



# SCOPE

## OPERATING INSTRUCTIONS



**METADEC** Metal/Mineral Locator

## INTRODUCTION

The C-Scope Metadec is the culmination of many years of research by both electronic engineers and metal detector enthusiasts to produce a detector with universal appeal to the experienced user.

The features which have been incorporated into the Metadec are there because they have real benefits for the detecting enthusiast although they may never be used all at once. This means that the number of sites worldwide that are now open to Metadec users are greatly increased.

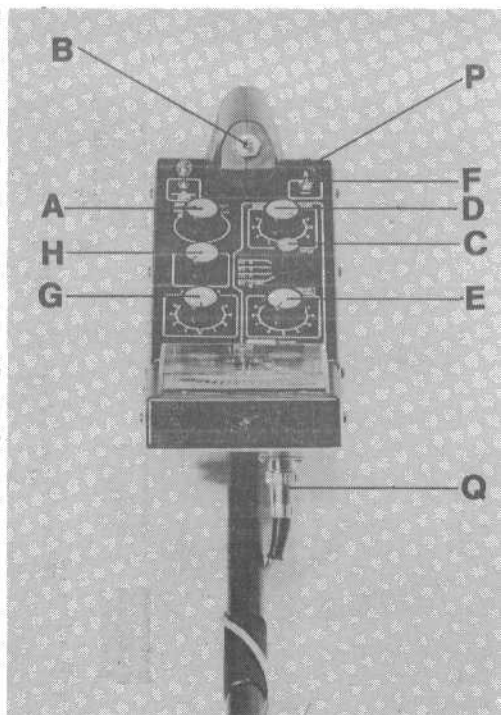
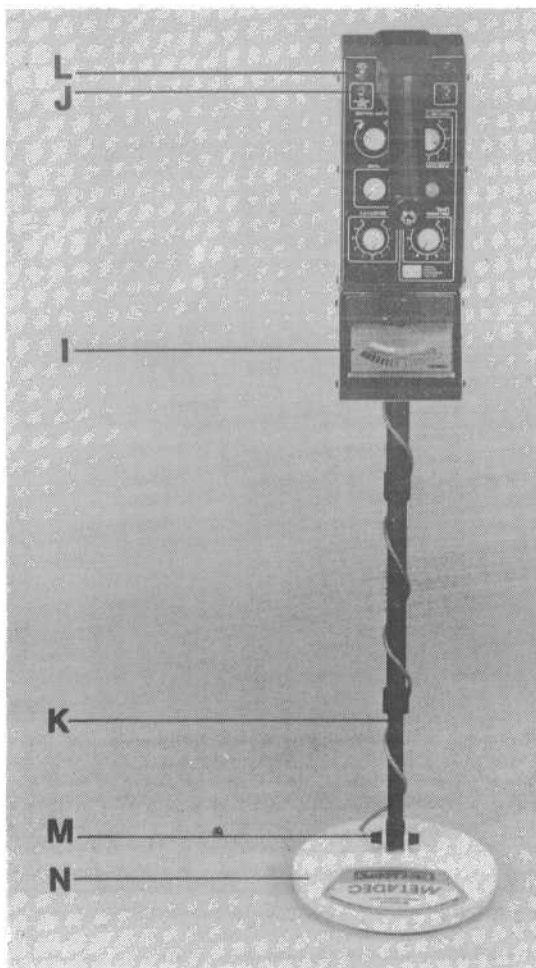
It is advisable that you read these instructions carefully before singling out any particular section for further experimentation.

Remember that the Metadec is a robust electronic instrument designed to be used out-of-doors so when you are experimenting indoors account should be taken of metallic and electrical interference.

Always remember that becoming a good treasure hunter is like becoming a good photographer or fisherman, it is essential to buy the best equipment but having bought it great patience and many hours of practice are needed to become proficient.

If you have any operational queries contact your local C-Scope dealer after re-reading these instructions carefully or ring the C-Scope Enquiry Service 0233 29181.

Diagram 1.



## **CONTROLS – WHAT THEY ARE, WHAT THEY DO**

### **A. On/Off Volume**

This control turns the machine on and off and regulates the level of audio output. This is particularly useful when headphones are used as full volume is often painful.

### **B. ADC Control/Auto Tune**

The most important and often used control on the detector. It operates in conjunction with the tune control which once set need not be touched again as the pre-set level is found automatically when the ADC switch is pressed. Adjustment of any control on the detector, the influence of climate and ground will throw the detector off tune, optimum tuning level is regained by pressing the ADC switch to left or right when this occurs.

The ADC switch is generally used during control change and adjustment, to save time.

This control not only acts as an auto tune button but also as a function selection switch when worked in conjunction with the function control

For example, if working on an inland site such as a ploughed field, a great deal of iron may be detected. By selecting G-D1 on the function control (C) and pressing the ADC control to the left, exploration can be made in the ground excluding all metal mode. If an object is detected an analysis can take place by pressing the ADC control to the right. In doing so D1 iron rejection mode is selected and tuned and the search head can be passed over the object again. If a negative (no signal) response is received then the object is iron and a quick push of the ADC control to the left will select G, ground exclusion mode for optimum search performance.

### **C. Function Selection Switch**

This allows the operator to choose the best mode of operation to suit a site.

For example, G Max may be selected to achieve super deep seeking on a known site which is expected to yield finds.

G-D1 might be selected on a ploughed field where ground exclusion takes care of any iron mineralisation when searching and D1 will save the user digging up endless bits of iron such as nails, when a target is located.

G-D2 will suit a picnic site where iron and silver paper often appear as target signals and need quick rejecting.

G-D3 will be selected when it has been found that a large number of ring pull can tops are to be found and are severely impeding progress. This mode should only be used as a last resort as coins can also be rejected.

N.B. Comparisons can also be made between D1 and D2 and D3 and so on, by simply turning the function selection switch and using the ADC control as an auto tune button when pressed to the right. This is particularly useful on wet salt sand where D1 mode is needed to reject the beach ground effect.

### **D. Ground Exclusion Control**

This control is worked in conjunction with G Max and G only. The effect of ground mineralisation (usually coinciding with the best site) can be tuned out by this control in the G/G Max ground exclusion all metal mode. Positive ground effect makes the detector sound off as if metal is present and hence the ground exclusion control needs to be turned up bit by bit until it is neutralised. Likewise negative ground effect (mainly inland sites) can be neutralised by turning the control in a minus direction. In practice a setting of 0 is most often used.

Refer also to the use of automatic tuning on sites where heavy positive ground effect occurs.

