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THE ART PRODUCTION OF COINS AND MEDALS.

A treatise on Designs, Sculptures & Methods

by

JAMES BERRY O.B.E. F.R.N.S.,N.Z.

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THE SUTHERLAND MEMORIAL LECTURE

The following lecture was delivered to a meeting of the Royal Numismatic Society of New Zealand on 30th October 1973, in the Royal Society Room of the National Museum, Wellington, Mrs P. Ranger presiding.

THE ART PRODUCTION OF COINS AND MEDALS

A treatise on Designs, Sculptures and Methods

By JAMES BERRY, O.B.E., F.R.N.S., N.Z.

INTRODUCTION:

I feel it fitting to start this paper with a tribute to the late Allan Sutherland, who was the virtual founder of this Society, and of the science of numismatics in New Zealand. His enthusiasm over many years, and his knowledge and writings on numismatics were finally gathered together in his fine book "The Numismatic History of New Zealand" It is worth recording that early in his career Allan Sutherland was a telegraphist with the New Zealand Railways, and in later years became a Hansard Reporter in Parliament. Finally he was editor of Hansard or Parliamentary Debates for several years before his untimely death. It is in his memory that this numismatic paper is being given this evening.

This lecture is given in the first person because I am mainly quoting my own experiences in the field of design and modelling for coins and medals. Occasionally I have seen articles in numismatic publications, dealing with the production of coins and medals, but little in real detail from the birth of a design through to the final sculptured plaster model before the master die and coin production really commences.

How important is a coin design? All important, in fact the most important part of all. Those remarks from a designer might sound egotistical, but if you have not a good or interesting design in the first place, the finest production methods of the best mints in the world are unable to make the end product a fine coin. Conversely, of course, a good design can be ruined by poor production, so really a marriage of good design with quality production methods is the ideal aim.

Coining mints stipulate a minimum time they require for production of dies and coins, especially for proof coins—and rightly so. The designer usually has the situation of having to produce the coin model urgently. In my own case this has proved both unfortunate and fortunate. It is unfortunate because one usually finds that better work on both large model and finished plaster could be accomplished if more time had been available. This specially applies to any portrait work for a coin where it is often difficult to model a good likeness in the very low relief permissible for a coin. I find, in such cases, that it is a good plan to lay the finished model aside for two or three days and then with a fresh look one can see exactly where further work is necessary to make improvements on the model. If it is required urgently, time does not permit this and the model remains the best one can do in the time available. The fortunate circumstances have been that where coins and/or medals were required urgently I have had the opportunity to produce models, plus negative and final plasters at three different mints.

At the Royal Mint, London, where the first issues of New Zealand's decimal coins were required urgently, I was a guest artist for some nine weeks in 1966. On other occasions, for urgent production of commemorative dollars I have been a guest at the Royal Australia Mint, Canberra in 1969 and 1970. In 1971, prior to leaving for a proposed overseas trip for four months I had a medal design accepted for production at the Franklin Mint in the U.S.A. The obverse and reverse models being required quickly it was arranged that I stay near Philadelphia for a few weeks and produce the models and the incuse and final positive plasters at the Franklin Mint.

While there a Lord Rutherford medal design I produced for the Royal Society of New Zealand was also accepted for issue by the Franklin Mint, so I did the medallic sculpturing for that one too. I was thus able to meet and associate with executives, medallic sculptors, artists, engravers and production technicians in mints of three different countries—a most valuable and I might say unique and rewarding experience. At each mint I received every courtesy and assistance and I met many good friendly people, including top flight designers and sculptors. I concluded that art is indeed a universal language and conducive to peaceful and friendly relations between peoples of different countries.

COINS (Sections)

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MEDALS (Sections)

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| A. Designs. | E. Medal finishes. |
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(1) RESEARCH:

The basic start for any coin or medal design is research on possible subjects on which to base the design. For a coin it usually follows the lines of history of the country, typical forms of native flora or fauna, outstanding events and important people in the country's history and so on. While reading up on the subject and finding all likely reference books I am continually on the

look out for illustrations in connection with the subject. A paragraph in a book or a photograph not necessarily closely connected with the subject can often set one on a new approach to the subject with possible good ideas for a design. The great deal of research I have undertaken over some 40 years in connection with stamp, coin and medal designs in other circumstances could perhaps have made it possible for me to be one of the top historians in the country. One great stumbling block has prevented any possibility of that—I have a poor memory.

I remember with amazement the remarkable memory of the late William Ferguson who, together with the late Allan Sutherland were undoubtedly the leading numismatists of this Society. A junior member once showed Mr Ferguson an early English coin and Mr Ferguson rattled off its history quoting many dates and so on—all without reference to any book. I thought that particular coin must have been his pet subject, but at a later meeting he discussed at equal length an unusual European coin shown to him. He seemed to have almost a photographic memory and able to quote *ad lib* as if he was reading from a book. What a lot of time I could save myself with such a memory! It may be just as well that I have kept to design and art work where a good memory is not so important.

After jotting down notes on the subject being researched, I make a short list of design suggestions. From this list I select the two or three which I feel have the best possibilities for developing a worthwhile design and these I toy around with making small rough sketches.

(2) THE DESIGN:

Now how does one go about trying to produce a good design? I first make rough pencil sketches in approximate coin size, or sometimes around twice the coin diameter size. In these I suggest different lines of thought on the wording, trying where possible to reduce this to a minimum. Then I try to emphasize the salient feature of the design and endeavour to balance the lettering with it to produce a pleasing and where possible—and this applies particularly to coins—a simple composition. I have found it more difficult to produce satisfactory designs for the circular format of coins and medals than for the short or long rectangular forms of postage stamps. I experiment with style and size of lettering in relation to the size of pictorial portion of design. The spacing of the lettering is also important. One or perhaps two short words on the design can be well spaced between letters for design balance. Several longer words probably mean a more condensed spacing of letters and perhaps also a smaller size of letter.

In building up designs to the large finished drawing stage I usually make use of tracing paper so that various sketch ideas and lettering layouts can be more easily tried out before deciding on the final composition of the design. I prefer hand lettering at all times on coin and medal work rather than the use of letters cast from printers' type moulds. I have seen top design medallic sculptors who use letters from type moulds on their models, either to save time or in some cases because they feel it is better than their own standard of hand lettering. I feel type letters have rather confining restrictions. In past attempts to use these I have found that a particular font of type is slightly too large

for the balance of the design. The next size smaller is too small. The letters may be too thick or too thin. They never seem to fit the exact requirement, whereas with hand lettering it can be designed just as required for each individual coin or medal.

These points may not seem very important in the overall design but I feel that they are necessary to achieve the right balance. Designs are usually submitted five or six times the diameter of the finished coin size. For example a $1\frac{1}{2}$ inch or 38 mm dollar size design is submitted in 9 inch diameter. With all parts of the design worked out on the final sheet of tracing paper, it is now ready for transposing on to a good quality art card for the finished drawing.

(3) TECHNIQUES FOR THE FINAL DESIGN:

Bearing in mind that the finished design has to be submitted for approval it is important to use a good technique to show the design to best advantage. They can be submitted in pencil with shading, in outline in black ink or designers black or as a shaded wash drawing. For many years I submitted my work as wash drawings with highlight and shadow effects so that when reduced photographs were made, the effect was almost that of a minted coin or medal.

For this technique I first marked the circle size on the card, say 9 inch diameter for reduction for a dollar size coin. In this circle I put a mid-grey wash in water colour. When dry the final tracing paper design is placed over it to trace through the outlines of the design on to the grey circle. For carbon I use a fine sheet of tissue which has been prepared as follows:—scrape a pile of fine powder with knife or razor blade from a black carbon or say a 6B pencil, making sure that no small wood shavings are in it as these will tear the paper. With a pad of similar tissue-paper, gently rub this powder over the whole foolscap or quarto sheet of tissue, taking care that it is rubbed in evenly all over and to all edges of the sheet. Keep rubbing with the pad until all surplus powder is absorbed and the sheet has a shiny appearance. I usually prepare about three sheets at a time and I find they last for about ten years or more.

To trace all parts of the design, including lettering, on to the grey circle, a fine-pointed lead pencil can be used. I now proceed with black ink or paint to put lines on the south-east side of all letters and design parts, imagining that a strong light is shining on the design from a north-west point. When all this is done I work similarly on the design with white paint on all opposite parts of letters and design which are facing the north-west light, making sure the painted lines are thick enough to stand six times reduction. Then I lighten or darken the grey tone where necessary to give the modelling effect to the design and when photographed in a reduced size the effect should be fairly near the effect of a finished coin. If the photos are not correctly exposed it often happens that the white highlights almost fade out with disappointing results in the prints, but with correct exposure, the finished photos can give the pleasing effect of a modelled relief coin.

More recently I have altered my finished design technique to simulate a proof-coin finish by having a black background with the lettering and design in shaded light grey. This simulates

with necessary shading the matt finish of the relief portions of a proof coin.

(4) LIMITATIONS, MEASUREMENTS AND GAUGES FOR MODEL RELIEF

To produce coinage economically and efficiently, the relief on a coin model must be kept low— a maximum of $\frac{1}{8}$ inch or approximately 3.2 mm on a 9 inch diameter model. This applies to a 9 inch diameter model or 6 diameters larger than coin size. For a five times larger model the maximum allowed is less than 1/10 inch and then only in central area. There is a general ruling that no part of a design should be higher than the rim of a coin. One reason for this is that in earlier banking days when counting coins they were stacked in little piles and if design relief was above the rim the coins would wobble and not stack easily. This point does not apply today with small cylindrical tin or plastic containers to hold the coins. Another point is that any part of design appearing above rim level would be more easily worn away in use and the coin would not have an attractive appearance in use for very long. Again such coins would not fit slot machines. A further reason, and very important, is that pressure on dies and coining presses in minting the coins would be much greater with higher relief dies, with consequent greater wear on the dies and more frequent possibility of die breakages.

How important this is, can be judged by the fact that in the changeover to decimal coinage for New Zealand the first order for 1 cent and 2 cent coins totalled some 220 million coins. The approximate life of a die for cupro-nickel coins was estimated at 80,000 with probably about twice that number from a coin die for bronze coins. Therefore for the 220 million bronze coins over 1300 coin dies were necessary. As these dies are expensive and time consuming to produce, it can be seen that the economics of production as well as other considerations preclude the use of high relief coins for which a far greater number of dies would be required. The maximum relief for lettering and value figures, especially near the rim, is considerably less than the maximum allowed in the centre area of the design. One reason for this is that the displacement of metal in the striking of coins is more difficult to force up to high relief near the edge than towards the centre. Another reason is that value figures on coins need to be in lower relief than the maximum allowed so that edges and corners of such figures will remain sharp and clear and not wear easily. This also applies to any lettering.

