

FSARG Induction Training

An Introduction to Metal Detecting

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The History of Metal Detecting.....	2
Anatomy of a Metal Detector.....	3
Operating Principles.....	4
Who can Metal Detect?.....	5
Places you Can, and Cannot Detect.....	5
Metal Detecting and The Law.....	6
Metal Detecting Organisations.....	6
Good Practice.....	7
Its place in archaeology.....	8
Discoveries from Hobbyists.....	8
What you'll need.....	10
Clubs.....	10

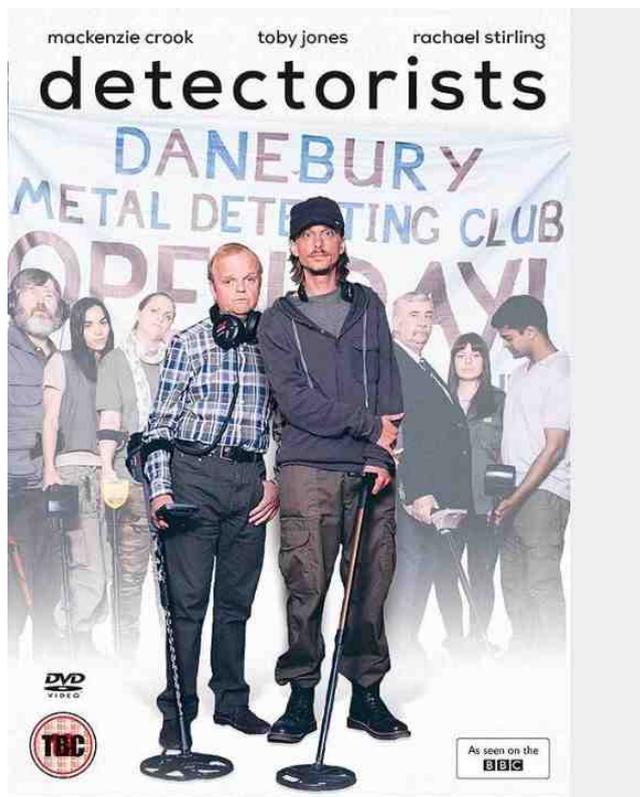
The History of Metal Detecting

Metal detecting – the ability to detect metallic objects obscured from view, usually buried beneath the ground or sea or river bed. Metal detectors were first developed towards the end of the 19th century for commercial purposes. It wasn't until the invention of the transistor in the 1950s and 1960s that small, practical, battery-powered metal detectors first appeared.

By the 1970s metal detector technology had improved dramatically, and finds such as the Water Newton Treasure in 1975 discovered during ploughing, and the Thetford Hoard in 1979 found by a metal detectorists fuelled the popularity of metal detecting as a hobby.

Today, metal detectors are used by a wide range of people...

- (1) **Hobbyists** - Referred to as *Metal Detectorists* (not metal detectors!)
- (2) **Archaeologists**
- (3) **Security personnel** (airports, postal screening)
- (4) **Utility / construction engineers**
- (5) **Criminals** - usually referred to as *Nighthawks*



By far the most passionate group are the hobbyists who will spend many hours conducting research, seeking permissions, and spending a huge amount of time out in the fields searching, often during the bleak cold winter months.

Left: Comedy series *Detectorists* written, directed by, and starring Mackenzie Crook depicts the hobby of metal detecting extremely accurately.

The anatomy of a detector



- (1) The Search Head or Coil. These come in many different shapes and sizes, and is the 'business end' of the detector.
- (2) Control Box. This houses all the electronics and controls necessary to setup and operate the detector.
- (3) Hand Grip. This is usually covered with a foam sleeve to make it more comfortable to hold for prolonged periods.
- (4) Armrest. The forearm is strapped into the armrest which takes strain away from the wrist when swinging the detector from side to side and greatly reduces the risk of RSI.
- (5) Battery Compartment. This houses the batteries. Many modern detectors use rechargeable batteries and are recharged from a plug-in charger.
- (6) The Shaft. This is adjustable to allow for differences in operator height.