### **E. Discrimination**

This control is most useful when used in conjunction with the function selection control (C). It helps the operator "Fine tune" the amount of discrimination for example D1 mode allows for iron rejection. However in practice 2" nails will be rejected around 5 on the control. Similarly D2 is a silver paper rejection mode, in practice 5 is the most common setting to reject cigarette packs.

The size and shape of iron combined with its orientation will determine reject settings. In practice large iron objects will not be rejected.

#### **F. Auto/Normal Switch**

This control overrides the ADC and automatically ensures the tuning is always at the selected level. Thus even the most highly mineralised ground can be tuned out and a great deal of manual retuning can be avoided.

Automatic tuning does not work on the meter discrimination circuit and when in use the ADC becomes purely a function switch not a function and tune switch.

#### **G. Sensitivity Control**

When discriminating continuously the effects of ground mineralisation can be reduced by decreasing the sensitivity of the detector. This is particularly useful for beginners. In G mode sensitivity can be set to maximum as no ground effect 'masks' signals.

#### **H. Tuning Control (Master)**

This main tuning control is pre-set by the operator to achieve the optimum threshold signal. Deviation from the threshold signal produced by control change, ground effect or drift can be rectified simply by pressing ADC Control B to regain the optimum setting.

#### **I. Signal Intensity Meter**

- (i) The meter acts as a battery check when battery check button is pressed. (Diagram 1. L.)
- (ii) The meter will give a visual indication of the optimum tuning level when the needle centres.
- (iii) When discriminating the meter will show a negative (needle swings left) to unwanted items.
- (iv) When pinpointing a target signal full deflection of the meter to the right will indicate the centre of the object.
- (v) Visual discrimination is available in conjunction with audio response.

#### **J. Meter Discriminate Switch**

This operates the meter discrimination circuit and separates the meter channel from the audio channel. It is therefore possible to ground exclude on audio and discriminate on visual.

#### **K. Adjustable Stem**

A fully adjustable stem allows for the best possible operating attitude to save user fatigue and increase finds. The lower stem, K, has a plastic bottom section to reduce its influence on the search head.

#### **L. Battery Check Button**

Located on the top of the control box one sustained press will give a visual guide to battery condition. Batteries should be changed when the meter needle approaches the change battery sign.

#### **M. Head Locking Nuts**

These ensure that the search head is locked in the most comfortable attitude and one which offers the best search position, i.e., parallel to the ground. Never use tools to lock these nuts as damage may occur.

#### **N. Search Head**

Outwardly C-Scope search heads are simple - but they are in fact complex and should be treated with care. They are designed to transmit and receive a magnetic field and detect changes in it which occur with the presence of metal. Designed to be waterproof further waterproofing should be made if continuous work is envisaged underwater. Always clean off salt water as it contains minerals. Because of the fine tolerances to which the search head has to be manufactured, sudden temperature changes will show signal drift and initially constant retuning is needed until the search head temperature meets that of the air temperature. (Up to 30 minutes is not unusual).

#### **P. Headphone Jack Plug Socket**

Provided for the metal detector enthusiast to use standard (1/4" Jack plug) headphones mono or stereo. These will increase finds as they cut out background noise so that faint deep signals can be heard. Battery drain is also reduced as they use less power than speakers.

#### **Q. Search Head Cable Connector**

The search head cable connector allows for the easy dismantling of the detector for carrying or storage. It will only plug in the control box socket one way and must not be forced.

### **ASSEMBLING YOUR DETECTOR**

Your new C-Scope Metadec is supplied to you in broken down form for ease of shipment.

To assemble your C-Scope, sections K1 and K2 (Diagram 1) need joining together to form the integral adjustable stem and head assembly.

Loosen knurled locking collar at the end of section K1 to allow stem section K2 to slide into it. To tighten simply turn anti-clockwise with fingers, adjusting the stem to a comfortable height.

Once the stem sections are in place, the search head may be attached using the bolts provided. Push the lower stem between the search head brackets. Push search head bolt through search head bracket and lower stem and tighten with fingers after connecting nut.

Having attached the search head to the stem, coil the search head cable around the stem, connect end of cable to control box plug, ensuring that the plug-in connector prongs are correctly matched before tightening.

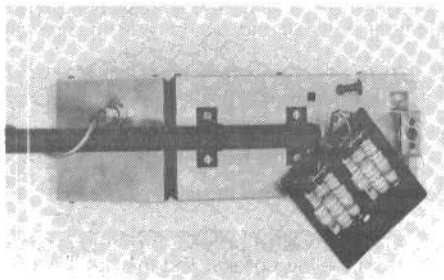
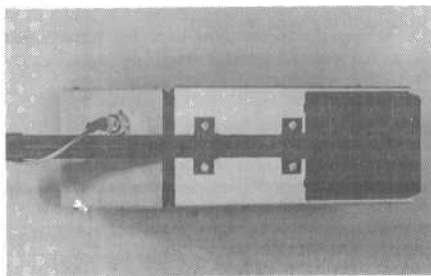
Final adjustment of the stem either lengthening or shortening may require more cable turns or fewer cable turns as the case may be. This is best achieved by rotating the stem in the appropriate direction as the stem length is adjusted.

### **BATTERIES**

- (i) Before you are able to use your detector it is necessary to purchase the correct batteries. Two options are available, your Metadec will take 12 HP7, held in 2 battery clips, or 12 Nickel Cadmium rechargeable batteries which give optimum performance for the life of the charge.

Whichever type of battery you purchase ensure they are of reputable manufacture as over 80% of metal detector faults are traced to faulty batteries or poor connections.

#### **Diagram 2.**



### **BATTERY COMPARTMENT REMOVAL AND BATTERY FITTING**

The Metadec is powered by 12 HP7 batteries contained in clips, it is strongly recommended that re-chargeable batteries are purchased as they will save the user considerable expense over the life of the machine.

To insert the batteries it is necessary to remove the battery compartment from the underside of the machine. First of all place the Metadec on its side as in Diagram 2. Insert a coin into locking nut, turn 45° anti-clockwise and remove, ensuring the compartment is held firmly so that it does not drop off. Push the compartment from the underside. Push the compartment forward slightly to allow it to come free from the two retaining holes in the front. Remove the battery compartment from the detector body carefully so that no strain is placed on the wires connecting the battery clips to the rest of the electronics.

Once the battery compartment has been detached, place it next to the detector body.

Attach the batteries to the clips as shown in Diagram 2, ensuring that the connections are firm and tight. Place batteries into battery container and fix on to the detector body replacing the locking nut in the opposite manner to its removal.

