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Written for THE INLAND PRINTER.

TALKS ON TYPECASTING.

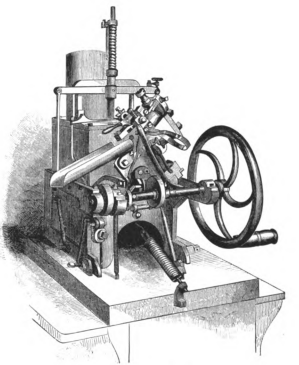
NO. I.—BY ALFRED MC CUE.

TYPECASTING machines for printers are a development of the times. Not that it is a new proposition for printers to be their own typefounders—the earliest printers always cast their own types; from Gutenberg to Caxton they were their own typefounders. The early American printers also followed this practice. The possession of the punches with which the matrices were driven created a natural monopoly in the hands of their owners. The cost of these punches alone in many cases mounted in the thousands of dollars, and the multiplication of faces made the investment in this particular soon eclipse that of all the other equipment of the printer. From occasionally casting a few fonts for other printers, the business of the typecasting printer increased in this line to a point where the printing end was entirely subordinated to the typefounding, and quite naturally the former printer soon chose the line along which there was the least competition. Here we have the nucleus of the modern typefoundry. The ownership of type-punches, their excessive cost and the rapid expansion of the printing trade made it inevitable that typefounding must be specialized, in order to keep up with the demand for type and printing.

To appreciate why this was so, it will be helpful to briefly outline the art of punchcutting, as it was practiced in those days. The characters constituting the font were first carefully drawn on paper. A counter-punch for each letter was then cut in steel and hardened. This punch represented the interior portions of the letters—the portions embraced by the outlines of the letters themselves. Each counter-punch was then driven into the end of a short bar of steel and the punchcutter cut away the outer portions until the letter stood in relief on the steel. The punch was then hardened. While a few words describe the process, infinite skill and care was essential, and each punch when finished represented a cost of from $2 to $3. When it is remembered that a font of roman book-type required the engraving of about one hundred and fifty punches, it will be seen that the outlay in this respect alone soon mounted into money of large denomination. Job-type fonts average about half this number of punches.

The next step was to drive the matrix. This was done by punching the character into a block of copper of somewhat larger dimensions than the face of the punch. This produced an intaglio, and after elaborate filing, fitting and justifying to position each character of the font in exact relation to the edges of the matrix, to make the drives of all of the same identical depth, and the faces and edges parallel and square, the matrices were ready for the typecaster.

Until 1888, typecasting machines were of the model invented by David Bruce, Jr., of New York, in 1838. Before that type was cast in hand-molds. A cut of this machine is here reproduced. The mold consisted of two parts of steel, L-shaped, and arranged to cast the type with a jet or sprue on the foot. A separate mold was required for each size of body. The mold was mounted at an angle



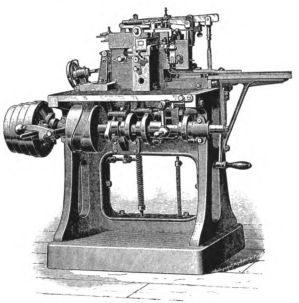
THE BRUCE TYPECASTING MACHINE.

on the machine, and as the crank was turned by hand the mold and matrix were pressed against the nozzle of a metal-pot and metal was pumped into the mold and against the matrix to form a type. The mold then opened on a hinge and the type was dropped into a chute, and thence into a box. As the type fell loosely into the box, with the jet or sprue still attached to the types, these had to be broken off by hand. They then were rubbed on the sides, to remove burs of metal, and set into long lines by hand. A plow was then run along the foot of the type, to remove the metal at the point of fracture.

In the early eighties, Foucher, of Paris, France, patented in Europe an automatic typecaster, which became the model of the present-day foundry machines.

In 1888 the late Henry Barth, of Cincinnati, Ohio, made substantial improvements in the

Foucher machine, and machines on the lines of his invention have superseded the Bruce machines almost entirely. A reproduction of the Barth typecaster is here shown. In this machine the type was finished complete and ready for the case. The mold was adjustable to cast various sizes of bodies, and sliding members ejected the type, broke off the jets, and pushed them through cutting-tools to dress the foot and remove the burs. Moreover, as the type was delivered all set up in



THE BARTH TYPECASTING MACHINE.

a line, it was ready for inspection and packaging. It was power-driven and automatic and the speed of production greatly in excess of the Bruce machine. This machine, or modifications of it, is used by all typefounders to-day.

