A Consumer's Guide To *Discriminators*

Important Information For Every Metal Detector Buyer

Sometimes it seems that with every new advancement in metal detector technology, advertising and promotional materials become more mysterious and difficult to understand. Because White's Electronics believes that shoppers need easy to understand, factual information in order to make buying decisions, we have put together a few facts and figures about metal detectors —especially those called "discriminators."

Product News From

White's

What's so great about discriminators?

Technically, any instrument that distinguishes between metals (non-ferrous) and (ferrous) objects could be called a discriminator. However, what we normally call discriminators are instruments that do a great deal more. Because their complex circuitry allows them to ignore or separate some junk metals that do not contain iron--such as tinfoil and bottle caps--from other good metals like gold or silver coins, these machines are a dream-come-true for coin hunters. This feature saves them many hours of digging for useless junk--when it works. But the search for a better discriminator has been going on for a long time.

A little history lesson: Why BFO's?

In the early years of metal detectors for hobbists, many companies entered the market with beat frequency or BFO instruments. These were popular with manufacturers because of their simple design and ease of construction. Their basic advantages were an ability to work in salt water and a variety of loop sizes to detect different sized objects.

But BFO's had serious problems because of their lack of sensitivity and tendency to "drift."

The basic characteristics of BFO design limit their depth of detection and frequent re-tuning to correct signal variation make operation difficult.

Despite these problems, for many years BFO instruments were the best metal detectors available -- because they were the only metal detectors available.

The TR's come of age.

During the early 1960's, a few detector manufacturers began producing a different type of metal detector design; the transmitter-receiver or TR (induction balance) type. These detectors had the advantage of not requiring two oscillators--which for all practical purposes eliminated any drift problems. In addition, the TR's utilized a multi-coil loop system which concentrated the detector's electromagnetic field in the center of the loop to produce a much more sensitive instrument.

Because of the complexity of the loop construction on these models, many manufacturers did not move into the production of the TR instruments and have continued to produce BFO's.

In recent years, the few advantages which BFO's had over TR instruments--such as the ability to work in salt water and the various sizes of loops--have been eliminated as TR technology has improved. White's, for example, now produces an amphibious TR detector that will work extremely well in salt water and has TR loops available for most models ranging in size from 2" to 24".

Back to BFO's.

The first discriminators were BFO's. They had all the old disadvantages of BFO's, such as drift and poor sensitivity, and a few new problems peculiar to discriminators. Starting with poor sensitivity, they became progressively worse with discrimination circuitry added on.

For these reasons, many manufacturers avoided the early discriminators, realizing that to be really effective, the superior discriminator would have to be a TR.

Only after sufficient research had been done to put the discriminating function in a TR instrument did these companies introduce a discriminator to their lines.

A few words about "back reading."

If a piece of material which a TR discriminator has been tuned to reject is placed very close to the loop, the instrument will give out a sharp, unusual signal. This false reading is called "back reading." While back reading is part of the nature of a TR detector, because of it's sensitivity, the distance from the loop at which it happens varies from one instrument to another. Some machines will back read at 3"; the Series II will react only at a maximum distance of 1½" to 1" on coin-sized objects.

BFO discriminators have low back reading reactions, in that you can actually place a rejected object on the loop and not get a signal. To achieve this, however, BFO's must sacrifice sensitivity and depth of detection.

The experienced detector user can easily recognize the sound of a back read and re-check the signal with the loop ½" to 1" above the ground. On the other hand, even the most skilled detector operator cannot increase the depth at which his or her BFO instrument will detect.

How to shop for your discriminator.

White's Electronics hopes that this material will help you understand the differences in discriminating detectors. The best way to choose your purchase is comparison shopping. Now that you've read this background information, you'll know what questions to ask and what to watch out for. Try different instruments; learn to adjust them and test their performance yourself under field conditions. This is the best way to find out if a machine really can do what it's supposed to.

Should you have questions about the operation of any make instrument, or need advice on the type of detector to buy, White's staff of technicians and engineers will be glad to give you an unbiased answer--in layman's language.

