooms.

The Church also will be well lighted from both sides, the main front window, and Chancel windows. The ventilation of the Church will be by means of hopper windows and extract roof ventilator.

The Heating of both Church and Schools will be by means of low pressure hot water system with pipes and radiators.

The Floors are of concrete, and where shown coloured "yellow" on plan will have wood blocks. Those coloured "pink" will be terrazzo or granolithic.

The Elevations are of brick and stone dressings.

The roofs will be covered with either grey-green slates or multi-coloured sand-faced tiles.

COST. Having gone very carefully into the cubic measurements I am of the opinion that the following is a fair approximate cost, with which my quantity surveyor is in agreement—£.....

The price includes for boundary walls and fencing and gates, grading and formation of bank preparatory to laying out the Grounds and Tennis Court.

The approximate estimate is based upon similar class of buildings and also taking into consideration the special characteristics of the site.

CHAPTER XI

THE ART OF SPECIFYING

THE example here illustrated of wooden staircases is to show how, in specifying, an item may be built up and written. Before proceeding to do which it is necessary to take into consideration several other important matters, and these may be stated briefly, thus:

1. Construction of staircases.
2. Costs.
3. Principles governing the construction of staircases.
4. Data for use in specifying.
5. Points to be specified.

It will serve also to explain the principles and practice of specifying, and a concrete illustration is given with typical examples of the same staircase.

1. Construction of Staircases

A knowledge of construction is essential. This may be acquired in various ways. The chief source of information may be found in books on the subject. The following are given for reference, and may be consulted:

1. *Model Practical Joinery*, by George Ellis. Chapter XV—"Stairbuilding", pages 218 to 247 inclusive. Chapter XVI—"Theory of Handrailing", pages 248 to 273 inclusive; Chapter XVII—Handrailing"; "Practical Work", pages 274 to 282 inclusive.
2. *Building Construction*, Part II, by Rivington. Chapter V—"Wooden Stairs", pages 102 to 106 down to "Stone Stairs", and pages 115 to 134 inclusive; Part III, page 405—"Timbers useful for stair treads", and page 464—"Handrail screws".
3. *Building Construction*, Part II, by Charles F. Mitchell. Chapter XXV—pages 801 to 823 inclusive.
4. *Architectural Building Construction*, by Walter R. Jaggard and Francis E. Drury. Volume I, pages 228 to 238 inclusive.

Types of wooden staircases may be roughly divided into two classes: newel and non-newel. Of the first kind: dog-legged, open newel, and spiral or circular newel; of the second kind: continuous or geometrical, the elliptic, polygonal, and circular well; the straight stair may be either kind, according to construction.

Besides a knowledge of the types, the specification writer should understand not only their different forms of construction, but should be thoroughly conversant with the terms employed in their construction. For example, the difference in construction of a rough string, close string, cut string, cut and mitred string, bracketed string, and wreathed string; why an outer string should be stronger than a wall string, and how a wall string is fixed; where a ramped string is necessary; know the difference between a round step, bull-nosed step, curtail step, commode step, curtail-commode step, dancing step, winders and kite-winders; not to describe a sudden rise in a handrail as a "knee" when he means a "ramp", or a "ramp" and a "knee" when the term employed is a "swan neck"; nor describe a "pitching piece" as a "fillet" or "firring piece", because "fillets" and "firring pieces" have their special functions, which are quite distinct from "pitching pieces", just as are "carriages"; and must be careful to observe that sufficient carriages are specified when the stair is finished with a "planceer"; also he must be careful to describe a horizontal curve in a handrail as a "quarter turn" and not as a "wreath", and distinguish between a "wreath" and a "wreathed" handrail.

2. Costs

It is not so much the relative costs of the various types of staircases as the difference in cost in any one type of staircase that may be occasioned

from a plain to an elaborate one, or by the employment of different methods of construction for the same type of staircase, with which the specification writer should be concerned. For the same type of staircase, it would follow, as a general rule, the more materials and labour that go in the construction, the dearer it will be. Close strings with moulded cappings will be cheaper than mitred cut strings and bracketed; risers merely tongued into the underside of the upper treads and nailed to the lower treads is a cheap form of construction, whereas risers that are not even tongued to the treads, but are done by the method of slot screwing with hollow moulds trenched into the underside of the upper treads is a more expensive form of construction, quite apart from the merit of the case.

A perusal and study of Clause 58, page 44, of the "Standard Method of Measurement of Building Works on Staircases" should help him to realize that, as labours are "measured", the estimate will be increased in proportions as the labours are increased, therefore the form of construction invariably influences the cost.

It does not follow that a costly staircase is always better than a cheap one. Its true value may lie in the design—simplicity rather than elaborateness;—its sound construction: materials and labour used wisely and skilfully, and maybe sparingly, rather than expensive materials and dear methods of construction; its fitness; suitably adaptable for the purpose. Attention to these matters may enable the specification writer to frame the specification on lines that will produce the effect desired.

3. Principles Governing the Construction of Staircases

The specification writer should be familiar with the leading principles which are common to all staircases, of whatever materials they may be constructed. For example, it is a maxim that a broad step should be of less height than one which is narrower, for it is assumed that the average length of steps in walking on the level is 24 in. and that it is twice as difficult or fatiguing to climb upwards as it is to walk forward. From these premises it is deduced that one step forward, plus two rises or steps upward, should equal 24 in., some authorities put this at 23 in. It is seldom, however, that the proportion of the step and riser is a matter of choice—the space allotted to the stairs usually determines this; but it is as well, all the same, to bear in mind that this is a useful standard, as the specification writer may be called upon to ascertain the "rise" or the "going" of stairs in specifying.

4. Data for Use in Specifying

In practising the art of specification writing the specification writer should begin by compiling data. This data should be the foundation upon which he proceeds to work. He would, therefore, be well advised to seek diligently for information in all matters that may be useful to him. Take our example of staircases as an illustration. The first is to know such of the technical terms employed in staircase building and handrailing that he will require in specifying. He could hardly proceed

otherwise. Very well. How is he to accomplish this? All the information is available in works on Building Construction and the like. He may begin by consulting them, and jotting down these terms in a notebook (or in any other way he chooses), just as they occur and without regard to order of arrangement. Afterwards he may rearrange them in alphabetical order on, say, foolscap paper, which should then be filed away with any other papers bearing upon the particular matter, for future reference. He will probably find that he will not require, in specifying, all the terms—particularly those employed in practical work; those which he does not require he can very well dispense with in his list, which may take after the following:

Apron lining, balusters, bearers and cross bearers, blocks, brackets and also rough brackets, bull-nose step, capping, carriages, commode step, core, curtail step, dancing step, drop, fillets, flights, flyers, firrings, going, going of the flight, handrail, handrail screws, joists, knee, landing, line of nosing, margin, mitre cap, monkey-tail, mop-stick, newel, nosing, nosing line, notch board, pitch of stairs, pitching piece, planceer, ramp, rise, riser, wrought string, round step, scotia, scroll-cap or scroll, soffit, spandril, springing, square-cut, staircase, stairs, stairway, step, strings—close string, cut string, cut and mitred string, bracketed string, wreathed string, wall and outer string—swan neck, timbering, tread, trimmer, turn, walking line, wedges, well or well hole, winder and kite-winder, wreath, wreathed and wreath-piece.

From this list of technical terms he would be well advised to prepare a glossary of terms. This will afford him excellent practice in expression, and, if perused with close application, no doubt, in a very short time, he would become capable of defining in a clear and pithy manner.

There are several methods by which this may be accomplished. One method is by copying these from the books previously referred to, writing a few at a time on a sheet of paper and reading them over carefully, two or three times, then laying aside the paper and writing in your own language a glossary of the terms. After a few attempts, correcting now and again, success may be achieved. How often it may be necessary to write and rewrite is a matter that rests entirely with the individual's aptitude and capability in that direction. With some it comes quite easily, but with others not so. To those who experience a difficulty in memorizing, as well as expressing themselves clearly and fluently, this method is strongly recommended, as writing helps as an aid to memory. To those who can express themselves in writing with ease and facility, and are good at memorizing, it may be necessary but to read them over once or twice and so go right ahead in the writing of the glossary straight away. For obvious reasons this is not as good as the first method. The chief object is to acquire the art of expressing in a clear and concise manner.

The glossary may take the following form:

SPECIFICATION. A description at length of the materials and workmanship to be used and employed in the erection of any building. (Gwilt's *Encyclopædia of Architecture*, page 1360.)

TIMBERING. A term applied to the underframing or rough supports of a stair between soffit and the steps. (*Modern Practical Joinery*, by George Ellis, page 221.)

WREATHED STRING is one formed in a continuous sweep round a well hole of a geometrical stair. (*Building Construction*, by Rivington, Volume II, page 117.)

The specification writer's data may be said to be incomplete unless it contains a list of the different kinds of wooden staircases with notes thereon of any special features.

Notes on methods of construction will be found to be useful, as, for example, the various ways of framing together treads and risers. These might with advantage be illustrated with sketches.

Notes on the kind and qualities of materials will be found to be serviceable in specifying, as, for example:

WOOD FOR STAIRS. In ordinary practice northern pine is used for all parts of stairs, but oak and teak are used for more important work and better for resisting great wear.

Pitch-pine is hardly suitable, although often used for ornamental effect for all parts of stairs, but unless thoroughly seasoned it shrinks and the joints open.

Italian walnut, for its colour and figure, is sometimes utilized for strings, balusters, newels, and handrails of stairs. Mahogany and teak are preferable for handrails, as they are durable, ornamental, and take a good polish. (*Building Construction*, Volume II, by Charles F. Mitchell, page 607.)

The construction of fireproof wooden staircases should be noted, as for example the requirements under the L.C.C. Regulations, which may be taken as being acceptable generally in other parts of the country.

Any special requirements demanded by Statutory Laws, such as the Cinematograph Act and Local By-Laws, should be noted.

5. POINTS TO BE SPECIFIED

In compiling a list of points to be given or mentioned in the specification, the specification writer's notes referred to in the previous section (4) may be consulted with profit. In any event, whether he has acted upon the suggestion herein of compiling data, he ought to be conversant with materials and construction.

Therefore, the list need not take the form of these notes. An axiom in writing specifications is to get at the root of the matter without an exhaustive research, for this may be more fatiguing than the actual writing of the specification. He should devote his whole attention to the main thing in hand—specifying. All that is required are the essential points set out in a simple manner and form. It should be borne in mind that this list is merely to act as a sign-post, a guide to the order and arrangement of the points in specifying an item, and should be so framed that any particular thing may readily be seen at a glance. It may be, probably will be, a useful aid to memory, and may be made use of to check whether any particular point has been omitted in specifying.

Thus it will be observed that it would serve no useful purpose to devise a mass of rules as to what to do and what must be done and how to do it, to be read every time when specifying. This would be a sheer waste of effort. All information that is likely to be of service should be in his notes, which may be referred to if and when in doubt upon any point. Or the specification writer may have facility for easy reference to these matters in other ways. Nothing further is required. In framing the list jot down the points as they occur, without reference to order or arrangement, then rearrange in the order of specifying, after the following manner:

1. State if to Detail Drawing, and describe (*a*) type; (*b*) position or height; (*c*) number of flights; (*d*) width; and (*e*) winders, if any.

2. Treads and Risers. Describe (*a*) kind of timbers; (*b*) framing together; (*c*) nosings; (*d*) mould under, if any; and (*e*) carriages.

3. Special Features to steps. Describe curtail step and the like.

4. Winders, if any. Describe (*a*) kind of timber; (*b*) type of winder; and (*c*) bearers.

5. Landings. Describe (*a*) kind of timbers; (*b*) type—quarter or half space; and (*c*) bearers.

6. Housings. Describe housing of treads and risers and winders to strings, and to newels.

7. Strings. Describe (*a*) kind of timber; (*b*) type of string; (*c*) finish; (*d*) capping, if any; and (*e*) method of framing.

8. Skirtings. Describe skirtings to landings.

9. Newels. Describe (*a*) kind of timber; (*b*) finish; (*c*) state length; (*d*) cap; (*e*) drop; and (*f*) framing.

10. Apron linings. Describe (*a*) kind of timbers; (*b*) finish; and (*c*) nosing.

11. Handrails. Describe (*a*) kind of timbers; (*b*) finish; (*c*) scroll ends and the like; (*d*) brackets, if any; (*e*) joints and screws; (*f*) framing to newels and the like; and (*g*) iron core.

12. Balusters. Describe (*a*) kind of timbers; and (*b*) fixing.

13. Soffit, if boarded. Describe (*a*) kind of timber; and (*b*) finish.

14. Spandril framing. Describe (*a*) kind of timber; (*b*) finish; (*c*) door in same, if any; and (*d*) if prepared for glazing.

SPECIFYING

One who has dealt with every item in building in a manner outlined herein ought to have a fairly sound knowledge of materials, understand thoroughly building construction, and have acquired a skill in describing detached constructional parts. He should now devote his attention to specifying, and may safely do so with confidence. A staircase is perhaps as difficult as anything he may have to contend with, and it is about the last thing he should attempt. However, a staircase is a good example to illustrate the art of specifying, and for that reason it has been chosen.

He should begin by following the method herein described for preparing a glossary of terms; that is, copying and rewriting, say, simple short items to begin with, and then more difficult ones, until he becomes proficient. Then in a very short time he will, no doubt, be able to dispense with everything except his list of points to be specified.

Now as regards style. Is the main purpose of a specification to describe the items of works and their location, or to give technical directions as to how these items of work shall be executed? Style means manner. In specifying, it is the manner in which the "hard, cold facts" are presented. The "hard, cold facts" relate to the materials and the framing of the staircase: "The ..... staircase *to have*.....; The stairs *to have*.....; The staircase *to be* .....; *Construct* the staircase from ..... to ..... with .....; *Construct* the staircase with

.....". This may seem to be trivial—much ado about nothing—but it is very important nevertheless. Style that contravenes the very purpose of the specification and obscures the meaning is bad—bad indeed!

Before going further with this, ask yourself the question: What is the object of a specification? The correct answer will give you the key to the situation. Is the object of the specification together with the drawings for the purpose of preparing an estimate, or to give instructions as to the manner of the carrying out of the work? Should it merely indicate the nature of the work to be done or command that the work be done in a certain way? Either of these may be correct, which would depend on whether the specification is merely for the purpose of obtaining an estimate, or for use solely as instructions in the performance of the work. It can scarcely be framed in a literal sense to do both; yet it may be made to serve both purposes in intention and in fact. Now, if the specification, as in the case in which there is not a bill of quantities or where a bill of quantities does not form part of the contract, is to serve the double purpose of: (*a*) to prepare an estimate and (*b*) describe the materials and give instructions as to the manner of the carrying out of the work, then it could and should be written in a style merely to indicate the nature of the work. On the other hand, if the specification, as in the case where a bill of quantities does form part of the contract, is to serve but this purpose—describe the materials and give instructions as to the manner of the carrying out of the work—then it should be written in a style which commands that the work shall be done in a prescribed way.

From all this the deduction is that there are two general styles in which a specification may be written:

(1) To indicate the nature of the work.
(2) To command that the work shall be done in a prescribed way.

And that in the case of (1) it served a double purpose, whereas in the case of (2) it serves but one purpose only.

In the case of (1) it will not suffice to say: "The staircase or stairs *to have* ..... treads", for this does not assure the contractor that the stairs will have treads of the sizes stated. It would be better to say: "The staircase or stairs *will have* ..... treads", meaning—"I promise" you that such will be the sizes of the treads. That would be some guarantee in a contract, of which the specification is a document that cannot be varied. Moreover, not only is it a guarantee to the contractor upon which he may safely base his estimate, but it is a guarantee that the contractor will put in the treads to the sizes stated; meaning, in effect, that, my estimate being based on the specification, "I promise" that such will be the case, for be it remembered that *a tender* is an offer to do the work. To do the work according to what? To the drawings and specification just as if they had been prepared by himself. Therefore, in such a case, it is only incumbent upon the architect or the building owner to see that the contractor fulfils his promise.

The fact must not be lost sight of that the specification is a contract document, and in the case of a contract in which a bill of quantities does not form part thereof or one in which there is not a bill of quantities the

contract cannot be varied, not even by an alteration or an amendment of the drawings, except by agreement in the shape of a new contract. The contract, in such instances, embraces only that which is shown on the drawings and outlined in the specification, and/or implied for the complete carrying out of the work.

It is true the architect has the right to order or give instructions as to the manner in which the work is to be executed, but then, if he desires to exercise this right, he must frame his specification accordingly. Keeping to the same kind of contract, it is clear that the style given previously is unsuitable. There are two recognized methods by which this may be accomplished: (*a*) "The work is *to be* done in the manner prescribed", (*b*) "The work *shall be* done .....". Retaining our staircase as an illustration: (*a*) "The staircase or stairs *to be* ....." and (*b*) "The staircase or stairs *shall be* .....", it will be observed that by the adoption of the first of these methods it is sought to make the specification serve the double purpose of obtaining tenders and instructions in the execution of the works; and by the second method it serves one purpose only—instructs how the work shall be done. The first method is weak on the instruction side, whereas the latter is emphatic. "The staircase *to be* .....", but it does not insist that it *shall be* nor that it shall not be done in any other way. There would seem to be a doubt; certainly it lacks specific directions; it may operate against either party. "The staircase to be .....". Well—provided it is not otherwise; to be certain, directions must be sought, and if it should not be what it says it is to be then at whose expense? No, the question of expense would not apply, because the contract cannot be varied in consideration (value), except by entering upon another contract, so that whatever the difference may be does not in any way affect the contract.

The specification should not only be clear as to its meaning, but it must be specific and definite, particularly with this type of contract.

Function

As regards the variation in value (cost), it must be borne in mind that, in a contract in which a bill of quantities forms part of the contract, this difference in value is susceptible of adjustment, irrespective of whatever may be given in the specification. For in these cases the estimate is based upon the bill of quantities, and the contract provides for the adjustment of variations whose values are arrived at upon the basis of the schedule rates contained therein or at rates analogous thereto. So that on this score the specification need not stress this point; in fact, it may safely ignore it. Hence the specification, in these cases, is rid of one of its functions—a function that ought never to have been assigned to it, i.e. that of appraising values. For example, if a staircase had to be constructed in *pine* but was executed in *oak* by agreement, the specification cannot set any store on the value of either. Again, suppose a portion of the contract was cancelled by consent, the value of such work cannot be assessed by the aid of the specification. It is possible it may have no value, in that the contractor may not have affixed any value to that work, and had it been carried out the cost would have had to be borne by the contractor. It is conceivable and quite feasible that a

contractor might omit to attach a price to a staircase where there is more than one staircase in the building, and the omission of that staircase, by consent, did not, say, render the building any the less serviceable. What, therefore, is the value of the staircase? None. It apparently was not required, and the fact of its being in the specification does not give it a monetary value, even had the contractor allowed a price for it in his estimate. But it must not be imagined for one moment that a specification does not affect the value of the work. It may be taken for granted that it does. A specification for a building in which all joinery work was specified to be executed in *oak* would relatively be more costly than a similar one in which all joinery work of the same construction was specified to be executed in *pine*. Though the specification would very likely influence the value, the cost is arrived at not by means of the specification. The estimate is based upon the items in the bill of quantities, where it forms part of the contract. This function of the specification has been relegated, and properly so, to the bill of quantities.

In this type of contract the proper function of a specification is to give technical directions. Its style should be such as will leave no doubt as to the manner of performance of the work. It should state precisely what is required, as example: "Construct the staircase .....". This direct manner takes the form of an instruction, thus: "I direct that you shall construct the staircase .....", meaning thereby that you command him to carry out the work to the technical instructions contained therein.

Lastly, a specification should be clear, concise, and precise. By "clear", it is here meant that the meaning should be evident; by "concise", it is here meant that the matter should be expressed as tersely as possible; and by "precise", it is here meant that it should be accurate and definite. By a strict observance of these simple directions, and carefully adhered to in writing a specification, there ought not to arise in the mind of a person interpreting the specification any doubt whatsoever as to what is meant, what is required, and what has to be done. Be it always remembered that the interpreter of the specification may have quite a multiplicity of duties to perform, of which the least is that of studying the specification. He would thank you for lightening his burden as much as possible, and you may hope, as a reward, to see your instructions carried out without a hitch, which would be ample recompense for your labours. At least, to be understood and appreciated is decidedly an encouragement, which may inspire confidence and instil a pride in your work.

Having examined at some length the methods of specifying and dealt with the two general types that may be adopted—(1) in those cases of contracts without a bill of quantities or where a bill of quantities does not form part of the contract, and (2) in those cases where a bill of quantities forms part of the contract—it only remains to point out that by either of these methods it can but fulfil specifically one purpose only, whatever else may be attempted or sought to be done by its aid. Such being the case, then the better plan is to make it fulfil the more important purpose, namely, describing the materials and give instructions as to the manner of carrying out the work. Thus, in soliciting a tender, and in the submission of the tender, for work upon a specification framed on these lines, it is implied that the estimate shall be and that it has been

prepared on the distinct understanding that, in the event of the acceptance of the tender, the specification was to be used solely as a guide in the preparation of the estimate and its main purpose is for use in the execution of the work. Granted this, then the specification may be made to serve a double purpose—the obtaining of tenders and for use in the execution of the work—without detracting from the main object: i.e. to describe the materials and instructions as to the manner of carrying out the work. The specification should be framed always with this object in view, and it has been made manifest that the form termed herein as "the direct style" is a suitable one, which may be safely adopted and is recommended.

Terms Employed

Before you begin upon the practical work of specifying it is as well to understand clearly that you should be well grounded in constructional details, that you should have a knowledge of comparative costs, that you should be acquainted with the principles governing construction, that you should be well versed in the terms employed and that you should have at hand the requisite data upon the subject matter about which you propose writing a specification. As to degree of accomplishment before you begin, it is a matter which rests entirely with yourself. A start will have to be made at one time or another if it be your intention to write a specification, and if you have followed the suggestions herein as to writing a glossary of terms and practised describing pieces of construction work you ought not to hesitate and there is no reason why you should not succeed. Well, then, is it a specification of a stairs or staircase you will write? You know the difference? Not certain? You cannot proceed satisfactorily unless you are certain. Here is where a knowledge of the terms employed comes in, and if you have prepared, as you ought, a glossary, you could turn to it for reference. The following are taken from *Modern Practical Joinery*, by George Ellis (1902 Edition), Chapter XV:

Staircase. The complete construction in one or more successive flights of stairs.

Stairs. A number of steps connecting two floors and closed in underneath, which differentiates them from a ladder which is open between the steps.

Stairway. The aperture provided for the stairs.

Thus you see "the stairway governs the plan of the staircase", meaning that the aperture will determine its plan—one or more flights of stairs, and, in general, the type of staircase.

Let it be noted that as a general rule the description for framing together of the treads and risers takes after the following: "glued, blocked, bracketed, housed and wedged to strings", the meaning of which everyone in the trade understands, and which says all that need be said in as little space as possible. These "group terms" are pithy and save a lot of writing.

The risers shall be tongued on both edges, the upper edge into the underside of the tread above, which shall be grooved to receive the riser, and the lower edge into the top of the tread below, which shall also be grooved to receive the

riser; the risers and treads shall be glued together and made securely rigid by triangular sawn deal blocks of the requisite number and customary size fixed in the internal underside angles, glued and spiked with strong wire nails to the risers and treads, which shall be fixed on strong deal sawn carriage pieces, one to each flight—with triangular shaped rough brackets on top and spiked thereto; the treads and risers shall be housed into the strings (properly prepared in the usual manner), and wedged—the wedges shall be glued just previously to fixing in position.