GAUGES:

These are used to ensure that no part of the model exceeds the maximum relief allowed. The Royal Mint, London, and the Royal Australian Mint, Canberra, prefer to have models produced in five times coin diameter and modelled on a flat sheet of plate glass or perspex. For these, flat gauges are used about 1/10 inch thick by about 1 inch wide and varying in length according to coin size multiplied by five plus 2 inch. Along one edge a slot, say 1/16 inch deep, is cut out to within about 1 inch of each end. This is used from time to time by drawing towards you over the model and any part over the maximum height, in this case 1/16 inch is removed and that part has to be remodelled slightly lower. In the case of most American and I think Canad-

ian mints, models are prepared on a slightly dished plaster basin with a flat surface rim about one inch wide on which the gauge ends, in perspex or metal, can be moved around to remove any part of model exceeding relief limits. This gauge is slightly curved in relation to the curve of the plaster basin.

It is interesting to note that for portrait work, coin models are often produced up to 10 - 15 inches or larger diameter size. In this coin and medal work there are three types of measurement to deal with. Gauges are mentioned in decimal inches such as .062500 which is 1/16 inch and this again is a little over 1.5mm. Measurements dealing with coin models are seldom higher than $\frac{1}{8}$ inch. For high relief medals these could be up to $\frac{1}{4}$ inch or more. Here is a table of these measurements.

Inches	Decimal Inches	Millimetres
1/64	0.015625	0.396875
1/32	0.031250	0.793750
3/64	0.046875	1.190625
1/16	0.062500	1.587500
5/64	0.078125	1.984375
3/32	0.093750	2.381250
7/64	0.109375	2.778125
1/8	0.125000	3.175000

The measurements for up to $\frac{1}{4}$ inch or more can be obtained from this table by adding or doubling.

(5) EQUIPMENT FOR MODELLING AND CASTING:

The modelling material used is somewhat similar to plasticine and has various brand names. In fact for the New Zealand decimal coin models I used black plasticine. I now use white Roma Plastilina grade 4, Italian, but made in the U.S.A. I would prefer a grade 5, slightly harder if obtainable. A slightly harder material in use in America which is dark brown in colour is really preferable for modelling, but I find the dark colour too difficult for seeing the relief modelling clearly.

A variety of modelling tools is available in metal or wood, much the same as used for clay modelling, but for coin and medallic work tools of the smaller sizes are more useful. I have quite a variety of tools but I find the most useful ones of all are some I have fashioned out of 1 inch nails after cutting the heads off and hammering, shaping and bending the end to required angle and fitting them into a universal pencil lead holder either with screw up or clutch-type end. With four holders I can thus have an endless variety of shaped ends for the smaller finishing work and for modelling the lettering and value figures. Some tools used by dentists can be similarly adapted. While engaged at the Franklin Mint in the U.S.A. in 1971, I had the privilege of working with some fifteen top flight medallic sculptors and each had his own preference for particular types or their own make of finishing tools, so there is no hard ruling to follow.

Besides the modelling material, tools and other equipment needed, a transparent plastic foot rule is useful, preferably marked with inches, divided into sixteenths and eighths on one edge and centimetres and millimetres on the other. Also a sheet of the finest possible grain wet and dry emery paper, a small

portion of this, mounted on a rectangular piece of wood about 4 centimetres by $1\frac{1}{2}$ x 1. This is used for gently smoothing off lettering surface in final plaster and on the background and other parts to smooth out irregularities. A piece of wood or hard-board about a foot long by two or three inches wide is needed with extra pieces of board about two inches long by $\frac{1}{4}$ inch thick glued beneath each end. This acts as a hand rest when modelling on the upper part of a plaster or on glass to prevent lower portion of model getting damaged or flattened. For the dished plaster basin models a quantity of fine plaster of Paris is needed. I obtain this by the sack, the plaster being in a plastic bag within the sack. This needs to be kept closed when not in use as it does not take long for the plaster to deteriorate with air or more especially damp atmosphere getting to it. Plaster of Paris for casting plaques, busts, moulds etc., is a composition of several species of gypsum originally obtained from Montmartre, Paris. Gypsum (from the Greek word gypsos-chalk) is a hydrous calcium sulphate, a mineral which in crystalised form is known as alabaster. Some kinds in soft chalky stone form, after heat treatment become a fine white powder usually known as plaster of Paris.

(6) PRODUCING THE MODEL:

In the case of a flat model on glass or clear perspex the design is placed beneath the glass and plastilina is first pressed over the lettering area using the required metal strip gauge for the maximum height of lettering to remove any surplus material. The lettering is usually designed in a curve a short distance from the edge of the circle. To find the centre for compass work for the lettering and outer rim of modelling I use about a $\frac{1}{4}$ inch square of tin in which I have made an indented point with a small nail. This is mounted in a small pad of modelling clay and pressed on to the approximate centre of the design seen through the glass. Light pencil lines from vertical and horizontal centre lines on the design crossing in the centre give indication of this position. By using adjustable angle pen end from compass set, a circle can be cut on the position of top edge of line of curved lettering. Angle of pen end is adjusted so that the cut in plastilina has a slight lean from vertical towards centre. On the inner curve of lettering, pen end is adjusted with opposite lean. This is important as a watchful eye must be kept on all parts of the model to avoid any undercutting. A fifteen degree slope from the vertical is sufficient.

A tracing taken on thin paper of the lettering can be traced with a hard point on to the curved strip of plastilina and the outline of letters cut out carefully, keeping in mind the steep outward angle necessary from the top to base of letter. The surplus material is then removed and the lettering of the required size and depth is ready for retouching. A final check with the lettering gauge is necessary here as once the higher relief of the main part of the design is started, the long gauge for lettering can not be used. I have made, for this purpose, a small gauge from a flat piece of plastic just over the width of the lettering which can be used at all times. This piece of plastic is in fact half the sliding cover lid from an uncirculated commemorative dollar case.

If the centre design is a portrait, it can be carefully built up and modelled with plastilina from the base upwards as some pre-

fer to do, or a flat layer of maximum height allowed can be put all over the area up to slightly over the outline of central design. I level this off with the higher gauge being careful not to run into the modelled lettering with this gauge while doing so. The outline of design is traced on to this layer, then I use a cutting tool round all outlines to remove surplus material. Then I proceed carefully with modelled relief, bearing in mind that the third dimension and perspective all has to be conveyed within the maximum height for relief of $\frac{1}{8}$ inch in the case of a nine inch diameter model and proportionately less for $7\frac{1}{2}$ inch diameter (five times) model. I then cut away and model down from the top instead of building from the base. It is a matter of personal preference which method is followed.

When modelling a full face or three quarter view head, a certain amount of distortion has to be used in the modelling to give an illusion of depth and to help bring the nose forward. The same applies to perspective of a building. In the case of the Sydney Opera House medal recently, I had the problem of conveying depth of the curved roof to the side walls. In front of the wall was a roadway or quay and then the wall of this quay dropping into the harbour. The problem was how to show all that in perspective when both the sea and sky were represented by the background surface of the medal. It had been the intention to make a proof finish of this medal, and so sea and sky were intended to be a highly polished mirror finish. A side section of this model would show that the highest point of relief was the base of the curved roof sections and the top of the wall. The wall sloped inward at the base, the edge of the quay projected out from there and the quay wall again sloped inward at the base to meet the sea, or rather $\frac{1}{32}$ inch above the sea. This shows where the medallic sculptor takes liberties in modelling the subject to create the illusion of depth and perspective. I have not heard of any medallic sculptor who has turned architect. Perhaps it is just as well, for his efforts might prove to be decided earthquake risks.

When all parts of the model have been worked on and retouched the next step is the incuse plaster model. In the case of working on a 9 inch dished plaster basin, the plaster base, which has been cast from a metal or plaster master model of correct dimensions, must first be perfectly dry. It is then given two or three coats of shellac thinned about 50% with methylated spirits. This waterproofs the base for the model: it gives a surface for the plastilina to adhere to and it makes separation of cast easier when taking the reverse plaster. There is no trouble with the plaster cast separating from the plastilina unless there is any undercutting in the model. When producing the model it is advisable to study the work from time to time with low level lighting from different points of the compass. This can be done by holding the model edgewise to the window light and then reversing your position and studying the model from the opposite angle and so on. At night an electric light with flexible holder can be used or several lights or a torch. By this means the weaknesses and strengths of the model will be discovered and final finishing touches to the model can be made as required.

(7) METHOD FOR TAKING REVERSE PLASTER.

For casting from a 9 inch diameter model prepared on a dished plaster basin the model is placed on top of a newspaper

on a level surface. With nearly an inch of level plain plaster edge to the model the total diameter is nearly 11 inches. I check level surface with a spirit level. If not level the plaster cast could finish up say an inch thick on one side and half an inch on the opposite side, instead of an even thickness of approximately threequarters of an inch. The cast need not be ruined if this happens, as by making compensating level adjustments for the next cast a reasonably even thickness can be obtained for the final plaster. A cardboard plastic or metal band $1\frac{3}{4}$ to 2 inches wide by approximately four feet long is placed around the circumference of the model and ends of overlap fastened with clips or sellotape. I use offcut strips of 26 gauge galvanised flat iron which I obtained from a plumber and after ascertaining the circle size by trying it around the model I fix the overlap ends with sellotape. The inner overlap needs a little plastilina smoothed out on the joint. On two occasions in the past when not covering this joint a plaster has cracked towards the centre from this join mark when drying out.

For casting of a 9 inch model (total diameter 11 inches) I first place one and a half pints of water in a fairly large bowl. If winter, and water is very cold, I add a small amount of warm water—not too much or plaster will set too quickly. To the water I add ten or eleven heaped tablespoonsful of plaster of Paris. The last portion of plaster added will be showing above the water level. I let it stand for about a minute. Then with rubber glove on hand I stir the plaster round until it is all of equal creamy consistency. With a large spoon I ladle three or four spoonsful carefully on to the model. I pick the model up and quickly shake this plaster to all parts of the design. Replacing on the paper I lift edges of the paper and quickly tap alternate sides on to the table to help force up any small air bubbles trapped in the sharp corners of letters and other parts. The rest of the liquid plaster in the bowl is stirred and then carefully poured on to the mould.