We are always happy to answer requests for information if you enclose a self-addressed, stamped envelope.

And of course, when you finally choose your detector, we hope it will meet the standards of performance we set for all the products manufactured by White's Electronics.

White's Electronics
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Sweet Home, Oregon 97386

The search for a superior discriminator.

The Series II TR discriminator, now being produced by White's Electronics, solves many of the problems which plagued the BFO discriminators, but it also shows significant improvement over many other TR discriminators currently on the market.

The addition of a three-position detector switch allows the operator to choose between discriminate, normal or automatic modes. Experienced users search on normal or automatic (for highly mineralized areas), and then re-check signals on discriminate to separate out the trash. This searching technique allows maximum depth and sensitivity for searching while still retains the selectivity of a discriminator.

Sensitivity in a discriminator is very important, but so is consistency. The White's Series II consistently maintains the same degree of discrimination regardless of ground conditions. This unusual feature means that the instrument can be used in widely varying types of ground without re-tuning the discriminate control.

Another important improvement is in the actual discrimination circuitry of the Series II which shows considerably less sensitivity loss in the discriminate mode--when compared to other TR discriminators.

Nationally distributed press releases from one detector manufacturer have recently admitted sensitivity losses of from 15%, when adjusted to reject tin foil, to 50% when set to reject pull tabs.

Contrary to what they would have us believe, however, these losses are not common to all discriminators. As you can see from the figures on page 4, sensitivity losses on the White's Series II discriminators are significantly less in many areas. These test results can be easily duplicated by any detector user.