This is all very nice and looks well at first sight, but it is no more effective than the group term, besides which, the joiner knows this probably better than you. If you fancy yourself and must indulge in elaborate descriptive detail, then be thorough; describe how the risers should be tongued, and how the treads should be grooved, and how the strings should be prepared, whether by hand or machine, and if the latter, the kind or kinds of machines. Let the craftsman be given to understand you know a "thing or two"; don't leave him in doubt upon any point, and the more explicit you are the foreman will be all the more grateful, as it will save him the trouble of issuing instructions. But do be exact, otherwise it may react upon you; so make sure you are right. If you aspire towards perfection so that there won't be any loophole that the builder or his foreman or the craftsman can riddle out of—say, use an inferior quality of glue when you intended to have the best—then describe such quality, and, whilst you are about it, also its consistency.

Only glue of the best quality shall be used, and after boiling, just prior to using, it should run from a brush or stick held at a slight angle to the horizontal in a clear crystal stream not like curdled buttermilk but like good rich cream milk; and the glue should set firm so that when cool and a slight pressure is applied by the thumb it will not leave an indented impression, not even a thumb mark.

There is nothing wrong with this—in fact it conforms to the true type of specification—and it is better than many descriptions in numberless specifications which, though claimed to be perfect, are lacking in fullness of detail. Regarded in this light, if everything is not fully described in every minute detail, is it really a specification? If the instructions are meagre and much is left to the imagination, can it be said to be—in the true sense of the word—a specification? It has been shown that according to Gwilt's *Encyclopædia of Architecture* a specification is:

A description at length of the materials and workmanship to be used and employed in the erection of any building.

And if this means what it says, then everything must be fully described down to the minutest detail. Though this may have been the case at one time, it is not necessary now. Were it so, a specification would be a text-book on construction for that particular building. But in these days it is assumed that everyone engaged in the trade understands construction, each at least with that particular part in which he is concerned. Only that which connotes the method of construction—as "treads and risers glued, blocked, bracketed, housed and wedged to strings", together with any special features and their location in the building, need be specified to meet modern requirements.

Concrete Examples

The first specification which follows was prepared from drawings drawn to one-eighth of an inch to the foot; the second from detail drawings drawn to one inch to a foot of the same staircase but slightly modified in several particulars; the third is the second condensed and the last is the third expressed in another manner—technical directions. Explanations and comments will follow each specification.

Newel Staircases of Columbian Pine (unless otherwise described). Construct the stairs to each house from ground to first floor, 3 ft. wide between strings, in two flights, of 1¼ in. by 11 in. wrought, rounded nosed, white deal treads grooved for 1 in. by 7 in. white deal, rebated risers, screwed together and glued, blocked and bracketed on to 2 in. by 4 in. sawn framed red deal carriage piece to each flight, housed, wedged and glued into 1¼ in. by 11 in. wrought, moulded on top edge wall strings, and 1¾ in. by 11 in. wrought, moulded on bottom edge outer strings; winders of 1¼ in. wrought one side cross-tongued, white deal on 2 in. by 4 in. sawn framed red deal bearers. Wall strings have extra depth to winders and ramped.

Form bull-nosed corners to bottom step of each stairs.

Construct quarter space landing (to each stairs) of 1¼ in. wrought, grooved and tongued white deal boards in 5 in. widths, on 2 in. by 4 in. sawn red deal bearers, spaced 12 in. apart. Form nosing to each landing with 1¼ in. by 4 in. wrought white deal, tongued to same.

Run 1¼ in. wrought and moulded skirtings to quarter space landings to match wall strings and plugged to walls. Perform all mitres and fitted ends.

Form nosing to top step of each stairs with 1¼ in. by 4 in. wrought white deal, tongued to floor boards.

Form margins to each well hole of staircases with 1¼ in. by 4 in. wrought white deal rounded nosing, tongued to floor boards.

Plant ¾-in. scotia mould under all nosings.

Run apron linings to each well hole of staircases with 1 in. by 8 in. wrought, beaded on bottom edge and grooved for plaster.

Plant capping mould to top edge of outer strings of 2 in. by 3 in. wrought and moulded both sides and trenched for strings.

Fix newel posts of 4½ in. by 4½ in. turned and moulded and finished with a 6 in. truncated ball terminal, dowelled to same; all of Canary wood and French polished. Form shaped drop ends, 6 in. long, where seen. Newels prepared to receive strings.

Fix handrails of 2¼ in. by 3 in. wrought and moulded Canary wood, and French polished. Handrails abutting against walls: each housed into 1¼ in. by 6 in. square, moulded all edges, Canary wood French polished pateras, fixed to plugs. Other ends of handrails housed into newels.

Fix balusters of 1¼ in. by 1¼ in. wrought, square turned, two to each tread, and those to landings spaced about 6 in. apart. End of balusters housed at top and bottom.

It will be observed that this does not follow in quite the same order as given under Points to be Specified, but it is in agreement with what has before been stated: that it should follow in the same order, as near as possible, as that in which the work will be carried out. The "points" are notes—signposts—relating to the construction of the pieces of the work that go to the making of a staircase, whereas the specification proper defines the sections of work in the making of a staircase, consistent with clearness.

The stairs, most likely, would be made in the workshop in two or three parts, and delivered at the job ready for fixing. All this is described in the first paragraph. The newels may also be delivered attached to these parts, but for the sake of clearness it is better to keep them separate.

Bull-nose corners to the bottom steps, being a special feature, have been given a separate paragraph.

Quarter space landings, which will be done entirely on the job, have been kept separate and given a paragraph of their own.

Forming nosings will be done on the job, and, for the sake of clearness, has been kept separate and given a paragraph all to itself. The same applies to the margins, and also to the apron linings.

Planting the scotia moulds has been kept separate, although those beneath the nosings to the steps would come to the job already fixed. It has been given a separate paragraph for the sake of clearness.

Capping mould, for the sake of clearness, has been kept separate, though it may come on the job ready fixed to the strings.

Newels, handrails, and balusters, for the sake of clearness, have each been given a separate paragraph. They come last, not because they are the least in importance but because they would be executed the last. It will be noted that they begin: "Fix newels . . .", "Fix handrails . . .", "fix balusters . . ." and not "supply and fix". Fixing implies supplying also, just as do "Plant ¾ in. scotia mould . . . Run apron linings . . ." When it means "fixing only" it should be so stated.

Note that the specification begins—"Construct the stairs . . .", and not "construct the staircases . . .", because the paragraph refers to the stairs only. The staircases consist of the whole of the matter described —the note describing the kind of staircase makes that perfectly clear. When the whole specification is given in one paragraph only, then in order to avoid confusion and ambiguity it is better to begin: "Construct the staircases . . .".

The specification could have been written in one paragraph, in fact in one sentence by substituting semi-colons for the periods. But the parts would not have stood out so clearly. Besides, although the block method—paragraphing—has been used, it reads now like one long sentence. When broken up into paragraphs it is not so wearisome reading, and more likely to be better understood.

One other point: attention is drawn to the fact, made apparent in the note at the commencement, that the staircases are constructed in Columbian pine, except those parts which are constructed in other timbers, and these are described in the specification.

And now for the second specification:

NEWEL STAIRCASES OF COLUMBIAN PINE (unless otherwise described) and to Detail drawings. Construct the stairs to each house from ground to first floor in two flights of 1¼ in. wrought white deal treads, 1 in. wrought white deal risers, screwed, glued, blocked, bracketed, housed and wedged to 1¼ in. wall and 1¾ in. outer wrought strings, and on 2 in. by 4 in. sawn red deal carriage pieces to each flight; the winders of 1¼ in. wrought, one side cross-tongued, white deal on 2 in. by 4 in. sawn red deal framed bearers. Wall strings have extra depth to winders and ramped.

Form bull-nose corners to bottom step of each stairs.

Construct quarter space landing (to each stairs) of 1¼ in. wrought, grooved

and tongued, white deal boards, in 5 in. widths on 2 in. by 4 in. sawn, red deal bearers, spaced 12 in. apart. Form nosing to each landing with 1¼ in. by 4 in. wrought white deal, tongued to same.

Run 1¼ in. wrought and moulded skirtings to landings to match wall strings, and plugged to walls. Perform all mitres and fitted ends.

Form nosing to top step of each stairs with 1¼ in. by 4 in. wrought white deal, tongued to floor boards.

Form margins to each well hole of staircases with 1¼ in. by 4 in. wrought white deal, rounded nosing, tongued to floor boards.

Plant ¾-in. scotia mould under all nosings.

Run 1 in. wrought apron linings to each well hole of staircases, beaded on bottom edge and grooved for plaster.

Plant 2 in. by 3 in. capping moulds to top edge of outer strings, and trenched for same. Plant 1 in. by 2½ in. moulds on face of outer strings forming panels thereto, and neatly perform all mitres.

Fix 6 in. by 6 in. wrought, plain tapering newel posts, framed to floors and finished with 7½ in. by 7½ in. by 2½ in. moulded all faces caps, dowelled to posts; all of Baywood and French polished. Form turned and moulded drop ends, 6 in. long, where seen. Newels prepared for strings.

Fix Baywood French polished handrails of 2¼ in. by 3 in. wrought and moulded and framed into newel posts. Handrails abutting walls, each housed into 1¼ in. by 6 in. square, moulded all edges, Baywood, French polished pateras, fixed to plugs.

Fix 1¼ in. by 1¼ in. wrought plain balusters, two to each tread and 6 in. apart on landings, housed top and bottom.

There is very little difference betwixt this and the one previous. Some of the sizes of members have been omitted and the descriptions in some cases are not so elaborate. What is clearly shown on the drawings need not be defined in the specification. Good detailed and well-dimensioned drawings may save much writing of descriptive matter in the specification.

Both these specifications would suffice in either case the two general types of contracts—with and without bills of quantities. Where, however, bills of quantities form part of the contract, the specification may be condensed, for the simple reason, as before stated, that it no longer fulfils one of its functions: i.e. for use in formulating an estimate. Before proceeding with the third specification—a condensed form of the second specification—the quantities should be examined and considered as to what bearing they have upon this point. Quantities for staircases, framed on the basis of the Standard Method of Measurement of Building Works, are set out as follows:

In No. 2 Staircases of Columbian pine (unless otherwise stated).

.... ft. sup. 1¼ in. wrought, white deal, rounded-nosed treads with ¾ in. scotia mould under each, and 1 in. wrought white deal risers, tongued, glued, well blocked, bracketed, and wedged, on and including 2 in. by 4 in. sawn red deal carriage piece to each flight.

No. .... Extra material and labour for double bull-nosed corners to bottom step.

No. .... Extra for notching tread to newels.

No. .... Extra for notching winder to newels.

No. .... Extra for housing tread and riser into string and newel.

.... ft. sup. 1¼ in. wrought white deal, cross-tongued winders with ¾ in.

scotia moulds and 1 in. risers, tongued together as before described, and on and including 2 in. by 4 in. sawn red deal framed bearers (measured net).

.... ft. sup. 1¼ in. wrought white deal, tongued and grooved floor boards, to quarter space landings, on and including 2 in. by 4 in. sawn, red deal bearers, spaced 12 in. apart.

.... ft. run (or linl.). Extra for 1¼ in. by 4 in. wrought nosing to ditto, tongued to floor boards and ¾ in. scotia mould under.

.... ft. run (or linl.). Extra on floor boards for 1¼ in. by 4 in. wrought, rounded-nosed margins to well holes, tongued to floor boards.

.... ft. run (or linl.). 1¼ in. by 11 in. wrought, quirked beaded on top edges, wall strings.

No. .... Extra for heading joint to ditto.

No. .... Extra for rounded corner and sunk stop to mould, to ditto.

No. .... Extra for tongued joint (to internal angle of winders) to ditto.

No. .... Extra for increased depth of string and ramp to winder (each of three) to ditto.

.... ft. run (or linl.). 1¾ in. by 11 in. wrought, moulded on bottom edge outer strings.

No. .... Extra for end framed into newel.

.... ft. run (or linl.). 2 in. by 3 in. wrought, moulded both edges capping moulds, grooved for and planted on top of outer strings.

No. .... Extra for scribed and fitted end to newel.

.... ft run (or linl.). 1 in. by 2½ in. moulds, planted on outer strings.

No. .... Extra for mitre to ditto.

.... ft. run (or linl.). 1¼ in. by 7 in. wrought, moulded skirtings (to match wall strings) to landings, plugged to walls.

No. .... Extra for mitre to ditto.

No. .... Extra for mitred and scribed joint to string.

.... ft. run (or linl.). 6 in. by 6 in. wrought, plain tapering, Baywood newels, French polished, in No. .... lengths.

No. .... Extra for turned and moulded drop to ditto, 6 in. long.

No. .... 7½ in. by 7½ in. by 2½ in. high, moulded all edges, Baywood, French polished cap to newel, dowelled to same with hardwood dowel.

.... ft. run (or linl.). 2½ in. by 3 in. wrought, fully moulded, Baywood, French polished handrails.

No. .... Extra for end framed to newel.

No. .... Extra for end housed into and including 1¼ in. by 6 in. square moulded all edges, Baywood, French polished patera, plugged to wall.

No. .... 1¼ in. by 1¼ in. wrought, plain baluster, one end housed into handrail, and one end into capping mould of string.

No. .... 1¼ in. by 1¼ in. ditto as last, one end housed into handrail and one into margin.

.... ft. run (or linl.). 1 in. by 8 in. wrought, beaded on edge, apron linings, grooved for plaster, and with ¾ in. scotia moulds planted on under nosings.

On the face of it, it is clear that the contractor can estimate the cots from the quantities much better than from the specification. Seeing that this is so, and the specification no longer needs to fulfil this function, what pertained thereto may, with safety, be omitted from the specification.

Therefore, nothing need be dealt with therein but technical directions as to the manner of the carrying out of the works. This merely demonstrates what has been said before repeatedly. And now for the specification:

STAIRCASES. Construct a newel staircase in each house in the position shown on plans and to detail drawings from ground floor to first floor, the stairs to consist

of nine steps, three winders and one quarter space landing, 11 in. wide treads and 7 in. high risers, framed together and glued and blocked and housed into wall and outer strings, and each flight supported on carriage piece and rough brackets.

Run skirtings to landing plugged to the walls, and neatly perform all mitres and fitted ends.

Form margins and fix apron linings with scotia moulds thereon beneath nosings, to well holes.

Securely fix the capping mould to top of strings, and form panels with moulds on face of outer strings as shown.

Fix newel posts, handrails and balusters as shown in a thoroughly workmanlike manner.

French polish newel posts and handrails.

If the width of the treads and the height of the risers are correctly shown on the drawings or figured thereon, and the method of framing and the positions of the staircases are shown also, then the specification might be further condensed, thus:

Construct in each house a newel staircase to detail drawings, in two flights; first of six treads and three winders and the second of three treads and a quarter space landing, with skirtings. Form margins and fix apron linings with scotia moulds under nosings. Form panels with moulds on outer strings. Fix capping moulds, newel posts, handrails and balusters as shown. The whole carried out in a thoroughly workmanlike manner. French polish newel posts and handrails.

So far as these staircases are concerned, the contractor could get all the information he required from the drawings and the quantities. Hence, in this instance, the specification is merely a formal matter. But this would not apply in the case of every item in the specification, as the quantities do not always supply all the information, particularly as to positions, nor are they suitable or adaptable for the purpose. Besides, there are a number of things which can only be dealt with in the specification in an effective manner, such as excavating down to solid foundations and the approval thereof.

Nevertheless, the contractor might be satisfied with this specification, although it would necessitate reference to the quantities for certain particulars—kinds of timbers. This is a serious drawback to its adoption, inasmuch as the specification and the drawings between them should give him all the information necessary as to materials and as to the manner of execution of the work without reference to the bills of quantities, which are not for that purpose.

And now for the last specification, which fulfils the requirements admirably.

STAIRCASES. Construct in each house a newel staircase in the position as shown on plans and to detail drawings, and of the following:

WHITE DEAL. 1¼ in. by 11 in. treads, 1 in. by 7 in. risers, 1¼ in. winders, and 1¼ in. quarter space landing.

RED DEAL. 2 in. by 4 in. carriage piece, and 2 in. by 4 in. bearers, and blocks and brackets.

COLUMBIAN PINE. 1¼ in. by 11 in. wall and 1⅜ in. by 11 in. outer strings, 1¼ in. by 7 in. skirtings to landings, 2 in. by 3 in. capping moulds, 1 in. by 2½ in. moulds planted on outer strings, ⅜ in. scotia moulds, 1 in. apron linings, and 1¼ in. by 1¼ in. balusters.

BAYWOOD. 6 in. by 6 in. newel posts and 7½ in. by 2½ in. high caps, 2½ in. by 3 in. handrails, 6 in. by 6 in by 1½ in. pateras, French polished.

All thoroughly framed together and executed in a sound workmanlike manner.

The dimensions of members also might be omitted, provided that the drawings are either drawn true to scale or the sizes figured thereon.

In this specification the particulars and instructions are set out in a clear and concise manner. The contractor can see at a glance which are which timbers, and which members are constructed of their respective timbers. He is referred to the drawings for the positions and detailed construction. These two documents alone suffice for his purpose.

This type of specification can be useful to the contractor in another way: it can serve the purpose and take the place of instructions to his foremen both at the shop and on the job, who in their turn can issue them as instructions to the craftsmen. The advantage of this is, from the moment of its departure it goes to all departments, dropping here and there its particulars and instructions, en route to its destination—the job—without modification or alteration in its form.

And likewise, it serves the purpose of instructions to the quantity surveyor in the preparation of the bills of quantities.

Finally, anyone who has a sound knowledge of construction ought with very little practice to be able to write such a specification from his "points to be specified", consulting his glossary, notes and sketches when in doubt on any matter, such as a particular kind of construction that he wishes to make mention of in his specification.

CHAPTER XII

INNOVATIONS

IN recent years there have been many innovations in the building industry. A greater use has been made of machinery, particularly concrete-mixing machines. In specifying their use on the works it should be observed as to whether they actually perform more proficiently than if performed by hand labour. The advantage in their favour is that they lighten the burden of labour and speed up the progress of the work. Whether they are more efficient economically than hand labour is a moot point. Certainly, as regards transport, horse-drawn carts are more economical than mechanically propelled vehicles. Concrete-pouring machines, except for special works, have been found to be expensive.

STANDARDIZATION

This is a matter that requires careful consideration when specifying. Many articles used in building works have been standardized and are on the increase. Their use may result in economy in building. But if it is a question as to quality and finish and workmanship that is required, these do not always compare favourably with those executed by expert craftsmen.

There are many articles of common use that could be reasonably

standardized without detracting from their usefulness and which would reduce building costs.

An example of these kinds is shown in the pamphlet issued by H.M. Stationery Office: *The Use of Standards in Buildings*. Reference is made therein to various articles standardized by the British Standards Institution, but this Institution issues publications of other standards of building materials not specifically mentioned therein.

Standard detail drawings, such as those issued on works by the Ministry of Works, is a valuable saving of time in specifying.

Many of the plates of illustrations in the Architect's Journal of Planned Information may be found useful, as representing standard practice.

Prefabrication

From the viewpoint of specifying, the definition given in the pamphlet *The Use of Standards in Buildings* serves the purpose admirably:

> Prefabrication has been assumed to mean the production under factory conditions of components which may be used in building; also the pre-assembly of such components into complete units of a building.

This can either be treated as a prime-cost item or as a provisional sum, and the fixing thereof specified.

But the components do not comprise the whole of the building works. Foundations, drains, water and gas and electric mains will require specifying; also plumbing work, glazing and painting.

Time and Progress Schedules

During this century many matters have been introduced that have resulted in an increase in cost of building. Amongst these may be cited insurances, i.e. workmen's compensation, national health and unemployment and pensions, silicosis, third-party risk and public liability; site items—such as cabins, huts for stores, sanitary equipment and amenities for workpeople; payments to workpeople—i.e. holidays with pay, tool money, lodgings, travelling time and expenses; breaks during working hours for tea in mornings and afternoons, and a guaranteed minimum weekly wage.

Whether the temporary measures such as the Uniformity Agreement and Essential Works Order (incorporating payment by results) will become a permanency is doubtful. Nevertheless, it is as well they should be noted.

These, as well as adding to the costs, have increased established charges of an administrative kind. To keep abreast of the times contractors give more attention to time and wages sheets to record the above matters. Useful information for the purpose of specifying that records of this kind should be carried out by the contractor will be found in the *British Standards* 1151: 1944: giving standard form of time and wages sheets and pay packets.

Ministry of Works pamphlet—*The Placing and Management of Building Contracts*—issued by H.M. Stationery Office, deals very fully in Chapter I

with pre-contract preparation and time and progress schedule. This should be consulted, and also the following pamphlets on the subject issued by H.M. Stationery Office: (1) *Programme and Progress*, which gives charts for large works; (2) *Progress Charts for Housing Contracts*, which covers the preparing of sites and sets out various methods of preparing programme charts for the construction of houses, both in small groups and in large schemes. In addition, it contains in detail methods of recording progress from week to week. Three specimen charts are published in the pamphlet. One is a programme for the construction of roads and drainage for an estate of 500 houses, and the other two are programme charts for small and large housing contracts. The charts include lines for actual and estimated labour forces throughout the job; (3) *Production in Building and Civil Engineering*, giving an example of estimate of labour and plant requirements, and programme and progress chart for roads and drainage work on a housing site.

Not many years ago contractors kept but few books on the recording of costs, mainly a prime-cost book and records of financial transactions. In 1924 an excellent book by Robert G Legge, *Builders' Accounts and Costs*, was published on this subject. Detailed costing was a thing rarely undertaken by contractors.

Formerly contracts contained a clause specifying the time for the completion of the works, and a penalty for the non-completion thereof within the time stated. But there was no indication as to whether the progress of the works at any time was such as would warrant anticipation that it would be completed within the time required by the contract.

When it was essential from the building owner's point of view that the contract should be executed within the time stated, and it was imperative that it should be, an impenetrable fog of doubt during the progress of the work was evident. Time and progress scheduling penetrates this fog of doubt. In the Ministry of Works' contracts there is a clause in the specification to this effect:

> The contractor shall within two weeks of instructions to commence work produce a time and progress schedule.

Chapter XIII

EXAMPLE OF A SPECIFICATION AND BILLS OF QUANTITIES

Procedure

The method of approach in the performance of a task of this kind is similar to that when preparing a report on dilapidations.

The procedure is to commence with the outside work first, beginning with the roof, then the external works, and finishing with the paths and drains; next the internal work beginning with the topmost storey—a room at a time—and working downwards to the basement, if any.

In taking the particulars on the site either of two methods may be adopted. One is to write fully and clearly the specification of items of

work along with the dimensions; the other is to take copious notes along with such dimensions as are necessary and finish the specification and bills of quantities in the office. If there be much measuring of new works and/or alterations the latter method is the one most suitable, provided the drawings are such as will permit this being done. This calls for greater skill and experience in the performance of this task than that of writing a specification for new works. The extent and nature of the works to be done and the descriptions of the items will of necessity be derived from a careful and minute inspection of the requirements to meet the case. Further, as in this case, and in the case of alterations, the stability of the structure must be taken into account. Sanitation is another item that must be carefully considered, the ascertainment of leaky joints in soil pipes and the like and whether the drains have been blocked.

Typical Example

The following example—a specification and bills of quantities—was for the conversion of a pair of houses into six flats. These had been damaged by enemy action and portions had been exposed to the weather for a considerable period. By reference to the plans it will be seen that one house is shown as it was originally and the other as altered—converted into flats.

For the purpose of publication, the example has been curtailed, amended, and the items numbered consecutively. In some of the trades the items of works refer to one house only; in the cases of repetition of similar items in the various positions in the building most of these have been abridged and referenced to the previous identical ones.

When the items are not enumerated care should be taken, in abridging, to identify them to the previous like kinds.