Operating Principles

As technology has changed over the years, so has the methods of metal detection. The main types are:

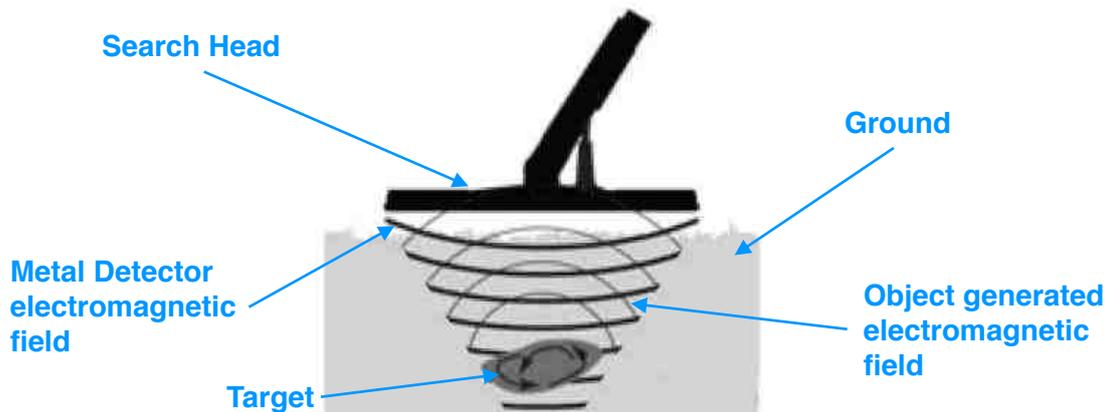
- BFO** (Beat Frequency Oscillator) – the earliest type from the 1970s
- VLF / TR** (Transmit / Receive) – the most popular type
- PI** (Pulse Induction) – for more specialist deep-seeking searching

In addition to the technology used, there are 2 distinct styles of operation: motion and non-motion.

- (1) **Motion** - where the detection takes place by nature of the search head moving over a metal 'target'.
- (2) **Non-motion** – where detection takes place whether the search head is moving or not.

Some detectors are able to switch between these 2 operating modes.

The search head (or coil) produces an electromagnetic field that penetrates the ground. When the head passes over a metallic object, or 'target', 'eddy currents' are induced in the metal, which in turn generates it's own electromagnetic field. It's this new field that's detected and initialises a response from the metal detector.



The depth of penetration depends on many factors - size of head, method of operation, size of metal 'target', build quality and design. Many modern detectors will pick up small coin-size metallic objects up to around 30cm. Large targets can be detected many metres down with specialist detectors.

Note in the diagram above that the electromagnetic field produced by the detector is a conical shape rather than a cylindrical one. This is a very important factor when it comes to using the detector in practice.

The target-generated electromagnetic field is identified by the electronics and an output is produced - usually in the form of an audible tone, or a visual indication on a display, or both.

Nearly all modern detectors are able to distinguish between ferrous (iron) and non-ferrous metals (tin, aluminium, zinc, copper, silver, gold etc). These detectors are called 'discriminating'. More sophisticated machines can 'filter out' very specific types of metal, and can 'learn' the 'signature' of certain objects and therefore ignore them. This is useful feature on a site where a particular nuisance target exists (such as ring-pulls). However, features like this should be used with great caution as they are not 100% accurate and may discriminate out wanted targets.

Metal detectors used in ALL METAL mode will produce a response regardless of the type of metal detected. In DISCRIMINATE mode, they can either produce no response for certain targets (usually ferrous), or give a different indication (such as a different audible response, or a visual indication).

In operation, the search head is swung from side to side at a relatively slow or moderate speed. For a *non-motion* detector, the head can be moved slower, and a target will be detected even if the head is stationary. Non-motion detectors usually emit a constant background 'tone' (called a 'threshold' tone) that changes when a target is detected. However, with a *motion* detector, the machine will only detect a target when the head is moving. If the head is stationary, no signal will be indicated. Motion detectors usually operate in a silent mode, only emitting a tone when a target is found. To 'pin-point' a target, motion detectors are often able to switch to a different (non-motion) mode. The choice between a motion, or non-motion machine is very much down to personal preference.

Who Can Metal Detect?

The short answer is *anybody*. A number of quality manufacturers even make scaled down versions suitable for use by children. A license was once required to operate a metal detector, but this is no longer the case in the UK. Note that Scotland have slightly different requirements.

Places to Metal Detect

Before setting out with a detector, it's important to understand that you cannot use it practically *anywhere* without obtaining permission (unless it's on your own land). Using it without permission will be breaking the law.

Here are some examples:

Coastal (foreshore). The foreshore is owned by The Crown Estate¹, and is defined as the land between mean high water and mean low water (a different definition applies in Scotland). A permit is required to metal detect along the foreshore, and is subject to strict terms and conditions.

Inland (fields - arable, grazing etc), or Private Land. Permission to search should be obtained from the landowner (preferably in writing) with an agreement over the distribution of any recovered artefacts. Ownership information can be obtained online from the Land Registry for a small fee (currently £3). FSARG operates an agreement with the house owners.

Parks and Open Spaces. Policies vary for individual councils, so they should be contacted and asked. Many councils have a blanket ban on metal detecting in parks.

Places you *Cannot* Metal Detect

Scheduled Sites - Details of scheduled sites can be found on the Historic England² website.