N.B. Never change batteries with the detector switched on as this may affect the unit's performance until switched off and on again.

### **QUICK GET STARTED PROCEDURE FOR METADEC**

Ensure that the detector is well away from any metal object seen or unseen before attempting the following procedure.

1. Turn all controls fully anti-clockwise.
  2. Set ground control to 0.
  3. Set Function control to G-D1 (D1 on wet salt beaches).
  4. Set Sensitivity control to 0.
  5. Set Discrimination control to 5.
  6. Press ADC switch to the left to select G and hold. Press to the right to select D1 on wet salt beaches. This will also tune the machine in conjunction with the tune control.
  7. Turn on/off volume control fully clockwise.
  8. Still with ADC control pressed to left or right, rotate tune control clockwise until signal is just heard through speaker and meter needle is central.
  9. Release ADC control.
  10. Commence search, making broad sweeps from left to right with search head parallel to the ground and about an inch above it.
- \* Initially several seconds may elapse after switching on, before tune reaches optimum.

### **HOW TO TUNE YOUR METADEC**

Familiarity with the control of this professional unit will enable you to get the best from your C-Scope in all conditions. It is best to gain experience using your new C-Scope at less than its optimum settings until your skill and understanding of the unit can be fully utilised and enjoyed.

- (i) Turn all controls fully anti-clockwise before switching on the machine. This will give you a "clean sheet" from which to start.
- (ii) Turn on/off Volume control fully clockwise; this will ensure that you are able to hear the relevant signals given off.
- (iii) Press ADC (B) to the left.
- (iv) Still keeping (B) pressed, turn tuning control (H) until faint threshold signal is heard coming from the loudspeaker and the visual signal meter centres. (This may take a few seconds).
- (v) Release ADC/Tune switch.

When pressed to the left or right the ADC switch will automatically adjust the level of the tune to that selected using tune control (H). Every time a control is changed or adjusted the ADC switch should be pressed to retune the detector. Any change of tune brought about by ground or climatic conditions can be returned to the optimum simply by pressing ADC switch (B).

Tuning and retuning is automatically achieved when the ADC control is pushed firmly right or firmly left, and held momentarily in this position.

Ensure before commencing procedure that your detector search head is at least 3ft. from any metal object including those hidden in the floor.

## GROUND EXCLUSION

The (G) positions on your Metadec have been provided so that no metal object can be missed either because it is ferrous or because the ground mineralisation is masking it (ground effect). This is why throughout this instruction booklet the user is advised to search in this mode where possible and analyse in other modes.

The (G) function works in conjunction with the ground exclude control. The ground exclude control only works on G mode. For most inland sites 0 on the ground exclude control will take care of any ground effect. However, if when lowering the machine to the ground after tuning in the air the meter needle falls to the left and the tuning signal decreases then there is negative ground effect present. To overcome this simply turn the G exclude control anti-clockwise (-) notch by notch while raising and lowering the machine until the meter and the signal remain still.

If, when tuned, the detector search head is lowered to the ground the tuning signal increases and the meter needle rises then positive ground effect is occurring. To neutralise this simply raise the search head, turn the G exclude control clockwise (+) lower the search head until no movement of the meter or rise in tuning signal is heard.

You'll soon learn to make these adjustments quite quickly. Occasionally, however, you'll find that it is not possible to 'eliminate the ground' in this way. There are two possible exceptions:

1. The piece of ground to which you have been lowering the head contains buried metal. Try again nearby and if you now succeed go back to the first spot and treasure hunt!
2. You have struck a patch of 'difficult' ground. A typical example is a beach saturated with salt water. In such cases the G mode cannot cope, but you can still get ground discrimination by turning the function switch to D1 and repeating the ground elimination procedure, but this time using the discriminate control instead of the ground exclude control which is now inoperative.

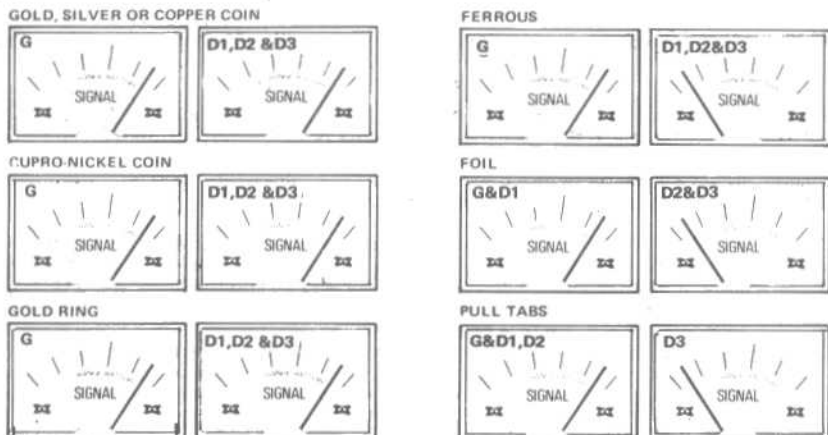
If you immerse the search head in salt water even D1 cannot cope. You must then use D2 (setting up as before) and put up with a certain amount of ground effect. See below under "Discrimination" for how to use the detector in these circumstances.

**N.B.** D3 should only be relied on or used on particular beaches in exceptional circumstances where pull tabs occur every few feet. Ground effect will be severe in D3 and therefore sensitivity control should be turned down (-) to reduce this.

Always use the least amount of discrimination. If you are not finding silver paper, for example, why set the detector against it? Refer also to 'Anomaly Zone'.

Below are pictorial illustrations of the reaction of the Metadec in the various modes to different target objects. These are of course generalised for simplicity and it is essential that these instructions are read fully to appreciate the detectors reaction to the individual types of coins or metals.

Diagram 3.



## G-MAX

The Metadec has significant features which set it apart from other detectors. One of these features is the G-Max function which gives the detector a super deep-searching mode of operation.

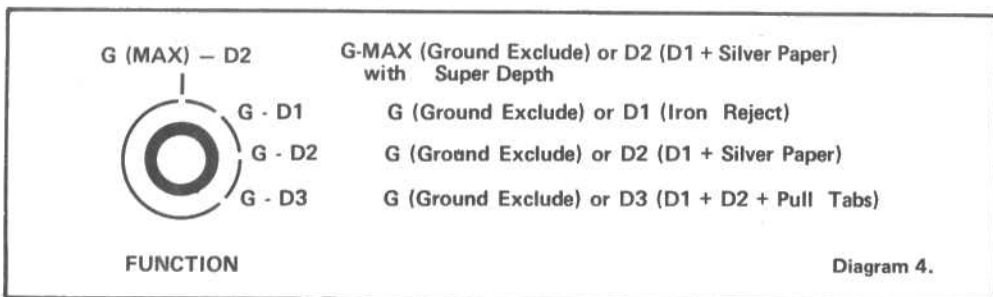
This is an all metal mode combined with ground exclusion and when selected ground effect should be neutralised using the ground exclude control as described previously.