In practice, when the items are not enumerated, it may be found advisable to write the descriptions in full rather than abridge and make use of the words "as previously described" in the repeat items. The word "Ditto" in the descriptions should be used sparingly and the meaning made obvious—otherwise it may create confusion and mislead.

A drawback to condensing items is that any error in the first description will be repeated the number of times that item is repeated, so particular attention should be paid to any item that will be repeated. But its advantage, particularly to the contractors tendering, is that it saves time in pricing, as for example, out of approximately 300 items only about 25 basic prices need be established in pricing the Painter's work.

Customary Practice

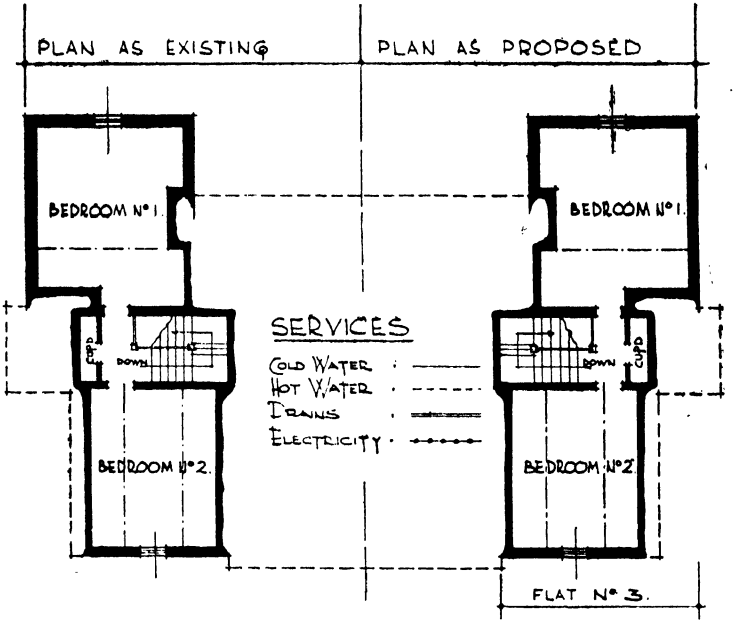
Besides the order of arrangement given in this example there are other methods, which are dealt with fully on pages 55 to 88.

From the particulars of requirements obtained as outlined at the commencement of this chapter, any method of arrangement of the items can be adopted to suit local custom.

Within the London area the custom is fairly uniform and takes a specific form. In other areas the custom varies according to locality.

Within a radius of fifty miles of Manchester—wherein more than one-fifth of the population of the country resides, and which is greater than Greater London area—there are numerous customs, varying in some cases but slightly. In other parts of the country customs again vary and differ from these two areas.

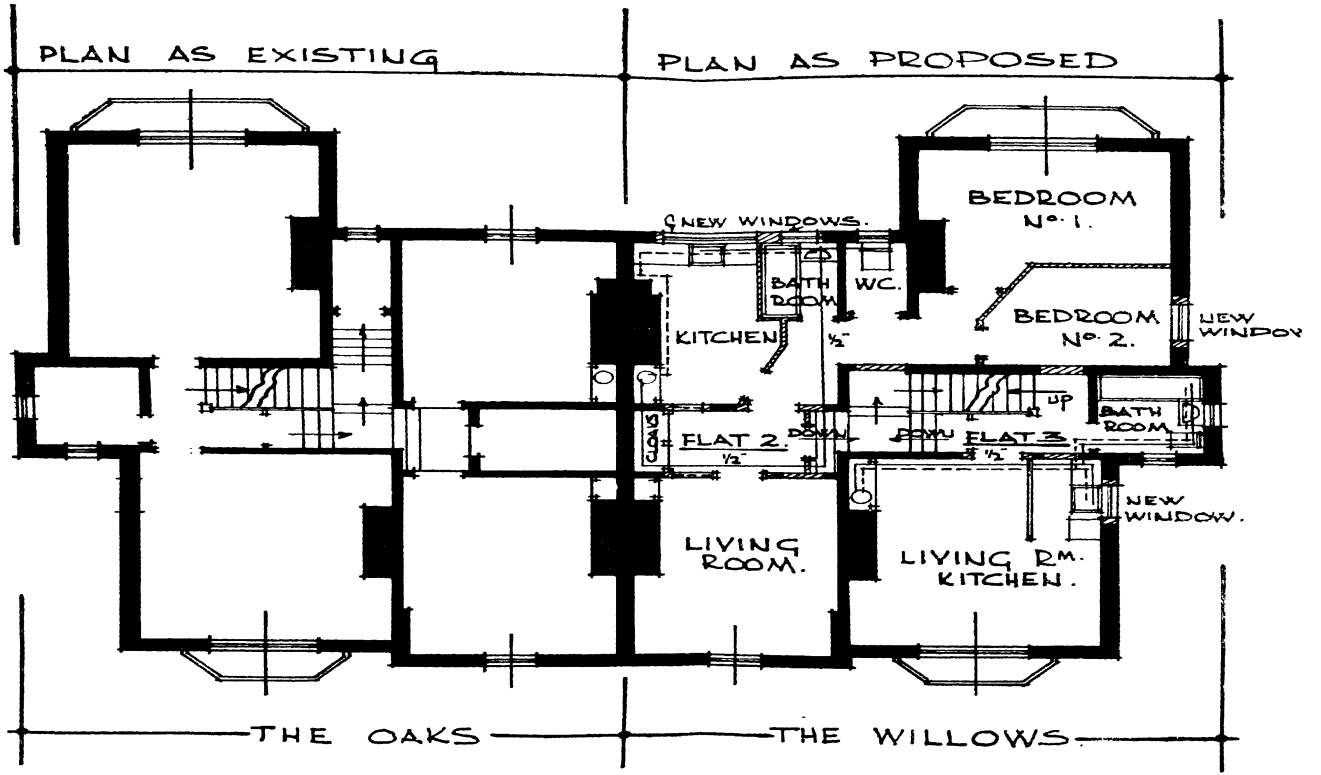
Irrespective of this they all have one thing in common: that is, the *description* of a unit item of work is constant throughout the length and breadth of the country.



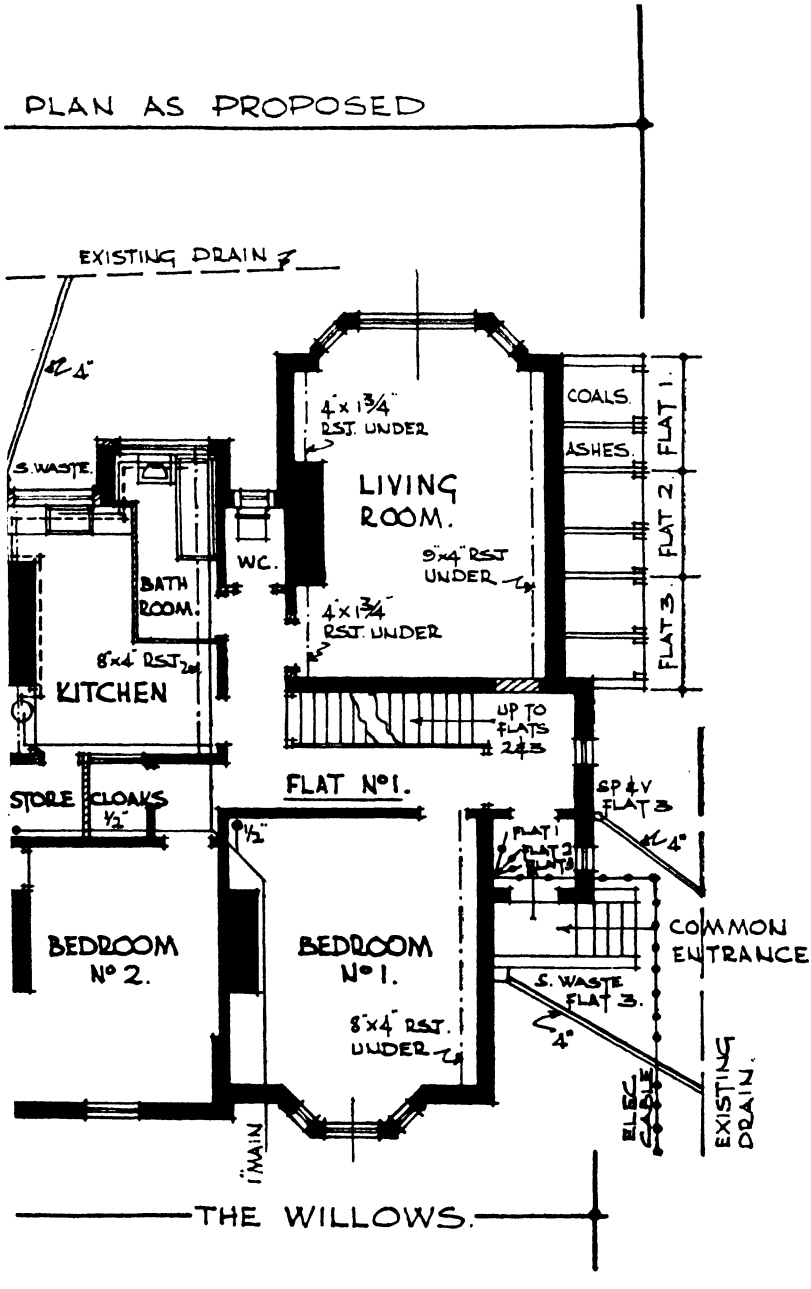
SECOND FLOOR PLAN.

The chief difference is in the *term* of quantity of the unit of work. This occurs mainly in the trades of Bricklayer and Carpenter and Joiner's work. In Bricklayer, for example, in the south reduced brickwork is mostly expressed in the terms of rods (comprising 272 ft. superficial, one-and-a-half-brick thick); in east Yorkshire in the terms of roods (comprising 63 ft. superficial one-brick thick); and in the rest of the country in the terms of yards superficial one-brick thick. In Carpenter, for example, in the south in the terms of feet cube, whilst in the rest of the country either in this term or in feet lineal. In Joiner, in the south, for instance, floor boarding and the like are in terms of squares (comprising 100 ft. superficial to a square); in the rest of the country mostly in yards superficial. The conversion into any or either of these terms in the example is a very simple matter.

At the beginning of this century the price of a unit item of work was low. Today, in comparison, the price is considerably higher and likely to continue so in the future. It does seem absurd, therefore, to express this unit item of works in other than its lowest denomination of measure-



FIRST FLOOR PLAN.


PLAN AS PROPOSED
EXISTING DRAIN
4"
S. WASTE.
4"x1¾" RSJ. UNDER
LIVING ROOM.
COALS.
ASHES.
FLAT 1.
FLAT 2.
FLAT 3.
WC.
BATH ROOM.
9"x4" RSJ UNDER
4"x1¾" RSJ. UNDER
8"x4" RSJ
KITCHEN
UP TO FLATS 2 & 3
FLAT Nº1.
STORE
CLOAKS
½"
½"
SP & V FLAT 3
4"
FLAT 1
FLAT 2
FLAT 3
COMMON ENTRANCE
BEDROOM Nº 2.
BEDROOM Nº 1.
S. WASTE FLAT 3.
8"x4" RSJ. UNDER
4"
ELEC CABLE
EXISTING DRAIN
1" MAIN
THE WILLOWS.

ment. It should be standardized and should be uniform throughout the country. Estimating would thus be facilitated by obviating the conversion necessitated by the use of different terms of quantity now employed.

By way of illustration; bricks, for example, bought at a price per thousand—hence, one coversion only would be necessary; that is, to arrive at a price per superficial foot for any thickness of walling; timber is purchased by standard of so many lineal feet to specified scantling sizes, so that the price per lineal foot is easily ascertained; floor boards and the like per standard of so many superficial feet, such that a price per superficial foot is likewise easily ascertained. No other conversions—to such terms as rods, roods, yards superficial, cubes, and squares—are necessary, nor the conversion of prices to suit these terms.

SPECIFICATION and BILLS of QUANTITIES of the Various Materials and Labour and other Matters and Things requisite and necessary in Restoration and Conversion of two houses—"The Oaks" and "The Willows", 240 and 242, Stretford Road, Urmston, into Six Flats for the Urmston Urban District Council. The Works to be carried out in accordance with the Drawings, and the General Conditions of Contract and to the instructions of the Surveyor and under his general supervision and to his reasonable satisfaction.

T. Sumner Smith, Esq., F.S.I.,
Chartered Quantity Surveyor,
Clifton Lodge, Park Crescent,
Victoria Park, *Manchester, 14.*

E. L. Leeming, Esq., M.Sc. (Tech.), M.Inst.C.E., Surveyor, Urmston Urban District Council, Town Hall, *Urmston.*

August 1944.

	£	s.	d.
GENERAL WORKS AND CONDITIONS			
1. The tender to be on the Form provided, sealed and endorsed and enclosed in an envelope, which must not bear any name or mark of the sender.			
2. The lowest or any tender will not necessarily be accepted.			
3. The Contractor tendering should visit the site and premises so as to be fully acquainted with the facilities or difficulties of access thereto and the nature and extent of the proposed works as no allowance will be made beyond the contract sum for any alleged ignorance in regard to these matters.			
Carried forward £			

Brought forward £

4. The Contractor should verify all dimensions shown or figured on the drawings and/or from the buildings, and should obtain his own information on all matters which may in any way influence his tender as no allowance whatsoever will be made beyond the Contract sum for any alleged ignorance in respect thereof.

5. The work shall be carried out to the true intent and meaning of the drawings whether specified or not for the complete carrying out of the works.

6. The Contractor shall include in his tender for setting out the works and he will be held responsible for all errors that may arise from the setting out, and he will be required to make good at his own expense any damage that may arise therefrom.

7. The Contractor shall give all requisite notices, pay all fees and charges of every kind, obtain all licences and permissions for the proper execution of the work and carry out the work in conformity with any Act of Parliament and the local By-Laws and Regulations applicable thereto.

8. The Contractor shall not sub-let this contract or any part thereof without the consent in writing of the Surveyor.

9. The Contractor shall take full responsibility for obtaining the whole of the materials whether supplied by himself or others, to complete within the time stated.

10. The Contractor shall furnish the Surveyor upon demand with any materials for the purpose of testing their quality, in such quantities as may be required for the purpose, and pay all costs on same. All materials fixed shall be equal to approved samples.

11. The Contractor shall supply the Surveyor with vouchers on demand showing the quality of the materials used.

12. The materials herein specified and all workmanship shall be the best of their respective kinds; no inferior materials or workmanship will be allowed. The whole of the works to be completed to the satisfaction of the Surveyor.

13. The Surveyor shall have at all reasonable times access to the works and workshops of the Contractor or other places where work is being prepared for the purpose of this contract.

14. The Surveyor shall have full power and authority to reject any materials which, in his opinion, are unsound or otherwise open to objection, and to cause any work which, in his judgment, may be improperly or imperfectly done, or that may be damaged during the progress of the works to be reconstructed or replaced by the Contractor at his own expense, and if he shall refuse or neglect to comply with the orders of the Surveyor, then the Surveyor shall have full power after the lapse of two days' notice in writing to suspend the further execution of the works and to take the whole or any part of the contract out of his hands and employ any other person to execute the work and deduct the cost of such work or material from any monies that may be then or afterwards become due to the Contractor.

Carried forward £

Brought forward £

15. The Contractor shall provide a sufficient supply of fresh water for the use of the works of all trades including, if necessary, laying on temporary service and meter, and remove on completion of the works.

16. The Contractor shall provide all lighting and watching and protection necessary for all trades.

17. The Contractor shall keep constantly on the works, during working hours, a competent general foreman.

18. The Contractor shall at the request of the Surveyor dismiss from the works any incompetent person or workman in his employment engaged on work carried out on this contract, or for misconduct.

19. The Contractor shall pay to his workmen the usual standard trade union rate of wages in the district in which the work is being performed.

20. The Contractor shall be held solely responsible for any injury that may be done or any accident that may happen during the progress or in consequence of these works.

21. The Contractor shall cover and protect the works during inclement or frosty weather with tarpaulin sheets, or in such other approved manner.

22. The Contractor shall make good at his own expense all damage to roads, footpaths or other property adjoining the site which may have been caused by reason of the carrying out of the works included in this contract.

23. The Contractor shall make good all defects, shrinkage or other faults whatsoever which may arise or appear within a period of 4 (four) calendar months after the certified completion of the works.

24. The Contractor shall if necessary provide from the commencement of the works a suitable office on the site for his use which is to have a drawing desk with two drawers to lock for the safe keeping of the drawings or any other papers relating to this contract.

25. The Contractor shall if necessary provide, erect and maintain suitable closets and urinals, quite detached from the works, temporarily connected to the drains for the use of the workmen in all trades, and shall keep the same disinfected and clean at all times during the progress of the works, and shall remove the sheds on the completion of the works.

26. The Contractor shall if necessary provide from the commencement to the completion of the works suitable mess huts, sheds, stores, etc., and shall keep these constantly clean and in good repair, and remove on the completion of the works.

27. The Contractor shall provide and erect for his own use, and remove on the completion of the works, all necessary scaffolding, planks, sheets, struts, platforms, tools and all other incidental labour and materials of every kind necessary for the proper and efficient carrying through and completion of the works.

Carried forward £

Brought forward £

28. The Contractor shall insure the works in a Fire Office to be approved by the Surveyor, and in such name or names as he shall direct, and such insurance shall cover the full value of the premises when completed. The receipt for such payment shall be deposited with the Surveyor previous to any certificates being granted to the Contractor, and the Contractor shall be held responsible for any damage or loss by fire to the works and such things as are covered by the "Policy" until the expiration of the maintenance period.

29. The Contractor, previous to the signing of the Contract, shall deliver to the Surveyor a Schedule of the Quantities fully priced and extended showing the basis on which the aggregate of his tender is calculated and on that basis all extras, deductions and variations shall be adjusted at the completion, and any item not set forth in the quantities shall be priced at an analogous rate thereto.

30. The Contractor shall commence the work immediately after the signing of the contract or on receiving instructions to do so. He shall complete the whole of the works under the Contract and in accordance with the terms and stipulations set out in the Contract Agreement. No extension of time will be considered or allowed by the Surveyor except by reason of and on account of strikes, lockouts, inclemency of weather or other unforeseen circumstances entirely outside of the control of the Contractor.

31. The "Contract Agreement" shall mean the Form of Articles of Agreement and Schedule of Conditions of Contract where Bills of Quantities form part of the Contract (issued in 1931 under the sanction of the Royal Institute of British Architects in agreement with the Institute of Builders and the National Federation of Building Trades Employers).

32. Certificates for payment will be given by the Surveyor in accordance with the terms set out in the Contract Agreement.

33. All Drawings and other documents supplied by the Surveyor to the Contractor for the carrying out of the works will remain his property, and these shall be delivered up to him before the issue of the final certificate.

34. The Drawings together with this Specification and Bills of Quantities shall be accepted and considered as sufficient for the description generally of the works, and the Contractor shall not depart therefrom without the written consent of the Surveyor.

35. Wherever the word "allow" occurs throughout these quantities the extent and cost of the item is at the risk of the Contractor.

36. The word "best" when used in describing work shall be in its ordinary English sense notwithstanding any trade or other custom to the contrary.

37. The letters P.C. or the words PRIME COST of any articles or materials whenever used in this Specification and Bills of Quantities shall mean the nett "prime cost" (after

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deducting all trade or other discounts, except a cash discount of not more than 5 per cent.), and shall include the cost of packing and carriage to the nearest station and the delivery on to the site, unless otherwise stated.

38. The words PROVISIONAL SUMS whenever used in these Bills of Quantities shall mean the "nett amount" (including a cash discount of 2½ per cent.) paid to the nominated SUB-CONTRACTORS or SUPPLIERS. The Provisional Sums mentioned are to be expended as the Surveyor may determine, or such sums may be paid (less cash discount) direct to the nominated sub-contractors or suppliers, or they may be entirely or partly deducted, whichever the Surveyor may decide. If the Contractor desires a profit (beyond the cash discount) he must therefore add it to the amount named.

39. The Contractor shall allow and pay carriage for the return of all empties as and when necessary in accordance with the Contract.

40. If at any time during the progress of the works any dispute shall arise as to the true intent and meaning of the Drawings, or the Specification and Bills of Quantities, or any other matter relating to this Contract, such dispute shall not invalidate this Contract but shall be decided solely by the Surveyor, whose decision shall be final and binding to all parties, subject to the provisions of the arbitration clause of this contract.

41. The Surveyor reserves to himself the right to alter or amend the drawings or omit any of the work under this Contract or to add further work to this Contract, and such or any deviation shall not invalidate this Contract.

42. No profit will be allowed on the cost of omitted works.

43. No allowance shall be made to the Contractor for any alterations, deviations or additions unless he can produce a written order of the Surveyor, and such order shall distinctly state that the matter thereof is to be subject to an extra or varied charge.

44. A copy of time-sheets for "daywork" account shall be sent to the Surveyor the week following the carrying out of any work charged for time and materials properly priced out together with a list of materials used. No work will be allowed for "daywork" if the same can be measured and valued.

45. The Contractor must determine for himself the ways and means of carrying out the works, and to act conjointly with tradesmen engaged in executing special works and afford them facilities so as to expedite the carrying out of the works.

46. Clear and cart away all impregnated materials, soil and faecal matter, and replace with good hard dry materials properly rammed.

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SPECIAL NOTES

47. The attention of the Contractor is directed to the following publications:

1. *The Standard of Wartime Building, 1943*, issued by His Majesty's Stationery Office, or subsequent publications.
2. *Wartime Building Supplies, 1943*, issued by His Majesty's Stationery Office or subsequent publications.
3. Ministry of Works: *Timber Economy No. 3 (Fitments) 1942*, issued by His Majesty's Stationery Office, or subsequent publications.
4. Ministry of Works: *Timber Economy No. 4 (Windows, etc. and their Black-out) 1943*, issued by His Majesty's Stationery Office, or subsequent publications.
5. Department of Scientific and Industrial Research: *Wartime Building Bulletin, No. 19, Economy of Timber Buildings, 1942*, issued by His Majesty's Stationery Office, or subsequent publications.
6. Doors: *War Emergency British Standard 459, 1942*, issued by the British Standard Institution, 28, Victoria Street, S.W.1.

48. The foregoing documents may be inspected at the Council Surveyor's Office, Town Hall, Urmston, or at the Quantity Surveyor's office.

49. The Contractor should conform to these documents as far as it is practicable.

50. Reference to other British Standard Specifications are given in the preamble to the trades or in the items.

CARRIED TO SUMMARY £

@ £ s. d.

EXCAVATOR AND DRAINER

51. The whole of the excavations to be inspected and approved by the Surveyor before the concrete is laid.

52. The Portland Cement to be of an approved manufacture, and must comply in every respect to the British Standard Specification.

53. The sand to be clean, sharp, river or pit sand, free from coal specks or other impurities, and to be washed if necessary before using.

Carried forward £

Brought forward £

54. The granite chippings to be of an approved size and to be obtained from an approved quarry.

55. All old materials arising from the "taking down" and not specified for re-use shall become the property of the Contractor and removed from the premises; but such old materials that are sound and suitable, if approved by the Surveyor, may be re-used at the option of the Contractor.

56. The prices for the whole of the works of conversion, restorations and repairs must include all costs incidental thereto of whatever nature, also must include for making out with new materials any defective works or deficiency arising therefrom.

57. The prices for the excavation must include the cost of providing and fixing all necessary shoring, planking and props required that may be necessary to keep up the sides of the several trenches, and for removal when foundations have been put in.

Yards and Cellars:

58. Clear away rockery stone and brickwork debris at gable ends, and remove from site. No. 2.

59. Excavate over surface of site, average 6 in. deep, for coals and ash bins. 21 yds. supl.

60. Excavate to form clean cut surface trenches 4 in. deep, levelled to receive concrete, part return, fill and ram. 9 yds. supl.