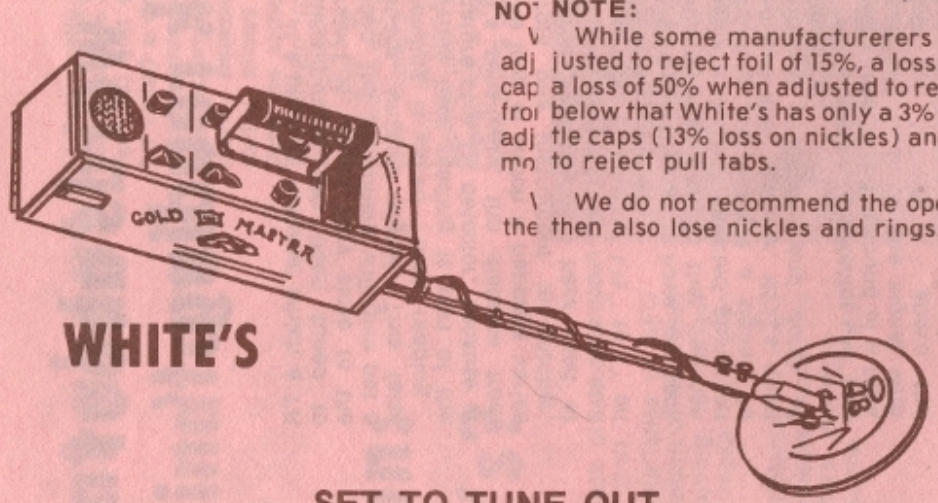
PERCENTAGE OF SENSITIVITY LOSS

White's vs Brand X

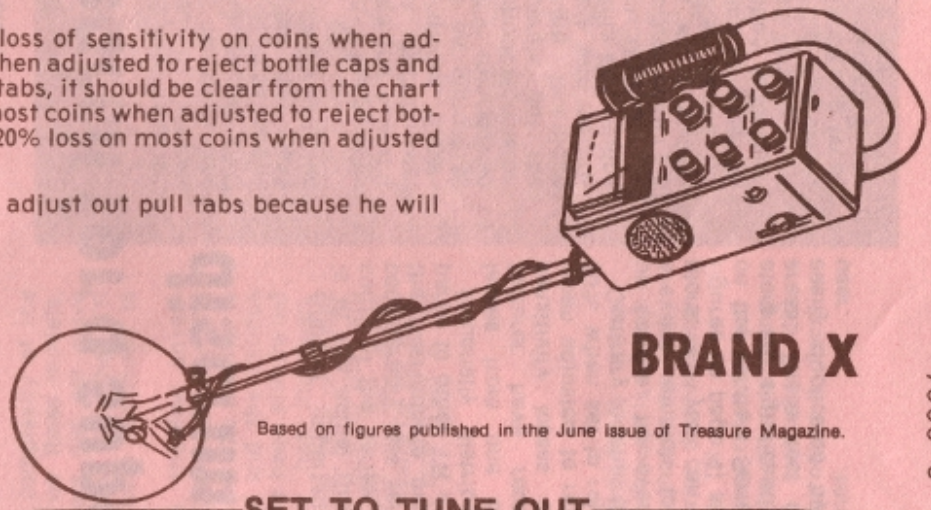
NO NOTE:

V While some manufacturerers claim a loss of sensitivity on coins when adj justed to reject foil of 15%, a loss of 25% when adjusted to reject bottle caps and cap a loss of 50% when adjusted to reject pull tabs, it should be clear from the chart fro below that White's has only a 3% loss on most coins when adjusted to reject botadj tle caps (13% loss on nickles) and only a 20% loss on most coins when adjusted mo to reject pull tabs.

V We do not recommend the operator to adjust out pull tabs because he will the then also lose nickles and rings.



WHITE'S



BRAND X

Based on figures published in the June issue of Treasure Magazine.

SET TO TUNE OUT

PERCENT LOSS ON THESE COINS:	Gum Wrapper	Foil	Bottle Cap	Pull Tab
Quarter	0	0	3%	15%
Penny	0	0	3%	20%
Dime	0	0	3%	20%
Nickel	0	5%	13%	100%

SET TO TUNE OUT

PERCENT LOSS ON THESE COINS:	Gum Wrapper	Foil	Bottle Cap	Pull Tab
Quarter	NO DATA AVAILABLE	15%	25%	50%
Penny		15%	25%	50%
Dime		15%	25%	50%
Nickel		15%	25%	100%

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A consumer's guide to Ground Exclusion Balance*

This COINMASTER V Supreme, shown here among Civil War ruins, is the original Ground Exclusion Balance instrument. The line now includes a number of models, some with discriminator function to tune out unwanted junk items.

Product News from White's

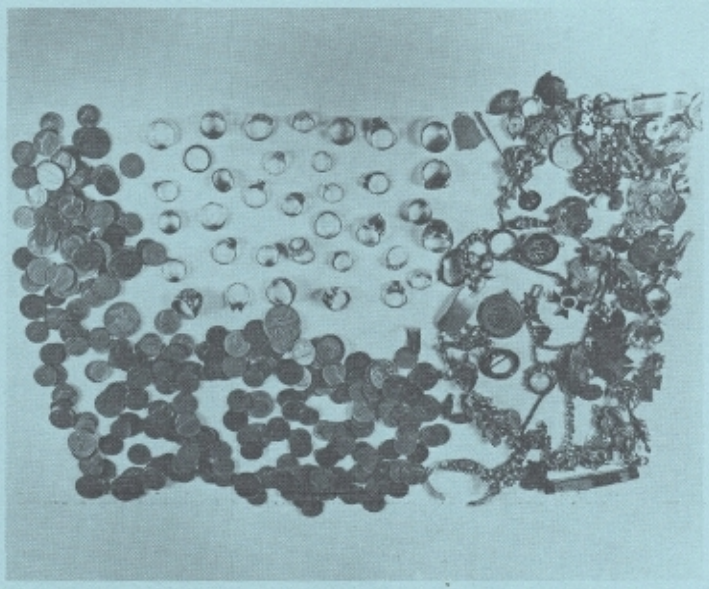
Ground Exclusion Balance circuitry, White's patent-pending invention of 1974, is the greatest contribution to the metal detecting industry in 30 years. White's has put together this information to help you understand how and why Ground Exclusion Balance (G.E.B.) works. We have included material comparing G.E.B. instruments with standard Transmitter-Receiver models for your convenience in determining the advantages of using a G.E.B. model. We hope this information is helpful as you select a metal detector.

