


 NATIONAL MONUMENTS RECORD
 (INCLUDING THE NATIONAL BUILDINGS RECORD)

 Air Photographs Unit
 Wellington House, Buckingham Gate, LONDON S.W.1
 Telephone: 01-930 9652, ext. 536 & 537

 16th June 71

Dear Beth (May 9?)

Thank you for your letter of the 13th June: glad to know your work is proceeding well. As to Kingscote, I do not think the crops will be off the ground before mid-August so it is likely to be late in that month at earliest before geophysics are possible. I am having this checked on the ground, and with the farmer, & will write as soon as further information becomes available.

As to the site: sub-soil is limestone with a varying depth of plough soil on top. I suspect it may only be 12" or so deep in places, although as we have what appear to be parcel marks one would have thought that shallow stub walls might remain under the plough. I estimate the total area involved might be in the order of about 250 m. square.

Very bad weather is holding our air photographs back: it looks as though it will be a poor year!

Yours sincerely

John Hamplar

Hampton

Hope arrive London airport Saturday

If ⁿinconvenient, ^{send cable telegram} ~~wire~~ ~~me~~ Hotel Boston Rome

If ~~not~~ ^{late} all right will cable flight details
on Friday. Expect to arrive in Rome

Thursday evening, possibly Friday morning.

Expect to arrive London airport Sat

July 24 11:45 A.M. BEA 351 If

inconvenient cable Hotel Boston Rome

My reservation not yet confirmed

will cable again Friday

B R

Cabled from Rome 7/22/71

August 25, 1971

Mr. John Hampton
Royal Commission on Historical Monuments
Air Photographs Unit
Wellington House
Buckingham Gate
London, S. W. 1, England

Dear John:

Many thanks for meeting me in the London airport. I regret only that there was not time to have lunch with you and your family.

Fro has just returned from vacation and has asked me to tell you that he will be coming via Grenoble and will not be able to arrive until Monday, September 13th. He plans to find his way on his own to the site.

Unfortunately, I have forgotten the name of the hotel and I am a little confused about the town where we shall be staying. Could you please send us this information as soon as possible?

According to Fro, Marina Bernaut will also be arriving independently. I think that she will already be staying with her mother who lives nearby.

Since the work that we have to do in Calais is now scheduled for September 20th, we shall not have an abundance of time at Kingscote unless we return after Calais, but there are some complications. Therefore, I should like to arrive on Friday or Saturday, the 10th or 11th to get things organized. I have to wire some batteries, start them charging, calibrate the rope, etc.

Should I plan to arrive in London and travel to the site with you or shall I make my way there independently? If you are busy with other things on the 10th or 11th, would it be possible for someone to deliver the equipment to the hotel ahead of time? In case you find it convenient to meet me at the airport, there are flights from Philadelphia that land at 7:00 A.M., 8:30 A.M., and 10:30 A.M. What would be your choice of time and day - it could be Friday, Saturday, or Sunday? Please don't feel that this is a necessity as I can certainly make my way there by myself.

There is one other possibility and that is that a friend of mine from Belfast may be joining us for a few days. If she does, I may arrive via Dublin, Belfast and Bristol, in which case we would rent a car in Bristol and drive to the hotel. There seem to be Mon. - Wed. - Fri. flights from Belfast to Bristol, but none from London to Bristol. My friend is better at driving on the left than I am. If this materializes, I'll let you know as soon as possible.

If I do arrive over the weekend when shops are closed, could I trouble you to bring an A. C. plug - the standard 220 volt type that one plugs into the wall socket? I need only one to connect to my transformer. I have only USA and Italian-Corsican types.

Sorry to bother you with so many requests and questions.

I am looking forward to seeing you.

Sincerely yours,

Eliz. K. Ralph

EKR:ekl

10:30

9:00

ROYAL COMMISSION ON HISTORICAL MONUMENTS (ENGLAND)
NATIONAL MONUMENTS RECORD,
Air Photographs Unit
Wellington House, Buckingham Gate, London, S.W.1.
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1st Sept 1971

Dear Bert,

Thank you for your letter of the 25th August. I sent you a cable to-day: but to explain further, we can meet you at Heathrow, London, on ~~Friday~~ Saturday, the 11th Sept at about 10.30 AM (might be a little late due to overnight commitments) and take you to 'The Swan', Market Street, WOTTON-UNDER-EDGE, GLOUCESTERSHIRE: Telephone Wotton-under-Edge 2329: bed + breakfast £2.75 per night + 12½^p a journey charge - single room - or + private bathroom £3.75. Please inform Fred of the address - this is the nearest accommodation to the site - about three miles from Kingscote.