61. 4 in. diameter, best quality, glazed and socketed drain pipes in branch connections to existing drains, for soil and waste to FLATS No. 3, and sink waste to FLATS No. 1, including excavation for and return, fill in and ram and make good to all paths and surfaces, average 4 ft. deep, about 28 yds. linl. in No. 5 lengths.

62. Extra for 6 in. to 4 in. junction. No. 6.

63. Extra for 4 in. diameter bends. No. 12.

64. Extra for rest bend and connection to waste or soil pipe. No. 6.

65. Allow for carefully examining the whole of existing drainage system to each house, including manholes and covers, rodding eyes, gullies and rest bends, clean and rod drains, and do all necessary repairs in making good any damaged, defective and missing work, clear from all obstructions and leave free to flow and in good working order. No. 2.

66. Clear away all rubbish of whatever kind from cellars and yards, and clear from site. No. 2.

Generally:

67. The Contractor will be held responsible for any slips or falls of earth in the sides of the excavations and will be required to make good at his own expense.

Carried forward £

Brought forward £

68. All excavations must be kept clear of all water at the Contractor's expense and must be filled in with dry soil to the required levels and well rammed.

69. All excavations that may be dug out in error by the Contractor are to be filled in by him with Portland cement concrete at his own expense.

70. Attend upon all other trades as required and make good any damaged or defective work and leave all perfect at the completion of the works.

71. Clear and cart away all rubbish from time to time and at the completion of the works.

CARRIED TO SUMMARY £

CONCRETOR

@ £ s. d.

72. The cement shall be medium setting Portland cement of British manufacture, of approved brand, and shall comply with the latest British Standard Specification for medium setting cement.

73. The cement shall be delivered on the site in packages, with an unbroken seal fixed by the maker and plainly marked with the names of the brand and the manufacturer.

74. The cement shall be stored in such a manner that it will be efficiently protected from moisture, and the consignments used up in the order in which they are received.

75. No cement will be allowed to be used in the works which has become damaged either in transit or storage or from whatever other cause.

76. The sand for plain concrete work to be graded, clean, sharp sand, obtained from an approved pit, free from loamy or extraneous matter, and to be washed if required.

77. The aggregate for reinforced work shall consist of crushed and washed gravel of a size to pass a $\frac{3}{4}$ in. screen and to be retained on a $\frac{1}{4}$ in. screen.

78. All reinforcement bars to be bent at ends and fixed approximately $1\frac{1}{2}$ in. from bottom edge.

79. The aggregate for plain concrete work to be hard, broken stone of approved kind and grade. For foundation work it shall pass a 2 in. ring and be retained on a $\frac{1}{4}$ in. ring; for plain concrete for solid floors to pass a $1\frac{1}{2}$ in. ring and be retained on a $\frac{1}{4}$ in. ring.

80. The proportion by volume of the materials before mixing shall be as follows:

Carried forward £

Brought forward £

(*a*) Reinforced concrete work—one part cement, two parts sand, and four parts coarse aggregate.
(*b*) Foundations—one part cement, two and a half parts sand, and five parts coarse aggregate.
(*c*) Solid floors—one part cement, two parts sand, and four parts coarse aggregate.

81. The relative proportions of the sand and coarse aggregate may be varied during the work upon the ascertainment of the voids.

82. The granite chippings for granolithic work shall be obtained from an approved quarry and shall be of an approved grade.

83. The concrete shall be mixed in an approved batch mixer, each batch being in the mixer for at least two minutes after the water is added.

84. A competent workman is to be in attendance at the mixing to approve each and every batch.

85. Enough water shall be gradually added to the mixer to obtain a correct consistency. The amount of water shall not be such as to cause the matrix to flow away from coarse aggregate.

86. Where special permission is given for small quantities of concrete to be mixed by hand, it shall be mixed on a wooden platform, turned over twice in a dry state and twice after water has been added from a watering-can with a rose head.

87. The Surveyor may require 10 per cent. addition of cement in the mix where hand mixing is resorted to.

88. Gauge boxes shall always be used for determining proper proportions. The box for the aggregate and sand shall be of such size as to allow for the use of one complete bag of cement.

89. All work to be carried out in conformity with the highest concrete practice and in accordance with the detailed directions which will be issued during the progress of the work by the Surveyor.

90. All old materials arising from the "taking down" and not specified for re-use shall become the property of the Contractor and removed from the premises; but such old materials that are sound and suitable, if approved by the Surveyor, may be re-used at the option of the Contractor.

91. The prices for the whole of the conversion, restoration and repairs must include all costs incidental thereto of whatever nature and must include for making out with new materials any defective works or deficiency arising therefrom.

Carried forward £

Brought forward £

Yards and Cellars:

92. Portland cement concrete, 4 in. thick, in foundations to coal houses. 8 yds. supl.

93. Portland cement concrete, 4 in. thick, in floors to coal houses, trowelled to a smooth and even surface, in small areas. 16 yds. supl.

94. Hardcore composed of broken bricks, 6 in. thick. 16 yds. supl.

95. Use and waste of formwork and labour, and extra cement in forming risers, 4 in. high. 32 ft. linl.

96. Portland cement concrete average 6 in. thick, in suspended flat to roofs of coal houses, laid to falls and trowelled to a smooth and even surface, with and including formwork. 19 yds. supl.

97. Extra labour and cement to vertical edge, soffit and throating, and ditto. 20 ft. supl.

98. Portland cement concrete 6 in. thick, in forming front and back-hearths to kitchen, "The Willows", and the kitchen and living-room to "The Oaks". Include for cutting chase in brickwork 6 in. high and 2 in. deep, 2 in. by 1 in. sawn battens spiked to joists and one layer of No. 4 B.R.C. reinforcement to each hearth. 5 yds. supl.

Precast Reinforced Concrete Lintels:

99. Concrete lintels to have a bearing of 6 in. at each end and top surface to be clearly marked for indentification.

100. Portland cement concrete lintels 3 ft. 6 in. long, 2½ in. on bed and 6½ in. deep, reinforced with and including one $\frac{5}{16}$ in. diameter mild steel bar, hooked at each end, to openings in new partition walls. No. 14.

101. Ditto all as item 100 but 4½ in. on bed and 6½ in. deep, to openings broken out in existing walls. No. 4.

102. Ditto all as item 101 but 3 ft. 8 in. long. No. 2.

103. Ditto all as item 102 but 3 ft. 10 in. long. No. 8.

104. Ditto all as item 103 but 4 ft. 0 in. long. No. 4.

105. Ditto all as item 100 but 4 ft. 6 in. long, 4½ in. bed and 6½ in deep, having one $\frac{3}{8}$ in. diameter mild steel bar. No. 4.

106. Ditto all as item 100 but 3 ft. 0 in. long, 6½ in. on bed and 6½ in. deep, having one $\frac{1}{4}$ in. diameter mild steel bar. No. 2.

107. Ditto all as item 106 but 3 ft. 3 in. long. No. 2.

Carried forward £

Brought forward £

108. Ditto all as item 100 but 5 ft. 6 in. long, 6½ in. on bed and 10 in. deep, having two ⅝ in. diameter mild steel bars. No. 2.

109. Ditto all as item 108 but 6 ft. 9 in. long, but having two ½ in. diameter mild steel bars. No. 2.

Precast Padstones:

110. 9 in. by 9 in. by 3 in. precast Portland cement concrete padstones, trowelled smooth on exposed surface. No. 26.

Generally:

111. Attend upon all other trades as required, and cut away for and make good after. Leave all perfect at the completion of the works.

112. Clear and cart away all rubbish and the like from time to time and at the completion of the works.

CARRIED TO SUMMARY £

BRICKLAYER AND MASON

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113. The common bricks throughout to be hard, well-burnt, square-made, wire-cut bricks of a uniform size, free from all defects and obtained from an approved manufacturer.

114. The external facing bricks to match existing in every respect.

115. No soft or inferior bricks will be allowed upon the works and no broken bricks or bats shall be used except as closers. All headers must be full-length unbroken bricks.

116. The bricks to be thoroughly soaked in clean water before being used, and the Contractor shall supply sufficient water butts for the purpose.

117. The whole of the work to be properly bonded and each course to be well bedded and jointed and flushed up course by course as the work proceeds.

118. The common bricks in new work to be laid four courses to 13 in., in old work to match existing in every respect.

119. All new work to match existing in every respect.

120. The lime to be freshly burnt Clitheroe or other approved hydraulic lime from an approved kiln. The lime to be formed into a heap and sprinkled with water and then covered with sand until thoroughly slaked.

Carried forward £

Brought forward £

121. The sand to be clean, sharp river or pit sand, free from coal specks and other impurities, and to be washed if necessary before using.

122. The lime mortar, mixed and ground in a mortar mill, to be composed of one part by measure of lime to three parts by measure of sand, in sufficient quantities for one day's consumption only.

123. The cement mortar to be composed of one part by measure of Portland cement (to British Standard Specification) to two parts by measure of sand and a little slaked lime water, thoroughly well incorporated together and mixed in sufficient quantities only for immediate use.

124. All pointing damaged by weather or imperfectly done to be repointed at a proper season of the year to the satisfaction of the Surveyor.

125. All old materials arising from the "taking down" and not specified for re-use shall become the property of the Contractor and be removed off the premises, Credit to be given for old materials—*see* Summary.

126. All rubbish and debris arising from the "taking down" to be cleared off the site from time to time, and at the completion of the works.

127. All sound materials after being thoroughly dressed and cleaned and approved by the Surveyor may be re-used in the new work where directed, if suitable. Such old hard broken bricks found suitable shall be delivered to the "Concretor" to be broken up to form the aggregate for the concrete.

128. The prices for the whole of the works of "taking down" shall include for all necessary propping arising therefrom and for works of restoration.

129. The prices for the whole of the works of restoration and repairs must include all costs incidental thereto of whatever nature, also must include for making out with new materials any defective works or deficiency arising therefrom.

130. The stone to be of the best quality of its respective kind and to match the existing in every respect.

131. The Surveyor's approval shall be obtained for alternative kinds of materials, if and when similar materials to match the existing in every respect, or those specified, are unobtainable or unprocurable.

Yards and Cellars:

132. Take down brickwork to existing sculleries at rear and clear away all debris from site. No. 2.

133. Cut out alternate courses and form quoins in lime mortar pointed to match existing work, left exposed after demolition (one face measured only).

30 ft. linl.

Carried forward £

Brought forward £

134. Hack off existing plaster on walls exposed by demolition, rake out joints and point in lime mortar to match existing. 13 yds. supl.

135. Take out existing stone steps 2 ft. 9 in. long together with brick raisers leading to back entrance, and clear away. No. 8.

136. Take up stone coping on both sides of brick wall together with iron railings leading to cellar, re-bed on top of new cellar fence wall (taken later) and include for all cutting and fitting. 20 ft. linl.

137. Rake out joints to brickwork exposed by steps removed and point in lime mortar to match existing work. 4 yds. supl.

138. Prepare, bed for and build 9 in. fence wall on top of existing wall on both sides of cellar steps, bedded and pointed both sides and ends in cement mortar. 7 yds. supl.

139. Common brickwork set and pointed one side in cement mortar 4½ in. thick, in forming support for 2½ in. breeze block partition wall along side of staircase. 16 yds. supl.

140. Extra labour and material cutting around joists and beam filling. 20 ft. linl.

141. Approved bitumen damp-proof course 9 in. wide, laid horizontally on walls with a 3 in. lap at joints and ironed (measured nett). 3 yds. supl.

142. Ditto all as last item but 4½ in. wide. 7 yds. supl.

Steelwork:

143. 9 in. by 4 in. by 21 lb. rolled steel joists 18 ft. 0 in. long. Include for hoisting and fixing tight under outer wall side of living-room floor joists (FLATS No. 1) and any sheet steel packings necessary. No. 2.

144. 4 in. by 1¾ in. by 5 lb. rolled steel joists 7 ft. 0 in. long, all as item 143, on each side of chimney breast. No. 4.

145. 8 in. by 4 in. by 18 lb. rolled steel joist 16 ft. 0 in. long. Include for hoisting and fixing tight under outer wall side of bedroom No. 1 floor joists (FLAT No. 1: "The Oaks" only). No. 1.

146. 8 in. by 4 in. by 18 lb. rolled steel joist 15 ft. 0 in. long, all as items 145, under kitchen floor joists (FLATS No. 1). No. 2.

147. 4 in. by 1¾ in. by 5 lb. rolled steel joists 4 ft. 0 in. long, all as item 145, on each side of chimney breast to last. No. 4.

148. Allow for breaking out to receive ends of joists, setting and pointing precast padstone (elsewhere taken) and cutting and pinning to ends of joists. No. 26.

Carried forward £

Brought forward £

Coal Houses:

149. Common brickwork, set in cement mortar, reduced to brick length in new external walls.
8 yds. supl.

150. Common brickwork 4½ in. thick, set in cement mortar in new internal partition walls.
25 yds. supl.

151. Extra for cutting, toothing and bonding new 9 in. walls into old. 20 ft. linl.

152. Ditto all as item 151, but 4½ in. thick,
50 ft. linl.

153. Extra cost over common brickwork set in cement mortar, for facing with selected common facing bricks and neatly jointed and pointed with a neat cut weather joint as the work proceeds.
12 yds. supl.

154. Extra cost over common brickwork set in cement mortar for fair face and flat pointing to internal divisions walls as the work proceeds.
60 yds. supl.

155. Build in wood fixing pallets laid dry with grain of timber at right angles to nailing direction (supplied by Carpenter). No. 36.

156. Re-set stone risers to front entrance steps, 3 ft. 11 in. long, bedded and pointed in cement.
No. 3.

Flats No. 3

Bedrooms No. 1:

157. Point in oil mastic to sides of register grate. 12 ft. linl.

158. Cut out defective fireback and rebuild in firebricks set and pointed in fireclay, and leave in good order. No. 2.

Living Rooms:

159. Allow for breaking out door opening in half-brick wall, size 2 ft. 10 in. by 6 ft. 9 in., make good with square jambs, and cut out for, hoist and fix and make good to top of concrete lintel (elsewhere taken) and include for all necessary propping.
No. 2.

160. Ditto, window opening in 11 in. cavity wall, size 3 ft. 0 in. by 5 ft. 0 in., make good with rebated jambs and cut out for, hoist and fix and make good to top of conrete lintel (elsewhere taken) and cut out for and prepare for stone sill (elsewhere taken) and include for all necessary propping. No. 2.

161. Brick segmental arch to item 160, 3 ft. 3 in. span by 9 in. on face and 4½ in. soffit, set and pointed in cement mortar 1 to 3 including all cutting and waste to skew backs and extrados and to match existing work. No. 2.

Carried forward £

Brought forward £

162. 11 in. by 6½ in. window sills, sunk weathered, throated on soffits and rubbed on all exposed surfaces, bedded, jointed and pointed in lime mortar, in No. 2 lengths. 8 ft. linl.

163. Extra for jamb seat worked on. No. 4.

164. 2½ in. breeze block partition wall in cement mortar 1 to 3, including all ordinary cutting and waste reinforced with "Bricktor" every four courses or other approved bonding material. 21 yds. supl.

165. Extra labour and waste in forming square end. 40 ft. linl.

166. Extra labour and material cutting out for and toothing and bonding new partition into old brick walls. 20 ft. linl.

167. Extra labour and waste cutting and fitting to underside of ceilings. 13 ft. linl.

168. Allow for building up internal door opening, size about 2 ft. 10 in. by 6 ft. 9 in. with common brickwork 4½ in. thick, including cutting out for and toothing new brickwork into old and cutting and pinning to underside of existing lintel. No. 2.

169. Allow for taking out existing grate and mantel and clear away. No. 2.

170. Provide the Provisional Sum of £18 18*s.* 6*d.* (eighteen pounds, eighteen shillings and sixpence) for grates, mantels, and tile hearths to be supplied by a firm to be selected by the Surveyor, or the amount deducted in part or in full as he may decide.

171. Add for profit or commission.

172. Add for unloading on site, taking responsibility for, and storing the following grates, mantels, and tile hearths:

173. Fixing only slabbed tile surround, size 42 in. by 36 in. high by 4½ return to wall. Slabbed raised hearth, 42 in. by 15 in. by 4½ in. high with 2½ in. sinking for kerb edge, 16 in. solid back for hot water boiler. 16 in. bottom grate and vitreous black fret, hot water damper and frame, with and including all common bricks, fire bricks, mortar, fireclay, flat bars, ties, etc., and include for altering and adapting existing opening to suit new boiler. No. 2.

174. Fixing only back boiler (supplied by Plumber) including forming flue. No. 2.

Landings:

175. 2½ in. breeze block partition wall in cement mortar 1 to 3, including all ordinary cutting and waste, all as item 164. 11 yds. supl.

176. Extra labour and waste forming square end. 20 ft. linl.

177. Extra for external angle. 20 ft. linl.

Carried forward £

Brought forward £

178. Extra labour and materials toothing and bonding into old brick walls, as item 166. 20 ft. linl.

179. Extra labour and waste cutting and fitting to underside of ceilings. 15 ft. linl.

Flats No. 2

Bedrooms No. 1 and 2:

180. Hack off plaster and take down loose and disturbed inner 4½ in. wall under windows and rebuild in lime mortar including all wedging up to existing work and all necessary propping. 9 yds. supl.

181. Allow for carefully taking out existing grate and mantel and store for re-use and build up openings in lime mortar ready for Plasterer. No. 2.

182. Allow for breaking out window opening in external 11 in. cavity wall, size 3 ft. 0 in. by 5 ft. 0 in., make good with rebated jambs, cut out for and prepare for stone sill (taken later), cut out for, hoist and fix and make good to top of concrete lintel (taken elsewhere) and include for all necessary propping. No. 2.

183. Brick segmental arch to item 161, 3 ft. 3 in. by 9 in. on face and 4½ in. soffit, all as item 161. No. 2.

184. 11 in. by 6½ in. window sills, all as item 162, in No. 2 lengths. 8 ft. linl.

185. Extra for jamb seat worked on. No. 4.

186. 2½ in. breeze block partition wall, all as item 164. 35 yds. supl.

187. Extra labour and waste cutting and bonding at intersection of cross wall. 20 ft. linl.

188. Extra labour and waste cutting and bonding of irregular angles. 40 ft. linl.

189. Extra labour and materials, all as item 166. 60 ft. linl.

190. Extra to underside of ceilings, as item 167. 13 ft. linl.

191. Allow for building up internal door opening, size about 3 ft. 0 in. by 6 ft. 10 in. with common brickwork 9 in. thick, all as item 168, bedroom 2. No. 2.

192. Approved 9 in. by 6 in. terra cotta ventilating bricks, including breaking out to form openings, closing cavities and cover slates, to bedrooms. No. 8.

Passages:

193. Allow for breaking out opening in 4½ in. wall, size 3 ft. 6 in. by 9 ft. 0 in., to form passage to bedrooms, all as item 159. No. 4.

Carried forward £

Brought forward

194. Allow for building up opening from staircase, size 2 ft. 11 in. by 9 ft. 0 in., with common brickwork 4½ in. thick, all as item 168. No. 2.

195. Allow for building up doorway opening from existing kitchen to entrance porch, size 2 ft. 10 in. by 6 ft. 9 in., with common brickwork 4½ in. thick, and all as item 168. No. 2.

Bathrooms and Kitchens:

196. Allow for breaking out window opening in external 11 in. cavity wall, size 2 ft. 3 in. by 4 ft. 0 in. to bathroom, all as item 182. No. 2.

197. Brick segmental arch to last, 2 ft. 6 in. by 9 in. on face and 4½ in. soffit, all as item 161. No. 2.

198. 11 in. by 6½ in. window sills, all as item 162, in No. 2 lengths. 6 ft. linl.

199. Extra for jamb seat worked on. No. 4.

200. Allow for cutting away rebated brick jamb on fireplace side of existing window openings, 2 ft. 3 in. wide by 6 ft. 6 in. high, make good with rebated jambs, cut out for and prepare for stone sill (taken later), cut out for, hoist and fix and make good to top of concrete lintel (elsewhere taken) and include for all necessary propping. Finished size of opening about 5 ft. 9 in. wide by existing height. No. 2.

201. Allow for taking out segmental arch 3 ft. 0 in. span by 9 in. on face by 4½ in. on soffit, to kitchen. No. 2.

202. Brick segmental arch, 5 ft. 9 in. span by 9 in. on face by 4½ in. on soffit, all as item 161. No. 2.

203. 11 in. by 6½ in. window sills, all as item 162, in No. 2 lengths. 19 ft. linl.

204. Extra for jamb seats worked on. No. 4.

205. 2½ in. breeze partition walls, all as item 164. 35 yds. supl.

206. Extra for bonding and toothing into existing walls, as item 166. 60 ft. linl.

207. Extra at intersections as item 187. 20 ft. linl.

208. Extra labour and waste cutting and bonding at irregular angles. 20 ft. linl.

209. Extra to underside of ceilings, as item 167. 40 ft. linl.

210. Take out grate and mantel and clear from site. No. 2.

211. The whole of the domestic hot water boilers and fittings and accessories to be obtained from the National Radiator Co. Ltd., Hull, or other approved manufacturer, and to be fixed and fitted in accordance with their written instructions.

Carried forward £

Brought forward £

212. Low pressure, Bower Barffed, "Ideal" domestic hot water boiler, size No. 0, in grey enamelled finish, with 1½ in. diameter flow and return union connections, ¾ in. diameter spring safety valve, draw off cock, set of stoking tools, and fixing. No. 2.

213. Extra for 4½ in. diameter obtuse bend and connections to boiler. No. 2.

214. Extra for short length of 4½ in. diameter cast iron flue pipe and connection to bend and flue. No. 2.

Living Rooms:

215. Take out existing grate and mantel and clear from site. No. 2.

216. Allow for refixing grate and mantel taken from bedroom No. 1 in place of last item. Include for any alterations to existing opening, also making good any damaged, defective or missing parts and leave in good working order. No. 2.

217. Allow for building up internal door opening, leading to entrance porch, size 2 ft. 10 in. by 6 ft. 9 in., with common brickwork 4½ in. thick, all as item 168. No. 2.

Halls:

218. Allow for breaking out door opening in 4½ in. wall, size 2 ft. 10 in. by 6 ft. 9 in., all as item 159. No. 4.

219. Ditto all as last item for borrowed light, size 2 ft. 6 in. by 2 ft. 9 in. No. 4.

220. Allow for taking down 4½ in. wall leading to entrance porch. 7 yds. supl.

221. Making good to wall face. 40 ft. linl.

222. 2½ in. breeze partition walls all as item 164. 7 yds. supl.

223. Bonding and toothing, all as item 166. 40 ft. linl.

224. Cutting to underside of ceilings, all as item 167. 10 ft. linl.

Flats No. 1

Bedrooms No. 1:

225. Allow for carefully examining fire grate and mantel and do all necessary repairs in making good any damaged, defective and missing parts and leave in good working order. No. 2.

Bedrooms No. 2:

226. Ditto all as item 225. No. 2.

Carried forward £

Brought forward £

Store and Cloaks:

227. Allow for building up internal door opening in 9 in. party wall, size 2 ft. 9 in. by 6 ft. 6 in., all as item 168. No. 1.

228. Allow for breaking out door opening from kitchen to store in 4½ in. wall, size 2 ft. 10 in. by 6 ft. 9 in., all as item 159. No. 2.

229. 2½ in. breeze block partition wall, all as item 164. 11 yrds. supl.