Sites of Special Scientific Interest (SSSI) - which are usually conservation areas set up in order to protect wildlife and plant life.

Anywhere else without permission of the landowner.

¹ <http://www.thecrownestate.co.uk/coastal/metal-detecting/>

² www.historicengland.org.uk

Metal Detecting - The Law

Anybody metal detecting should acquaint themselves with **The Treasure Act 1996**³.

The Treasure Act 1996 is an Act of Parliament designed to deal with finds of treasure in England, Wales and Northern Ireland. It **legally obliges** finders of objects which constitute a legally defined term of treasure to report their find to their local coroner within fourteen days. An inquest led by the coroner then determines whether the find constitutes treasure or not. If it is declared to be treasure then the owner must offer the item for sale to a museum at a price set by an independent board of antiquities experts (Treasure Valuation Committee). Only if a museum expresses no interest in the item, or is unable to purchase it, can the owner retain it.

'Treasure' is defined as being:

- All coins from the same hoard. A hoard is defined as two or more coins, as long as they are at least 300 years old when found. If they contain less than 10% gold or silver there must be at least 10 in the hoard for it to qualify.
- Two or more prehistoric base metal objects in association with one another.
- Any individual (non-coin) find that is at least 300 years old and contains at least 10% gold or silver.
- Associated finds: any object of any material found in the same place as (or which had previously been together with) another object which is deemed treasure.
- Objects substantially made from gold or silver but are less than 300 years old, that have been deliberately hidden with the intention of recovery and whose owners or heirs are unknown.

Under English law a landowner has sole title to any archaeological artefacts found on his or her property. Legitimate metal detectorists come to an agreement with the owners of the land they detect on to share any proceeds from treasure sales.

Note that in practice, treasure is usually split 50:50 between the finder and landowner.

Affiliated Organisations

There are 2 organisations that are affiliated with the hobby:

The National Council for Metal Detecting (NCMD)⁴ - which is a representative body of elected volunteers formed in 1981 to provide a means whereby responsible metal detector users would have a democratic forum to discuss problems affecting the hobby and to provide an authoritative voice to counter ill -informed and frequently misleading criticism of the hobby. It does not represent the trade or archaeological interests.

The NCMD has gained Government recognition as an organisation which represents metal detector users countrywide. It has played a major role in representing the views of those metal detector users to Government Departments regarding legislation affecting the hobby.

³ <http://www.legislation.gov.uk/ukpga/1996/24/introduction>

⁴ <http://www.ncmd.co.uk>

The Federation of Independent Detectorists (FID)⁵ - the Worlds largest metal detecting organisation. As a member you receive quarterly postal bulletins, keeping you up to date with all the news, your own personal identity card with your photo on it, if you live in the United Kingdom you also have free public liability insurance for £10,000,000.

Good Practice

Insurance

Although there is no legal requirement to provide your own insurance cover, without it you may find seeking permission to detect on land very difficult. Many rallies will also require insurance cover. This can be easily obtained by joining one of the 2 organisations for just a few pounds a year.

Find-spot Recording

It is extremely important that items removed from the ground have their locations accurately recorded, and can form one of the terms and conditions required for searching. This has been made much easier today with the advent of hand-held GPS units. For as little as £80 a fairly accurate (within 2m) unit can be purchased. These are best used in large open spaces where points of reference are few and far between. In built up areas with poor line of site, recording from large scale maps may be more appropriate. Items recovered should be individually bagged with the location written on it.

Disturbing the ground

Extraction technique is very important to ensure minimal ground disturbance. Different digging methods should be implemented according to the ground type. For example, a small spade could be used on a rough ploughed field, but for grass / lawns, a smaller tool such as a knife should be used. All holes (even on rough ploughed fields) should be filled in without exception. A good detectorist will leave no sign of a hole ever having been dug.

It is also very important to be aware of any possible archaeological structures that may be very close to the surface. It is vital not to dig through any archaeology, but to report it in the first instance to the landowner.

Portable Antiquities Scheme (PAS)⁶

PAS is a voluntary programme run by the government to record the increasing numbers of small finds of archaeological interest found by members of the public. The scheme was begun in 1997 and now covers most of England and Wales.

It is primarily focused on private metal detectorists who through their hobby regularly discover artefacts that would otherwise go unrecorded. Members of the public can also report objects they have found and finds of non-metallic objects are also covered by the scheme. Finds that legally constitute treasure are dealt with through the Treasure Act, 1996. This however concentrates on precious metals, prehistoric base metal, and finds in association with them. Non-prehistoric base metal and non-metal finds would not be recognised as treasure and therefore be unrecorded. The PAS exists to fill this gap.