***Patent Pending**

Now available

White's revolutionary new Ground Exclusion Balance circuitry is now available with a number of White's instruments. With any of them it may increase the depth of detection in mineralized soil up to four times that of a standard TR! G.E.B. is available in both land and underwater models. It detects minerals and metals, whether ferrous or non-ferrous. Whether you are coinshooting, doing salvage work or hunting relics, there is a G.E.B. instrument for your purpose!

Prospecting can be highly successful combining the best of the old ways with the latest in electronic equipment, a G.E.B. detector.



This collection of treasure—too deep to detect with anything but a G.E.B. instrument from White's—includes valuable coins, rings, watches and other jewelry, some pieces set with semi-precious and precious gems.

The concept

The Ground Exclusion Balance line of instruments uses a revolutionary new concept with White's new, exclusive (patent pending) *Terranean Attenuator* (TA) which operates in the low frequency spectrum.

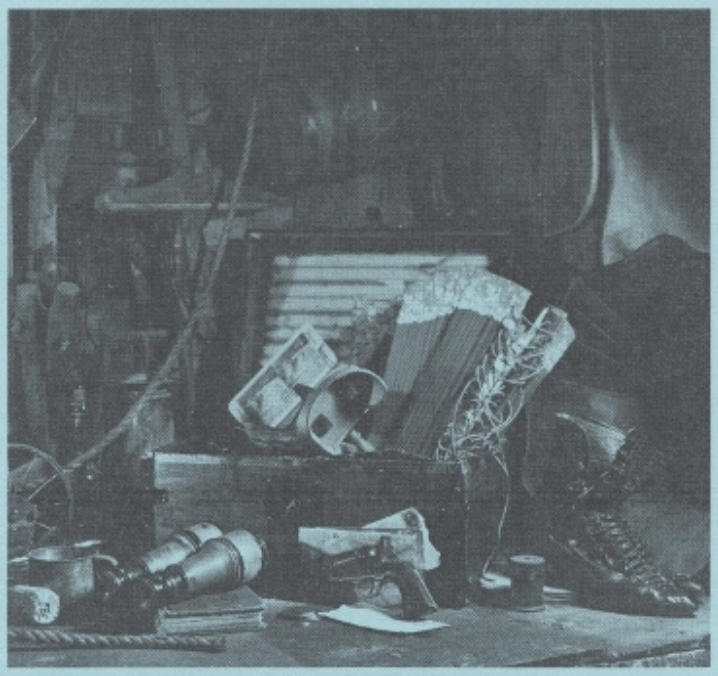
White's engineering staff introduced the first of these instruments in June of 1974.

Once the TA adjustment is made the instrument operates as if there is no ground to interfere! The G.E.B. circuitry and the TA control also minimize the effects of loop height variation, which can be annoying with a standard instrument.

G.E.B. instruments detect all *metals* — both ferrous and non-ferrous — on the *same* setting. No need to change settings as required with other instruments! At the same time, the G.E.B. instruments do not respond to black magnetic sand or mineralized soil, which may interfere with the detection of coins, rings and other metal objects when using conventional instruments.
In the past, for example, pockets of gold nuggets under black sand could not be detected directly with a standard instrument because of the magnetic field of the sand. The sand itself had to be detected on the mineral setting, then panned for possible gold nuggets. With a G.E.B. instrument, however, the prospector can detect valuable nuggets directly, with no magnetic interference. This is something prospectors have dreamed of for 50 years!

In short, the G.E.B. feature enables instruments to have exceptional detection depth regardless of ground or soil conditions. Since most of the earth's surface is mineralized, there are few areas where the G.E.B. feature is not a definite advantage.

Searching ghost towns is a specialty all its own that often leads to fascinating bits of history and a collection of unique conversation pieces.