230. Toothing and bonding as item 166 new partition wall into old brick walls. 44 ft. linl.

231. Cutting and fitting to underside of ceilings, as item 167. 10 ft. linl.

Kitchens and Bathrooms:

232. Take out existing range and mantel and clear from site. No. 2.

233. Allow for building up existing door opening, size 2 ft. 8 in. by 3 ft. 0 in., with common brickwork 4½ in. thick on internal face and selected facing bricks set and pointed in lime mortar to match existing on external face. Break out on side and top of remaining portion of existing door opening in 11 in. cavity wall to form window opening size 4 ft. 6 in. by 5 ft. 9 in., all as item 160. No. 2.

234. Brick segmental arch to last, 4 ft. 6 in. span by 9 in. on face and 4½ in. soffit, all as item 161. No. 2.

235. 11 in. by 6½ in. window sill, all as item 162, in No. 2 lengths. 11 ft. linl.

236. Extra for jamb seats worked on. No. 4.

237. Allow for breaking out door opening in 4½ in. wall, size 2 ft. 8 in. by 7 ft. 0 in., all as item 159. No. 4.

238. 2½ in. breeze block partition wall, all as item 164. 36 yds. supl.

239. Extra for external angles. 44 ft. linl.

240. Extra labour and materials, toothing and bonding existing walls, all as item 166. 44 ft. linl.

241. Extra labour and waste cutting and fitting to underside of ceilings. 30 ft. linl.

242. The whole of the domestic hot water boilers, fittings, and accessories, all as item 211.

243. Low pressure, Bower Barffed "Ideal" domestic hot water boiler, all as item 212. No. 2.

244. Extra for 4½ in. diameter cast iron obtuse bend and connections to boilers. No. 2.

245. Extra for short lengths of 4½ in. diameter cast iron flue pipe and connections to bend and flue. No. 2.

Carried forward £

Brought forward £

W.C.s:

246. Allow for building up existing door opening in 11 in. external wall, size 2 ft. 10 in. by 3 ft. 6 in., high, with common brickwork 4½ in. on internal face and selected facing bricks set and pointed in lime mortar to match existing on external face. Break out on top of remaining portion of existing door opening to form window opening size 2 ft. 0 in. by 4 ft. 0 in., all as item 160. No. 2.

247. Brick segmental arch to last, 2 ft. span by 9 in. on face and 4½ in. soffit, all as item 161. No. 2.

248. 11 in. by 6½ in. window sill, all as item 162, in No. 2 lengths. 5 ft. linl.

249. Extra for jamb seat worked on. No. 4.

250. 2½ in. breeze partition walls, as item 164. 5 yds. supl.

251. Extra for bonding and toothing, as item 166. 44 ft. linl.

252. Extra for underside of ceilings, as item 167. 7 ft. linl.

Living Rooms:

253. Allow for breaking out door opening in 4½ in. internal wall, size 2 ft. 10 in. by 6 ft. 9 in., all as item 159. No. 2.

254. Allow for building up internal door opening, size about 2 ft. 10 in. by 6 ft. 9 in., with common brickwork 9 in. thick, all as item 168. No. 2.

255. Allow for carefully examining existing grate and mantel, all as item 216. ("The Willows," No. 1.)

256. Provide the Provisional Sum of £9 1*s.* 9*d.* (Nine pounds, one shilling and ninepence) for grate, mantel, and tile hearth, all as item 170.

257. Add for profit or commission.

258. Add for unloading on site, taking responsibility for, and storing the following grate, mantel, and tile hearth:

259. Fixing only slabbed tile surround all as item 173. (To "The Oaks" only.) No. 1.

Vestibules and Passages:

260. 2½ in. breeze block partition wall, in cement mortar and all as item 164. 31 yds. supl.

261. Extra labour and waste forming square end. 22 ft. linl.

262. Extra for external angle. 22 ft. linl.

263. Extra labour and materials toothing and bonding old brick walls, as item 166. 22 ft. linl.

264. Extra to underside of ceilings, as item 167. 29 ft. linl.

265. Extra for raking cutting and waste to strings of staircase. 4 ft. linl.

Carried forward £

Brought forward £

Entrance Porches and Vestibules:

266. Allow for carefully examining tiled floor and do all necessary repairs in making good any damaged, defective and missing parts and leave in good order. No. 2.

External Work:

267. Allow for carefully examining main chimney stack, take down all loose and disturbed work, prepare bed for building upon and rebuild stack in bricks to match existing, set and pointed in cement mortar, size 3 ft. 0 in. by 6 ft. 0 in. by 3 ft. 0 in. high (measured solid). No. 1.

268. Extra labour and materials for plain oversailing courses to match existing. 19 ft. linl.

269. Fireclay chimney pots to match existing, or other approved, set and flaunched up with cement mortar. No. 10.

Note. Four chimney pots are at present lying in the front garden, and these are to be re-used, together with a further six to make up the quantity required.

270. Allow for taking down two brick piers to damaged archway at gable end to a depth of 6 in. below path level, make good to face of main wall and clear away all debris arising therefrom. Include for filling in footings with tar macadam to match existing path. (To "The Willows" only.) No. 1.

Elevations:

271. Allow for cutting out defective brick to external face of wall and replacing with new selected common facing brick, set and pointed in lime mortar to match existing in every respect. (Provisional.) No. 100.

272. Allow for raking out joints and re-pointing in lime mortar to rear elevation. 53 yds. supl.

273. Allow for carefully taking down disturbed and defective brickwork to two rear bay windows and rebuild in lime mortar to match existing in every respect. Include for any additional material necessary. 6 yds. supl.

274. Allow for taking out existing stone sill and reset in lime mortar, true and level, in No. 4 lengths. 16 ft. linl.

275. Allow for raking out joints and re-pointing in lime mortar to brickwork of rear bay windows. 40 yds. supl.

276. Allow for cutting out broken 9 in. by 3 in. cast iron cavity ventilator and replace with 9 in. by

Carried forward £

Brought forward £

3 in. terra cotta ditto set and pointed in lime mortar to front elevation. No. 3.

277. Allow for carefully examining chimney stack, rake out joints and re-point in cement mortar, adjust pots where disturbed, and well flaunch in cement mortar and leave in good order. No. 4.

278. Allow for raking out existing pointing to all door and window frames, fill in with flat joint in cement mortar and point in oil mastic. No. 56.

Sundry Work:

279. Sweep all flues and leave clear of all obstructions. No. 18.

280. Take out flue pipe in living-room, Flat No. 1, "The Willows", and make good in lime mortar. No. 1.

281. Take up flag paving to kitchens, Flats No. 1, and clear away, in No. 2. 41 yds. supl.

Generally:

282. Attend upon and cut all holes for and make good after all other trades. Do all jobbing work necessary for the complete carrying out of the work in these trades. Leave all perfect at the completion of the works.

283. Bed all plates, lintels, fillets, bearers, and all other work intended to be set in or upon the brickwork. Carefully stop up all putlog holes and do all necessary ordinary cutting.

284. Clear and cart away all rubbish and the like from time to time and at the completion of the works.

CARRIED TO SUMMARY £

CARPENTER AND JOINER

@ £ s. d.

285. The timbers for carpenter and joiner's work to be of the best of their respective kinds available, and obtained from the Ministry of Supply. They should be similar in quality and kind, if procurable, to match the existing in every respect.

286. All materials arising from the "taking down", and not specified for re-use, shall become the property of the Contractor. Credit to be given for old materials; *see* Summary.

287. All rubbish and debris arising from the "taking down" to be cleared off the site from time to time.

Carried forward £

Brought forward £

288. All sound existing materials after a thorough examination may be re-used in the new work where directed, if found suitable and approved by the Surveyor.

289. All joinery work to be prepared for painting.

290. The prices for the whole of the works of restoration and on the completion of the works must include all costs incidental thereto of whatever nature; also must include for making out with new materials any defective works or deficiency of any kind.

291. The Surveyor's approval shall be obtained for alternative kinds of materials should similar materials to existing or those specified be unobtainable.

Yards and Cellars:

292. Allow for carefully examining combination door and window frame to external entrances of cellars, door size 2 ft. 8 in. by 6 ft. 0 in., sash size 1 ft. 8 in. by 2 ft. 10 in., and do all necessary repairs in making good any damaged, defective and missing parts, fit with and including new dead lock and two 6 in. barrel bolts to door and new stay and fastener to sash. No. 2.

293. Allow for carefully examining casement window in rear cellar, size 4 ft. 2 in. by 3 ft. 0 in. and do all necessary repairs in making good any damaged, defective, and missing parts, including any new sashes required and fit with and including two 3 in. barrel bolts and stay and fastener to each. Include for hanging sashes on and including one pair of 2½ in. wrought butt hinges to each, and leave in good order. No. 2.

294. Ditto all as last described to front cellar, but size 3 ft. 9 in. by 3 ft. 4 in. No. 2.

Coal Houses, etc.:

295. 4 in. by 2 in. wrought and rebated door frames to suit 1 in. ledged and braced doors (size 2 ft. 9 in. by 5 ft. 0 in.) properly trenched and fitted and spiked to opening. No. 6.

296. 1 in. ledged and braced door, size 2 ft. 9 in. by 5 ft. 0 in., composed of 1 in. wrought, tongued and grooved white deal boards, two 1¼ in. by 6 in. yellow deal battens splayed all round and one 1¼ in. by 6 in. yellow deal brace splayed on two edges, the door hung on and including one pair 14 in. Scotch Tee hinges and fitted with and including strong approved hasp and staple and galvanized padlock. No. 6.

297. Ease and adjust garden gate, size 3 ft. 11 in. by 3 ft. 9 in. ("The Oaks" only). No. 1.

Carried forward £

Brought forward £

"The Willows"—Flats No. 3

Bedroom No. 3:

298. Allow for carefully examining floor boards and joists and do all necessary repairs in making good any damaged, defective and missing work; dress off any uneven boards and leave in good order. 224 ft. supl.

299. Allow for carefully examining sliding sash window, architraves, etc. sash size 2 ft. 8 in. by 4 ft. 3 in., and do all necessary repairs in making good any damaged, defective and missing parts (both sashes missing). Include for hanging sashes with and including "Aero" or other approved sash cord, fitted with and including approved sash fastener, and leave in good order. No. 1.

300. Take off existing bed mould on both sides of purlin 13 ft. long, supply and fix 7 in. by 1 in. wrought and chamfered fascia on one side and 4 in. by 1 in. ditto on the other side, the full length of purlin. Include for all fitting and scribing and fixing with strong screws. No. 1.

301. Allow for cutting out five lengths of match-board underdrawing to ceiling damaged by shrapnel, and make good with material to match existing. No. 1.

302. Allow for cutting out damaged portion of door casing and architraves and make good with material to match existing. No. 1.

303. 1½ in. panel door, size 2 ft. 7 in. by 6 ft. 3 in., hung on and including one pair 3 in. wrought butt hinges and fitted with and including approved rim lock and furniture. No. 1.

304. 5 in. by 1 in. wrot and moulded mantel shelf 3 ft. long, supported on and including two small shaped brackets. No. 1.

305. Extra for returned moulded ends. No. 2.

306. ⅝ in. "Poilite" Asbestos cement top to wardrobe 5 ft. long by 1 ft. 3 in. wide, supported on and including 3 in. by 1½ in. wrot and chamfered rail and 1½ in. by 1 in. wrot and chamfered cleat. No. 1.

Bedroom No. 2:

307. Floor boards and joists, all as item 298. 165 ft. supl.

308. Sliding sash window, sash size 2 ft. 8 in. by 4 ft. 3 in., and hang sashes, all as item 299, but only one sash missing. No. 1.

309. Ease and adjust panel door size 2 ft. 7 in. by 6 ft. 4 in., fitted with and including approved mortice lock and furniture. No. 1.

Carried forward £

Brought forward £

Landing:

310. Ease and adjust door to cupboard size 2 ft. 10 in. by 4 ft. 6 in. and fit with and including approved Bales catch and pull handle. No. 1.

311. Allow for carefully examining skylight, size 3 ft. 3 in. by 6 ft. 0 in., and do all necessary repairs in making good any damaged, defective or missing parts, including providing and fixing one vertical bar in centre. No. 1.

312. Allow for carefully examining strings, steps, handrails, newel posts and balusters from first floor to second floor and do all necessary repairs in making good any damaged, defective and missing parts, and leave in good order. No. 1.

Bathroom:

313. Floor boards and joists, all as item 298. 41 ft. supl.

314. Sliding sash window, sash size 2 ft. 4 in. by 4 ft. 9 in., all as item 299. Include for cutting out all parts affected by dry rot, and refixing window frame, and leave in good order. No. 2.

315. Sliding sash window, sash size 1 ft. 11 in. by 3 ft. 9 in., all as item 299. No. 1.

316. Allow for carefully examining panel door, size 2 ft. 8 in. by 6 ft. 8 in., casing and architraves and do all necessary repairs in making good any damaged, defective and missing parts, fitted with and including approved mortice lock and furniture, and leave in good order. No. 1.

317. Allow for attendance on Plumber and include for supplying and fixing all wrot and chamfered cleats, pipe boards, etc., sawn framing to front of bath, and fixing only polished asbestos cement panel thereto with and including chromium plated screws. No. 1.

Living Room:

318. Floor boards and joists, all as item 298. 214 ft. supl.

319. Sliding sash window, sash size 3 ft. 5 in. by 6 ft. 7 in. all as item 299. No. 2.

320. Allow for carefully examining existing wardrobe cupboard and doors, size 4 ft. 3 in. by 10 ft. 0 in., and do all necessary repairs in making good any damaged, defective and missing parts. Include for supplying and fixing strong raised platform for seating for cylinder and three rows of shelves composed of 3 in. by 1 in. wrought deal spaced lags and 3 in. by 1 in. wrought and chamfered bearers cut and fitted to cylinder. The upper part fitted with strong framed shelf composed of 1 in. deal boards and 4 in. by 3 in. wrought and chamfered bearers for cistern. No. 1.

Carried forward £

Brought forward £

321. Take out existing door casing, architraves, and door, size 2 ft. 8 in. by 6 ft. 8 in. and refix casing and architraves in new opening and rehang door. Include for fitting door with and including approved mortice lock and furniture. No. 1.

322. Deal cased window frame with sunk and weathered Oak sill, fitted with 2 in. moulded sashes hung on and including brass axle pullies, "Aero" or approved sash cord, weights and fitted with and including approved sash fastener, complete with architraves and window bottom and similar in all respects to existing windows, size 3 ft. 9 in. by 5 ft. 6 in. No. 1.

323. Wrought and moulded skirtings to match existing, including mitres and fitted ends, plugged to walls. 18 ft. linl.

Scullery Recess:

324. 1½ in. wrought and fluted sycamore draining board, size 3 ft. 0 in. long by 17 in. wide, with two 2 in. by 1 in. slotted deal fillets screwed to back and 2 in. by ½ in. wrought and rounded one edge sycamore fillets screwed to sides and one end, supported on and including 3 in. by 1½ in. wrought and chamfered bearers plugged to wall. No. 1.

Hall:

325. 4 in. by 2 in. wrought and rebated door casing to suit 2 in. standard panel door, size 2 ft. 8 in. by 6 ft. 8 in., the stiles to extend from floor to ceiling and trenched to receive head. Include for 3 in. by 1 in. wrought and chamfered architrave mould on both sides. No. 1.

326. 2 in. standard panel door, size 2 ft. 8 in. by 6 ft. 8 in., hung on and including one pair of 4 in. wrought butt hinges and fitted with and including approved Yale pattern night latch, two 6 in. barrel bolts and approved letter plate. No. 1.

327. Wrought and moulded skirtings, all as item 323. 13 ft. linl.

328. 5 in. by 1 in. wrought and chamfered hat and coat rail plugged to wall and fitted with and including six approved hat and coat hooks. 4 ft. linl.

Flats No. 2

Bedrooms Nos. 1 and 2 of each Flat:

329. Floor boards and joists, all as item 298. 238 ft. supl.

330. Sliding sash window, sash size 3 ft. 5 in. by 6 ft. 3 in., all as item 299. No. 2.

Carried forward £

Brought forward £

331. Deal cased window frame with sunk and weathered Oak sill, size 3 ft. 9 in. by 5 ft. 6 in., all as item 322, to bedroom No. 2. No. 1.

332. Ease and adjust folding door to wardrobe, size 5 ft. 2 in. by 6 ft. 9 in., and fitted with and including 4 in. barrel bolt and cupboard turn and knob. Include for 6 in. by 1 in. wrought and beaded rail, 12 in. long, plugged to wall, and "Poilite" asbestos cement shelf 5 ft. 7 in. long by 12 in. wide. No. 1.

333. 4 in. by 2 in. wrought and rebated door casing to suit 1½ in. standard panel door, size 2 ft. 6 in. by 6 ft. 6 in., all as item 325. No. 2.

334. 1½ in. standard panel door, size 2 ft. 6 in. by 6 ft. 6 in., hung on and including one pair of 3 in. wrought butt hinges and fitted with and including approved rim lock and cocus furniture. No. 2.

335. Take out existing door casing and architrave and door, size 2 ft. 8 in. by 6 ft. 8 in. and clear away. No. 1.

336. Wrought and moulded skirtings, all as item 323. 25 ft. linl.

337. Wrought and moulded picture rail to match existing, including all mitres and fitted ends, plugged to wall. 31 ft. linl.

W.C.s and Passages:

338. Fill in space occupied by small flight of stairs leading from quarter spaced landing to W.C. with and including 1 in. tongued and grooved floor boards, neatly fitted and jointed on three sides to existing floor, and supported on and including 4 in. by 3 in. sawn joists: trimmed to existing. 17 ft. supl.

339. Ease and adjust sash to casement window, size 1 ft. 0 in. by 2 ft. 3 in., fitted with and including approved stay and fastener. No. 1.

340. Ease and adjust top glazed panel door, size 2 ft. 5 in. by 6 ft. 8 in., fitted with and including approved rim latch and furniture and 4 in. brass barrel bolt to W.C. No. 1.

341. Take out existing door casing and architraves and door, size 2 ft. 8 in. by 6 ft. 8 in., and clear away; passages to hall. No. 1.

342. Take out existing wood panelling and clear away. No. 1.

343. Wrought and moulded skirtings, all as item 323. 15 ft. linl.

344. 3 in. by 1 in. wrought and chamfered pipe board plugged to wall. 8 ft. linl.

Carried forward £

Brought forward £

Kitchen and Bathroom:

345. Floor boards and joists all as item 298. 156 ft. supl.

346. Take out existing sliding sash window, sash size 3 ft. 11 in. by 6 ft. 3 in., and clear away. No. 1.

347. Three light deal cased window frames with sunk and weathered Oak sill and 2 in. solid mullions, 2 in. moulded sashes, size 6 ft. 3 in. by 5 ft. 3 in., the side light fixed and the centre light hung on and including brass axle pullies, all as item 322, to kitchen. No. 1.

348. Deal cased window frame, size 2 ft. 5 in. by 4 ft. 3 in., all as item 322, to bathroom. No. 1.

349. 4 in. by 2 in. wrought and rebated door casing to suit 1½ in. standard panel door, size 2 ft. 6 in. by 6 ft. 6 in., all as item 325. No. 2.

350. 1½ in. standard panel door, size 2 ft. 6 in. by 6 ft. 6 in., all as item 334. No. 2.

351. 1½ in. panel door, size 2 ft. 8 in. by 6 ft. 8 in., hung on and including one pair 3 in. wrought butt hinges and fitted with and including approved Bales catch and pull handle to cylinder cupboard. No. 1.

352. Ease and adjust existing top panel door to last, size 2 ft. 8 in. by 2 ft. 9 in., fitted with and including approved Bales catch and pull handle. No. 1.

353. The existing cylinder cupboard to be fitted with and including strong raised platform for cylinder and three rows of shelves composed of 2 in. by 1 in. wrought deal spaced lags and 3 in. by 1 in. wrought and chamfered bearers cut and fitted to cylinder. No. 1.

354. 1½ in. wrought and fluted draining board, size 2 ft. 6 in. long by 17 in. wide, all as item 324. No. 1.

355. Wrought and moulded skirtings, all as item 323. 29 ft. linl.

356. Allow for attendance on Plumber, all as item 317. No. 1.

Hall:

357. Floor boards and joists, all as item 298. 40 ft. supl.

358. 1½in. wrought deal cupboard frame, size 5 ft. 1 in. by 10 ft. 0 in., with top and middle rail only to suit doors 6 ft. 4 in. high. The lower portion filled in with and including 1½ in. panel door 4 ft. 7 in. by 6 ft. 4 in., and the top portion filled in with 1½ in. ditto 4 ft. 7 in. by 3 ft. 2 in., both hung folding on and including one pair of 3 in. wrought butt hinges to each door. Include for fitting each pair of doors with and including approved spring catch and cupboard turn and knob. No. 1.

Carried forward £

Brought forward £

359. Wrought and rebated linings to suit door, size 2 ft. 8 in. by 6 ft. 8 in., in 4½ in. wall, and architraves to match existing. No. 2.

360. Rehang door (previously given for taking out) to above linings and re-fix architraves to both sides, do all necessary repairs in making good any damage, defective or missing parts, fitted with and including approved mortice lock and furniture, and leave in good order. No. 2.

361. Rehang front entrance door, size 2 ft. 9 in. by 6 ft. 9 in., to and including new wrought and rebated linings in 2½ in. breeze partition wall, re-fix architraves to both sides, do all necessary repairs as item 360, door fitted with and including Yale pattern night latch, two 6 in. barrel bolts and approved letter plate. No. 1.

362. 2 in. by 2 in. wrought and moulded sash, size 3 ft. 0 in. by 3 ft. 6 in., with 1 in. wrought and rebated linings to suit 4½ in. wall, and run 3 in. by 1 in. architrave moulds to both sides, borrowed lights. No. 2.

363. Wrought and moulded skirtings, all as item 323. 18 ft. linl.

364. 5 in. by 1 in. wrought and moulded hat and coat rail plugged to wall, fitted with and including eight approved hat and coat hooks. 8 ft. linl.

Living Room:

365. Floor boards and joists, all as item 298. 174 ft. linl.

366. Sliding sash window, sash size 3 ft. 5 in. by 6 ft. 6 in., all as item 299. No. 1.

367. Take out existing small cupboard and clear away. No. 1.

368. Wrought and moulded skirtings, all as item 323. 6 ft. linl.

Staircase and Landing:

369. Fill in space between top step to existing entrance with floor boards and bearers all as item 338, and include for riser and nosing to step, size 5 ft. 0 in. by 3 ft. 0 in. No. 1.

370. Examine and repair strings, steps, handrails, newel posts and balusters from ground to first floor, all as item 312. No. 1.

370A. 4 in. by 2 in. wrought deal post fixed on fourteenth tread to take end of breeze block partition wall with and including 3 in. by 1 in. wrought and moulded architrave on each side. 10 ft. linl.

371. Wrought and moulded skirting, all as item 323. 4 ft. linl.

Carried forward £

Brought forward £

FLAT No. 1

Bedroom No. 1:

372. Floor boards and joists all as item 298. 225 ft. supl.

373. Sliding sash window, sash size 3 ft. 5 in. by 7 ft. 10 in., architraves, etc., and re-hang sashes, all as item 299. (Middle bay.) No. 1.

374. Ditto all as last item to side bay windows, sash size 1 ft. 9 in. by 7 ft. 10 in. No. 2.

375. Allow for carefully examining door casing, architraves, and 2 in. panel door, size 2 ft. 8 in. by by 6 ft. 8 in., all as item 316. No. 1.

Bedroom No. 2:

376. Floor boards and joists, all as item 298. 167 ft. supl.

377. Sliding sash window, sash size 3 ft. 11 in. by 7 ft. 6 in., all as item 299, including built up panelled framing under window, and about 6 ft. linl. skirting, all to match existing. No. 1.