We will take your equipment to The Swan - I will bring a suitable plug-rope & pegs as discussed - if this timing is O.K. for you.

Miss Murnaghan of Belfast phoned and said she did not think Belfast a good place to go at the moment - & doubted if she would be able to come, but if you arrived on the 10th it might be possible! I hope I have translated the sense from conversation!

Please advise of E.T.A. Heathrow - or wherever. Suggest we meet at the Stand of the Company you fly with.

Yours sincerely, John

To open cut here ←

Sender's name and address: *J. N. HAMPTON*

ROYAL COMMISSION ON HISTORICAL MONUMENTS (ENGLAND)

NATIONAL MONUMENTS RECORD,

Air Photographs Unit

Wellington House, Buckingham Gate, London, S.W.1.

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BY AIR MAIL
PAR AVION
AIR LETTER
AEROGARME



REMEMBER
to use the
POST CODE! -
MISS E. K. RALPH.
UNIVERSITY MUSEUM
UNIVERSITY OF PENNSYLVANIA
33rd & SPRUCE STREETS
PHILADELPHIA 19104
USA

"Non-magnetic" soil seems to be about 50×10^{-6} emu/cc

RESEARCH LABORATORY FOR ARCHAEOLOGY
AND THE HISTORY OF ART

TEL. 55211

6 KEBLE ROAD
OXFORD
OX1 3QJ

MJA/PJT

27th September, 1971

Miss Elizabeth Ralph
MASCA
University Museum
33rd & Spruce Streets
Philadelphia, Pa.
U.S.A.

Dear Beth,

Mike has measured the susceptibility of the Kingscote soil and finds it to be 110×10^{-6} emu/g. He regards this as reasonably high and consistent with the fact that the site is on Jurassic strata which would have a high iron oxide content.

I hope you had a good trip back.

With best wishes,



M.J. Aitken.

For comparison, measurements made of more magnetic samples from Divostin, Yugoslavia, Neolithic site are as follows!

Sample
Burnt house floor
Fired clay from a hearth

magnetic
Susceptibility
 400×10^{-6} emu
 1400×10^{-6} emu

EKR

NATIONAL MONUMENTS RECORD
(INCLUDING THE NATIONAL BUILDINGS RECORD)Air Photographs Unit
Wellington House, Buckingham Gate, LONDON S.W.1
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~ early October '71

Dear Beth,

Thank you for your note - had hoped to send you everything at once, but a lot of work seems to have built up after our week at Kingscote! I have finished plotting the audio survey, and it looks good. But I have been giving further consideration to the other bands of photography, and the Kodak type 8443 has been printed at two levels: $.5-.6 \mu$ and $.6-.9 \mu$. The former gives a good impression of the building complex, the latter the 'roadway', particularly on the E side of the field. Will send you copies of these in due course, but ^{the} underlines the importance of M/S photography. Early days yet, but think we might be on to something very useful.

Roger tells me you are having trouble with the reproduction of the geophysics. In view of the alignment on the E. side of the field shown by these new prints GRID 2 will be of great importance.

Thank you for your kind wishes - back slowly improving.

Kind regards,
Sincerely, John.

over →

ROYAL COMMISSION ON HISTORICAL MONUMENTS

OFFICE OF THE SECRETARY

P.S. Excavations across the line of the supposed road
at Kingscote are due to take place at the end of
this month. Will keep you posted.

JH

1st November 1971

ROYAL COMMISSION ON HISTORICAL MONUMENTS (ENGLAND)
NATIONAL MONUMENTS RECORD,
Air Photographs Unit
Wellington House, Buckingham Gate, London, S.W.1.
Telephone 01-930-9652, ext 536 & 537

Ralph
Brown
ASCT

Dear Fro,

Just a note to appraise you of the following:

- ① excavations at Kingscote last weekend and this across our 'road' have revealed two ditches 5' wide and approx 2½' deep and about 40' apart. S. ditch sterile, N. containing pottery & bones. Excavation extended to continue next weekend when dating of N. ditch is hoped for. No evidence for 'road' between ditches
- ② have received letter from Richie discussing our paper on the M/S photography: am proceeding with this.
- ③ the interim resumé I gave at the R.P.S. Symposium is going for publication after suitable editing.
- ④ Have been unable to assess the latest M/S material: intend to start work on it myself in about a fortnight after completing papers noted above! Suggested Richie might like to come over for this one - as we discussed - but no answer from Richie yet.
- ⑤ I have had further work done on the photographic material that came from the 1970 sorties: this involves (a) printing with colour separation filters from the false colour film (b) unsharp mask technique of enhancement. (a) gave some interesting results for Kingscote, showing an anomaly extending eastwards from the double ditched section.