This feature is intended for use on sites where very little scrap metal contamination is to be found or sites which have been covered by other metal detectors and now need a deep searcher to weed out the very deepest objects previously undetected.

This is not a general search mode as ordinary (G) will do this job with added capability of being able to select instantaneous analysis of find.

Incorporated in the ADC control is an Auto Tune Switch which means that if this function is selected instant retuning takes place when the control is pushed to the left.

It should be noted however that when G-Max is selected on the function control (C) the ADC switch should be pushed to the left only. If retuning is then necessary pushing to the left will re-establish the ideal performance setting. Pushing to the right will select D2.



**Warning** In G-Max (very high gain) all external influences are exaggerated, i.e., temperature drift, radio interference and number of target signals, hence progress can only be slow.

### Discrimination With The Meter on G-Max Only

The Metadec has the ability to detect all metal using just the audio speaker output whilst analysing each signal for acceptability using the meter. This facility works only on G-Max and allows the operator to ground exclude and discriminate simultaneously.

To operate meter discrimination simply move the meter disc switch to the on position and retune as normal. The meter should take up a central position whilst the audio is tuned to threshold signal.

The depth penetration of the meter circuitry is less than that of the audio circuitry in order that the ground effect does not allow the meter needle to swing violently from left to right and vice versa.

The meter circuitry is pre-set to give a negative response to silver paper and iron operating as a D2 mode whilst still responding positively to the target object in the audio

This means that if no movement in the meter takes place but an audio signal is given then the object is beyond the detection range of the meter circuitry and should be pinpointed and dug, e.g., on detecting a piece of iron the audio will give a positive response and the meter will give a negative response.

N.B. Ground effect will affect the meter circuitry and a positive or negative response to this should not be confused with a find. The automatic tuning does not operate on the meter discriminate circuitry - therefore occasional retuning by pressing the ADC control right or left will be necessary.



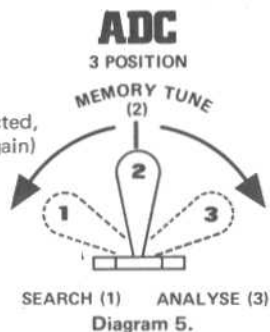
## G-MAX DISCRIMINATION

When G-Max is selected and the ADC control pushed to the left, super deepseeking all metal ground exclusion is available.

Should a site become tiresome because of the amount of junk being detected, perhaps in isolated patches, then by pushing the ADC control right (low gain) ordinary depth penetration discrimination equivalent to D2 setting on the function switch is selected.

By sweeping over the object again slowly the response of the object can now be noted via the audio signal and the visual signal meter.

N.B. Ground effect will be severe in D2 mode.



Therefore after a target signal is detected in G-Max a check can be made. Analyse the signal simply by pressing the ADC control right. If the visual signal meter swings left and the audio signal fades away silver paper or iron has been rejected. If the meter remains central and the audio signal remains at threshold then the object is beyond the detection range in that mode and should be located again on G-Max (push ADC left).

After pinpointing the object should be dug.

If a signal is still received in D2, then of course it should be dug.

## THE ADC CONTROL AS A FUNCTION SELECTOR

The ADC switch works in conjunction with the function switch as shown in diagram. If iron rejection is needed the function control is turned to D1 and the ADC switch is pushed to the right.

If ground exclusion all metal (G) is required the ADC switch is simply moved to the left. This automatically switches off D1 iron reject.

If further comparison of the target signal is required D2 silver paper reject or D3 foil reject can be selected pressing the ADC control to the right and turning the function control to the required level of discrimination.

The ADC switch when used in the way intended by C-Scope will prove a valuable aid to the ardent metal detector enthusiast enabling him to make the most of his limited time.

## SELECTING THE FUNCTION & LEVEL OF DISCRIMINATION

### Function Selection

With your detector turned on and tuned in you need to select the optimum search (mode) function. On most inland sites your C-Scope can be used as an analytical detector. This means searches are conducted in G-Max-D2, G-D1 or G-D3 ground exclusion all metal mode and analysis of target signals is made by switching on D1 iron reject or D2 silver paper and iron reject or D3 foil; ring pull, silver paper and iron reject.

Press ADC switch left or right before function selection of discrimination level setting and release after threshold signal has returned, and meter centred.

After each mode is selected the search head must be swept over the target signal again.

### Choosing the Discrimination Level

As you now appreciate the degree of discrimination is selected on function control D1, D2 and D3 to a low level to reject iron, silver paper and so on. It will probably be necessary to set higher discrimination levels using control (E) to reject larger pieces of the unwanted items.

The Sensitivity Control (G) should be used to reduce ground effect in the discrimination settings. The higher the discrimination the worse the ground effects the machine showing itself as a wildly fluctuating meter needle and an unsteady signal.

To reduce ground effect on difficult sites or to make searching less tiresome, the sensitivity (gain) of the detector can be reduced (0 to -5) to a maximum of 1/6 loss of total sensitivity, but ground effect will be decreased by about 2½ times.

Alternatively when searching in G or in discrimination on sites where the ground is flat and contains few minerals to upset the machine, sensitivity may be turned up to (0 to +5) increasing detection range by about 1/6 accompanied by an increase in ground effect (however little) or 2½ times.

If the sensitivity control is used on maximum in discrimination where ground effect is severe a continuous false "target signal" will be given off masking any real target signal from a metallic item. It is therefore best not to confuse "in air" detection range with those on the ground. Alternatively Automatic tuning can be selected to tune out the ground effect - however continuous sweeping will be necessary to maintain depth (see also Auto/Normal mode).