Memorabilia of by-gone days in the Wild West suggest a nostalgic dip into history. Be sure to take along a G.E.B. detector!

Valuable gold nuggets — the one pictured here weighs 45 ounces and is worth $8,000 — and old coins are just some of the treasure you may find with a G.E.B. detector!

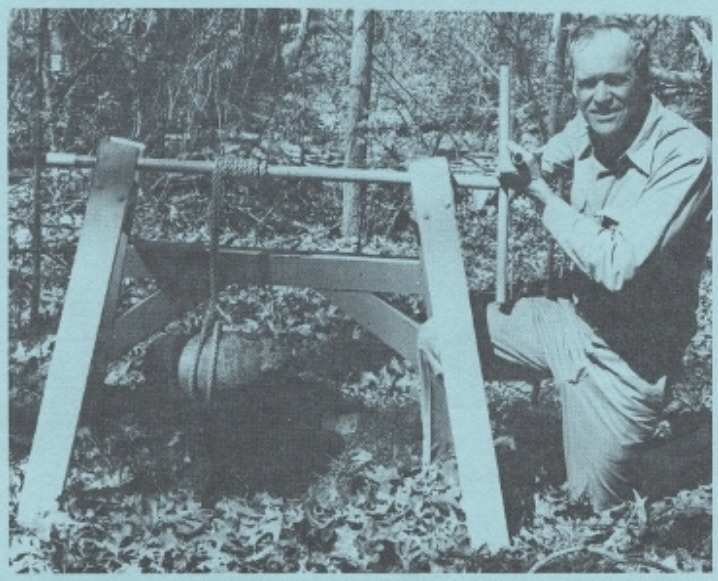
The principle

The principle of Ground Exclusion Balance, developed by White's engineers, is the greatest contribution to metal detecting in 30 years. It has revolutionized the industry!

It works because the unbalanced electrical field of magnetite-bearing ground (mineralized soil) has unique timing characteristics which distinguish it from the fields produced by conductive targets or magnetic targets.

G.E.B. circuitry allows the instrument to ignore the ground's field, but to detect the fields that are different from it in timing. These include both ferrous and non-ferrous metals.

Once the TA is adjusted, it automatically tunes out mineralization, while also ignoring variations in the height at which you hold the loop. This last factor greatly increases the ease of operation.



Atlanta historian Tom Dickey lifts a Civil War projectile with a custom-built hoist. His find is one of hundreds that were too deeply buried for detection by anything but a White's G.E.B. instrument!

The comparison

The more magnetic the ground (and therefore the more difficult to penetrate with a conventional instrument), the better a G.E.B. instrument performs relative to other types of detectors on the market today.

The graph shown here is a sensitivity comparison of a conventional Transmitter-Receiver instrument and a Ground Exclusion Balance instrument.

The left (vertical) axis shows the percentage of maximum volume emitted from the speaker by the instrument being tested. The bottom (horizontal) axis shows the effective detection depth in the ground for a freshly buried U.S. penny. The horizontal lines under the curve for the conventional TR indicate the detuning effects of mineralized ground on this instrument. You can see that the detuning effect drastically reduces the TR's effective detection depth. The curve for the G.E.B. instrument shows that there is no detuning effect due to mineralized ground.

The horizontal dotted line at the 40% level of volume, for example, shows that the G.E.B. instrument will give a 40% volume signal for a penny freshly buried at 6½ inches. For the same volume level the effective detection depth of the TR may vary from about 4½ inches in non-mineralized soil to only 1½ inches in mineralized soil.

In general, G.E.B. models have an increased detection depth in highly mineralized soil of up to *four times* that of conventional TR's and BFO models.