Will send you etc

Best wishes:

Due Course:

John

en cut here →

To

Sender's name and address: *J. L. HAMPTON*

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BY AIR MAIL
PAR AVION
AIR LETTER
AEROGRAMME



*Professor F. Ramey,
Director,
The University Museum,
University of Pennsylvania,
33rd & Spruce Streets,
Philadelphia
PA 19104
U.S.A.*

November 4, 1971

Mr. John Hampton
Royal Commission on Historical Monuments
Air Photographs Unit
Wellington House, Buckingham Gate
London, S.W. 1, England

Dear John:

Two copies of my preliminary report are enclosed. As you can see, it is not exactly in form for publication, but hopefully, we can put something together jointly that will be publishable.

A few specific questions are as follows:

1) The aerial photo -

Can you provide extra copies (about 7) of it and perhaps of the densiometer plots. Probably the latter will be included anyway in your report.

2) Fig. 1. Do you want to put more detail in this or redraw it from the original map? Or, shall we ~~entire~~ part of Fig. 1 and combine it with Fig. 2?

3) Fig. 4. If you change the size of the aerial photo, we can easily change this one, too. Fig. 5. Probably your plot of this is more accurate than mine.

I have included the photos of the grids because the Xerox copies are not too clear. We are eager to hear the results of your test excavation.

With best regards to you and Peggy.

Sincerely yours,

Cesium Magnetometer Survey at Kingscote, Gloucestershire, England

by

Elizabeth K. Ralph, Museum Applied Science Center for Archaeology
University Museum, Philadelphia

ABSTRACT

In the region of Kingscote, Gloucestershire, aerial photographs were taken on the 19th of June, 1970. Studies of the photographs revealed anomalies, that is, the possibility of buried structures, in one large field in the area called Ashel Barn. (See Fig. 1), In this region of Kingscote, but not especially in this field, many Roman coins and sherds had been found previously.

Therefore, this field was chosen for a cesium magnetometer survey from 12th to 17th September, 1971, by members of the Museum Applied Science Center for Archaeology (MASCA) and of the Royal Commission on Historical Monuments. Four detailed grids were made with the MASCA Precision Cesium Magnetometer in the region of the photographic anomalies (See Figs. 1 and 2) and indeed pronounced magnetic anomalies were detected (see Fig. 4), which were in excellent correspondence with those in the aerial photographs. An overlay of the contours of equal magnetic intensity on top of a sample photograph illustrates this good agreement.

In the region of grid no. 4 (the most westerly one), two parallel lines of anomalies about 10 meters apart were first detected on a very foggy morning with the smaller MASCA audio readout, and were pinpointed precisely with bamboo canes. Subsequently, the locations of the canes were measured and a detailed grid (no. 4) was made, in which the parallel lines were also detected. A test excavation, conducted later, revealed that these parallel lines of anomalies represented ancient ditches. (The excavation is described by)

Cesium Magnetometer Survey
at Kingscote, Gloucestershire, England

by

Elizabeth K. Ralph

At this site, aerial photographs were taken by John Hampton of the Royal Commission on Historical Monuments (England) on the 19th of June 1970. Studies of the photographs revealed anomalies in one large field in the area called Ashel Barn, a farm which is now owned by Mr. G. H. Nicols. (Its location is shown in Fig. 1).

In this region of Kingscote, but not, especially, in this field, many Roman coins and sherds had been found previously, mostly south of this particular field. However, the aerial photographic anomalies were most pronounced in this one large field which measures approximately 225 x 300 meters. Therefore, this field was chosen for a comparison between a ground survey with magnetometers and aerial photo-interpretation.

The survey was conducted from September 12th to 17th, 1971 by members of the Museum Applied Science Center for Archaeology (MASCA) - namely, Froelich Rainey and Elizabeth Ralph, and volunteers Marina Bernaut and Sheelagh Murnaghan, with the capable assistance of John and Peggy Hampton and Roger Palmer (Royal Commission on Historical Monuments). The magnetometers used and the method of doing grids are described in the next pages.

MASCA CESIUM MAGNETOMETERS

1. Varian Associates Precision Portable Cesium Magnetometer Model 4920.

This instrument was designed specifically for archaeological prospecting by Varian Associates (611 Hansen Way, Palo Alto, California 94303, U.S.A.) at the request of the University Museum, University of Pennsylvania. The components are the read-out, cesium sensor (or sensors) and 30-volt battery pack. It is lightweight and readily portable. Its maximum sensitivity with one sensor is 0.1 gamma. The principles of operation as well as its application in the search for Sybaris in southern Italy are described by E. K. Ralph, Frank Morrison, and D. P. O'Brien in "Archaeological Surveying Utilizing a High-Sensitivity Difference Magnetometer", Geoexploration, vol. 6 (1968) pp. 109-122.