I do not delay unduly in these operations as once the plaster starts to set it is fairly rapid. The paper with the mould and plaster is lifted again and alternate edges tapped on the table to release any further bubbles. Allowing around half an hour or more for plaster to set, the surface first gets hot and then cools off. I knife through the sellotape joints and remove the outer strip. Then the model with plaster cast is stood on edge and the join followed round with a knife edge lightly tapping on the back of the blade with a tack hammer or piece of wood. Slowly the suction will release and the cast will separate from the model. I let the cast partly dry before further work. For casting from a $7\frac{1}{2}$ -inch model on glass, the base of metal band is held in place by plasticine and I then proceed as with the 9-inch dished plaster model.

(8) WORK ON THE REVERSE PLASTER.

Some parts of a design such as thin lines and small size lettering are easier to cut in on the reverse plaster. In fact a few medallist sculptors prefer to do a minimum amount of work on the first model such as putting in the basic shapes and doing far more of the work in incuse form on the reverse plaster. I prefer to do as much as possible on the first model but the plastilina is a little too soft for exacting fine finishing work. Any blem-

ishes on the background which in this reverse plaster is now the upper surface. can be carefully smoothed out with the finest grade of emery paper. The grade required for this work is so fine that it feels little different from ordinary paper. It is best to have this attached to a small block of wood as mentioned in the equipment section. I work on any other part of this incuse model which I feel will be easier to do than in the final model. For example the mast of a ship, the branches of a tree and similar tubular forms can be more easily corrected or perfected in reverse than in the final raised plaster model.

The lettering in incuse can be sharpened up and retouched where necessary. One of the annoying factors with the plaster casts is the appearance of little air bubbles here and there. If too many air bubbles show it saves time to throw the cast away and do another one. If not too many they can be retouched by dipping the end of a modelling tool in water and placing a drop on the hole left by the bubble. Then I dip the same tool in a small quantity of plaster powder, some of which adheres to the damp end and press this into the hole. Then dip in water again and smooth over surface. If the plaster is close to setting before pouring on the mould it can happen that small black spots on the plaster model, if probed with a fine modelling tool, turn into miniature caverns beneath. These also must be filled and smoothed over. I wear magnifying glasses fixed to a plastic hood when engaged on this work and also in retouching the lettering and possible undercuts. To avoid bubbles in the mix I used to add a few drops of a detergent to the mixing water, but I now find better results by adding about five drops of milk instead. Having retouched and improved the modelling where I feel it is necessary the next step is

(9) MAKING THE POSITIVE MODEL.

The first process is to pour about a tablespoonful of water-soluble (not spirit) liquid soap into a saucer and the same quantity of water. Mix with a small sponge and keep dabbing this on to the reverse plaster taking particular care to see that it gets into all the lettering corners and other fine points of the model. I keep doing this for about twenty minutes with light dabbing motions, never a wiping motion. The rim portion must also receive attention and it helps to dab a little on the outside vertical edge too. For about the last two minutes of dabbing I pour about five drops of olive oil on to the sponge and dab this in with the soapy mixture all over the model. Then the solution can be washed off under a slow running tap.

The surface should now be impervious to water. I let the model dry and for good measure and to help separation, I give the surface a light spraying of a clear plastic from a spray can. I then fix a metal band around as described earlier and place on a newspaper on a level surface. Plaster is mixed as before and when first pouring a little on to cover the surface I find it a good plan to go over the lettering and other fine indentations with a fairly small sable artist's brush. This gets the plaster into all corners and gets rid of air bubbles. I do this fairly quickly before the plaster starts setting and then pour on the balance. Tap the edges of the cast on the table as before or place on a small vibrator machine for a short time to condense plaster and force out stray bubbles. This has to be done quickly before the

plaster starts to set. While cast is drying, the bowl, rubber glove, brush and spoon need quick washing under an outside tap. To leave it to do later is much harder as when really set the plaster is very hard to get off and the brush will not last long. I never clean these under the taps inside the house as the drainpipes would be clogged up with plaster in very short time. The separation with a knife edge is gently eased under the plaster in different parts until the suction is released. Care must be taken to lift the model straight up as side motion can damage it especially the lettering which can easily get broken off at this stage.

(10) FINISHING WORK ON FINAL PLASTER MODEL.

The amount of work necessary on this depends to a large extent on how well the original model was made and the amount of work done on the reverse plaster. The little emery block can be gently rubbed over the lettering surfaces to give a smooth surface finish and bubbles and other blemishes retouched. Alterations can be made by dabbing over plaster as described for retouching bubble holes and remodelling that particular portion. I here study the finished plaster from various side angles of light. A part that looks quite good with the light from one side may not look as good with light from the other side and so I make further alterations to improve this. With final smoothing of flat surfaces, the model is now ready for careful packing and despatch by air freight to Australia or the U.S.A. I might add that all this modelling work is for overseas as there is no true coin or medal reducing machine in New Zealand.

(11) TAKING A RUBBER MOULD.

It sometimes happens that a rubber mould is required as well. I produce this by placing a band around the final plaster as before and then mixing two 1 lb tins of liquid white rubber compound with its equivalent catalyst and pouring it over the model. This is left until the next day when it should be well set. If not it can be placed in a warming cupboard which accelerates the setting. It will separate easily when set.

This comes to the end of the design, modelling and casting work. From here on the processes are procedures of the mint producing the coins or medals. In the coining mints it is generally the practice for them to produce their own rubber moulds as well.

(12) CASTING FROM A RUBBER MOULD. (Two methods).

One type of casting from a rubber mould includes a graphite powder mixed in with the rubber, giving a grey rubber mould. This, in an electrolytic process, produces a thin nickel plating on the face of the mould. This, in turn, in another process, is backed with copper to give rigidity, set in a pad of beeswax and mounted in a vertical position on a reducing machine. The other method which is now in use in Australia, the United States of America and, I think, Canada is to make a cast from the white rubber mould in a hard epoxy material and to clamp this on the reducing machine.

(13) REDUCING MACHINE AND MASTER DIE PUNCH.

A few details of this machine will indicate how the master punch, in steel is made from the large model clamped on the

reducing machine. This pointer has movement to follow the ups and downs of the relief as the model slowly revolves on its axis. A bar from the pointer is adjusted to a revolving steel cutting bit at the other end which cuts a replica of the design into the surface of a soft block of steel. By the adjustment of belts this replica can be made in any coin size from one cent up to one dollar or larger. That is why the effigy of Her Majesty the Queen is exactly the same on all New Zealand coins. The dies have all been produced from the same large master model. The pointer and cutter work from the centre out towards the rim. For a large coin the model and cutter can be going continuously day and night for two or three days. Unattended at night, if the cutting bit breaks, a spring release automatically stops the machine. A new bit can be fixed next morning and the process carries on. Two runs are usually made on the reducing machine using a finer cutting bit for the second run to reproduce the fine detail work of the model. When finished the result is the master punch in the coin size required and in relief just like the required coin.

(14) BRIEF DESCRIPTION OF PROCESSES TO FINAL COIN DIE AND MINTING.

The master punch is then hardened and pressed into a soft steel block with great pressure. The result is called a matrix with incuse design like a die. This is hardened and again used in a like manner to produce the working punch from which are made the coining dies. At all stages any defects are removed or re-touched by skilled master engravers. These last dies are placed in the coining presses for the actual striking of the coins. There are no less than eleven processes from the finished design to the final coin. These are as follows. The design, the model, the reverse plaster, final positive plaster, rubber mould, the epoxy cast for reducing machine, the master punch, the matrix, the working punch, the coin die and finally the coin. It has always been a source of amazement to me that the details of a design and model still appear quite faithfully in the final coin after so many processes on the way. One thing that does tend to disappear is any fine work which may be too fine for the amount of reduction involved. This must always be borne in mind by the designer and modeller. That is why for coinage it is always better to keep to simple yet forceful designs where possible.

For the actual coining, coin blanks which have been stamped out from strip metal of the required thickness first go through a thorough cleaning process. These blanks are then fed into coining presses fitted with an upper and lower die and a collar to contain the blank. Under very heavy pressure the coins are struck and ejected on the upward movement of the top die and at the same time a fresh blank is fed into the collar. The pressure for striking varies with the diameter of the coin and the amount of relief on the dies. The coins are spread over a moving belt for inspection and any seen with defects are removed. The coins are counted, weighed and bagged and then ready for delivery. The mint processes have been more fully described elsewhere, but I felt some description was necessary to round off the picture of the complete stages from the accepted designs to the finished coins.