With, then, the typefounders in possession of the punches and the machines (for be it known, each typefounder built his own machines, nor would he build or sell them to others), how does it come that to-day we are returning to the methods of the discoverers and originators of printing? Again it is because of the matrix. The invention of the art of electrotyping has resulted in once more placing in the printer's hands the manufacture of his own type. Typefounders themselves have long employed this method to rapidly produce new faces and reproduce old ones.

If duplication of a font of type already in existence is wanted, the characters are prepared for the electrotyping bath. If a new design is wanted, it is cut in type-metal, cheaply and rapidly. These are suspended in the electrotyping solution and the copper shell removed and mounted in a brass plate, backed up, fitted and is then ready for the machine. The type cast from these matrices is in every way equal to that cast from steel-driven copper matrices. Instead of a restricted and narrowing art, the production of type at once became a universal possibility. Electrotyping methods were familiar to many; punch-cutting to the few.

Another method used by typefounders for the production of matrices is that of engraving by machinery, pantograph machines being used for both punchcutting and engraving matrices direct. These machines are expensive, costing several thousand dollars each, but their invention made it possible to keep up with the rapid strides made in other branches of the art of printing.

(To be continued.)

THE APPRECIATIVE WORD THAT IS BETTER THAN GOLD.

William Allen White printed the following card of thanks in the Emporia *Gazette:* "Before getting down to work again it will be necessary for the undersigned to clean off his desk three cubic feet of accumulated mail. But it is only just to the men and women who have been running the *Gazette* for the past five months to say that they have been running it without strings — just as they would have run it if they had owned it. They were left no instructions, no general orders — no limitations. And they have conducted the paper as nearly in the line of absolute honesty as it is possible to conduct any human business. They have made a most interesting paper — and it has represented their idea of what a newspaper should be, and candor compels the statement that on the whole it was a more entertaining and enjoyable paper than it would have been if the owner had been here. Local stories of a most delicate nature were handled with the most admirable taste. The dead were honorably buried, the brides were sent on their way rejoicing, politics was left hanging on the clothesline to bleach in the wind, and the subscription is better and the advertising patronage stronger than it was last fall. If ever men and women were faithful to a trust these men and women were who have been running the *Gazette* during the spring past and the summer passing; and the trust they were loyal to was their own consciences and their own judgments. They were true to themselves, and, hence, to every one." To *Pointers* the *Gazette* has never been more interesting than during the past five months. The compliment was merited.— *Pointers.*

TRIBULATIONS OF AN EDITOR.

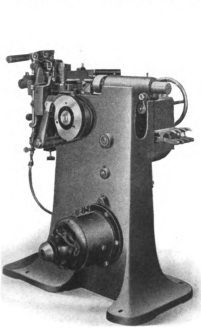
Last week a man stepped up to us and said he would pay us every cent that he owed us if he lived until Saturday night. We presume the man died. Another man said he would pay us in a day or two as sure as we were born. Query — Did the man lie or were we never born? Another said he would settle as sure as shooting. We presume that shooting is very uncertain. Another man said he hoped to go to the devil if he did not pay us within three days. Haven't seen him since. Suppose he has gone, but trust he did not hope in vain. Quite a number said they would see us to-morrow. They must have been stricken blind or to-morrow has not come yet. One man told us six months ago that he would pay us as soon as he got the money. The man would not lie, of course. He has not had a cent since.— *Fredericktown (Ohio) Free Press.*

Written for THE INLAND PRINTER.

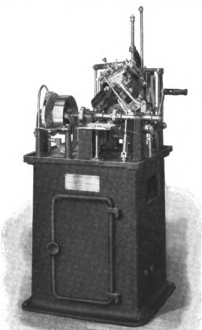
TALKS ON TYPECASTING.

NO. II.— BY ALFRED MC CUE.