378. Take out small cupboard, size 2 ft. 3 in. by 11 ft. 0 in. and clear away. No. 1.

379. Allow for carefully examining door casing and architraves and panel door, size 2 ft. 8 in. by 6 ft. 8 in., all as item 375. No. 1.

Stores and Cloaks:

380. Take out existing door casing and architraves from kitchen to cloaks, and clear away. No. 1.

381. Take out existing door, size 2 ft. 1 in. by 6 ft. 4 in., from kitchen to cloaks, and clear away. No. 1.

382. 1½ in. wrought and rebated casing to suit 1½ in. standard panel door, size 2 ft. 4 in. by 6 ft. 4 in., in 4½ in. wall, with architraves to both sides. No. 1.

383. 1½ in. standard panel door, size 2 ft. 4 in. by 6 ft. 4 in., hung on and including one pair of 3 in. wrought butt hinges and fitted with and including approved rim lock and furniture. No. 1.

384. Take out existing borrowed light, size 2 ft. 11 in. by 4 ft. 9 in., lining and architraves, and re-fix in new opening. No. 1.

385. Allow for carefully examining door casing, architraves and panel door, size 2 ft. 8 in. by 6 ft. 8 in., fitted with and including approved mortice lock and furniture as item 375. No. 1.

386. Wrought and moulded skirtings, all as item 323. 12 ft. linl.

387. 5 in. by 1 in. wrought and moulded hat and coat rail, all as item 364. 8 ft. linl.

388. Allow for taking out cupboard under sink, drainer boards and shelves, etc., and clear away. No. 1.

Carried forward £

Brought forward £

Kitchen and Bathroom:

389. Allow for taking up existing floor boards and joists, cut out all dry rot and relay joist on rolled steel joists (elsewhere taken). Include for all trimming, cutting, packing and waste and any additional timber required to complete and leave true and to required level to suit existing floors (measured nett area of room). 174 ft. supl.

390. 1 in. wrought, first quality, white deal, tongued and grooved boards in 5 in. widths, well clamped, nailed, punched, puttied, and dressed off at completion. 174 ft. supl.

391. Extra for 3 in. by 1 in. hardwood mitred margin to hearth and all cutting and waste. 10 ft. linl.

392. Extra for making good between new and old floor boards. 8 ft. linl.

393. Allow for notching bottom rail of existing cupboard for joists raised the thickness of previous existing flags. No. 1.

394. Sliding sash window, sash size 4 ft. 6 in. by 5 ft. 9 in., all as item 299. (Bathroom.) No. 1.

395. Three light deal cased window frame, all as item 347 to kitchen window, size 5 ft. 3 in. by 5 ft. 3 in. No. 1.

396. Take out existing cylinder cupboard frame, size 3 ft. 0 in. by 11 ft. 0 in., and clear away. No. 1.

397. Take out dwarf cupboard under window, size 5 ft. 9 in. by 2 ft. 7 in., and clear away. No. 1.

398. Take off wainscot boarding, size 21 ft. 0 in. by 4 ft 6 in., and clear away. No. 1.

399. Take off skirting to last, size 21 ft. 0 in. linl., and clear away. No. 1.

400. Take off bell board, size 7 ft. 0 in. by 11 in., and clear away. No. 1.

401. Allow for carefully examining cupboard on Store side of chimney breast and do all necessary repairs in making good any damaged, defective and missing parts, including new drawers, doors, etc. Include for strong raised platform for cylinder and three rows of shelves composed of 3 in. by 1 in. wrought deal spaced lags and 3 in. by 1 in. wrought and chamfered bearers, cut and fitted to cylinder. No. 1.

402. 1½ in. wrought and fluted sycamore draining board, size 3 ft. 0 in. long by 17 in. wide, all as item 324. No. 2.

403. 1 in. by 7 in. wrought and moulded skirting, plugged to walls, including all mitres and returned ends, to Kitchen. 46 ft. linl.

Carried forward £

Brought forward £

404. Ditto all as last described to bathroom. 29 ft. linl.

405. Take out door casing and architraves (door missing): size 2 ft. 6 in. by 6 ft. 8 in., leading from present kitchen to previously existing scullery. No. 1.

406. 1½ in. standard panel door, size 2 ft. 4 in. by 6 ft. 4 in., hung to and including 4 in. by 2 in. wrought and rebated casings, extending from floor to ceiling and trenched to receive transome, with and including one pair of 3 in. wrought butt hinges and fitted with and including approved mortice lock and furniture, supply and fix architrave moulds to both sides, to bathroom. No. 1.

407. Door casing and architraves and panel door, size 2 ft. 8 in. by 6 ft. 8 in., all as item 316. No. 1.

408. Allow for attendance on Plumber, all as item 317. No. 1.

W.C.:

409. Deal cased window frame, size 2 ft. 6 in. by 4 ft. 6 in., all as item 322. No. 1.

410. Take out existing external door frame, architraves and door, size 2 ft. 8 in. by 6 ft. 8 in., and clear away. No. 1.

411. 1½ in. standard panel door, size 2 ft. 6 in. by 6 ft. 4 in., all as item 406 and including 4 in. brass barrel bolt. No. 1.

412. Wrought and moulded skirting, all as item 323. 2 ft. linl.

Living Room:

413. Allow for carefully examining and do all necessary repairs to floor boards and joists and include for cutting out and replacing with sound timber all parts affected by dry-rot and packing up true and level on rolled steel joists (elsewhere taken). 264 ft. linl.

414. Sliding sash window (middle bay) sash size 4 ft. 5 in. by 7 ft. 9 in., all as item 299. No. 1.

415. Sliding sash window (side bays) sash size 1 ft. 11 in. by 7 ft. 9 in., all as last item. No. 2.

416. Take out existing door casing in 9 in. wall, architraves and panel door, size 2 ft. 10 in. by 6 ft. 10 in., alter width of stiles and head of casing to suit 4½ in. wall, re-fix in new opening complete with architraves on both sides, and afterwards re-hang door and fit with and including approved mortice lock and furniture, and leave in good order. No. 1.

417. Wrought and moulded skirting, all as item 323. 6 ft. linl.

Carried forward £

Brought forward £

Hall and Passages:

418. Floor board and joists, all as item 298, and allow for neatly cutting floor boards along face of spandril to staircase to allow bricklayer to continue brick wall up from cellar, and afterwards make good. 99 ft. supl.

419. Ease and adjust door leading to cellar, size 2 ft. 6 in. by 6 ft. 7 in., and fit with and including two 6 in. barrel bolts. No. 1.

420. 4 in. by 2 in. wrought and rebated door casing to suit 2 in. standard panel door, size 2 ft. 8 in. by 6 ft. 8 in., the stiles to extend from floor to ceiling and trenched to receive head, complete with and including wrought and moulded architrave on both sides. No. 1.

421. 2 in. standard panel door, size 2 ft. 8 in. by 6 ft. 8 in., hung on and including one pair of 4 in. butt hinges, and fitted with and including approved Yale pattern night latch, two 6 in. barrel bolts and approved letter plate. No. 1.

422. Wrought and moulded skirtings, all as item 323. 18 ft. linl.

423. Wrought and moulded picture rail, all as item 337. 31 ft. linl.

Vestibule:

424. Floor boards and joists, all as item 298. 34 ft. supl.

425. Sliding sash window, sash size 2 ft. 2 in. by 7 ft. 6 in., all as item 299. No. 1.

426. Allow for carefully examining entrance door, frame and architraves, all as item 316, but having Yale pattern night latch. No. 1.

427. Wrought and moulded skirtings, all as item 323. 4 ft. linl.

Front Porch:

428. Sliding sash window, sash size 2 ft. 2 in. by 7 ft. 6 in., all as item 299. No. 1.

429. Allow for carefully examining entrance door, frame, architraves, and linings, affected by dry rot, door size 3 ft. 5 in. by 6 ft. 10 in., all as item 316, but having Yale pattern night latch. No. 1.

"The Oaks"

430. The items for "The Oaks", with a few exceptions, are similar and have been omitted here to save space.

External Work:

431. Allow for taking down loose and disturbed fascia and soffit at eaves of rear main roof, cut rafter feet to a straight line flush with face of building,

Carried forward £

Brought forward £

include for 7 in. by 1 in. wrought and moulded fascia, securely spiked to rafter feet, and tilting fillet behind (two out of 3 in. by 2 in. sawn deal) and fixing. 32 ft. linl.

432. Allow for carefully examining skylight over existing kitchen, size 5 ft. 6 in. by 2 ft. 6 in., and do all necessary repairs in making good any damaged, defective and missing parts, and leave in good order. No. 2.

433. Allow for carefully examining barge boards and capping and fascia and soffit boards, bed and crown moulds, etc., at gable end, front elevation, and do all necessary repairs in making good any damaged, defective and missing parts, and leave in good order. No. 1.

434. 7 in. by 1 in. wrought and moulded fascia, securely spiked to packing blocks fixed to wall plate, to rear bay windows in No. 2 lengths, including all mitres, etc. 33 ft. linl.

Generally:

435. Supply all nogs, plugs, blocks, grounds, etc., required by Plumber and other trades.

436. Attend upon all other trades, cut away for and make good after, and leave all perfect at the completion of the works.

437. Clear and cart away all rubbish from time to time and at the completion of the works.

CARRIED TO SUMMARY £

SLATER

	@	£	s.	d.

438. The Slater's work shall be similar in quality and kind of material and workmanship and to match the existing in every respect.

439. The battens to be of the size to match the existing in every respect.

440. The nails to be similar in quality and kind and size to match the existing in every respect.

441. The mortar to be composed of one part by measure of lime to two parts by measure of clean, sharp sand, and to have 9 lb. of good long pile cow hair to every cubic yard of mixture, well beaten and thoroughly incorporated.

442. All old materials arising from the "taking down" and not specified for re-use shall become the property of the Contractor and be removed off the premises. Credit to be given for old materials—*see* Summary.

Carried forward £

Brought forward £

443. All rubbish and debris arising from the "taking down" to be cleared off the site from time to time.

444. All sound materials after being thoroughly dressed and cleaned and approved by the Surveyor may be re-used in the new work where directed, if suitable.

445. The prices for the whole of the works of restorations and repairs must include all costs incidental thereto, also must include for making out with new materials any defective works or deficiency arising therefrom.

446. The Surveyor's approval shall be obtained for alternative kinds of materials should similar materials to match existing or those specified be unobtainable.

Main Roof at Rear:

447. Allow for carefully stripping off existing slates and ridge tile and stack for re-use. 74 yds. supl.

448. Reslate roof on and including 2 in. by 1 in. sawn slate battens, using any sound and serviceable slates recoverable from stipping. Include for any further slates required to complete roof, which must match existing in every respect. Each slate to be secured with two 1¾ in. galvanized slate nails and tiered on underside with haired mortar. 74 yds. supl.

449. Extra for double eaves course and all cutting and waste. 32 ft. linl.

450. Extra for cutting and waste to top edge and vertical sides. 49 ft. linl.

451. Extra for cutting and waste to valley (one side measured). 33 ft. linl.

452. Re-set ridge tile in haired mortar and point in oil mastic. Include for making out with any further ridge tile required to match existing. 26 ft. linl.

453. Allow for and arrange with Plumber in fixing soakers as required. No. 1.

454. Allow for carefully examining existing roof covering to bay windows at front and rear (part lead sheet and part slates) and do all necessary repairs in making good any damaged, defective and missing parts to the slated portion. Include for any assistance required by Plumber. No. 4.

455. Allow for carefully examining remainder of slating to main roof and do all necessary repairs in making good any damaged, defective and missing parts and leave in good order. 271 yds. supl.

456. Allow for carefully examining slated roof to porch and do all necessary repairs in making good any damaged, defective and missing parts and leave in good order. 9 yds. supl.

Carried forward £

Brought forward £

Generally:

457. Attend upon all other trades requiring same, replace all broken or damaged slates with new and leave the whole of the roofs perfectly drop-dry at the completion of the works.

458. Clean out all gutters and clear and cart away all rubbish from time to time and at the completion of the works.

CARRIED TO SUMMARY £

@	£	s.	d.

PLUMBER AND GLAZIER

459. The whole of the works to be executed in strict accordance with the regulations and requirements of the Urmston Urban District Council.

460. The whole of the glass to be known as "Ordinary Glazing Quality" unless otherwise described, free from specks, waves, bubbles or other imperfection, and obtained from an approved firm.

461. The linseed oil putty to conform to British Standards Specification No. 544/1934 Type No. 1. Linseed oil putty to be used for glazing in wood frames.

462. The glazing in woodwork where not otherwise described to be secured with wood beads (supplied by Joiner) to be well bedded and back puttied, sprigged in and front puttied.

463. The whole of the electrical wiring and the like to be executed in accordance with the requirements of the Urmston Urban District Council.

464. The Plumber and Glazier's work shall be similar in quality and kind and size of the respective materials to match the existing in every respect, also in workmanship.

465. The Surveyor's approval shall be obtained for alternative kinds of materials should similar materials to existing or those specified be unobtainable.

466. All old materials arising from the "taking down" and not specified for re-use shall become the property of the Contractor, and removed off the premises. Credit to be given for all materials—*see* Summary.

467. All rubbish and debris arising from the "taking down" to be cleared off the site from time to time.

468. All sound materials, after a thorough examination, may be re-used in the new work where directed if found suitable and approved by the Surveyor.

Carried forward £

Brought forward £

469. The prices for the whole of the works of restoration and repairs must include all costs incidental thereto of whatever nature, also must include for making out with new materials any defective works or deficiency arising therefrom.

Yards and Cellars:

470. Allow for hacking out all broken, cracked, and defective glass, smooth and prime all rebates and glaze with new to match existing to front cellar window, sash size 1 ft. 6 in. by 2 ft. 8 in., in one square. No. 2.

471. Glazing with 24 oz. clear sheet glass in new wood sashes, size 1 ft. 6 in. by 2 ft. 8 in., in one square (to front cellar). No. 2.

472. Hack out and reglaze as item 470 with 24 oz. clear sheet in wood sash, size 2 ft. 1 in. by 3 ft. 0 in., in two squares, to back cellar. No. 1.

473. Glazing with 18 oz. clear sheet glass in new wood sashes size 2 ft. 1 in. by 3 ft. 0 in., in two squares (back cellar). No. 3.

474. Hack out and reglaze as item 470 with 24 oz. clear sheet in sash of combination door and window frame, size 1 ft. 1 in. by 2 ft. 10 in., in one square. No. 2.

475. Hack out and reglaze as item 470 with ¼ in. rolled plate in skylight over existing kitchen, size 5 ft. 9 in. by 2 ft. 6 in., in four squares. No. 2.

Sanitary Fittings:

476. Provide the Provisional Sum of £165 15s. 6d. (one hundred and sixty five pounds, fifteen shillings and sixpence) for sanitary fittings to be selected by the Surveyor, or the amount expended as he may direct or deducted in part or in full as he may decide.

477. Add for profit or commission.

478. Fixing only lavatory basin with brackets, brass waste, taps, and chain and plug complete. No. 6.

479. Fixing only square topped bath with brass trapped waste, overflow, taps, chain and plug complete. No. 6.

480. Fixing only wash-down pedestal closet with seat hinges and buffers complete. No. 4.

481. Fixing only 2½ gallon flushing cistern with brackets, chain and pull complete. No. 4.

482. Fixing only 24 in. by 18 in. by 10 in. deep, white glazed sink, with two chromium plated bib taps, having back plates, 1¼ in. waste pipe and trap, and supported on brackets. No. 6.

Carried forward £

Brought forward £

Water Service and Fittings:

483. The lead pipes to be of the various strengths and weights required by the Local Authorities.

484. The diameter of pipes means the internal diameter or bore of pipes.

485. The price to include for all running joints, bends, wall hooks, pipe brackets, plugs, and strong galvanized clips where fixed upon boards.

486. Allow for testing of all taps by the Local Authorities and pay all fees.

487. Tap main in Stretford Road, form connection with and including 1 in. diameter brass ferrule and 1 in. diameter lead pipe about 15 ft. linl. from main to stop tap, excavate for, fill in and ram trench solid. Make good roadway and path, and pay all fees. No. 2.

488. 1 in. fullway, gunmetal stopcock with tinned and soldered joints, with and including cast iron boxed frame and hinged lid, long key, brick eye built in cement mortar and having concrete bottom. No. 2.

489. 1 in. diameter, strong lead pipe from stop tap to cellar, excavate for and fill in trench solid, about 30 ft. linl. No. 2.

490. 40 gallon, galvanized, wrought iron plate cistern No. 14 gauge before galvanizing, with one ½ in. and two ¾ in. diameter unions complete. No. 4.

491. ½ in. diameter, best quality, copper ball tap, with union and fixing to cistern including drilling. No. 4.

492. ¾ in. diameter unions with back nuts and cap and lining. No. 8.

493. 34 gallon, galvanized hot water cylinder, ⅛ in. metal, tested to 25 lb. pressure, and fitted with No. 5 union connections. No. 4.

494. ½ in. diameter, fullway, gunmetal stopcocks, with tinned and soldered joints. No. 6.

495. ½ in. diameter, strong lead rising main to cisterns. 222 ft. linl.

496. ½ in. diameter, strong lead pipe in branches to fittings. 260 ft. linl.

497. ½ in. diameter lead pipes, as item 496, but in short lengths. 54 ft. linl.

498. ¾ in. diameter, medium strength lead service pipes in "hot" branches to fittings. 288 ft. linl.

499. ¾ in. diameter lead pipes as item 498, but in short lengths. 54 ft. linl.

500. ¾ in. diameter lead pipes, as item 498, in expansion pipe and cold supply from cisterns to cylinders. 102 ft. linl.

501. ¾ in. diameter lead pipes, as item 498, in flow and return pipes between boilers and cylinders. 96 ft. linl.

Carried forward £

Brought forward £

502. Extra for ½ in. to ½ in. wiped branch joint connection. No. 30.
503. Extra for ¾ in. to ¾ in. ditto. No. 24.
504. Extra for ½ in. to 1 in. ditto. No. 6.
505. Extra for soldered end to ½ in. diameter pipe. No. 6.
506. Extra for soldered end to ¾ in. diameter pipe. No. 6.
507. Extra for ½ in. diameter tinned and soldered joints to union. No. 30.
508. Extra for ¾ in. diameter ditto. No. 54.
509. ½ in. diameter, fullway, gunmetal stopcock, with tinned and soldered joints fixed at suitable position on each rising main. No. 6.
510. ¾ in. diameter stopcock, as item 509, cold supply to cylinder. No. 6.

Lead Waste Pipes:

511. 1½ in. diameter, strong lead, waste pipe, including all bends, joints, clips, in No. 12 lengths, to sink and lavatory basins. 76 ft. linl.
512. 1½ in. diameter, waste pipes, as item 511, in No. 6 lengths, to baths. 26 ft. linl.
513. 1½ in. diameter, lead "P" trap, with brass screw access cap and connection to union and waste pipe of lavatory basin. No. 6.
514. Fixing only galvanized, steel, flush pipes, with and including all clips, and connection to union of flushing cistern, also connection to W.C. basin with and including indiarubber cone and copper wire to Flats Nos. 1 and 3. No. 4.
515. ¾ in. diameter lead overflow pipe, with fishtail end and connection to union of W.C. flushing cistern and carry through wall, in No. 4 lengths, to Flats Nos. 1 and 3. 12 ft. linl.
516. ¾ in. diameter ditto, all as item 515 but to storage tank, in No. 4 lengths, to Flats Nos. 1 and 3. 60 ft. linl.
517. 1½ in. diameter, lead overflow pipe, with and including wiped tafted joint to overflow unions and wiped soldered joint to 1½ in. diameter lead bath waste, in No. 6 lengths. 12 ft. linl.

"THE WILLOWS"—FLAT NO. 3

Bedroom No. 1:

518. Glazing with 24 oz. clear sheet glass in new wood sashes, size 2 ft. 5 in. by 1 ft. 11 in., in one square. No. 2.
519. Take out existing gas fitting and clear away. No. 1.

Carried forward £

Brought forward £

Landing:

520. Hack out and re-glaze as item 470 with ¼ in. rolled plate in skylight, size 3 ft. 3 in. by 6 ft. 0 in., in two squares. No. 1.

521. Take out existing gas fittings and clear away. No. 1.

Bedroom No. 2:

522. Hack out and re-glaze as item 470 with 24 oz. clear sheet glass in sash, size 2 ft. 5 in. by 1 ft. 11 in., in one square. No. 2.

523. Take out existing gas fittings and clear away. No. 1.

Bathroom:

524. Hack out and re-glaze as item 470 with obscured glass to match existing to top sash, size 1 ft. 10 in. by 1 ft. 8 in. in one square. No. 1.

525. Take out existing bath and lavatory basin and shower tank and all fittings in ceiling, and clear from site. No. 1.

526. Take out existing gas fittings and clear away. No. 1.

Living Room:

527. Hack out and re-glaze as item 470 with 24 oz. clear sheet glass in sash, size 3 ft. 1 in. by 3 ft. 1 in., in one square. No. 3.

528. Extra for circular cutting and risk. 4 ft. linl.

Scullery Recess:

529. Glazing with 24 oz. clear sheet glass in new wood sashes, size 3 ft. 0 in. by 2 ft. 6 in., in one square. No. 2.

FLAT NO. 2

Bedroom No. 1:

530. Hack out and re-glaze as item 470 with 32 oz. clear sheet glass in sash, size 3 ft. 0 in. by 2 ft. 9 in., in one square. No. 4.

531. Take out existing gas fittings and clear away. No. 1.

Bedroom No. 2:

532. Glazing with 24 oz. clear sheet glass in new wood sashes, size 3 ft. 0 in. by 2 ft. 6 in., in one square. No. 2.

W.C.:

533. Allow for carefully examining existing W.C. apparatus complete, and do all necessary repairs in making good any damaged, defective and missing parts and leave in good working order. No. 1.

Carried forward £

Brought forward £

534. Hack out and re-glaze as item 470 with 18 oz. clear sheet glass to sash, size 9 in. by 1 ft. 10 in., in one square. No. 1.

535. Take out wood beads and hack out and re-glaze as item 470 with approved obscured glass in top panels of door, size 9 in. by 3 ft. 3 in., in one square No. 2.

Bathroom:

536. Glazing with approved obscured glass in new wood sashes, size 1 ft. 8 in. by 1 ft. 11 in., in one square. No. 2.

Kitchen:

537. Glazing with 24 oz. clear sheet glass in new wood sashes, size 2 ft. 5 in. by 2 ft. 5 in., in one square. No. 2.

538. Ditto all as last described, but sash size 1 ft. 6 in. by 2 ft. 5 in., in one square. No. 4.

539. Take out existing sink and clear away. No. 1.

540. Glazing with approved obscured glass in new wood sash to borrowed light, size 2 ft. 9 in. by 2 ft. 9 in., in one square. No. 2.

Living Room:

541. Take out existing gas fittings and clear away. No. 1.

542. Take out existing lead water pipes, and clear away. No. 1.

"THE WILLOWS"—FLAT NO. 1

Bedroom No. 1:

543. Hack out and re-glaze as item 470 with 32 oz. clear sheet glass in sash, size 3 ft. 1 in. by 3 ft. 6 in., in one square. No. 1.

544. Hack out and re-glaze as item 470 with 24 oz. clear sheet glass in sash, size 1 ft. 3 in. by 3 ft. 6 in., in one square. No. 1.

545. Take out existing gas fittings and clear away. No. 1.

Bedroom No. 2:

546. Hack out and re-glaze as item 470 with 32 oz. clear sheet glass in sash, size 3 ft. 6 in. by 3 ft. 6 in., in one square. No. 2.