## **DISCRIMINATION IN THE FIELD**

If the site is relatively junk free, the detector can be used in the (G) mode with the detector adjusted for 'ground' elimination. When an object has been located then the detection mode can be reset by pressing the ADC control and changing modes to D1. The object can then be re-scanned. The mode can then be reset as before to D2 and then re-scanned, and also to D3. By using this method the target object can be analysed. The drawback to this method is that sensitivity to cupro-nickel coins is less on D2 or on D3 than on G or D1, so a 5-pence coin could be rejected on D3 although it will be detected on G, D1 or D2. The golden rule here is dig the object unless there is a clear rejection of the target object, i.e. a negative meter swing or decrease in volume. Used correctly, this method will give the most comprehensive analysis of the nature of the target object. It is extremely useful to bury a range of items such as an iron nail, a piece of silver paper, a pull tab, a copper coin, a silver coin, and a cupro-nickel fifty pence piece, and familiarise yourself with the reactions in the various modes.

If iron is a problem on site and the G mode is giving too many signals to be analysed, the detector can be used in D1 as the main operational mode, and when an object is located, the modes changed to D2 and D3 in turn and the target object rescanned.

If silver paper or pull tabs are a problem, and the G mode is giving too many signals to be analysed, the detector should still be operated on D1 as the main operational mode, and as previously when an object is located, the modes changed to D2 and D3 in turn.

### **Auto/Normal Mode (P)**

Automatic tuning has been incorporated into the Metadec to enable the user to pre-set the machine for a site and never touch the controls again.

To operate this function, switch the auto/normal switch (P) (to auto) ensuring that the machine is at the desired optimum tuning level set, using the normal tuning procedure.

On sites where ground effect, due to heavy concentration of mineralised (metallic) rock and soil occur the automatic tuning resists the destabilising effect of the rock and yet allows metallic objects to be picked up. This is particularly useful when the ground control is overloaded on sites where natural mineral deposits occur.

It must be remembered that the operator must continue to sweep at a steady pace otherwise the automatic tuning will over compensate and tune out any target signal.

Generally speaking the more quickly the user sweeps the greater depth penetration. The optimum sweeping speed can be assessed by placing a coin on the floor and scanning over it to see at what depth the coin is detected at the most comfortable speed of sweep.

The automatic tuning control does not operate in conjunction with the meter discrimination facility only on the audio circuit.

Accurate pinpointing may best be achieved by flicking back to manual tuning so that the target does not "disappear" and sweeps can be made more slowly.

### **Discriminate in Automatic Mode**

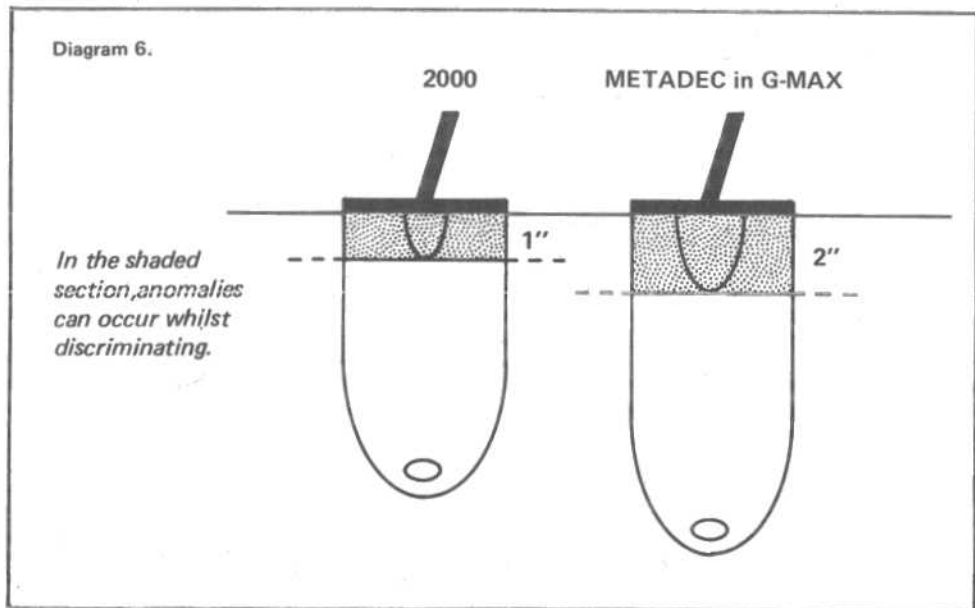
A strong negative response to iron or silver paper etc., will give an audio and meter overshoot as the head is swept beyond the target. This happens only momentarily and the automatic tuning will reset the tuning level. This overshoot should not be confused with a find.

## G-Max and the Anomaly Zone

Beneath the centre of the search head of all makes of metal detector which use multi coils lies an anomaly zone. (Diagram 6.)

Generally speaking the characteristics of this area are directly opposite those on the controls. For example, if D1 iron reject is selected small iron fragments within one inch of the search head will react positively instead of negatively at certain points.

Because the G-Max setting is extremely high gain (extra depth) this anomaly zone is larger up to 2" from the search head. Under some circumstances thin narrow objects such as a coin edge-on may well give a negative response on the meter and a negative audio response on the speaker. This will be followed by a full scale deflection of the meter and a continuous sounding note. If this happens simply retune by pressing the ADC switch either right or left until meter needle centres and sound returns to threshold.



## C-SCOPE METADEC – USE OF YOUR DETECTOR IN THE FIELD

### Detection Range

Detection ranges will vary depending on the size of the object, the length of time an object has been buried, and the type of ground the object is buried in.

The best ground conditions are well compacted soils and coins can be found at the greatest depths if the object has been buried for some time and the coin has interacted with the salts in the ground, thereby appearing larger to the detector. The worst conditions for detecting are on loosely compacted or freshly dug ground or when the object has only recently been buried. In these conditions detection range will be reduced. 90% of all artefacts are found within 6" of the surface.

N.B. Adverse soil conditions can reduce depth of detection by more than half.

### Determining the Target Size and Depth

An operator who is familiar with his instrument will be able to do an excellent job of determining object size, shape, and depth before he digs. This technique is learned from careful analysis of the audio signals coming from the detector. Each time a signal is heard, listen for any peculiar characteristics it may have, determine over how large an area you get a detector signal, and try to "outline" the object before you dig. Listen for the sharpness or dullness of the signals and determine the magnitude of strength of the signal. A coin for example will have a sharp signal, a nail a fuzzy signal.

After digging up the object compare the object size, shape, depth and position in the ground with signal information you received before digging. After careful analysis of many digs, you will learn to "read" the hidden target before digging.

### Detecting

To test for the type of signal you will get, take a coin or metal object and with the detector set up on a table tuned as previously described, move the metal object towards and across the search head. You will note that the volume will increase quickly as the metal object passes across the search head, with the loudest sound coming when the search head is immediately centred over the metal object. As the object passes beyond the search head the sound will quickly fade.