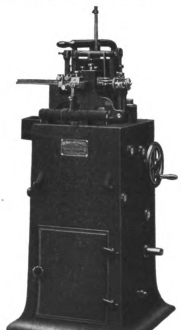
THE typecasting-machine field is no exception to the law of supply and demand. A decade ago, the printer could not purchase a typecaster for love or money, as none was for sale. And had he one, the matrices were lacking. To-day he has the choice of several, and matrices knock at his very door. Typefounding has existed for more than four hundred years, and its practice has settled along certain well-established lines. It is fair to presume that no radical changes can be made in the methods. Type will, in all probability, be cast one at a time for many years to come. Not that there have been no attempts to do otherwise. The innovation. The venture was unfortunate in other ways. The machine was designed on novel lines, the mold being radically different from what had been settled upon by many years of experience and experiment. It might be called a combination of the Bruce and Barth principles. The mold was an opening and closing affair, but the type was ejected by a sliding body-piece onto a stick, the mold parts closing together with a wedging action. The excessive wear of the mold parts and lack of means for adjustment soon destroyed its accuracy. The fact that the jet opening, through which the metal entered the mold, could not be enlarged when casting the larger bodies of type, caused these to be cast more or less hollow, and as a result the type was crushed when subjected to the pressure of the printing-press. No means for lubrication or water-cooling of the mold were provided, and the



THE COMPOSITYPE AUTOMATIC TYPECASTER.



NUERNBERGER-RETTIG TYPECASTER.



THE THOMPSON TYPECASTER.

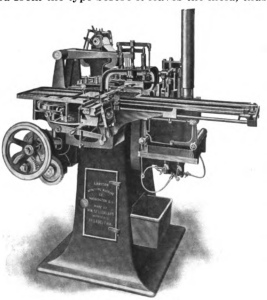
patent records are replete with many brilliantly conceived schemes to cast whole alphabets at one operation, or groups of characters, or even two types at once, but commercially the ways of Bruce and of Barth still prevail. True, in England there is the Wicks machine, which spouts out type in a continuous stream, whole alphabets in succession, but this machine is confined to the smaller bodies and really casts but one letter at a time.

The first attempt to usher in the new order of things was made in Baltimore, Maryland, by the manufacturers of the Compositype machine. Printers did not for a long time take kindly to the speed of the machine was, therefore, painfully slow. The limit of this machine was from six to thirty-six point type. Separate mold sections were required for each body size, but low quads and spaces could also be cast in the letter-molds. Notwithstanding all the drawbacks and the opposition of antagonists, several hundred machines were placed in this country. Many of them are running to-day. The company had practically exhausted its resources in 1907, and its factory in Baltimore has not been in operation for the past few years.

One great benefit done by this company was the making and stocking of thousands of fonts of elec-

trotyped matrices, which were rented to its customers at a nominal daily rental. It demonstrated to the satisfaction of the printers of the country that the matrix, at least, no longer was an obstacle to their becoming their own typefounders.

The next typecaster to make its bow to the printing world was the Nuernberger-Rettig machine, made in Chicago. The lines of this machine follow closely those of the Bruce machine. Indeed, the main point of variance is that the jet is separated from the type before it leaves the mold, thus



THE LANSTON MONOTYPE CASTER.

doing away with the handwork of breaking the jets. As the point of separation extends upward into the body of the type, no tooling of the foot of the type is necessary. Otherwise, the machine is virtually a power-driven Bruce machine. Nothing smaller than six-point is cast and nothing larger than thirty-six-point. As with its progenitor, separate and complete molds are required for each body-size of type, and another set of molds is also necessary to cast low quads and spaces. These molds can be quickly taken from the machine and changed, as can also the matrices. The latter are copper-driven, similar to the regular foundry matrices, the company operating a large punchcutting and matrixmaking department. A number of these machines have been installed in printing-offices in various parts of the country, and are substantial evidence of the fact that printers are eager to return to first principles when the opportunity is offered.

As the Compositype machine was a composite of the Bruce and Barth, and the Nuernberger-Rettig a regenerated Bruce, we look for the successor of the Barth machine, and find it in the Thompson typecaster, another Chicago man's invention. Here we have the Barth style of mold, universally adjustable to cast all sizes from five to forty-eight point type, and, by using a special matrix, low quads and spaces are cast in the same mold. The type is ejected in a continuous line and dressed and trimmed by cutting-tools, as in the Barth machine. But, perhaps, the greatest stride in the direction of gaining the printer's favor is found in the fact that this machine employs the ordinary Linotype matrix from which to cast its type. These matrices cost but 3 cents each, and can be had in over three hundred fonts and faces, for English as well as foreign languages. Logotypes can be also cast from Linotype matrices. Electrotype matrices are used for the faces above the Linotype range (fourteen-point) and, as matrices of the Compositype machine can also be used interchangeably with those made for the Thompson machine, the resources of its predecessors are at its command. The Thompson Type Machine Company also manufactures electrotype matrices in all sizes up to forty-eight point, which it rents to its customers.