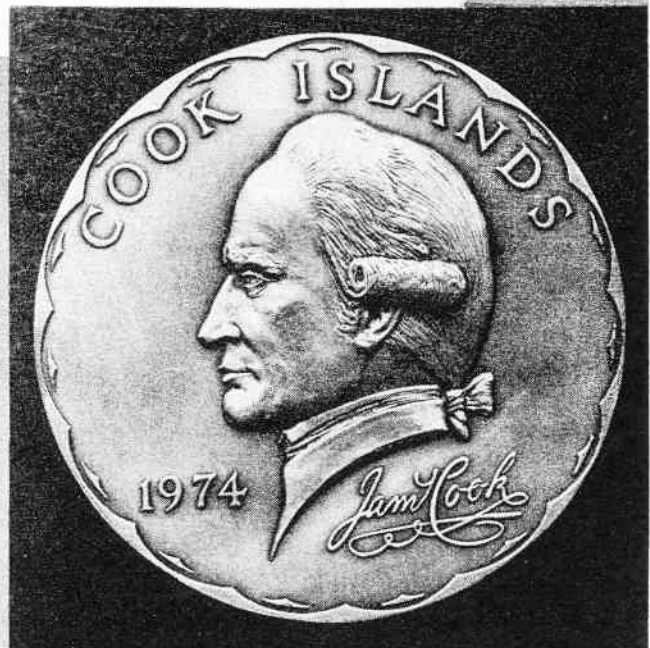


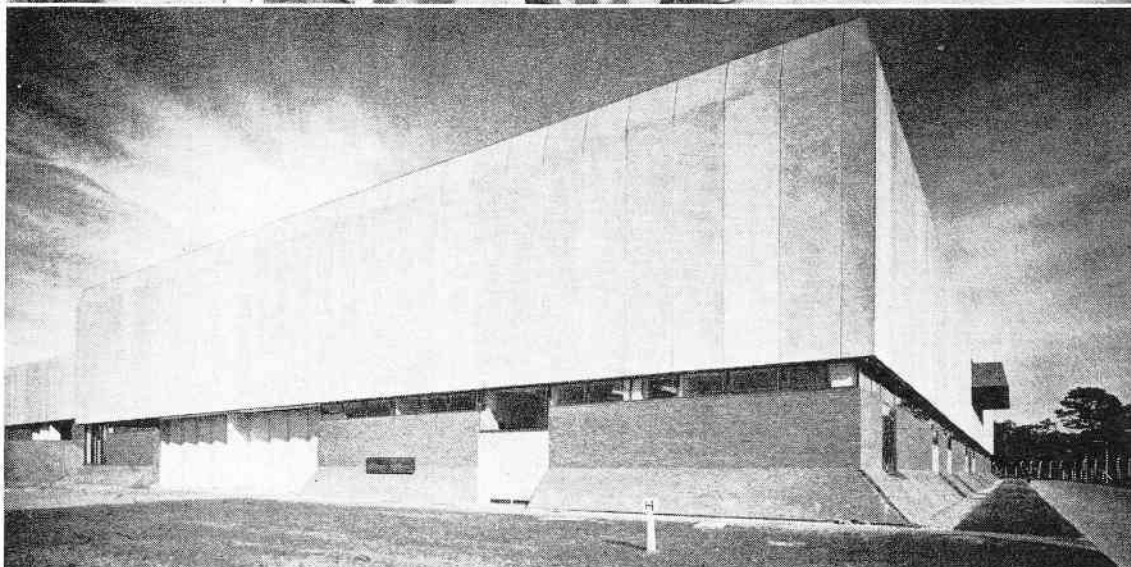
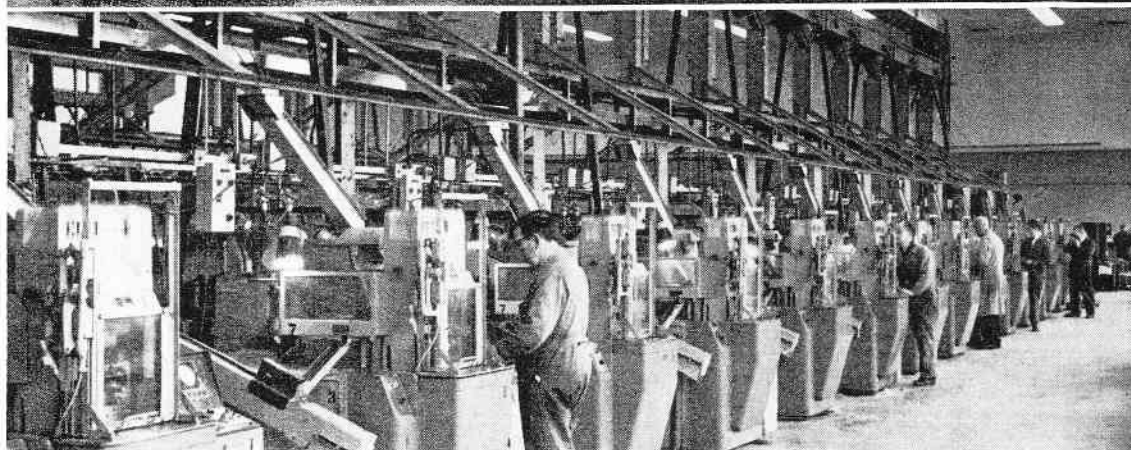
This special medallion for presentation purposes only was commissioned by the Cook Islands Government late in 1973. The seven ounce silver medals in the size shown were produced in proof, frosted and antique finish.

The cased pair presented to Her Majesty the Queen were silver gilt proof and silver gilt frosted. Cased medals were also presented to other members of the Royal Family present and to some of the other guests.

*On the occasion of the first
Royal Visit
to the
COOK ISLANDS
this special issue medallion is
presented to commemorate the
Official Opening by
HER MAJESTY QUEEN ELIZABETH II
of
RAROTONGA INTERNATIONAL AIRPORT
29th January 1974*

The Royal Australian Mint, Canberra, made a fine quality striking of these medals. Close to Christmas and unable to obtain suitable cases and insets I spent almost as much time helping to make the presentation cases as I did designing and sculpturing the model. Obtaining card and material for the cases before firms shut down for the holidays was another problem. Happily the medals and cases arrived in Rarotonga by plane just in time for the important occasion.





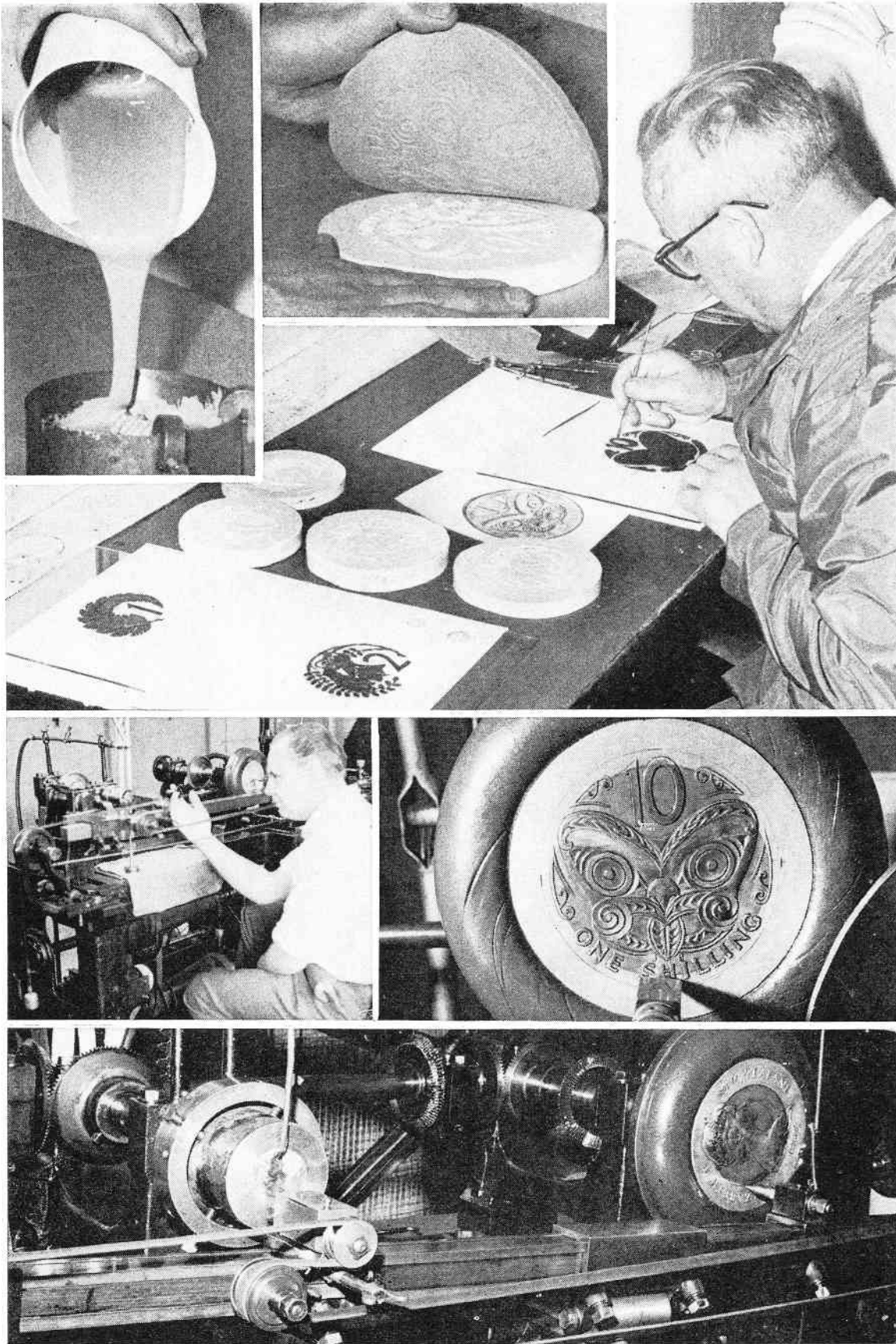
Top: The main building of the Royal Mint on Tower Hill, London. In the centre is a line of coining presses with automatic blank feed, each press producing 200–250 coins per minute at the new Royal Mint in South Wales.

Below: Exterior view of the coining block at Llantrisant, Glamorgan. The new Mint was opened by Her Majesty The Queen in 1968.

Photos courtesy the Royal Mint



Some of the designs I submitted to the Decimal Currency Board are shown above. These are in line and wash technique. Final designs approved by Government are below. Drawn on grey plastic sheet: an eraser and white paint were used for highlights and soft pencil and black paint for darks. Because of the low relief I endeavoured in each case to keep the value figures clear of the designs. The fern on the 1 cent is a national symbol of New Zealand as is the kiwi on the 20 cent. The kowhai blossoms on the 2 cent are regarded as the national flower of New Zealand.



Top: At work on the model for the 10 cent coin at the Royal Mint, London, in August 1966. Black plasticine models on glass of the 1 and 2 cent designs are on the left with negative and final positive plaster casts alongside.

Inset above: Rubber being poured on the 10 cent plaster and the set mould being removed.

Below: Reducing machines at the Royal Mint showing the models and the die-cutting.

Photos courtesy the Royal Mint



A page of designs all produced by the hand-engraving method in antique finish. All reduced in size about 12%: the top bi-centenary Cook plaques were designed for the Australian Numismatic Society and engraved in Sydney in 1970. The four centre medals were all produced over 30 years ago and engraved by the late George Whitehouse of Mayer & Kean, now Mayer Toye Ltd, Wellington. The Otago centennial medals were engraved by Trevor Dick and produced by Dick and Watt Ltd, of Petone.

The Royal Numismatic Society of New Zealand issued a 2½-inch medallion in silver and bronze to mark the introduction of Decimal Coinage in 1967. The obverse at right shows the Society's badge as central motif. I produced the model and plasters for this die. The reverse die was made up from coin models and dies on hand in the engraving department of the Royal Mint, London, where the medal was produced.