Since the detectors employ a Total Response search head the object can be detected across the full width, back to front of the search head. Maximum sensitivity occurring over an area of 1" by 8" down the middle of the search head.

Diagram 7.

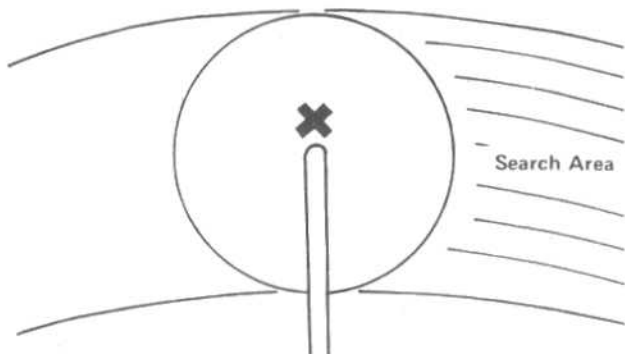
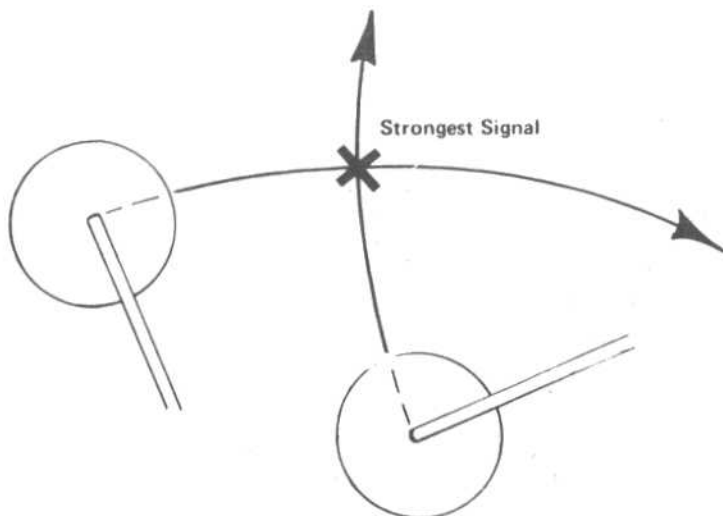


Diagram 8.



## Pinpointing

- (i) The strongest signals will always be received when the object is directly beneath the centre of the head (See X in Diagram 7). To pinpoint the find, stop the search head when you are directly over the target object, then move the search head through 90°, and sweep again, thus forming a cross with the two sweeps as shown in Diagram 8.
- (ii) To focus the target signal further, raise the search head, retuning if necessary, and pass the search head over the object until only a faint signal is heard.

The faint signal will then be occurring at point X under the centre of the head (diagram 8). More accurate pinpointing, particularly of deeply buried objects can be achieved by finding the centre of the target object as described above and fixing its position in the 'mind's eye'.

Turning your detector through 90° and sweeping across the target again will give a second reading, accurately determining the centre of the object (Diagram 8).

Digging carefully at point X will reveal the find. With little practice, size, shape and depth of an article may be estimated in this way before digging.

## Notes on G & Discrimination

In the G mode ordinary soil has very little effect indeed. It can be made to have no effect at all, by means of one simple adjustment which you will quickly learn to carry out, as described under Ground Exclusion. Once the ground has been 'eliminated' in this way you will find that there is no change of sound as the head is lowered towards the ground or raised from the ground. The only thing that affects the sound is buried objects capable of conducting electricity. In general this means metal of any kind — copper, iron, aluminium, silver, gold.....

The one disadvantage of the G mode is that it does not discriminate between metals - though it does perform the useful job of discriminating against the particles of iron ore which permeate some soils and can cause false indication with some detectors. Such 'mineralised' soil can be 'tuned out' in the G mode just like ordinary soils. Learning to 'tune out' the ground is excellent practice in preparation for getting to work on the D modes. D modes are used for object discrimination.

Here the detector reacts according to the nature of the target object. It can be set to go silent when the object is a tinplate bottle cap, a piece of silver paper, a cigarette packet, an iron article, a ring pull, but will still sound out when the article is a coin. The price paid for this is that the detector now becomes sensitive to the ground. It will sound off if the head is not kept at a constant height above the surface, or go silent and less sensitive. Also as more and more discrimination is used the detector becomes blind to some types of wanted objects such as 5-pence cupro-nickel pieces. This is where the need for experience enters. The user must get to know just how much discrimination to employ on any particular sight. The actual operation of your C-Scope on 'discriminate' is easy, it's the ability to assess how to use it that calls for skill.

No matter what the site conditions, your C-Scope is made easy to operate by the provision of an ADC switch. If the detector should drift off tune or be affected by changes in the ground the correct level is instantly and automatically restored by pressing the switch to the left or right, or where auto is used the machine reacts automatically to these changes.

With low batteries in G Max and Max volume on loudspeaker a positive signal can cause a continuous tone to be emitted. This can be cured by reducing the volume or using headphones.

## CARE AND MAINTENANCE

### Care of your Detector

The working life of your detector will be shortened by careless use or neglect of the unit. Think of your detector as a scientific instrument NOT A TOY. Your detector is designed to withstand rugged handling on any terrain, but mis-use or lack of due attention will tell in the end:

After using your detector in a hostile environment (salt water, sand, etc.) the exterior parts of the casing should be flushed with clean fresh water, paying particular attention to the head, and carefully wiped dry.

### **Salt Damage**

If you use your detector continually in a salty environment, particularly when the wind is blowing off the sea, salty air can penetrate the control box.

Corrosion can occur in vital parts of the delicate electronic circuitry.

It is therefore recommended that precautions such as covering the control box with polythene be taken to avoid damage.

The guarantee cannot cover such occurrences and any repairs needed because of salt water or spray will be charged.

### **The Use of Solvents**

It has been found that some types of solvent used for cleaning circuitry will in fact melt the plastic covered components.

Clean the circuit board only with recognised circuit board cleaning agents.

If damage from this source occurs a charge will be made for repairing the detector.

The life of the controls may be extended by periodic (100 hours of use) application of small quantities of light lubricant to the spindles, threads and knob grub screws (3 in 1 or similar household oil is suitable). This operation requires the knobs to be removed.

Light packing grease should be smeared on the threads of the locking collar, and at the same time, the head fixing bolt. Do not store the detector in a damp place.

If the detector is to be stored, remove the batteries as they may leak and corrode the surrounding electronics.