That the manufacturers anticipate a demand from not only the larger city printers, but also the country printers, is shown by the manner of constructing a speed-changing device within the machine base, so that the machine can be run by belt with connection from a line-shaft, where direct or alternating current motors are not used. Gas, gasoline or coal-oil burners have also been developed to heat the metal-pot in districts where there is no choice. These machines have been in commercial use for nearly two years, some having been shipped to Oriental countries.

Another typecasting machine which is dedicated to the printing world is one which, while older than either of the others, has only recently been offered as a typefounding machine — the Monotype. This is the well-known typecasting machine, stripped of its typesetting complications, and adapted to cast type from, not only its copper, punch-driven body matrices, but also the larger sizes of job type, the latter being electrotypes. As this typecaster is convertible into a typesetting machine, it serves a double purpose. Separate molds are employed for each size up to twelve-point. Above that the molds are adjustable within certain limits, three sizes being employed to cast the sizes up to thirty-six-point. Low quads and spaces require a separate set of molds. Quads above one em in size can be cast in bodies above twelve-point. The mechanism of this machine, of course, is peculiar to the requirements of a typesetting machine, but in so far as the mold is concerned, it is a direct descendant of the Barth.

dently a wide-awake concern, though it is more than a century old. We are not informed as to just how this firm expects to get its work through, but have no doubt it is speaking by the book when it offers to do so. Nor do we believe, speaking relatively, that much work will cross the Atlantic — not even though the Germans follow the Englishman's example and go him one better as to cost. In this, however, the wish may be father to the thought. But the incident is interesting in that it shows the need of concerted action on the part of the printing trades. When the Congressional Ways and Means Committee was giving hearings last summer, we directed attention to the absurdity of organizations of employers and employees going before the committee as unrelated entities. A vigorous attack was made on the paper interests, but we notice the paper schedules are in such shape as to prevent this enterprising Briton from seeking to compete for all kinds of work. From any standpoint — number or quality of people engaged or capital invested — the papermaking industry can not be compared with the printing trade. Yet, under a protectionist régime the smaller and less useful industry is taken care of, while the greater and more useful occupation — in which fierce competition prevails — is left to the mercies of foreign competitors. There are many reasons for this, but over and above all the others is the fact that the craft is not unified. Therefore, its plea on questions of public moment is not put in the most forceful manner, nor is it presented in the most intelligent way, for the advocates lack that peculiar knowledge which only unification can give. Had representatives of the unions and the Typothetæ, after discussion, formulated a series of demands in regard to the tariff (or any other matter) and presented them jointly to the authorities, it would have a much greater influence than for the Typothetæ to be petitioning for one thing one day and the unions for another the next. Acting in unison, they would speak for the entire trade. Now the delegations are merely the mouthpieces of factions, raising a babel of sound that confuses the legislator, while an authoritative voice would be helpful to him and beneficial to the trade.

PERSISTENCY IN ADVERTISING.

One stroke of a bell in a thick fog does not give any lasting impression of its location, but when followed by repeated strokes at regular intervals, the densest fog or the darkest night can not long conceal its whereabouts. Likewise a single insertion of an advertisement — as compared with regular and systematic advertising — is in its effect not unlike a sound which, heard but faintly once, is lost in space and soon forgot.— *Printing Art.*

PROFITS come from the man whose heart is in his work. — *David Gibson.*

Written for THE INLAND PRINTER.

TALKS ON TYPECASTING.

NO. III.— BY ALFRED MC CUE.

MOST printers know that type-metal is composed of lead, tin and antimony. Few know the proportions, and, probably, none how to determine whether the metal he is buying is according to any certain formula. There are certain facts regarding type-metal, however, which can be ascertained by any printer. If type-metal purporting to contain certain percentages of lead, tin and antimony is offered at less than the market price of these commodities, the printer may be sure that the pretended formula is a sham. Prices of these metals fluctuate, but the daily papers quote the market every day, and the cost of any formula can be readily calculated.