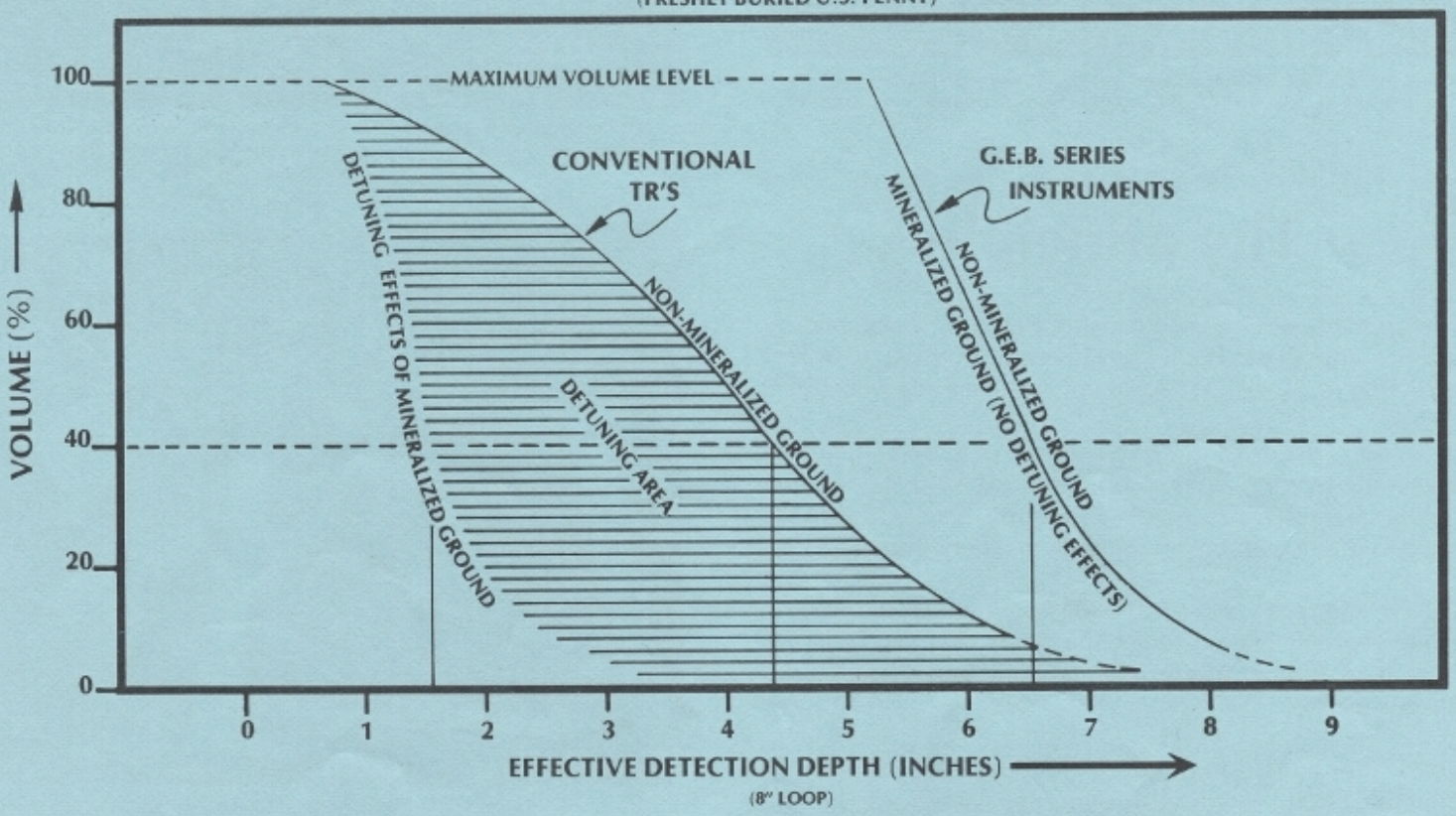
Spanish milled dollars (Pieces of Eight) are still to be found. This one is worth $75,000!

The dream come true

Knowing these facts, it is easy to understand why Ground Exclusion Balance instruments have been called a treasure hunter and coinshooter's dream-come-true. Now the surface of the world can become a new frontier for the owner of a G.E.B. metal detector, exclusively from White's!

SENSITIVITY COMPARISON

(FRESHLY BURIED U.S. PENNY)



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