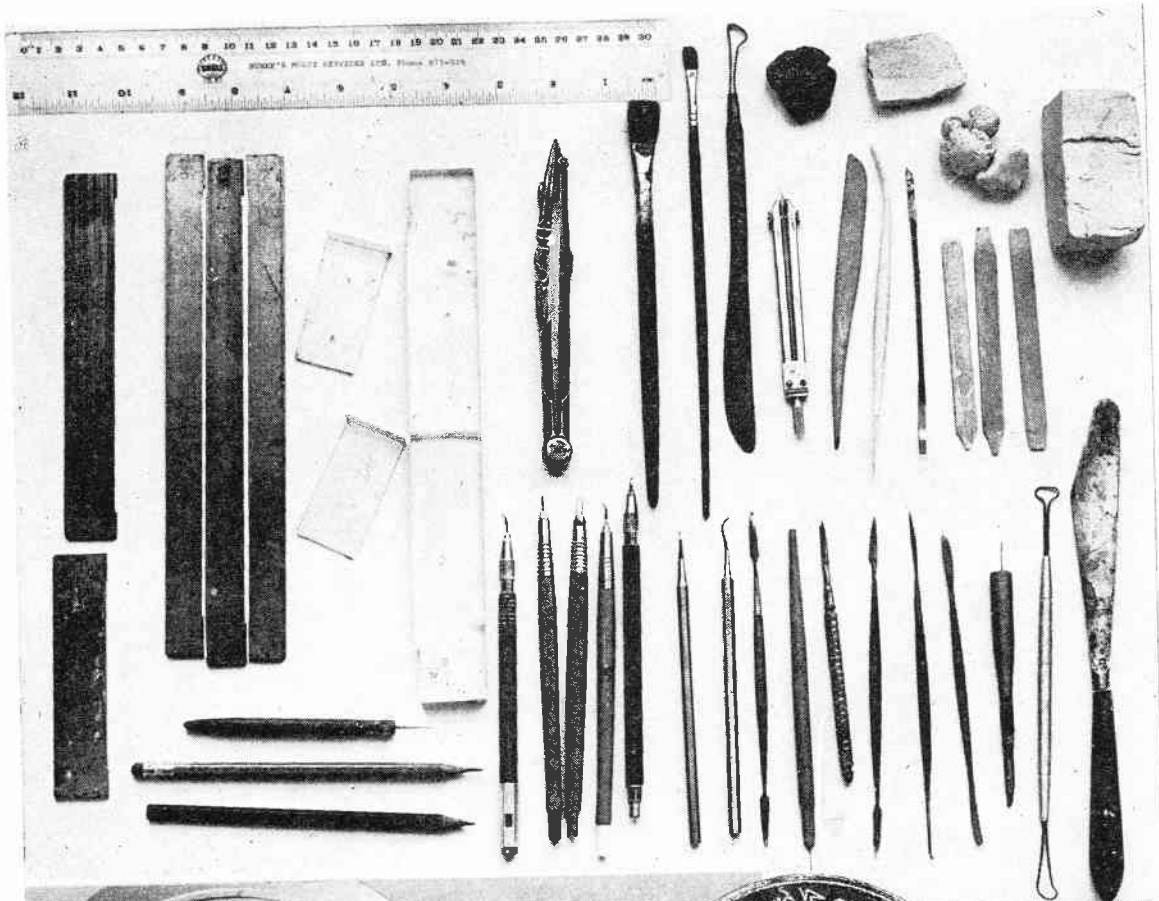


In 1969 the Society issued another 2½-inch medallion in silver and bronze to commemorate the bi-centenary of James Cook's rediscovery of New Zealand. In this case I produced the models and plasters for the design areas. The large amount of small lettering was etched into the dies. Struck at the Royal Australian Mint, Canberra.



At top: A set of seven proof coins for the new Decimal Coinage of the Cook Islands issued in 1972. All designs submitted for this set were approved excepting the \$1 Tanga-roa (God of the Sea) design shown top left. This was replaced with a preferred profile figure as on the coin.

Below: Obverse and reverse designs for a Sydney Opera House medal, and a design for a famous New Zealand racehorse.



Top: A range of tools etc. used in producing low relief models and plasters for coins and medals. Note the narrow slots for maximum relief allowed on the flat steel gauges at left.

Below is a reduced photo of the final plaster model with the finished coin for the James Cook tala for Western Samoa.

On right: Modelling the design for the New Zealand Cook's Chart dollar at the Royal Australian Mint which minted all four coins shown.

Top photo and bottom right photo p. 20 courtesy The Royal Australian Mint.



The \$100 gold coin for the Cook Islands. The obverse is the standard effigy of Her Majesty The Queen by Arnold Machin, O.B.E. of England. Planned for a large silver coin my Churchill design was commended by several overseas executives.

Below: Two designs for silver coins for the Cook Islands, All were minted at the Royal Australian Mint shown at top. The administration building in front and the hundred-yard square production block at left rear.



Design essays for the N.Z. Cook dollar and reduced photo of the final plaster model. The centre right design was adapted for the first Cook Islands dollar, 1970. Note lighting effects on coin photos compared with those on page 20. My Cook medal design at right was sculptured by Richard Baldwin, of the Franklin Mint, U.S.A.



Five examples at top of medals produced in sterling silver and also 24 carat gold-plated for the Medalic History of Australia, for Stokes, medallists, of Melbourne. *Below* are reduced photos of a nine-inch model, reverse plaster and final positive plaster before retouching. Details of windows, spectacles and incuse lettering are cut into the reverse plaster. Lower centre shows the Sir William Upjohn medal for the University of Melbourne.



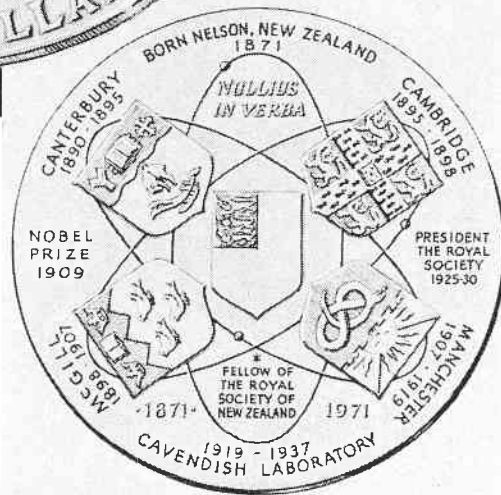
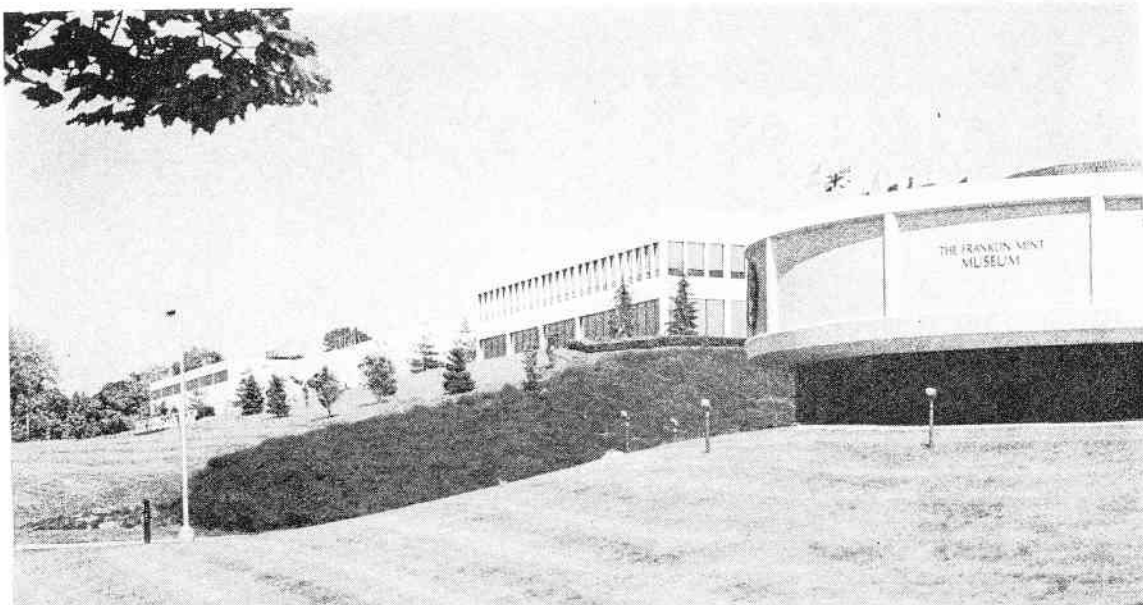
Above at left are four designs alongside the new proof set of seven coins designed and sculptured for 1974 issue for Western Samoa. All these designs are on food production.



Reduced photos of two N.Z. decimal coin plasters before retouching. Maximum height gauges for these were: .024 and .035 of an inch (.031 = 1/32 of an inch = .79 mm).