There are some dealers who pretend that their formulas are trade secrets, and who refuse to divulge them to purchasers. The only course to pursue in these cases is a refusal to buy blindly. Any honest dealer will guarantee to deliver goods according to specifications, and the purchaser is warranted in demanding to know exactly what he is buying.

This article has to do principally with metals for casting type. Linotype, electrotype and stereotype metals are made of the same ingredients, the proportions only being varied.

A fine grade of type-metal is composed of fifty-eight per cent lead, twenty-six per cent antimony and fifteen per cent tin, with the addition of one per cent of copper. This latter ingredient can not profitably be increased. A trace of it in type-metal gives it a toughness not otherwise obtained. The other elements may be varied, it being understood that the greater the percentage of lead an alloy contains the softer will the type be. The addition of antimony would require the proportionate addition of tin, though increasing the above percentages of these will not result in making a better type-metal. There are certain limits beyond which the metals will not properly amalgamate.

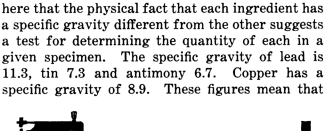
Besides the proper proportions of lead, tin and antimony, the other important factor in the preparing of type-metal is the method of mixing. Unless mixed intelligently, the formula will not save it.

In mixing these metals it must be remembered that each element has a different melting point. Lead melts at 617°, tin at 442°, and antimony at 806°. So, in order that they properly amalgamate, consideration must be given this point. If the temperature of the mixture does not reach the melting point of the antimony, it stands to reason that this

element will not amalgamate with the others. A thermometer should be employed to verify the heat, but, in its absence, a stick of pine can be used to test the mixture, which should be hot enough to char it a dark brown. Pure lead, Straits' tin and Cookson's antimony should be used.

The following describes the process of mixing the metals: Place one-half of the quantity of lead in the kettle, with all of the antimony. Heat it until the metal is hot enough to char a pine stick dark brown, and stir vigorously until the antimony is amalgamated with the lead. The tin should then be added and stirred well, keeping the temperature to the point indicated above. Then slowly add the balance of the lead, a pig at a time, stirring meanwhile and allowing time for each to melt before adding another. When all the lead is in the kettle, stir thoroughly and skim off clean. Then allow the metal to cool and pour off into molds.

This description of how the metals should be mixed applies when the ingredients are known, but it is oftener the case that the printer has metals to mix of unknown composition or purity. It is here that the physical fact that each ingredient has a specific gravity different from the other suggests a test for determining the quantity of each in a given specimen. The specific gravity of lead is 11.3, tin 7.3 and antimony 6.7. Copper has a specific gravity of 8.9. These figures mean that



A GRAVITY SCALE FOR TESTING TYPE METAL.

these metals are that much heavier than a like volume of water. There is known to some chemists a "gravity scale," which simplifies the calculations otherwise necessary. This scale is the result of careful computations and tests, and is worked out to a marvelous degree of accuracy. It is now employed by some of the largest dealers in metals, as well as by the larger purchasers of mixed metals. With it, one may determine to a nicety just what and how much is needed to bring a batch of metal up to a certain formula. An illustration of this device is given here. A conical mold is used to produce a cast of the metal to be tested. This cone (A) is placed on the balance of the scale and the weight slid along the beam until the scale balances. Were the sample (A) composed of fifty per cent lead and fifty per cent tin, the scale would balance at 50. If the percentage of lead is greater than this, the weight would have to be moved farther outward on the beam, its position indicating by the gradations on the beam just what percentage of tin or antimony is contained in the sample. If an excess of lead is found, a second test is made to determine just what proportion of antimony and of tin is lacking. This is known as the "tensile" test. A V-shaped mold is used, and a cast made therein. Metal is poured in one arm of the mold until it flows out of the other. When thoroughly cold, the mold (which is in two parts) is opened and the cast removed. In making this test the metal should be at about 700°. The mold should be warmed by making a preliminary cast, and three samples made, taking the average result. If the casting is held in both hands, and the two ends brought together, the distance they approach before breaking will indicate the relative proportions of lead and antimony. The gravity scale, for instance, indicates the sample (A) is deficient in tin or antimony; in other words, has an excess of lead. To determine whether it is tin or antimony which is lacking, the "tensile" test is used. If low in tin, the metal will be sluggish when poured into the V-mold, and will not flow out of the opposite end from which it is poured. The temperature is important here, and the metal poured at the working heat, 700°. If the two ends of the sample approach without breaking, antimony is needed. The higher the antimony, the less bending strain it will stand without breaking.