547. Extra for circular cutting and risk. 4 ft. linl.

548. Take out existing gas fittings and clear away. No. 1.

549. Take out existing lead water pipes and clear away. No. 1.

Carried forward £

Brought forward £

Kitchen:

550. Glazing with 24 oz. clear sheet glass in new wood sash, size 2 ft. 6 in. by 2 ft. 5 in., in one square. No. 2.

551. Ditto all as last described, but size 1 ft. 0 in. by 2 ft. 5 in., in one square to fixed side sashes. No. 4.

552. Hack out and re-glaze as item 470 with approved obscured glass to borrowed light, size 2 ft. 1 in. by 4 ft. 0 in., in one square. No. 1.

553. Take out existing gas fitting and clear away. No. 1.

Bathroom:

554. Hack out and re-glaze as item 470 with approved obscured glass in sash, size 2 ft. 1 in. by 2 ft. 7 in., in one square. No. 4.

Living Room:

555. Hack out and re-glaze as item 470 with 32 oz. clear sheet glass in sash 4 ft. 0 in. by 3 ft. 7 in., in one square. No. 2.

556. Hack out and re-glaze as item 470 with 24 oz. clear sheet glass in sash 1 ft .7 in. by 3 ft. 7 in., in one square. No. 4.

557. Take out all existing gas fittings and clear away. No. 1.

558. Take out existing lead water pipes and clear away. No. 1.

Vestibule:

559. Hack out and re-glaze as item 470 with 24 oz. clear sheet glass in sash, size 1 ft. 10 in. by 3 ft. 7 in., in one square. No. 2.

560. Hack out and re-glaze as item 470 with approved obscured glass in top panel of door, size 2 ft. 6 in. by 3 ft. 3 in., in one square. No. 1.

561. Take out all existing gas fittings and clear away. No. 1.

Porch:

562. Hack out and re-glaze as item 470 with approved obscured glass to match existing to top panel of door, size 2 ft. 7 in. by 3 ft. 3 in. No. 1.

"The Oaks" Flat

563. The items for "The Oaks" are similar and have been omitted here to save space.

External Work:

564. Take down existing cast iron gutter at rear and clear away. 32 ft. linl.

Carried forward £

Brought forward £

565. Ditto to bay window at rear. 33 ft. linl.

566. Ditto 3 in. diameter cast iron rainwater pipes. 120 ft. linl.

567. Ditto 4 in. diameter cast iron soil pipe. 54 ft. linl.

568. Allow for carefully examining lead-lined eaves gutter and do all necessary repairs in making good any damaged, defective and missing parts, and leave in good order. 64 ft. linl.

569. Allow for carefully examining lead flat over Bedrooms No. 1, FLATS No. 3, lead parapet gutters, valleys, gutter backs and step and apron flashings, etc., to main roof and do all necessary repairs in making good any damaged, defective and missing parts, and leave in good order. No. 2.

570. Allow for carefully examining all lead work to cropped hip slated roof to porch and do all necessary repairs in making good any damaged, defective and missing work, include for labour and materials necessary to extend lead parapet gutter about 6 in. longer with stopped end, and with and including short length of 1½ in. diameter lead waste pipe, soldered thereto. No. 2.

571. Allow for carefully examining 2 in. diameter cast iron, rainwater pipe to roof of porch, and do all necessary repairs in making good any damaged, defective and missing parts. No. 2.

572. Ditto all as item 571 to 3 in. rainwater pipes to front elevation in No. 3 lengths. 48 ft. linl.

573. Ditto all as item 571 to 4 in. diameter rainwater pipes at gable ends, in No. 2 lengths. 44 ft. linl.

574. Allow for carefully examining cast iron eaves gutter to front bays, step and cover flashings, and do all necessary repairs in making good any damaged, defective and missing parts. No. 2.

575. Allow for re-dressing existing soakers taken from stripped roof and include for any further soakers required to complete, and hand to Slater for fixing. No. 1.

576. Allow for neatly dressing back all lead cover flashings to stone sills, and include for any soldered seams and close copper nailing required. No. 38.

Asbestos Rainwater Goods:

577. The whole of the asbestos cement rain-water goods and soil and ventilating pipes, to be obtained from Messrs. Turner's Asbestos Cement Co. Ltd., Trafford Park, Manchester 17, or other approved manufacturer.

578. 6 in. Ogee "Everite" asbestos cement, eaves gutter, the joints to be made with red lead putty and

Carried forward £

Brought forward £

hemp, bolted, and supported on and including approved wrought iron, galvanized brackets (obtained from manufacturer), two to each length, and securely fixed to fascia with strong galvanized screws, laid to required falls in an approved manner to rear main roof. 32 ft. linl.

579. Extra for stop end. No. 2.

580. Extra for nozzle outlet for 3 in. diameter pipe. No. 2.

581. 4 in. Ogee "Everite" asbestos cement eaves gutter, all as item 578, to rear bay windows in No. 2 lengths. 33 ft. linl.

582. Extra for two stop end and nozzle outlet. No. 2.

582A. Extra for external angle. No. 8.

583. 2 in. diameter "Everite" asbestos cement rainwater pipes with socketed ends, fixed to wall with "Everite" rainwater pipe clips, type Y, spiked to walls with large-headed, galvanized nails and wood plugs; the joints to be made with red lead putty and hemp (sink waste to scullery recess FLATS Nos. 3 and rainwater from porch), in No. 4 lengths. 42 ft. linl.

584. Extra for cistern head type 19a (Messrs. Turner's Asbestos Cement Co.'s catalogue), to suit 2 in. diameter pipe. No. 2.

585. Extra for 2 in. to 2 in. diameter single branch piece. No. 2.

586. 3 in. diameter "Everite" asbestos cement rainwater pipes, all as item 583, to rear elevation in No. 5 lengths. 135 ft. linl.

587. Extra for cistern head type 19a, as item 584. No. 5.

588. Extra for 2 in. to 3 in. diameter single branch piece. No. 4.

589. Extra for 3 in. diameter offset. No. 4.

590. 4 in. diameter asbestos cement, soil and ventilating pipe $\frac{1}{4}$ in. material with socketed ends, coated with mineral bitumen, fixed to walls with and including heavy type black clips and loose sockets (obtained from manufacturer), and spiked to walls with large-headed, galvanized nails and wood plugs; the joints to be made perfectly air- and water-tight with a tarred gasket, bituminous compound, 1 in. deep, and caulked with neat cement just moist, in No. 4 lengths. 120 ft. linl.

591. Extra for swan neck. No. 2.

592. Extra for long arm branch. No. 4.

593. Extra for long arm obtuse bend. No. 4.

594. Extra for heavy quality cone cap. No. 2.

595. Extra for connection of 4 in. diameter soil pipe to earthenware drain. No. 6.

Carried forward £

Brought forward £

596. Extra for connection to W.C. basin in an approved manner. No. 6.

597. Allow for disconnecting existing soil pipe from W.C. basin. No. 2.

598. Mica flap fresh air inlet valve, vertical fitting to suit 4 in. diameter soil pipe with cast brass front and metal ears cast on, spiked to wall with large-headed, galvanized nails and jointed as item 590 to and including 9 ft. length of 4 in. diameter soil pipe. No. 2.

CARRIED TO SUMMARY £

	@	£	s.	d.

ELECTRICIAN

599. Arrange with the electricity authority for supplying and laying electric cables to each group of three flats. No. 2.

600. Arrange with the electricity authority for supplying and fixing cable from master meter to sub-meter in each flat. No. 6.

601. All cables, wires and the like to be in accordance with the standards of the Cable Makers' Association. The insulation resistance to be not less than 600 megohms per mile.

602. The sizes to be such that the maximum drop of potential is not more than 2·5 per cent. No smaller wire than 3/·029 to be used and all wires to be stranded.

603. All joints to be avoided where possible; where they have to be made they must be made by means of connections in suitable junction boxes.

604. Run enamel, screw-jointed conduits of ample bore, twin cables, switches, lamp-holders, roses and flexible cords to the following positions, all in conformity with the regulations and practice of the Institute of Electrical Engineers and to the satisfaction of the Surveyor and the local electricity authority:

605. *No. 2 Flats, No. 3:*

Bedroom No. 1.	No. 2.
„ „ 2.	No. 2.
Bathroom	No. 1.
Hall	No. 1.
Living Room	No. 2.
Scullery	No. 1.

606. Second floor staircase landing with two-way switches, one at top and one at bottom. No. 1.

607. *No. 2 Flats, No. 2:*

Bedroom No. 1.	No. 2.
„ „ 2.	No. 2.
Passage	No. 2.
W.C.	No. 1.

Carried forward £

Brought forward £

Bathroom ..... No. 1.
Kitchen ..... No. 1.
Hall ..... No. 1.
Living Room ..... No. 2.

608. *No. 2 Flats, No. 1:*

Bedroom No. 1. ..... No. 2.
„ „ 2. ..... No. 2.
Cloaks ..... No. 1.
Entrance Hall & Passage.... No. 2.
Store ..... No. 2.
Kitchen ..... No. 1.
Bathroom ..... No. 1.
W.C. ..... No. 1.
Living Room ..... No. 2.
Cellars ..... No. 3.

609. On cellar staircase landing with two-way switches, one at top and one at bottom. No. 1.

610. Supply and fix two single-pole fuse boxes and one double-pole iron-clad switch by each master meter (No. 2) and run enamel, screw-jointed, conduits, all as before described in item 604, to the following positions with two-way switches to each:

Each Porch ..... No. 1.
Each Vestibule..... No. 1.
Landing by Flat 2 ..... No. 1.
Landing by Flat 3 ..... No. 1.

611. Supply and fix in each flat two single-pole fuse boxes and one double-pole iron-clad switch by sub-meter. No. 6.

612. Supply and fix in each flat a distribution board having two double-pole fuses to each wired position. No. 6.

613. Run from meter to cooker in the kitchen of each flat enamel screw-jointed conduits of ample bore, twin cable, and include for iron-clad switch, double-pole fuse box, and earthing necessary. No. 6.

614. Allow for arranging with the electricity authority for supplying and fixing master meter, switch and fuse box. No. 2.

615. Ditto for supplying and fixing sub-meters. No. 6.

616. Ditto for supplying and fixing electricity cooker. No. 6.

Generally:

617. Replace all broken and cracked glass from whatever cause. Leave the whole of the glass clean and perfect at the completion of the works.

618. Attend upon all other trades and make good after. Leave all perfect at the completion of the works.

619. Clear and cart away rubbish and the like from time to time and at the completion of the works.

CARRIED TO SUMMARY £

PLASTERER

Patching Old Work:

620. The laths to be similar in quality and kind and size, and to match existing in every respect.

621. The nails to be similar in quality and kind and size, and to match existing in every respect.

622. The sand to be clean, sharp, river or pit sand, free from all impurities, and washed if required. Only such as the Surveyor approves is to be used.

623. The hair to be long pile cow hair of approved quality, and to be thoroughly well beaten.

624. The lime to be freshly burned Buxton lime; after being throughly slaked it is to be run through a fine riddle in the usual way and to stand at least a month before being used.

625. The first coat for walls to be in proportion of one part lime to three parts sand. That for ceilings to be in the proportions of one part lime to two parts sand. The first coat for walls and ceilings to have 9 lb. of cow hair well beaten in and thoroughly incorporated to every cubic yard of coarse stuff.

626. The finishing coat for walls and ceilings to be in equal portions of sand and lime, gauged with Parian cement.

627. If mill ground coarse stuff mixture is used, the hair is to be added after grinding.

628. All "making good" is to be cut out to a rectangular shape, the edges cut to form dovetailed key and finished flush with face of surrounding plaster work.

629. The joints of brickwork to be raked out after the old wall plaster has been hacked off and the surface wetted before "making good".

630. All rubbish and debris arising from "making good" to be cleared off the site from time to time.

631. The prices for the whole of the work of restoration and repairs must include all costs incidental thereto of whatever nature, also must include for making out with new materials any defective or deficiency arising therefrom.

New Work:

632. The thistle plaster board to be obtained from Messrs. Thomas McGhie & Sons Ltd., 605 Tower Buildings, Liverpool 2.

633. The nails to be 1½ in. by 12 W.G. galvanized nails, with ⅜ in. diameter heads.

634. The sand to be graded, clean, sharp pit or river sand, free from all impurities, and washed if required; not more than 8 per cent. should be retained on an 8-mesh sieve (8 meshes to a lineal inch)

Carried forward £

Brought forward £

and at least 60 per cent. should be retained on a 50 mesh, and no more than 6 per cent. pass a 100 mesh.

635. The plaster to be "Thistle" brand hard wall plaster and to be obtained from Messrs. Thomas McGhie and Sons Ltd., 605 Tower Buildings, Liverpool 2.

636. The first coat on plaster board ceilings to be composed of 1½ parts of sand to one part of "Thistle" browning plaster by volume.

637. The first coat for walls to be composed of three parts sand to one part of "Thistle" browning plaster by volume.

638. The finishing coat on plaster board ceilings to be neat "Thistle" unhaired plaster and to be gauged with not more than 10 per cent. of fat or hydrated lime added thereto. The joints to be made with scrim cloth.

639. The finishing coat for walls to be neat "Thistle" unhaired plaster and to have not more than 10 per cent. fat or hydrated lime added thereto.

640. The "Thistle" plaster board and "Thistle" plaster to be applied in the manner as described in the "Green Book" issued by the manufacturers.

641. The Portland cement to be of an approved brand and manufacture, and in every respect to comply with the British Standard Specification.

642. The surveyor's approval must be obtained for alternative kinds of materials should similar materials to existing in every respect or those specified be unobtainable.

Flats No. 3

Bedroom No. 1—"The Oaks" only:

643. Allow for carefully examining lath and plaster ceiling and make good in patching any damaged and defective work. 26 yds. supl.

644. Allow for carefully examining plaster on walls, hack off all damaged and defective work and make good in patching. 43 yds. supl.

Bedroom No. 2—"The Oaks" only:

645. Allow for carefully examining ceiling, all as item 643. 20 yds. supl.

646. Allow for carefully examining plaster on walls, all as item 644. 38 yds. supl.

Carried forward £

Brought forward £

"THE WILLOWS" AND "THE OAKS"

No. 2 Cupboards on Second Floor Landings:

647. Allow for carefully examining lath and plaster ceiling, all as item 643. 2 yds. supl.

648. Allow for carefully examining plaster on walls, all as item 644. 29 yds. supl.

No. 2 Landings—Second Floor:

649. Allow for carefully examining lath and plaster ceiling, all as item 643. 13 yds. supl.

650. Allow for carefully examining plaster on walls, all as item 644. 72 yds. supl.

No. 2 Bathrooms:

651. Strip off existing lath and plaster ceiling and clear away. 9 yds. supl.

652. "Thistle" board and two coats plaster on ceiling to last. 9 yds. supl.

653. Strip off existing plaster and tiles from walls and clear away. 41 yds. supl.

654. Brush down, form key for and render and set on old walls. 41 yds. supl.

No. 2 Living Rooms:

655. Allow for carefully examining ceiling plaster, all as item 643. 46 yds. supl.

656. Allow for carefully examining plaster on walls, all as item 644. 115 yds. supl.

657. Render and set on new partition walls. 39 yds. supl.

658. Render and set on new work in patching and making good to existing. 7 yds. supl.

659. Make good in patching around mantel. No. 2.

No. 2 Entrance Hall and Staircase to Second Floor:

660. Allow for carefully examining ceiling plaster to ceilings and soffits of stairs, all as item 643. 7 yds. supl.

661. Allow for carefully examining plaster on walls, all as item 644. 49 yds. supl.

662. Render and set on new work in patching and making good to existing. 13 yds. supl.

FLATS NO. 2

Bedrooms No. 1 and 2 of each Flat:

663. Strip off existing lath and plaster ceiling and cornice and clear away. 53 yds. supl.

664. "Thistle" board and two coats plaster on ceilings. 53 yds. supl.

Brought forward £

Brought forward £

665. Hack off plaster on rear walls. 19 yds. supl.

666. Brush down, hack to form key, and render and set on old walls. 19 yds. supl.

667. Allow for carefully examining plaster on remaining walls, all as item 644. 99 yds. supl.

668. Render and set on new walls. 65 yds supl.

No. 2 W.C.s:

669. Strip off lath and plaster ceilings and clear away. 5 yds. supl.

670. "Thistle" board and two coats plaster on ceilings. 5 yds. supl.

671. Allow for carefully examining plaster on walls, all as item 644. 44 yds. supl.

No. 2 Passages:

672. Strip off lath and plaster ceilings and clear away. 13 yds. supl.

673. "Thistle" board and two coats plaster on ceilings. 13 yds. supl.

674. Render and set on new partition walls. 28 yds. supl.

675. Render and set on new walls in patching and making good to existing. 11 yds. supl.

676. Render and set to sides and soffit of beam, 24 in. in girth. 14 ft. linl.

No. 2 Bathrooms:

677. Strip off lath and plaster ceilings and clear away. 7 yds. supl.

678. "Thistle" board and two coats plaster on ceilings. 7 yds. supl.

679. Allow for carefully examining plaster on walls, all as item 644. 20 yds. supl.

680. Render and set on new walls and making good to existing. 19 yds. supl.

No. 2 Kitchens:

681. Strip off lath and plaster ceilings and clear away. 21 yds. supl.

682. "Thistle" board and two coats plaster on ceilings. 21 yds. supl.

683. Allow for carefully examining plaster on walls, all as item 644. 52 yds. supl.

684. Render and set on new walls and making good to existing. 42 yds. supl.

685. Render in cement and set in "Thistle" plaster on back and reveals of two fireplace openings including extra labour forming two square arrises to each. 6 yds. supl.

Carried forward £

Brought forward £

686. Ditto all as last item on soffit of segmental arch of fireplace opening, 4 ft. wide by 9 in. on soffit, and including extra labour forming square arris and intersections between jambs and soffits.
No. 2.

No. 2 Halls:

687. Strip off lath and plaster ceilings and clear away. 12 yds. supl.

688. "Thistle" board and two coats plaster on ceilings. 12 yds. supl.

689. Allow for carefully examining plaster on walls, all as item 644. 43 yds. supl.

690. Render and set on new walls in patching and making good to existing. 17 yds. supl.

No. 2 Living Rooms:

691. Strip off lath and plaster ceilings and clear away. 37 yds. supl.

692. "Thistle" board and two coats plaster on ceilings. 37 yds. supl.

693. Allow for carefully examining plaster on walls, all as item 644. 105 yds. supl.

694. Render and set on new walls and make good to existing work. 11 yds. supl.

Entrance Vestibules:

695. Strip off lath and plaster ceilings and clear away. 2 yds. supl.

696. "Thistle" board and two coats plaster on ceilings. 2 yds. supl.

697. Allow for carefully examining plaster on walls, all as item 644. 7 yds. supl.

698. Render and set on new walls and making good to existing. 12 yds. supl.

FLATS No. 1

No. 2 Bedrooms—No. 1:

699. Allow for carefully examining lath and plaster ceilings and cornice, all as item 643. 49 yds. supl.

700. Allow for carefully examining plaster on walls, all as item 644. 132 yds. supl.

No. 2 Bedrooms—No. 2:

701. Allow for carefully examining lath and plaster ceilings, all as item 643. 36 yds. supl.

702. Allow for carefully examining plaster on walls, all as item 644. 120 yds. supl.

Carried forward £

Brought forward £

No. 2 Cloaks:

703: Allow for carefully examining lath and plaster ceilings, all as item 643. 3 yds. supl.

704. Allow for carefully examining plaster on walls, all as item 644. 21 yds. supl.

705. Render and set on new work in patching and making good to existing. 11 yds. supl.

No. 2 Stores:

706. Allow for carefully examining lath and plaster ceilings, all as item 643. 5 yds. supl.

707. Allow for carefully examining plaster on walls all as item 644. 29 yds. supl.

708. Render and set on new work in patching and making good to existing. 16 yds. supl.

No. 2 Kitchens:

709. Allow for carefully examining lath and plaster ceilings, all as item 643. 24 yds. supl.

710. Allow for carefully examining plaster on walls all as item 644. 77 yds. supl.

711. Render and set in new partition walls. 29 yds. supl.

712. Render and set on new work in patching and making good to existing. 11 yds. supl.

713. Render in cement and set in "Thistle" plaster on back and reveals of two fireplace openings, all as item 685. 6 yds supl.

714. Ditto all as last item on soffit of segmental arch of fireplace opening 4 ft. wide by 9 in. on soffits, all as item 686. No. 2.

No. 2 Bathrooms:

715. Allow for carefully examining lath and plaster ceilings and make good in patching up to old. 12 yds. supl.

716. Allow for carefully examining plaster on walls, hack off all damaged and defective work and make good in patching. 34 yds. supl.

717. Render and set in new partition walls. 33 yds. supl.

718. Render and set on new work in patching and making good to existing. 4 yds. supl.

No. 2 W.C.s:

719. Allow for carefully examining lath and plaster ceilings and make good in patching up to old. 4 yds. supl.

720. Allow for carefully examining plaster on walls, hack off all damaged and defective work and make good in patching. 22 yds supl.

721. Render and set in new partition walls. 5 yds. supl.

Carried forward £

Brought forward £

722. Render and set on new work in patching and making good to existing. 6 yds. supl.

No. 2 Living Rooms:

723. Strip off lath and plaster ceilings, cornices and clear away. 58 yds. supl.

724. "Thistle" board and two coats plaster on ceilings. 58 yds. supl.

725. Allow for carefully examining plaster on walls, hack off all damaged and defective work and make good in patching. 121 yds. supl.

726. Render and set on new work in patching and making good to existing. 4 yds. supl.

727. Render and set on old walls (cornice taken down) 12 in. deep and making good up to old. 135 ft. linl.

728. Allow for carefully examining plaster on beam over bay window, about 4 ft. girth and 10 ft. long, and make good in patching. ("The Willows" only.) No. 1.

No. 2 Halls and Passages:

729. Allow for carefully examining lath and plaster ceilings and make good in patching up to old. 23 yds. supl.

730. Allow for carefully examining plaster on walls, hack off all damaged and defective work and make good in patching. 29 yds. supl.

731. Render and set in new partition walls. 35 yds. supl.

732. Render and set on new work in patching and making good to existing. 20 yds. supl.

No. 2 Vestibules and Staircases:

733. Allow for carefully examining lath and plaster ceilings and make good in patching up to old. 23 yds. supl.

734. Allow for carefully examining plaster on walls, hack off all damaged and defective work and make good in patching. 86 yds. supl.

735. Render and set on new partition walls. 45 yds. supl.

736. Render and set on new work in patching and make good to old. 28 yds. supl.

No. 2 Porches:

737. Allow for carefully examining lath and plaster ceilings and cornice, and make good in patching up to old. 4 yds. supl.

738. Allow for carefully examining plaster on walls, hack off all damaged and defective work and make good in patching. 28 yds. supl.

Carried forward £

Brought forward £

External Work:

739. Run 3 in. cement fillet above stone plinth at front entrance, 3 ft. long. No. 2.

740. Ditto all as last described at intersection of concrete flat over coal houses and main wall, 18 ft. long. No. 2.

741. Hack and form key, render in cement trowelled smooth to two stone plinths by entrance. 3 yds. supl.

Generally:

742. Execute all ordinary arrises, beads, mitres, etc., and do all ordinary counter-lathing; make good cracks and blisters, and do all patching as required.

743. Attend upon all other trades generally and make good after, leave the whole of the work clean and perfect at completion.

744. Clear and cart away all rubbish from time to time and at the completion of the works.

CARRIED TO SUMMARY £

PAINTER

@ £ s. d.

745. The paint to be mixed general purpose paint obtained from an approved manufacturer.

746. Knotting to be best shellac knotting.

747. The priming coat to be genuine white lead paint.

748. Only best quality linseed oil and genuine American turpentine are to be used for thinners and driers; driers are to be avoided as much as possible, but never to exceed two per cent.