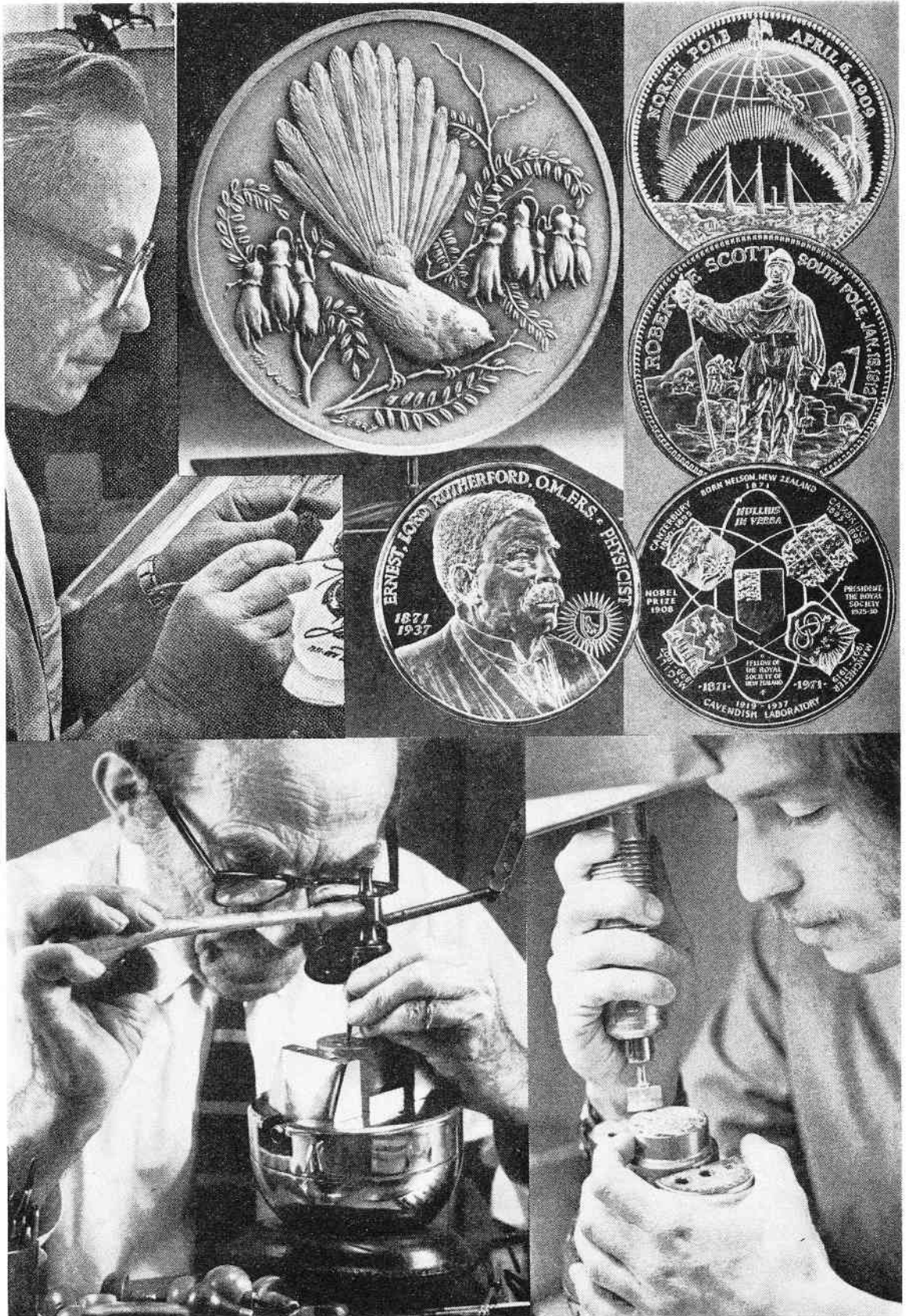
Six designs in nine-inch diameter size with highlights and shadows to simulate finished medal. The top four are drawn on circles treated with a grey wash. The Antarctic designs were drawn on a black background to simulate a proof finish. The National Commemorative Society of America commissioned the Robert Peary medal and the Britannia Commemorative Society, the Oliver Cromwell medal. The Amundsen-Scott medal was designed and modelled for the Franklin Mint Collectors' Society.



The centre reverse design was prepared for a large silver coin but was used for a small \$100 gold coin. It was produced at the Franklin Mint shown above. The Mint Museum at right opened in 1974 and has a fine display of medals and coins.

Designs for the Rutherford medal (*below*) were commissioned in proof bronze by the Royal Society of New Zealand. The final medal (shown on next page) was also used for a Franklin Mint issue in silver.

Top photo courtesy the Franklin Mint, U.S.A.



The New Zealand fantail and kowhai blossom medal was commissioned by The Société de la Médaille. High relief modelling permitted for this 2 ½-inch diameter 8 oz. sterling silver medal gives a better effect in the final medal which is mounted on a marble base. On a visit this year to the Franklin Mint I was pleased to see this medal on display in the Mint Museum.

Below: Expert craftsmen at the Franklin Mint on essential work retouching and polishing dies. The medals shown were all struck at the Franklin Mint.

Working photos courtesy The Franklin Mint, U.S.A.



Top: City of London Medal commissioned by the Britannia Commemorative Society and produced in sterling silver at the Franklin Mint, which also struck the Hillary-Tenzing Mount Everest medals in silver and bronze. These Mount Everest medals are still available for purchase at the Canterbury Museum, Christchurch, N.Z.

Below are six reduction punches (from the reducing machine) for the Cook Island coinage. The reduction punch is used to produce a matrix from which a working punch is made, and from that the final coin die.

Bottom photo courtesy Royal Australian Mint.

(15) TYPES OF FINISH

The coins in use by the public at large are despatched to the Reserve Bank by the mint from which they have been ordered. These are described as uncirculated and good selections of these are placed in holders to sell to collectors as uncirculated coins. The next grade up are the polished specimen sets which are from polished blanks and give a near proof-like finish. This grade is no longer ordered for New Zealand coins. The top finish is proof coins. These are of two types and both are struck from polished blanks with the dies being highly polished as well. In one type the coins have a bright mirror finish all over. The other has the lettering and design in a matt finish with mirror-like background surface. This latter type of proof coin is the one currently ordered for proof coins in New Zealand. These are produced with great care in dust free conditions with staff wearing white uniforms and wearing head caps, plastic gloves and often nose and mouth masks too. One has the impression that the operators are surgeons and nurses in an operating theatre. The resulting finish to coin sets, suitably mounted in cases is really beautiful and mints that turn out these fine examples of the coining art are to be congratulated on the state of perfection they have achieved in this field.



The Alphabet medallion shown above is not only a fine example of hand-lettering but a splendid exemplification of the progress of civilization. In all, ten alphabetic styles are portrayed, some ancient and others contemporary. Beautifully designed and sculptured by Edward R. Grove, of West Palm Beach, Florida, U.S.A. I consider this medal will go down in history as one of the world's finest. This high relief fine art medallion is nearly three inches in diameter. Details of this and other medallions issued by the Society of Medallists (a non-profit organisation) may be obtained by writing to the Secretary at West Branch Road, Weston, Conn. 06880, U.S.A.

READERS PLEASE NOTE.—The only medals of those illustrated still available for purchase are the Alphabet medal above and the Hillary-Tenzing Mount Everest Medal on page 28, which is still available from the Museum, Christchurch.

For those interested in proof or other coins please write to The Coin Section, The Treasury, Private Bag, Wellington, for N.Z. coins.

The Numismatic Bureau, Post Office, Rarotonga, Cook Islands, for Cook Island coins.

The Numismatic Section, Treasury, Apia, Western Samoa, for Western Samoa coins.

MEDAL SECTION

A. DESIGN. This varies from coin designs in many cases because medals are usually commemorating an event in history, the opening of a special building and so on and more wording is also usually involved. Some are of portraits of famous people and in this case the obverse sometimes may not differ greatly from a coin design, but the reverse is usually of a more complex nature because there is often a pictorial story to tell.

B. HAND ENGRAVED DIES. Simple designs can be more economically produced by hand engraving and by-passing the modelling and plaster cast and related processes. Complicated designs and portraits are usually better produced by modelling and reducing machine methods. The deciding factor, either way, is usually a question of economics. The final result in each case depends largely on the skill of the craftsmen involved. I have had some medal designs well produced by hand engraving in New Zealand. In fact over three decades the rather small number of medals I designed were all produced that way, the engraver usually working from a photograph of my design reduced down to medal size. The technique of my designs in each case indicated by light and shade the relief modelling of the design. The engraver's task was most difficult. He not only had to engrave the die in the actual size of the medal as against the modelling and reducing machine methods described, but he had to cut out the design in a block of steel. This often led to considerable differences in the finished product, usually in the lettering. In most cases the engraver would select from an often limited supply of different type punches, the nearest in size and style to that shown on the design. The final result could be a complete upset of balance of the design compared with the original. On the other hand some engravers can produce very good medals very close in effect to the original design. I commend, in this regard, the work of Mr. Trevor Dick of Petone who has made fine productions, within fairly strict limitations, of bi-centenary medals commemorating the first and second voyages of James Cook to New Zealand.

C. LOW RELIEF COIN MEDALS. Today a great revival is taking place in the oldest collectors' hobby in the civilized world. Starting in the United States the resurgence of the medal is now spreading to other parts of the World.. These are mostly produced around the dollar size of approximately $1\frac{1}{2}$ inch diameter but some are $1\frac{3}{4}$ inch to 2 inch or more. They often have a milled edge like a coin and have a brilliant proof finish just like proof coins. The term coin-medal is used to describe these, and like proof coins, they are usually issued in limited editions and are eagerly sought by collectors. When the limited edition has been struck the dies are destroyed, thus ensuring comparative rarity of that particular medal.

D. HIGH RELIEF LARGE MEDALS. These can be in various diameter sizes up to three or four inches or more. Depending on the amount of relief the medal can be struck several times in the die press to bring up the relief. Between some of the strikings the

medal has to be annealed or heat softened before further strikings. Although high relief medals can be very beautiful in effect, their production is a slow and rather costly process. Consequently they are not issued to the same extent as the smaller low relief medals which is a great pity.

E. MEDAL FINISHES. Metals used for medal production are usually copper, bronze, silver and occasionally gold. These can be in polished finish, matt finish, antique finish, proof-like finish and proof finish. These different metals and finishes all give different effects to the resulting medals from the one original design or model.

F. DIFFERING MODEL TECHNIQUES FOR TYPES OF MEDAL.

However, special modelling rules apply to models required for proof medals. The edges of all parts of the model must step up smartly from the base of the 9 inch model to a minimum height of $1/32$ of an inch. The reason for this is that in the reduced polished die the constant polishing between strikings of proof medals would wear away the edges of the design or lettering with resulting poor effects on the later medals struck from the dies. On the other hand beautiful soft misty effects blending into the background can be obtained with matt or light antique finish. Some of the French medals produced around the beginning of this century are excellent examples of this technique. In this case the model can be blended into the background just as in the final effect required in the medal. The New Zealand decimal coinage medallion I designed and sculptured in 1967 was produced by the Royal Mint, London, in bright bronze finish and also in matt finish as well as in matt-silver finish. The different effect the finish gives to a medal can sometimes be quite astonishing as these $2\frac{1}{2}$ diameter medallions show.

My designs and models for the James Cook bi-centenary medallion of 1969 produced by the Royal Australian Mint are an example of a medallion in the same size with an antique finish in bronze and in silver. Another example of an antique finish in silver is the high relief $2\frac{1}{2}$ inch diameter medallion I designed and modelled showing the New Zealand fantail and Kowhai blossoms. I produced this work for the Franklin Mint in Pennsylvania, U.S.A. while there in 1971. This medal is more than a quarter inch thick and contains seven ounces of sterling silver. The thickness gives more metal for displacement in striking and saves some of the extra blows to bring up the higher relief. I have called these last three items medallions the term used for any large size medal.