### **Detector Not Operating**

- (a) Check the condition of batteries under load using meter. (See Battery Check Procedure).
- (b) Check that the search head is properly attached to the control box via the search head cable connector.
- (c) Interchange batteries and ensure connections are correct and secure. Battery life can vary tremendously between makes, therefore your 'new' batteries may already be insufficiently powerful to run your detector.

### **Oscillating Signal Accompanied by Slight Meter Fluctuation**

- (a) Caused most often by outside equipment such as fluorescent lights, taxis, radios, power lines, and other metal detectors working nearby.

### **Intermittent Sound From Speaker**

- (a) This could be due to poor battery connections. Ensure they are tight and the batteries are securely clipped into place.
- (b) Loose search head cable connection - tighten.
- (c) Radio transmission from passing taxi or vehicle using radio transmitter equipment.

### **The Detector Drifts out of Tune**

- (a) Temperature drift caused by the change in air temperature when a machine is moved from a house or car into the open.
- (b) The greater the change in temperature the more the drift, and up to 30 minutes may be needed for the electronic circuitry to acclimatise itself.

- (c) Sometimes battery drain can cause drift of signal. Replace batteries and this should help to maintain a stable signal.

Before returning a detector for repair to C-Scope ensure you have done the following:

- Read instructions thoroughly.
- Tried new batteries and checked procedure outlined above.
- Spoken to local dealer about performance of detector, especially if you are still unfamiliar with metal detectors in general.

Return detector with letter giving details of fault.

With low batteries (in G Max) and Max volume on loudspeaker a positive signal can cause a continuous tone to be emitted. This can be cured by:

- Turning volume down and retuning.
- Using headphones and retuning.

## TREASURE HUNTING TIPS

### Sweeping

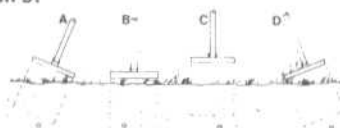
For example:

For extremely small object searching, such as coins, rings, nuggets, etc., lower the search coil to within one inch of the ground. Sweep the coil from side to side in a straight line in front of you. Keep the coil at a constant height as you sweep from side to side. Move the coil at the rate of one foot per second (see Diagram 11).

After you have become familiar with the instrument the sweep rate may be increased to two feet per second. The optimum sweep rate must be determined by each operator.

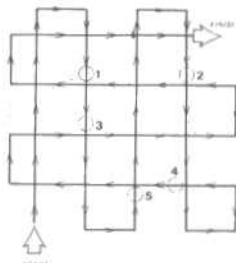
The detector should be held comfortably in the hand, with the coil held as closely to the ground as possible. As the detector is scanned from side to side in front of the operator, the search coil should be advanced approximately two-thirds the diameter of the coil. This keeps the operator moving ahead, and it allows some overlapping of each sweep. This overlapping ensures that nothing will be missed. It is as well to note here that the operator **SHOULD NOT RUSH**. This is one of the most common mistakes made by detector users. If you rush, you will not adequately cover the ground.

Diagram 9.



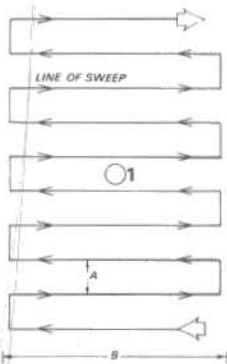
It is essential that the search head is kept close and parallel to the ground to avoid missing finds as in A, C, and D.

Diagram 11.



On arrival at the site a cross search is made marking the positions of finds: 1, 2, 3, 4, and 5. A detailed search of the area around the finds is made on completion of the cross search as in Dia 12.

Diagram 10.



An area ten foot square is marked out around the find located by cross search. This is then divided into strips which are carefully searched.  
Distance A = width of the detector's pick-up area.  
Distance B = length of a comfortable sweep.

## Use in the Field

Treasure hunting can be a profitable and rewarding hobby, if approached in a patient and diligent manner. Time spent researching to locate a worthwhile site for a search can be time wasted if your search is hasty and erratic. To achieve maximum results, it is important, then, to decide on your approach to any particular site, in advance of the actual search.

Tactics will be decided by the type of site - it is more profitable to scan a small area thoroughly, than to conduct a haphazard search of the total site. However, when the site is too far away for you to make several return visits, a plan should be adopted which gives maximum site coverage, at the same time as indicating the most likely areas for detailed search.

One method is to divide the area into large squares by use of a criss/cross search pattern. Starting along the left hand perimeter, search in a straight line, marking the location of any finds with small sticks, until you have covered the length of the site. Then, moving approximately ten feet to the right, search in a straight line parallel to the first line of search. This pattern should be repeated until the right hand perimeter is reached; then follow a similar pattern across the tracks of the first lines of search (Diagram 10).

## A GUIDE TO TREASURE HUNTING

### THE IMPORTANCE OF THE RIGHT APPROACH

#### HOW TO LOOK

#### THE BEST SITES

#### WHERE TO LOOK

#### TREASURE HUNTING AND THE LAW

#### THE RIGHTS OF THE FINDER

#### TREASURE TROVE

#### A CODE OF CONDUCT

### The Importance of the Right Approach

Your detector alone is not a guarantee of successful treasure hunting. Any detector needs an operator and for the best results the operator needs the right approach, attitude and technique. Too many beginners neglect the importance of pre-planning and research before using their detector in the field, and patience and technique during the actual search.

A successful search should begin with research sometime before the day of the actual search. The extent and thoroughness of your research will be one of the major factors in the success of your detecting. You should aim to get as complete an understanding as possible of the local history and geography.

The key to the choice of the site is to think of people, where they congregated over the past few hundred years. What were their customs and pursuits? Where did they spend money? Where did they carry money? The answers are not Roman sites, nor are they associated with mystic treasure stories of crocks of gold. Rather, they are unassuming, undramatic places, like public footpaths and ancient rights of way, old houses and so on.

When you have chosen your site, allocate a whole day from early morning to early evening for the search. Make sure that you have all equipment you are likely to need. Your detector should be checked before starting out, and you should always carry a spare set of batteries. You will also need a strong, sharp trowel. It is also a good idea to have a set of lines and pins so that you can lay out your search area scientifically. Most beginners make the mistake of rushing about hoping to chance upon a rare find. If for example, there happened to be a valuable ring that was buried 4" deep on the site you were searching, if you rushed about haphazardly and quickly on the site, the odds would be very much against your finding it. On the other hand, if you pegged out the area scientifically and searched slowly and thoroughly, the odds of finding the ring would be much more in your favour.