The Model 4920 contains also a difference circuit for use with two sensors. The second sensor may be used either in a gradiometer arrangement or it may be placed in a fixed location in the center of a grid. The second sensor serves to cancel out diurnal and other extraneous magnetic variations, and only the difference between the fixed and movable sensors is read. When operated as a difference magnetometer, the second sensor replaces the crystal oscillator to regulate the counting interval. The readings are no longer in gammas (γ),

but are adjusted to an arbitrary base reading of 80,000 units when the magnetic field at the two sensors is equal. The reading of the movable sensor may be converted to change in γ by the formula:

$$\Delta H = \frac{H_F}{80,000} [N - 80,000]$$

Where ΔH is the difference in γ between the fixed and movable sensors, H_F is the total field intensity (in γ) of the fixed sensor only; and N is the instrument reading in units. Since the total field intensity at Kingscote was approximately 47800 γ at the time of the survey, in the difference mode of operation, the sensitivity of the instrument is roughly double (0.6 γ /unit) than with one sensor only.

At sites with large anomalies of the order of 100 γ or more, this extra sensitivity is not required, but use of the difference circuit eliminates the tedious process of correcting readings for diurnal changes. The great advantage of cesium and of other alkali vapor magnetometers over proton magnetometers is speed. The measurement display interval in this instrument may be selected on the basis of desired speed of operation, from a minimum of 1.5 seconds to infinite (or manual). A built-in memory circuit "holds" the former reading after its 1.5 second measurement cycle. In practice, the readings can be viewed continuously by the operator who can see when significant anomalies are encountered and slow down to record changes in

readings when anomalies are large. This prevents measurement slew resulting from the averaging done by the readout.

This cesium magnetometer is especially suitable for recording readings in a grid pattern.

2. Varian Associates Portable Search Magnetometer Model V-4971 - Audio Type.

This instrument consists also of a readout, one cesium sensor, and battery pack. The big difference is with the readout. This readout is very much smaller and simplified. It contains an oscillator which can be varied with a control knob to match the Larmor frequency from the sensor. This match is made by obtaining a "null" or zero beat frequency on the readout's built-in speaker. Then a reading can be taken from the calibrated dial attached to the control knob. The dial range is from 1 to 1000 and each unit is approximately equal to $1\frac{1}{2}$ γ . (There is a coarser control for bringing the dial into range in any particular magnetic field.) This readout is particularly suitable for doing rapid exploratory lines. One sets the dial at "null" and then while walking along, one need only listen to changes in the audio tone from the loudspeaker to know whether or not anomalies exist. If desired, one may pause to take a reading to find out the approximate magnitude of each anomaly.

This readout, referred to later as the "audio" readout, is most useful for preliminary exploration, and for finding the limits of sites beyond the areas covered in detail by grids. It is also the more suitable of the two for detecting narrow linear features such as shallow ditches.

GRID PROCEDURE

In most cases, after preliminary exploration along lines with the audio readout, grids are laid out in the areas of interest, to be covered in detail with the precision readout. For each grid, two parallel lines (one at each end of the grid) are marked with stakes at 10-meter intervals with tape measures. A rope, calibrated in 2-meter intervals, is then strung between the end stakes of each line. The man carrying the sensor then walks along this line (the zero line) and the adjacent two- and four-meter lines and pauses at each two-meter marker for a reading to be taken. Upon the completion of the first three readings, he then moves 2 meters into the grid, three more readings are taken, and so on in a serpentine fashion along the edge of the grid. After the completion of three lines, the rope is moved between the and strung/ next 10 meter stakes, and the sensor man then moves to the six-, eight-, ten-, twelve-, and fourteen-meter stations at each two-meter marker on the rope, and traverses the grid again, but with a serpentine pattern now five measurements wide.

Each reading is called out by the man carrying the readout and batteries, and is recorded by a third person in a notebook oriented in the same direction as the grid being traversed. In bushy or rough terrain, a fourth person coils and uncoils the 100-meter cable leading to the fixed sensor. When the grid is finished, the pages of the notebook are then put together with

Scotch "magic-mending" tape to form the complete grid.