The scheme funds the posts of Finds Liaison Officers (FLOs) at county councils or local museums to whom finders can report their objects. The FLO is qualified to examine the find and provide the finder with more information on it. He or she also records the find, its function, date, material and location and places this information into a database which can be analysed. The information on the find-spot can be used to organise more research on the area. Many previously unknown archaeological sites have been identified through the scheme and it has contributed greatly to the level of knowledge of the

⁵ <http://fid.newbury.net>

⁶ <https://finds.org.uk>

past. FLOs maintain close links with local metal detecting societies and have contributed to a thaw in relationships between the detectorists and archaeologists who often previously disdained one another. The find remains the property of the finder or the landowner who are free to dispose of non-treasure finds.

Code of Practice / Conduct For Responsible Metal Detecting

The NCMD, FID, The Treasure Act 1996, and PAS all offer similar codes of practice for responsible metal detecting. This training document covers many details of the codes for responsible metal detecting.

Metal Detecting - Its Place in Archaeology

From the popularity of metal detecting in the 1970s, metal detecting and archaeology struggled to establish an amicable relationship. There are many books written on the subject, and a useful summary document can be found on the PAS website⁷. At the height of the friction, two opposing groups STOP (Stop Taking Our Past - The Campaign against Treasure Hunting) and DIG (Detector Information Group) were at loggerheads over the future of metal detecting. Attempts had been made to formulate an antiquities bill from the 1950s - 1980s, but unsuccessfully. However, in 1983, the 'nighthawking' of the Roman temple at Wanborough focussed attention and was the catalyst in forming The Treasure Act 1996. Today, many archaeologists employ the services of detectorists to assist with digs.

In FSARG, we use metal detectors to scan over any spoil that's been removed. Even after sieving, it's possible for very small items to be missed. In addition, we also periodically scan over the trench floor, most times just to verify that we've reached the 'natural' where there should be an absence of metal. It was during one of these exercises that our one and only Saxon knife was discovered.

Discoveries made by hobbyists



The Hoxne Hoard - (1992)
The largest hoard of Roman silver and gold ever found in Britain. Valued at £1.75m

⁷ <https://finds.org.uk/documents/guideforresearchers.pdf>



The Ringlemere Cup (2001) – Bronze age cup found at Ringlemere, near Sandwich, Kent Valued at £270k



The Newark Torc (2005) – Iron Age torc neckless found at Newark, Nottinghamshire. Valued at £350k



The Staffordshire Hoard (2009) – The largest hoard of Anglo-Saxon gold and silver metalwork ever found in the world. More than 3,500 items were recovered. Valued at £3.285m



Metal Detecting - What You'll Need

A Metal Detector	£100 to £8,500 +
Headphones	£
Hand-Held GPS	£80 +
Digging equipment	
Finds bag (with segregated sections)	
Selection of various size Grip Seal Bags	
Pens	
Suitable Clothing	
Mobile Phone with contact details for your Finds Liaison Officer (FLO) and landowner	

Clubs

An ideal way to learn more about metal detecting and to gain access to land to search is to join a local metal detecting club. There are a number in Kent.

Club	Contact Details
Mid-Kent Metal Detecting Club	www.mkmdc.org.uk
Canterbury & District Searchers (C.A.D.S.)	Neil Allen email neil@cads1.wanadoo.co.uk
Romney Marshland Metal Detecting Club	Club meets 2nd Wednesday of the month at The Clubhouse, Marlie Farm Holiday Village, Dymchurch Road, New Romney, Kent
Swale Search & Recovery Club	www.swalemdc.org.uk
Royal Phoenix Detecting Group	Meet 2nd Tuesday of the month at the Cricketers Public House, River, Dover
White Cliffs Detecting Club	Meet 1st Tuesday of the month at the Cricketers Public House, River, Dover
The Medway Pirate's	Meet 3rd Thursday of the month at the Cecil Arms, Cliff Road, Strood. Contact Pete Clarke 01634 723986

Finally, from time to time, metal detectorists can unearth ordnance. If any items are discovered that look like potential bombs, large shells etc, the local police and landowner should be contacted straight away, the spot marked and left undisturbed until it has been checked out.

Often, particularly if detecting in woodland where WW2 training exercises took place, small munitions (303 bullets etc) will often be found. These will consist of 'blanks', live rounds, and 'mis-fires'. In all cases, these should be handled with great care and can be taken to the local police station where they have the facilities to temporarily store, and then dispose of them safely.

Disclaimer

This document is not intended to be a definitive guide to metal detecting. Information is subject to change. It is the responsibility of the metal detectorist to ensure that they comply with current laws, bylaws, restriction, and terms and conditions imposed for searches.