749. The distemper to be obtained from an approved manufacturer.

750. The paints and distempers are to be delivered on the site in sealed cans bearing the name of the manufacturer, and labelled as to quality for both interior and exterior work.

751. The Surveyor's approval shall be obtained for alternative kinds of materials, should those specified be unobtainable.

752. Each coat of paint to be of a different tint, no coat to be applied until the previous one has been approved, and finish in such plain colour as directed.

753. All work to be thoroughly rubbed down between each coat and stopped and/or faced up as necessary.

Carried forward £

Brought forward £

754. All ironwork, whether delivered primed or unprimed, including existing ironwork, to be thoroughly cleaned down and wire-brushed and scraped as necessary, to remove all rust and loose scale.

755. All gutters to be thoroughly cleaned out before painting.

756. Where the words BRUSH DOWN appear in the item of description it shall mean: brush down with wire brushes.

757. Where the word PREPARE appears in the item of description on plaster work it shall mean: glass paper, dust down and remove all superfluous matter, effectively treat all grease and tar stains by covering with a good quality knotting, repair all damaged portions and cracks by raking out and thoroughly wetting and filling in with stopping made from one part plaster of Paris and one part whiting mixed to a thick paste with water, then the whole surface sized with weak jellied size to obtain even absorption over the whole surface.

758. Where the words WASH OFF AND PREPARE appear in the item of description on plaster work which has been previously distempered it shall mean: that all distemper must be removed by washing with water, and where the surface is badly stained and cracked in addition to washing it shall include making good all holes and cracks by raking out wetting and fitting in with stopping as described in Preamble Clause 757, and when dry as therein described.

759. Where the words SCRAPE OFF, WASH AND PREPARE appear in the item of description for existing work it shall mean: all old paper is to be removed in one process by thoroughly soaking with water and removed with a broad knife, and the surface afterwards treated in a manner as described in Preamble Clause 757.

760. Where the words CLEAN OFF AND PREPARE appear in the item of description for cement work which has been previously painted it shall mean: that the paint on the existing surface to be thoroughly removed therefrom, brush down, make good all holes and cracks by raking out, wetting and fitting in with stopping made from one part plaster of Paris (white cement for external work) and one part lime, made into a paste with water.

761. Where the words PREPARE, KNOT, STOP . . . appear in the description of item it shall mean: the removal of all foreign matter, plaster, mortar, glue, etc., glass-papering of rough portions and general dusting down, the treatment of all knots and sappy portions with a shellac composition and the

Carried forward £

Brought forward £

filling in of all holes and cracks made with the same material as the paint, stiffened with whiting.

762. Where the words SCRAPE OR BURN OFF, PREPARE . . . appear in the item of description on previously painted woodwork it shall mean: that the paint shall be burnt or scraped off existing painted surfaces and the surfaces prepared in a like manner as described in the Preamble Clause 761.

763. The prices for the whole of the works of restorations and repairs must include all costs incidental thereto of whatever nature, also must include for touching up any defective or damaged parts arising therefrom.

Yards and Cellars:

764. Prepare, knot, stop, prime and three coats plain paint and one coat varnish on external face and two coats plain paint on internal face of combination door and window frame, size of door 2 ft. 8 in. by 6 ft. 0 in. and size of window 1 ft. 8 in. by 2 ft. 10 in. No. 2.

765. All as item 764 but on casement window size 4 ft. 2 in. by 3 ft. 0 in. No. 2.

766. All as item 765 but size 3 ft. 9 in. by 3 ft. 4 in. No. 2.

Coal Houses:

767. Prepare, stop, prime and three coats plain paint and one coat varnish on external face and two coats plain paint in internal face of coal house door frames and doors, size 2 ft. 9 in. by 5 ft. 0 in. No. 6.

FLATS NO. 3

"THE WILLOWS" only.

Bedroom No. 1:

768. Scrape or burn off, prepare and two coats plain paint on matchboarded ceiling, walls, purlins, and bed moulds. 35 yds. supl.

769. Scrape or burn off, prepare and three coats plain paint and one coat varnish on external face and two coats plain paint on internal face of sliding sash window, size 3 ft. 3 in. by 4 ft. 9 in., and architraves, etc. No. 1.

770. Scrape and burn off, prepare and two coats plain paint on wood skirtings. 21 yds. linl.

771. Prepare, knot, stop, prime and two coats plain paint on new fascia board, average 6 in. girth. 10 yds. linl.

772. Prepare, knot, stop, prime and two coats plain on both sides of panel door, size 2 ft. 7 in. by 6 ft. 3 in. and casing, architraves, etc. No. 1.

Carried forward £

Brought forward £

773. All as item 773 on new wood mantel shelf, 3 ft. long. No. 1.

774. Prepare and two coats Brunswick Black on register grate. No. 1.

Bedroom No. 2:

775. All as item 768 on matchboarded ceiling, walls, purlin and bed moulds. 65 yds. supl.

776. All as item 769 on sliding sash window, size 3 ft. 3 in. by 4 ft., 9 in. and architraves, etc. No. 1.

777. All as item 770 on wood skirting. 17 yds. linl.

778. All as item 772 on both sides of panel door, size 2 ft. 7 in. by 6 ft. 4 in., and casing, architraves, etc. No. 1.

"THE OAKS" only

Bedroom No. 1:

779. Wash off and prepare and two coats distemper on ceiling plaster. 26 yds. supl.

780. Scrape off, wash, prepare and two coats distemper on wall plaster. 43 yds. supl.

781. All as item 769 on sliding sash window, size 3 ft. 3 in. by 4 ft. 9 in, and architraves, etc. No. 1.

782. All as item 770 on wood skirting. 21 yds. linl.

783. All as item 772 on both sides of panel door, size 2 ft. 7 in. by 6 ft. 3 in., and casing and architraves, etc. No. 1.

Bedroom No. 2:

784. All as item 779 on ceiling plaster. 20 yds. supl.

785. All as item 780 on wall plaster. 38 yds. supl.

786. All as item 769 on sliding sash window, size 3 ft. 3 in. by 4 ft. 9 in., and architraves, etc. No. 1.

787. All as item 770 on wood skirting. 17 yds. linl.

788. All as item 772 on both sides of panel door, size 2 ft. 7 in. by 6 ft. 4 in., and casing and architraves. No. 1.

"THE WILLOWS" and "THE OAKS"

No. 2 Cupboards on Second Floor Landing:

789. All as item 779 on ceiling plaster. 2 yds. supl.

Carried forward £

Brought forward £

790. All as item 780 on wall plaster.
29 yds. supl.

791. All as item 772 on both sides of panel door, size 2 ft. 10 in. by 4 ft. 6 in., and casing and architraves. No. 2.

No. 2 Landings—Second Floor:

792. All as item 779 on ceiling. 13 yds. supl.

793. All as item 780 on wall plaster.
72 yds. supl.

794. Scrape or burn off, prepare and two coats on both sides of skylight, size 3 ft. 3 in. by 6 ft. 0 in. No. 2.

795. All as item 770 on wood skirting.
4 yds. linl.

No. 2 Bathrooms:

796. Prepare and two coats distemper on new ceiling. 9 yds. supl.

797. Prepare and two coats distemper on new wall plaster. 41 yds. supl.

798. All as item 769 on sliding sash window, size 2 ft. 11 in. by 5 ft. 3 in., and architraves, etc. No. 2.

799. Ditto all as last item, but size 2 ft. 6 in. by 4 ft. 3 in. No. 2.

800. All as item 770 on wood skirting.
9 yds. linl.

801. Prepare, knot, stop, prime and two coats plain paint on all cleats, pipe boards. No. 2.

802. All as item 772 on both sides of panel door size 2 ft. 8 in. by 6 ft. 8 in., and casing and architraves. No. 2.

No. 2 Living Rooms:

803. All as item 779 on ceiling. 46 yds. supl.

804. All as item 780 on wall plaster.
115 yds. supl.

805. All as item 797 on new wall plaster.
46 yds. supl.

806. All as item 769 on sliding sash window, size 4 ft. 0 in. by 7 ft. 1 in., and architraves, etc. No. 4.

807. All as item 770 on wood skirting.
34 yds. linl.

808. Prepare, knot, stop, prime and two coats plain paint on new wood skirtings. 12 yds. linl.

809. Prepare, knot, stop, prime and two coats plain paint on both sides of cylinder cupboard and doors, size 4 ft. 3 in. by 10 ft. 0 in., architraves and shelf edges. No. 2.

810. All as item 772 on both sides of panel door, size 2 ft. 8 in. by 6 ft. 8 in., and casing and architraves. No. 2.

Carried forward £

Brought forward £

No. 2 Scullery Recesses:

811. Prepare, stop, prime and three coats plain paint and one coat varnish on external face and two coats plain paint on internal face of new sliding sash window, size 3 ft. 9 in. by 5 ft. 6 in., and architraves, etc. No. 2.

No. 2. Halls and Staircases:

812. All as item 779 on ceiling. 7 yds. supl.

813. All as item 780 on wall plaster. 49 yds. supl.

814. All as item 797 on new wall plaster. 13 yds. supl.

815. Scrape or burn off, prepare and two coats plain paint on strings and margins of staircase, also balusters and capping. No. 2.

816. All as item 772 on both sides of panel door, size 2 ft. 8 in. by 6 ft. 8 in., and frame and architraves. No. 2.

FLATS NO. 2

Bedrooms Nos. 1 and 2 of each Flat:

817. All as item 796 on new ceilings. 53 yds. supl.

818. All as item 780 on wall plaster. 99 yds. supl.

819. All as item 797 on new partition wall plaster. 84 yds. supl.

820. All as item 769 on sliding sash window, size 4 ft. 0 in. by 6 ft. 9 in., and architraves, etc. No. 4.

821. All as item 811 on new sliding sash window to Bedrooms No. 2, size 3 ft. 9 in. by 5 ft. 6 in., and architraves, etc. No. 2.

822. All as item 809 frame and doors to wardrobe, size 5 ft. 2 in. by 6 ft. 9 in., and architraves, shelf, rails, etc. No. 2.

823. All as item 770 on wood skirting. 35 yds. linl.

824. All as item 808 on new wood skirting. 16 yds. linl.

825. Scrape or burn off, prepare and two coats plain paint on picture rail. 35 yds. linl.

826. Prepare, knot, stop, prime and two coats plain paint on new picture rail on partition walls. 21 yds. linl.

827. All as item 772 on both sides of door, size 2 ft. 6 in. by 6 ft. 6 in., and casing and architraves. No. 4.

Carried forward £

Brought forward £

No. 2 W.C.s and Passages:

828. All as item 796 on new ceiling plaster.
18 yds. supl.

829. All as item 780 on wall plaster.
44 yds. supl.

830. All as item 797 on new wall plaster.
42 yds. supl.

831. All as item 769 on sash window, size 1 ft. 5 in. by 2 ft. 7 in. No. 2.

832. All as item 801 on pipe board.
6 yds. linl.

833. All as item 770 on wood skirtings.
18 yds. linl.

834. All as item 808 on new wood skirtings.
10 yds. linl.

835. Scrape or burn off, prepare and two coats plain paint on both sides of glazed top panel door, size 2 ft. 5 in. by 6 ft. 8 in., and casing and architraves.
No. 2.

No. 2 Kitchens and Bathrooms:

836. All as item 796 on new plaster ceiling.
28 yds. supl.

837. All as item 780 on wall plaster.
72 yds. supl.

838. All as item 797 on new wall plaster to partition walls. 61 yds. supl.

839. Prepare, knot, stop and prime with "Foochow" Macsealer and paint one with "Foochow" liquid wall glaze on wall and soffit plaster at back of heating boilers. 7 yds. supl.

840. All as item 811 on new sliding sash three-light window, size 6 ft. 3 in. by 5 ft. 3 in., and architraves, etc. No. 2.

841. All as item 840 on new sliding sash window, size 2 ft. 5 in. by 4 ft. 3 in. No. 2.

842. All as item 770 on wood skirtings.
18 yds. linl.

843. All as item 808 on new wood skirtings.
19 yds. linl.

844. All as item 801 on pipe boards, cleats, etc.
No. 2.

845. All as item 809 on both sides of cylinder cupboard frame and doors, size 2 ft. 8 in. by 6 ft. 8 in. and 2 ft. 8 in. by 2 ft. 9 in., and shelving, cleats, etc. No. 2.

846. All as item 772 on both sides of panel door, size 2 ft. 6 in. by 6 ft. 6 in., and casing, architraves, etc. No. 6.

Carried forward £

Brought forward £

No. 2 Halls:

847. All as item 792 on new plaster ceilings.
12 yds. supl.

848. All as item 780 on wall plaster.
43 yds. supl.

849. All as item 797 on new wall plaster.
17 yds. supl.

850. All as item 770 on wood skirtings.
11 yds. linl.

851. All as item 808 on new wood skirting.
12 yds. linl.

852. All as item 801 on hat and coat rail.
6 yds. linl.

853. All as item 809 on both sides of cloak cupboard frame and door, size 5 ft. 0 in. by 10 ft. 0 in., and architraves and hat and coat rail, etc. No. 2.

854. All as item 794 on both sides of borrowed light, size 3 ft. 0 in. by 3 ft. 6 in., and linings and architraves. No. 4.

855. All as item 772 on both sides of entrance door size 2 ft. 8 in. by 6 ft. 8 in., and casing and architraves. No. 2.

No. 2 Living Rooms:

856. All as item 796 on new ceiling plaster.
37 yds. supl.

857. All as item 780 on wall plaster.
105 yds. supl.

858. All as item 797 on new wall plaster.
11 yds. supl.

859. All as item 769 on sliding sash window, size 4 ft. 0 in. by 7 ft. 0 in. and architraves, etc. No. 2.

860. All as item 770 on wood skirting.
35 yds. linl.

861. All as item 808 on new wood skirtings.
4 yds. linl.

862. All as item 825 on picture rail.
37 yds. linl.

863. All as item 772 on both sides of panel door, size 2 ft. 8 in. by 6 ft. 8 in., and casing and architraves.
No. 2.

No. 2 Entrance Vestibules:

864. All as item 796 on new ceiling plaster.
2 yds. supl.

865. All as item 780 on wall plaster.
7 yds. supl.

866. All as item 797 on new wall plaster.
12 yds. supl.

867. All as item 770 on wood skirting.
6 yds. linl.

Carried forward £

Brought forward £

FLATS NO. 1

No. 2 Bedrooms—No. 1:

868. All as item 779 on ceiling plaster.
49 yds. supl.

869. All as item 780 on wall plaster.
132 yds. supl.

870. All as item 769 on sliding sash window, size 4 ft. 0 in. by 8 ft. 4 in., and architraves, etc. (middle bay). No. 2.

871. Ditto all as last item, but size 2 ft. 4 in. by 8 ft. 4 in., and architraves, etc. (side bays).
No. 4.

872. All as item 770 on wood skirting.
21 yds. linl.

873. All as item 825 on picture rail.
37 yds. linl.

874. All as item 772 on both sides of panel door size 2 ft. 10 in. by 6 ft. 10 in., and casing, architraves, etc. No. 2.

No. 2 Bedrooms—No. 2:

875. All as item 779 on ceiling plaster.
36 yds. supl.

876. All as item 780 on wall plaster.
120 yds. supl.

877. All as item 769 on sliding sash window, size 4 ft. 6 in. by 8 ft. 0 in., and architraves, etc.
No. 2.

878. All as item 770 on wood skirting.
33 yds. linl.

879. All as item 825 on picture rail.
37 yds. linl.

880. All as item 809 on both sides of wardrobe cupboard, size 2 ft. 3 in. by 11 ft. 0 in. No. 2.

881. All as item 772 on both sides of panel door, size 2 ft. 8 in. by 6 ft. 8 in., and casing, architraves, etc. No. 2.

No. 2 Stores and No. 2 Cloaks:

882. All as item 779 on ceiling plaster.
8 yds. supl.

883. All as item 780 on wall plaster.
50 yds. supl.

884. All as item 797 on new wall plaster.
27 yds. supl.

885. All as item 794 on both sides of borrowed light, size 2 ft. 11 in. by 4 ft. 9 in., and linings, architraves, etc. No. 2.

886. All as item 770 on wood skirting.
12 yds. linl.

Carried forward £

Brought forward £

887. All as item 808 on new wood skirting.
8 yds. linl.

888. All as item 801 on 5 in. wrought and moulded hat and coat rail. 6 yds. linl.

889. All as item 772 on both sides of panel door, size 2 ft. 4 in. by 6 ft. 4 in., and casing, architraves, etc. No. 2.

890. All as item 773 on both sides of panel door, size 2 ft. 8 in. by 6 ft. 8 in., and casing and architraves. No. 2.

No. 2 Kitchens and Bathrooms:

891. All as item 779 on ceiling plaster.
36 yds. supl.

892. All as item 780 on wall plaster.
111 yds. supl.

893. All as item 797 on new wall plaster.
84 yds. supl.

894. All as item 769 on sliding sash window, size 5 ft. 1 in. by 6 ft. 3 in., and architraves, etc. No. 2.

895. All as item 811 on new three light sliding sash windows, size 5 ft. 3 in. by 5 ft. 3 in. No. 2.

896. All as item 808 on new wood skirting.
49 yds. linl.

897. All as item 801 on pipe boards, cleats, etc., in bathroom. No. 2.

898. Ditto all as item 809 on cylinder cupboard, size 4 ft. 0 in. by 11 ft. 0 in. No. 2.

899. All as item 772 on both sides of panel door, size 2 ft. 8 in. by 6 ft. 8 in., and casing, architraves, etc. No. 2.

900. All as item 772 on both sides of panel door, size 2 ft. 6 in. by 6 ft. 8 in., and casing, architraves, etc. No. 2.

No. 2 W.C.s:

901. All as item 779 on ceiling plaster.
4 yds. supl.

902. All as item 780 on wall plaster.
22 yds. supl.

903. All as item 797 on new wall plaster.
11 yds. supl.

904. All as item 769 on sliding sash windows, size 2 ft. 6 in. by 4 ft. 6 in., architraves, etc. No. 2.

905. All as item 770 on wood skirting.
10 yds. linl.

906. All as item 772 on both sides of panel door, size 2 ft. 4 in. by 6 ft. 4 in., and casing, architraves, etc. No. 2.

No. 2 Living Rooms:

907. All as item 796 on new ceiling plaster.
58 yds. supl.

Carried forward £

Brought forward £

908. Wash off and prepare and two coats distemper on plaster beam over bay window, about 4 ft. girth and 10 ft. long ("THE WILLOWS" only). No. 1.

909. All as item 780 on wall plaster and cornice.
121 yds. supl.

910. All as item 797 on new wall plaster.
19 yds. supl.

911. All as item 769 sliding sash window, size 5 ft. 0 in. by 8 ft. 3 in., and architraves, etc. No. 2.

912. Ditto all as last described, but size 2 ft. 6 in. by 6 ft. 3 in. to side bay windows. No. 4.

913. All as item 770 on wood skirting.
37 yds. linl.

914. All as item 808 on new wood skirting.
3 yds. linl.

915. All as item 825 on picture rail.
37 yds. linl.

916. All as item 772 on both sides of panel door, size 2 ft. 10 in. by 6 ft. 10 in., and casing, architraves, etc. No. 2.

No. 2 Halls and Passages:

917. All as item 779 on ceiling plaster.
23 yds. supl.

918. All as item 780 on wall plaster.
29 yds. supl.

919. All as item 797 on new wall plaster.
55 yds. supl.

920. Scrape or burn off, prepare and two coats plain paint on both sides of doors and panelling to staircase. 8 yds. supl.

921. All as item 772 on both sides of entrance panel door, size 2 ft. 8 in. by 6 ft. 8 in., and casing and architraves. No. 2.

922. All as item 770 on wood skirting.
16 yds. linl.

923. All as item 808 on new wood skirting.
11 yds. linl.

924. All as item 825 on picture rail.
34 yds. linl.

925. All as item 826 on new picture rail.
10 yds. linl.

No. 2 Vestibules and Staircases up to entrance to Flats No. 3:

926. All as item 779 on ceiling plaster and cornice. 23 yds. supl.

927. All as item 780 on wall plaster.
86 yds. supl.

928. All as item 797 on new wall plaster.
73 yds. supl.

929. All as item 769 on sliding sash window, size 2 ft. 9 in. by 8 ft. 0 in., and architraves, etc. No. 2.

Carried forward £

Brought forward £

930. All as item 770 on wood skirting.
14 yds. linl.

931. All as item 808 on new wood skirting.
6 yds. linl.

932. All as item 825 on picture rail.
23 yds. linl.

933. All as item 826 on new picture rail.
10 yds. linl.

934. All as item 815 on strings and margins of staircase, also balusters and capping. No. 2.

935. All as item 772 on both sides of entrance door, size 3 ft. 4 in. by 6 ft. 10 in., door frame and architraves. No. 2.

No. 2 Porches:

936. All as item 779 on ceiling plaster.
4 yds. supl.

937. All as item 780 on wall plaster.
28 yds. supl.

938. All as item 770 on wood skirting.
7 yds. linl.

939. All as item 769 on sliding sash window, size 2 ft. 9 in. by 8 ft. 0 in., and architraves, etc.
No. 2.

940. All as item 764 on both sides of front entrance door, size 3 ft. 5 in. by 6 ft. 10 in., and frames, linings, and architraves. No. 2.

External Works:

941. Prepare, knot, stop, prime and three coats plain paint and one coat varnish on 7 in. wrought and moulded fascia. 22 yds. linl.

942. All as item 794 on skylight at rear, size 5 ft. 6 in. by 2 ft. 6 in. No. 2.

943. All as item 941 on barge boards and capping, fascia and crown moulds, etc., at gable ends and front elevation. No. 1.

944. All as item 941 on garden gate to "The Oaks" only, size 3 ft. 11 in. by 3 ft. 9 in. No. 1.

945. Brush down and two coats plain paint and one coat varnish on 2 in. diameter, cast iron rainwater pipes. 10 yds. linl.

946. All as item 945 on 3 in. diameter cast iron rainwater pipes. 24 yds. linl.

947. All as item 945 on 4 in. diameter cast iron rainwater pipes. 16 yds. linl.

948. Prepare, clean from rust, brush down and two coats plain paint and one coat varnish on cast iron eaves gutter to front bays. 12 yds. linl.

Carried forward £

Brought forward £

On Asbestos Pipes, etc.:

949. Prepare, prime with mordant, and two coats plain paint and one coat varnish on 6 in. moulded eaves gutters, inside and outside, including nozzles, stop ends, brackets, etc. 11 yds. linl.

950. Ditto all as last item on 4 in. 11 yds. linl.

951. Ditto all as last item on 2 in. diameter rainwater and waste pipes, cistern heads, offsets, branches, etc. 14 yds. linl.

952. Ditto all as last item on 3 in. diameter rainwater pipes and fittings. 45 yds. linl.

953. Ditto all as last item on 4 in. diameter soil and ventilating pipes, branches, bends, and swan-necks. 40 yds. linl.

Generally:

954. Clean and scour all floors on completion; clean all windows, inside and outside, on completion; and clean off all paint splashes and spots on completion.

955. Attend upon all other trades and make good after. Touch up any defective work and leave all perfect at the completion of the works.

956. Clear and cart away all rubbish and the like from time to time and at the completion of the works.

CARRIED TO SUMMARY £

SUMMARY

	£	s.	d.
To General Works and Conditions			
Excavator and Drainer			
Concretor			
Bricklayer and Mason			
Carpenter and Joiner			
Slater			
Plumber and Glazier			
Plasterer			
Painter			
By CREDIT for Old Materials			
CARRIED TO FORM OF TENDER £			

Signature of Contractor .....

Address .....

Date ....

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