A recent commission from Stokes (Australia) Limited of Melbourne was for a smaller medal design requiring a 6-inch diameter model and plasters for a portrait medal for the University of Melbourne. In this case the smaller lettering was easier to cut incuse into the reverse or negative plaster which is cast from the plastilina model. In fact I now frequently do the larger lettering the same way as I feel sharper edges can be given to the letters with less re-touching required than in the first modelling. It is necessary with this method to have the incuse letters with a slight fifteen degree

from the vertical inward slope down from the plaster surface so that the final plaster cast has no undercutting on the letters. The lettering outlines can be worked on to the negative plaster by means of a reverse tracing of the design lettering. In the final positive plaster the fine emery block can be carefully rubbed over the surface of the letters to give a smooth even finish at the same time carefully checking the correct depth of the letters.

Stokes of Melbourne have been medallists for nearly 120 years (since 1856). In 1972 following technical arrangements in regard to medal production with the Franklin Mint, Franklin Center, Pennsylvania, U.S.A., Stokes began issuing high quality proof medals. As a result of this association I received a large commission to design and sculpture "The Medallistic History of Australia", a medal a month to be issued over five years for a series of sixty medals in sterling silver proof finish and also 24ct gold finish on sterling silver. This first involved a few weeks in Australia on pictorial research in libraries and appearances on television and radio, plus Press interviews in Melbourne and Sydney. A cut-off date (September 30th 1972) was decided on for those wishing to order this series of medals. I had anticipated getting well ahead with models and final plaster casts for this series but further commissions for coins and medals have been more than expected. However, I still manage to keep a few medals ahead of the issuing programme of a medal each month.

Mr. T. V. Stokes, a director of the firm in control of the medal issues sends pictorial reference material which I may find difficult to obtain in Wellington. A panel of leading historians in Melbourne advise on subjects for the medals and help considerably with required reference material. The accord between us has been first class and in a recent letter he mentions "In letters received from subscribers to the series we have received nothing but praise for the first 14 medals.

This is most encouraging when one is engaged on such a large assignment as it generates a happy frame of mind which I feel helps me to do my best in this exacting work of historical medals.

The models for the "Medallistic History of Australia" are all produced on 9 inch diameter slightly dished plaster basins, the final silver medals being $1\frac{3}{4}$ inches in diameter.

G. CONCLUSION. I have tried to set down in this paper as complete a record as I have learnt from experience on the designing and modelling of coins and medals. Fortunately my work over the years has also become my hobby, otherwise I could not now take the long hours involved. Constant rush work can be very exasperating at times, especially when I know that with more time available I could produce a much better design, model or finished relief plaster.

It is my hope that this paper will in the course of time encourage some younger generation artist-designers to take up this very interesting and absorbing occupation. Anyone deciding to do so, unless he is a born genius, will have to become more or less dedicated to the work, which means longer than the usual regular hours of work and missing out on some of the other joys of life

normally available. Time involved usually has to include many hours of historical and pictorial research before even commencing the designs for the medal. The final rewards will be, at times, a sense of achievement in producing an imperishable work of art of proved quality.

In nearly 40 years since I started in the design field, mostly on stamp designs in earlier days, I have never once been really satisfied with my work. I am always striving to produce something better which I guess is the aim of all dedicated artists. I have never aspired to being a genius in my work but maybe in the book of records I might go down as one of the best triers. This perhaps in itself is an achievement as I have had no special training in any branch of art work. In conclusion I would like to thank the New Zealand Government for the opportunities I have received in designing and sculpturing our decimal coins and several commemorative dollars. My appreciation also to the executives of the Royal Mint, London, and in particular the chief engraver, Mr. Walter Newman and also Mr. Philip Nathan in his department when I was engaged there on producing the models for New Zealand decimal coins during July-September 1966.

To the executives of the Royal Australian Mint for similar favours when engaged there for short periods in 1969 and 1970 on models for commemorative dollars, in particular to Mr. J. B. Joslin, then in charge of production, now Controller of the Mint and also Mr Van Veinberg, chief engraver. To the executives of the Franklin Mint, U.S.A. and in particular to the founder of the Mint, Mr. Joseph Segel who could well go down in history, in my opinion, as the greatest patron of the arts of this century. To Mr. William Cousins director of sculpture there and to his highly talented and friendly staff of 15 medallic sculptors.

While in America in 1971 I came in contact with Mr. Edward R. Grove now a free lance designer, medallic sculptor and painter living in Florida. To my knowledge he is the only designer with the same art pursuits as myself: stamp designing, coin and medal designing and sculpturing and landscape painting. He was engraver of many United States stamps and designer of some. For several years he worked under Mr. Gilroy Roberts, then chief engraver of the U.S. Mint and now Chairman Emeritus of the Franklin Mint. Mr. Grove's design and high relief portrait work on the series of World War II medals for the Presidential Art Medal Co. are really excellent examples of high relief antique finish medal work.

Last but not least, I wish to thank the Royal Numismatic Society of New Zealand for the opportunity to contribute this paper and for encouragement over the years in my design work.

After delivering this lecture in the Royal Society Room at the National Museum I sent a copy of the manuscript to Dr A. F. N. Sutherland, of Auckland, who is the only son of the late Allan Sutherland and Mrs Sutherland, of Milford, Auckland. Giving his approval of the lecture he suggested that the printed journal should include a record of my design work over the years. The list will not be complete, but as far as memory allows, the main items are recorded.

Since 1933 I have had close to two hundred designs accepted for postage stamps. Most of these were submitted under 'nom de plume' in open competitions with different panels of judges. Of little interest in a numismatic journal I will not go into great detail but list the main items.

- 1935 New Zealand Airmail (in the days of the two-seater biplane).
- 1935 Western Samoa pictorial stamps. Six and a half designs.
- 1940 New Zealand Centennial. Nine and a half designs.
- 1946 New Zealand Peace. Complete set of eleven designs.
- 1946 New Zealand Government Life Insurance Office. Set of six designs.
- 1948 Otago Centennial. Set of four designs.
- 1950 Canterbury Centennial. Three designs.
- 1950 Tonga (Treaty of Friendship with Great Britain). Set of six designs.
- 1950 Tonga. Queen Salote's 50th Birthday. Set of three designs.
- 1950 Tonga. Pictorial designs. Set of fourteen.
- 1953 New Zealand Coronation of H.M. Queen Elizabeth II. Four stamps.
- 1966 New Zealand Government Life Insurance Office. Further set of stamps.
- 1970 Western Samoa. Set of five Cook designs.
- Various Health stamps. Several other single stamps for New Zealand and other countries. Four stamps for Bermuda in world competition.

COINS

- 1935 Basic reverse design only for New Zealand Waitangi Crown piece. (Amendments and sculpture by P. Metcalfe of England.)
- 1947 Reverse for Fiji. 12-sided threepence (design only).
- 1949 Reverse New Zealand Crown piece (design only).
- 1967 New Zealand's new Decimal Coinage. Six designs, models and sculptures.
- 1969 New Zealand Cook's Chart commemorative dollar. Design and sculptures.
- 1970 Royal Visit to New Zealand commemorative dollar. Design and sculptures.
- 1974 New Zealand Day commemorative dollar. Design and sculptures.
- 1970 Cook Islands commemorative dollar. Design and sculptures.
- 1972 Cook Islands new Decimel Coinage. Complete set of seven coins. Designs and sculptures.
- 1973 Cook Islands James Cook commemorative silver coins. \$2½ and \$7½. Designs and sculptures.
- 1974 Cook Islands Winston Churchill commemorative coins in silver and gold. Designs and sculptures.
- 1975 Cook Islands King George III, James Cook and H.M.S. Resolution. \$100 gold coin. Design and sculptures.
- 1969 Western Samoa. R. L. Stevenson, commemorative *tala*. Sculptures only.
- 1970 Western Samoa James Cook commemorative *tala*. Design and sculptures.
- 1972 Western Samoa Jacob Roggeveen commemorative *tala*. Design and sculptures.
- 1973 Western Samoa Commonwealth Games commemorative *tala*. Design and sculptures.
- 1974 Western Samoa Full set of seven coins. Designs and sculptures.

MEDALS

- 1935 Bledisloe Medal. Reverse design only. N.Z. Aero Club Medal. (Presented in gold to Flt-Lt. Clouston and Jean Batten.) Designs only.
- 1940 New Zealand Institute of Engineers Medal. Designs only.
- New Zealand Association of Scientific Workers. Designs only.
- Esther Glenn Memorial Medal (N.Z. Library Association). Designs only.
- Wellington Chamber of Commerce. Obverse design only.
- 1948 Otago Centennial. Designs only. (Dies hand-engraved in Birmingham, England.)
- 1966 South Pacific Bureau of Adult Education. Obverse and reverse designs for a medallion.
- 1970 Palmerston North Centennial. Designs only. (Dies hand-engraved By Trevor Dick, of Dick & Watt Ltd., Petone), who also produced two bicentenary James Cook medals from my designs for the Hawkes Bay and Gisborne Savings Bank).

- 1970 Australian Numismatic Society Cook Bicentenary. Designs only. (Dieshand-engraved in Sydney.)
Except where otherwise stated the dies for the above medals were hand-engraved by the late George Whitehouse, of Mayer & Kean Ltd (now Mayer & Toye Ltd, Wellington).
The following medals have been designed and obverse and reverse sculptures completed for the reducing machine method of production.
- 1967 The Royal Numismatic Society of New Zealand. Decimal coinage medal.
- 1969 The Royal Numismatic Society of New Zealand James Cook Bicentenary Medal.
- 1970 The First Papal Visit to Australia commemorative medal.
- 1971 The Royal Society of New Zealand, also the Franklin Mint Collectors' Society.
The Lord Rutherford Medal.
- 1971 The National Commemorative Society of America. The Robert Peary North Pole Medal.
- 1971 The Britannia Commemorative Society. The Oliver Cromwell medal.
- 1973 The Franklin Mint Collectors' Society. The Hillary-Tenzing Mount Everest medal.
- 1974 The Britannia Commemorative Society. The City of London medal.
- 1975 The National Commemorative Society of America. Paul Revere's Ride medal.