The formula here given for type-metal will bend slightly before breaking. The Linotype-metal formula will produce a metal which will break when the ends are about an inch apart.

The grain of the metal at the point of fracture will indicate to an experienced eye something of the ingredients of a sample, but unless the temperature at which the metal is mixed and poured is known, this test is misleading. For instance, the broken pig of metal shows a coarse glittering grain, while the type cast from such a metal will show a fine, compact grain. It all depends on the temperature at which the cast was made, as also the pressure employed in casting.

Type-metal should always be melted in a large furnace or kettle, the larger the better. A more uniform mixture is possible when melted in large quantities. The metal should be brought to a high temperature and thoroughly stirred. Skimmings from the metal-pots should be placed in the furnace kettle and reduced. Lead oxid rises in the form of black powder, and no metallic substance should be thrown out as dross. Sal ammoniac, mutton or beef tallow or fats of any kind, rosin, green pine wood or raw potatoes can be used to separate the oxid from the metal.

The presence of zinc in the metal can be detected by heating up a small ladleful until it becomes red hot, when, if zinc be present, bright blue and green colors arise. Zinc is most deleterious in type-metal and should be carefully excluded. It can be eliminated by heating the metal to a red-hot state, skimming clean and stirring until it revolves rapidly in the kettle. Then throw into the metal two or three pounds of granular sal ammoniac, and skim clean.

Metal for the Monotype machine works best when composed of lead, 74 per cent; antimony, 18 per cent; tin, 8 per cent. A good Linotype metal is composed of lead, 83 per cent; antimony, 12 per cent; tin, 5 per cent. Stereotype metal contains 82½ per cent lead, 13 per cent antimony and 4½ per cent tin. A good electrotype metal contains 93 per cent lead, 4 per cent antimony and 3 per cent tin. By using the gravity scale and other tests herein explained, the printer can determine just what metals and what quantities are required to add to his mixture to standardize it.

MOVING THE FAMILY.
Photograph by Charles Reid, Wishaw, North Britain.

Written for THE INLAND PRINTER.

THE LINE OF LEAST RESISTANCE.

BY F. HORACE TEALL.

IT is with reference to the decision of questions of form that this subject is here considered. While too much formality is to be deprecated, at least in most common matters of life, proofreaders, and in fact printers generally, must give much attention to form. Fortunately, few printing-offices now attempt such a line of least resistance as that of having no proofreader. Yet the writer has just received this in a letter: "Rochester is in the dark ages as far as printing is concerned. Firms told me frankly that they never employed a proofreader. As a result I saw things like 'Mens Clothing,' 'Ladie's Suits,' and other bad things in printing done there — for example, on business cards, etc., men's names with the Christian name in lower-case and the surname in capitals." Of course all the writing or lecturing possible will never furnish an absolutely perfect preventive of such conditions. "The poor ye have always with you" — not only those who are poor in purse, but those who are poor in knowledge and understanding.

These printers who never employ proofreaders certainly adopt one line of least resistance. They save on the pay-roll anyway. But with equal certainty they expose themselves to danger of disastrous resistance through loss of custom if their patrons ever sufficiently realize their shortcomings. In one respect their position is not anomalous. Many job printers whose production is excellent employ no one specifically as a proofreader, but this can be true only where some special hand, or any one in the place, does good proofreading. No one can do printing of any kind with no proofreading and be sure of long-continued success.

Another very commonly adopted line of least resistance may be seen exemplified in much of our best literature. It is that of simply ignoring uniformity and leaving things just as they happen to come. At least that is what seems to have been done in many cases, especially those like the following one.

Knowing that such things may be found easily, we yet are somewhat surprised when we find so flagrant an instance within two minutes in a book picked up purely at haphazard, "Music and Musicians," published by Harper & Brothers. On page 16 is an anecdote which, after naming Queen Elizabeth, speaks of her, within ten lines, twice as "the queen" and twice as "the Queen." No matter how this came to be done so — it was probably through "following copy" — it is indefensible.