Remember, BE PATIENT and WORK SLOWLY. Do not try to cover too large an area. Restrict yourself to a small area and work through it thoroughly. Make a note of the position and extent of the area, and then when you return you can start again further on without missing any ground or covering the same area twice.

It is also important to keep the detector head as close to the ground as possible. Ideally, you should "iron" the ground with the search head of the detector, so that you do not lose any detection range.



Similarly, if you work slowly and carefully you should be able to distinguish the faint signals as well as the clear-cut signals and further increase your finds.

The technique of getting the best out of your detector is not learnt overnight. You need to get as much experience as possible so that you can recognise every kind of signal. Indeed, a good detector operator can often tell you what is being detected before it is unearthed.

### **Where To Look**

It has already been mentioned that the most profitable sites are those where people have congregated, walked, or lived over the past few hundred years, or even longer.

**HOUSES** If you live in a Victorian house you might not even have to leave your home for your treasure hunting. Old houses have seen remarkable amounts of money pass over the threshold during their history. Britain has had its fair share of misers, and it is surprising how many little hoards or boxes containing savings turn up.

One area to concentrate on is under skirting boards, where coins or rings might have rolled. Doorways too, may prove rewarding as many money transactions take place there. Old fireplaces and chimneys should be well scanned with the detector, as these are favourites for finding hoards, etc. The floorboards should be examined carefully and special attention paid to short lengths which could conceal caches. It is also surprising how much money is lost in old chairs, so give them a look over. And then, of course, the garden should be thoroughly examined. The amount of coins lost in old houses cannot be over-estimated. Most coin shops confirm that many people bring coins in for valuation that they have found accidentally in their houses. A deliberate search in a house of the right age can hardly fail to be rewarding.

**RIVERS** The best parts of rivers to concentrate on are (1) public footpaths along river banks (2) Bends of the river where erosion has been taking place. (3) Bends in the river where coins are likely to be deposited against a particular bank by the action of the current. (4) Areas downstream of old drainage pipes or upstream of projections such as wooded piers, or other obstructions. (5) Old fords or bridges. (6) Areas exposed at low tide where eddy action has been taking place.

Tidal rivers are particularly interesting, as once you have found a good site or spot where coins have collected due to the currents, you can search the area well one day and still return at a later date for more rewarding finds. Rivers tend to sort out their load and distribute it according to weight along the bank in places like those itemised above.

**BEACHES** Beaches are, without a doubt, the favourite haunt of the average British treasure hunter. At one time or another, almost everybody has made the journey to the coast. The beaches are the only place where people undress publicly; anyone who has attempted to change into a bathing costume discreetly and then store their coins on the open sand knows the chances of losing not only coins, but jewellery and wristwatches too.

Once an object has been mislaid on the beach, it is maddeningly difficult to find it again.

There is also a high incidence of wrecks along our coasts, the contents of which are deposited at intervals on our beaches.

These factors contribute to make our beaches probably the richest site for the amateur treasure hunter. The best times to explore beaches are after heavy storms when the sand has been thoroughly stirred up and shifted. A good place to concentrate on is along or just below the tide marks, which are easily identified by the lines of debris that are left. Under piers or alongside breakwaters also usually pay dividends.

Other good sites are:- Fairgrounds, Children's Playgrounds, Tobbogan Runs and Demolition Sites.

### **Rights of the Finder**

The rights of the finder fall into two distinct classes. The first relates to objects that have recently been lost, and the second to items of gold or silver which are subject, or might be subject, to the laws of the Treasure Trove.

In the first place, where the object has been recently lost and found and is valuable, it should be handed to the Police as soon after it has been found as possible. The Police will then attempt to locate the owner. If they succeed in locating the owner, he has the legal right to the object and is not legally bound to reward the finder. That is a matter for the owner's conscience.

In the event of the Police failing to locate the owner they will probably return the object to the finder. If, however, the owner makes a claim for the object at a later date, the finder must return the item to the owner.

If the owner is not located the finder has the best rights to ownership, provided that the object was not found on private property, in which case the owner of the land has a better right than the finder. The solution here, of course, is to obtain permission beforehand and to come to some agreement with the landowner with regard to the division of any finds.

If on the other hand, the find of gold or silver can be proved to have been deliberately concealed, with a view to recovery at a later date, the find comes under the laws of the Treasure Trove. If the objects cannot be proved to have been deliberately concealed, the find cannot be declared Treasure Trove. Usually this point centres around the quantity of coins in a hoard, or whether the find is in a container. Obviously, if there are a hundred or so coins in a pot, they were almost certainly deliberately concealed. If, however, there are only one or two coins, it is more likely that they were lost accidentally.

If the objects are declared Treasure Trove, the finder has no need to worry, for he is rewarded with a cash settlement to the full market value of the find.

When the objects are not declared Treasure Trove, the owner of the land on which the find was made usually has a better claim to ownership than the finder.

## CODE OF CONDUCT

1. Do not interfere with archaeological sites or ancient monuments. Join your local archaeological society if you are interested in ancient history.
2. Do not leave a mess. It is perfectly simple to extract a coin or other small object buried a few inches under the ground without digging a great hole. Use a sharpened trowel or knife to cut a neat circle or triangle (do not remove the plug of earth entirely from the ground); extract the object; replace the soil and grass carefully and even you will have difficulty in finding the spot again.
3. Help keep Britain tidy - and help yourself. Bottle tops, silver paper and tin cans are the last things you should throw away. You could well be digging them up again next year. Do yourself and the community a favour by taking all the rusty junk you find to the nearest litter bin.
4. Do not trespass. Ask permission before venturing on to any private land.
5. Report all unusual historical finds to the local museum and get expert help if you accidentally discover a site of archaeological interest.
6. If you discover any live ammunition or any lethal object such as an unexploded mine, do not touch it. Mark the site carefully and report the find at once to the local police.
7. Learn the treasure trove laws and report all finds of gold and silver objects to the Police. If a coroner's inquest finds that the objects were deliberately concealed with the intention of retrieving them, they become the property of the Crown and therefore treasure trove. But even if the British Museum decides to exercise its right to keep the property, the finder is granted the full market value.
8. Respect the Country Code. Do not leave gates open when crossing fields, and do not damage crops or frighten animals.
9. Never miss an opportunity to show and explain your detector to anyone who asks about it. Be friendly. You could pick up some useful clues to another site. If you meet another detector user introduce yourself. You may learn much about the hobby from each other.
10. Remember that when you are out with your detector, you are an ambassador for the amateur treasure hunting fraternity. Do not give us a bad name.