The New Zealand Post Office Crest design in use for some 30 years. Used on letterheads and practically all Post Office stationery—on the doors of all Post Office trucks, vans and cars, and on flags flying over all New Zealand Post Offices.

Numerous other crests, medals and badges for hospitals, nurses, sports clubs, associations and societies, etc.

Honoured by Her Majesty Queen Elizabeth II with the O.B.E. in the New Year Honours List 1968: "For services in the field of stamp and coin designs.

In June of this year it was necessary for me to take some urgent work over to the Franklin Mint at Franklin Center, some twenty miles south of Philadelphia. I had the pleasure of renewing friendships from my earlier visit in 1971 and meeting a number of new staff members in the Sculpture Studio.

The Studio Director, Mr William Cousins, had increased his talented staff from fifteen in 1971 to twenty-four and there were also additional staff in the Art Department. During my stay there I had the opportunity to visit the splendid Franklin Mint Museum. Beautifully designed and with many excellent displays it was a treasure house of fine art applied to numismatics. It has now become a tourist attraction and visitors arrive by coach and car from all parts of the U.S.A. to take the guided tour of the Mint including a 30-minute colour film and a visit to the Mint Museum.

As I had urgent work to return to in Wellington my stay at the Mint on this occasion was rather brief. I left convinced of the increasing interest in proof coins and medals. There is now also a growing demand for gold coins. This great interest in well designed coins and medals of fine quality has now spread to Europe and other parts of the world and is creating a wider participation in numismatics generally.

A few months ago a letter from an executive in the U.S.A. mentioned that having contact with the finest medallic sculptors in the world he considered I was one of the very best of all. The impulse to rush out to buy a larger size hat was quickly dampened by remembering all the fine work I had seen being produced during my visits to the Franklin Mint. I am just one of many perpetually striving for the elusive 'perfection' in the field of designs and sculptures for coins and medals.

**ROYAL NUMISMATIC SOCIETY OF NEW ZEALAND
OFFICERS 1975-76**

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Canterbury Branch Delegate: Mr H. R. Sampson.

ANNUAL REPORT 1974

As the first lady President of the Royal Numismatic Society of New Zealand I have pleasure in presenting a review of the Society's activities for the past year. The year has been successful in some aspects but disappointing in others, namely our failure to produce a journal and the general lack of numismatic research taking place in New Zealand, particularly on New Zealand material.

I note again with pleasure the continued work of our Vice-President Mr James Berry, OBE, in the designing of coins and medals for several countries and organisations throughout the world, including the forthcoming New Zealand Day Commemorative Dollar. On the New Zealand numismatic scene the Government has for the first time issued a Sterling silver dollar in the proof issue of the Commonwealth Games Commemorative. The numbers were limited and unfortunately many collectors were unable to purchase a set. Later this year a New Zealand Day dollar is to be issued and I understand that the mintage is to be 5000 proof and 50,000 uncirculated.

Publications

As I have already stated an issue of the journal did not appear this year, the last issue being May 1972. I am able to report that three journals are in production. The first should be completed within the next few weeks. The second "The Captain G. T. Stagg Memorial Journal" has been delayed as some of the contributors have been unable to complete their sections. The third "The Sutherland Memorial Lecture Journal" is well advanced and should be printed this year. These journals will be of the same high standard as those of the past and once again I make the appeal of past Presidents for quality articles for inclusion in future journals. There is an undoubted dearth of such contributions.

Membership

The total membership of the Society is 496 which is a net drop of thirty on last year's total. It is with deep regret that I record the deaths of: Mr R. Sellars, F.R.N.S.N.Z., Prof. Murray, F.R.N.S.N.Z., Mr G. N. Balmer.

Twenty members were removed from the roll during the year for being in arrears for three or more years.

Fellowships

No Fellowships were conferred during the year and the roll now totals 16 ordinary and 3 Honorary Fellows.

Sutherland Memorial Lecture 1973

The third Sutherland Memorial Lecture was presented in October by our distinguished Vice President Mr James Berry, OBE, entitled "The Art Production for Coins and Medals" which was a treatise on designs, sculptures and methods from the first small sketch ideas through to the finished die. The talk was well illustrated with coins and medals particularly of New Zealand and the Pacific area, and sketches, finished designs, models plaster casts and rubber moulds were also exhibited. The lecture was the highlight of our year and is printed in the journal.

Meetings

Through the continued generosity of the National Museum we have met in the Royal Society room or the lecture hall, and I wish to record my appreciation to the Museum and to the Wellington Branch of the Royal Society. There have been several displays and short talk evenings and Mr E. Horwood presented an excellent paper on "Forgeries, Counterfeits and Reproductions". Through the generosity of B.P. New Zealand Limited our Christmas Social was held in the B.P. Theatre and lounge, and I wish to thank my son, Mr G. Ranger, for helping with the organisation of this function.

Branches

The branches continue to prosper within their districts though it is unfortunate that contact with them was not satisfactory. However the difficulties in this area have been overcome and proper communications have been restored.

Administration

The decline in our activities has been noted in the amount of work requiring attention by the Executive. I wish to record the Society's thanks to Mr James Berry for the continued use of his post office box. I conclude this report with an expression of gratitude to my colleagues on the Council and especially the Executive Officers on whom has fallen the burden of the major part of the administration of the Society.

Mrs I. Ranger PRESIDENT

Appendix**MEMBERSHIP**

(As at 31 May 1974)

Membership 31.5.73		526
Less Resignations and deaths	15	
Removal from roll	20	
In reserve G.N.A.	5	40
		<hr/>
Plus new members		10
		486
		<hr/>
Total at 31 May 1974		496
		<hr/>

NEW ZEALAND SOUVENIR COIN STATISTICS

Year	Proof Dollars	Proof Sets	Specimen Sets	Ordinary Sets	Uncirculated Dollars
1967			50,000	250,000	200,000 Commonwealth Games
1968			40,000	35,000	— Issue
1969			50,000	—	400,000 N.Z. Day
1970			20,000	30,000	285,000
1971		5,000	—	15,000	30,000
1972	3,000	8,000	—	15,000	27,000
1973	8,000	8,000	—	15,000	22,000
1974	{ 10,000	8,000	—	15,000	500,000
	{ 5,000	—	—	15,000	50,000
1975	10,000	10,000	—	—	50,000

CIRCULATING COINS

MINTAGE FIGURES DECIMAL CURRENCY

Year	50c	20c	10c	5c	2c	1c
1967	10,000,000	13,000,000	17,000,000	26,000,000	75,000,000	120,000,000
1968	Nil					
1969	—	2,500,000	3,000,000	10,260,000	20,510,000	—
1970	—	—	2,046,000	11,152,000	—	10,060,000
1971	1,123,200	1,600,000	2,808,000	11,520,000	15,050,000	10,000,000
1972	1,408,000	1,516,000	2,024,000	20,000,000	17,510,000	10,040,000
1973	2,508,000	3,028,000	3,510,000	4,024,000	38,550,000	15,040,000
1974	1,200,000	4,512,000	4,608,000	18,000,000	50,000,000	35,020,000

MINTINGS OF NEW ZEALAND COINS 1933 TO 1965

Year	Crown	Half Crown	Florin	Shilling	Sixpence	Threepence	Penny	Halfpenny
1933	N	20,000,000	2,100,000	2,000,000	3,000,000	6,000,000	N	N
1935	1,128	612,364	2,850,000	3,400,000	3,600,000	6,000,000	N	N
1934	N	2,720,000	755,364	1,680,364	560,364	40,364	N	N
1936	N	N	150,000	N	1,580,000	2,760,000	N	N
1937	N	672,000	1,190,000	890,000	1,280,000	2,880,000	N	N
1938	N	N	N	N	N	N	N	N
1939	N	N	N	N	700,000	3,000,000	N	N
1940	N	100,800	500,000	500,000	800,000	2,000,000	5,424,000	3,432,000
1941	N	776,000	820,000	360,000	440,000	1,760,000	1,200,000	960,000
1942	N	240,000	150,000	240,000	360,000	3,120,000	3,120,000	1,920,000
1943	N	1,120,000	1,400,000	900,000	1,800,000	2,840,000	3,696,000	2,035,200
1944	N	180,000	140,000	480,000	1,160,000	4,400,000	8,400,000	N
1945	N	420,000	515,000	1,030,000	940,000	2,840,000	3,696,000	2,035,200
1946	N	960,000	1,200,000	1,060,000	2,120,000	2,520,000	4,764,000	1,516,800
1947	N	1,600,000	2,500,000	2,800,000	3,200,000	6,080,000	6,720,000	3,120,000
1948	N	1,400,000	1,750,000	1,000,000	2,000,000	6,400,000	5,880,000	2,726,400
1949	200,020	2,800,000	3,500,000	N	N	4,000,000	N	N
1950	N	3,600,000	3,500,000	600,000	800,000	N	2,016,000	1,766,400
1951	N	1,200,000	2,000,000	1,200,000	1,800,000	800,000	5,784,000	1,425,600
1952	N	N	N	600,000	3,200,000	3,600,000	6,888,000	2,342,400
1953	257,000	127,000	257,000	207,000	1,207,000	8,000,000	10,800,000	2,400,000
1954	N	N	N	N	1,200,000	4,007,000	2,407,000	727,000
1955	N	N	N	200,000	1,600,000	4,000,000	3,720,000	240,000
1956	N	N	N	800,000	2,000,000	4,800,000	3,600,000	1,200,000
1957	N	N	N	800,000	2,400,000	8,000,000	2,400,000	1,440,000
1958	N	N	N	1,000,000	3,000,000	4,800,000	10,800,000	1,920,000
1959	N	N	N	600,000	2,000,000	4,000,000	8,400,000	1,920,000
1960	N	N	N	600,000	1,600,000	4,000,000	7,200,000	2,400,000
1961	N	80,000	1,500,000	400,000	800,000	4,800,000	7,200,000	2,880,000
1962	N	600,000	1,500,000	1,000,000	1,200,000	6,000,000	6,000,000	2,880,000
1963	N	400,000	100,000	600,000	800,000	4,000,000	2,400,000	1,680,000
1964	N	N	2,000,000	1,400,000	3,800,000	6,400,000	18,000,000	2,880,000
1965	N	200,000	9,450,000	3,500,000	8,600,000	4,200,000	200,000	5,200,000
	458,148	21,808,164	39,827,364	29,847,364	59,547,364	129,207,364	138,099,000	49,251,800
				GRAND TOTAL	468,046,568			2.00

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