The differential mode with 2 sensors is usually used for all grids with the second sensor placed in a fixed position in the middle of each grid. The usual height of the movable sensor is in the comfortable position at arm's length at one's side - about 75 cm above the ground. Grids may be varied in size, but it is frequently convenient to lay them out in 100 x 100 meter squares. This area can be covered at 2-meter intervals in a six to eight hour work day, depending upon the terrain.

After a grid has been taped together, contour lines of equal magnetic intensity are then drawn for easy visualization of magnetic patterns. In these plots, "0" represents 80,000 units; "10" = 80,010 units; "990" = 79,990 units, etc. In most grids, with average anomalies, contours are drawn at intervals of 10 units, or approximately 5 γ .

When several grids are made, one adjacent to another, the average base readings may be adjusted to be the same for each by placing an artificial anomaly such as a compass near the fixed sensor. Thus, a reading such as "40 units" in the second or subsequent grids represents the same difference in magnetism above background without anomalies (usually set at 20 units for convenience) as in the first grid. This aids in the interpretation of the final plots of magnetic contours by allowing adjacent grid maps to be connected directly together with no discontinuity.

At Kingscote four grids were made, the locations of which are shown in Fig.2. These areas were chosen to correspond with the anomalies in the aerial photographs (described by John Hampton).

Grid No. 1 was centered on the most pronounced aerial anomalies and was done on the first day of field work. Unlike the subsequent grids, No. 1 was run at 1-meter intervals for the purpose of a detailed first test of the terrain. As one can see in Fig. 3, we did indeed detect pronounced magnetic anomalies. One sees strong evidence of the "angle" anomaly corresponding with that in the aerial photograph, but in addition, west of the "angle" there is a definite rectangular feature, which is probably representative of a building.

After this trial, we proceeded to do Grid Nos. 2, 3, and 4, at 2-meter intervals. The combined plots of these grids are shown in Fig. 4. If we overlay the transparency of Fig. 4 on the aerial photograph (Fig.), we see the good correspondence of the "angle" anomaly as well as other magnetic anomalies.

The two lines of possible ditches running east-west just south of the center of the field were not detected in Grid No. 2, but they do show clearly in Grid No. 4. The contours of the latter were drawn at intervals of 5 units (rather than 10) since these "ditch" anomalies tend to be weaker than others detected previously.

Before Grid No. 4 was made, the region of the ditches was explored with the audio readout on a very foggy morning.

The magnetometer crew did short lines perpendicular to the possible lines of the ditches and while everyone else got lost in the fog, the crew, listening to the change in frequency, had pinpointed the lines of ditches precisely with bamboo canes. This was revealed about mid-day when the fog lifted. Grid No. 4 was made subsequently to see if the ditches could be detected with the precision readout and the more sensitive differential system. In this grid, they were detected, but not nearly so precisely as with the audio unit. The reason for this is that the grid was made at 2-meter intervals whereas with the audio, the change in tone was monitored continuously. The anomalies heard with the audio were a meter or less wide, and were therefore, not missed as they were in the grid system at 2-meter intervals. A plot of the audio anomalies is shown in Fig. 5.

When we first plotted and looked at Grid No. 1 (Fig. 3) and also Grid Nos. 2 and 3, we wondered why the anomalies were so strong. The earth was dark brown in color and did not appear to be magnetic. The stones in the wall and elsewhere were less magnetic. Therefore, we put the movable sensor in a fixed position on top of the long stone wall (shown in Fig. 2) and tested bags of earth. About 300 grams of earth put on top or under the sensor caused a magnetic change of 5 gammas. The susceptibility of this soil was subsequently measured in the laboratory by Mike Tite^{*}. This measurement and others for comparison from other sites are listed below.

* We are grateful to Mike Tite (Department of Physics, University of Essex) and to Martin Aitken (Research Laboratory for Archaeology and the History of Art, Oxford University) who visited the site and transported the sample to him.

<u>Sample</u>	<u>Magnetic Susceptibility</u>
Kingscote soil	110 x 10 ⁻⁶ emu/g
"Non-magnetic" soil	50 x 10 ⁻⁶ emu/g
Burnt house floor	400 x 10 ⁻⁶ emu/g
Fired clay from a hearth	1400 x 10 ⁻⁶ emu/g

As Mike Tite has commented, "...the Kingscote soil is reasonably high and consistent with the fact that the site is on Jurassic strata which would have a high iron oxide content."

We observed also that the farmer follows the practice of burning the grain stubble. Even though each burning penetrates to a depth of only 1 cm, the yearly plowing and turning under of the top layer would tend to make the uppermost 20 cm more magnetic than the unburned earth. Perhaps, in the regions of the archaeological features, more of this earth piled up as the walls fell and disappeared and this may account for the positive magnetic anomalies.

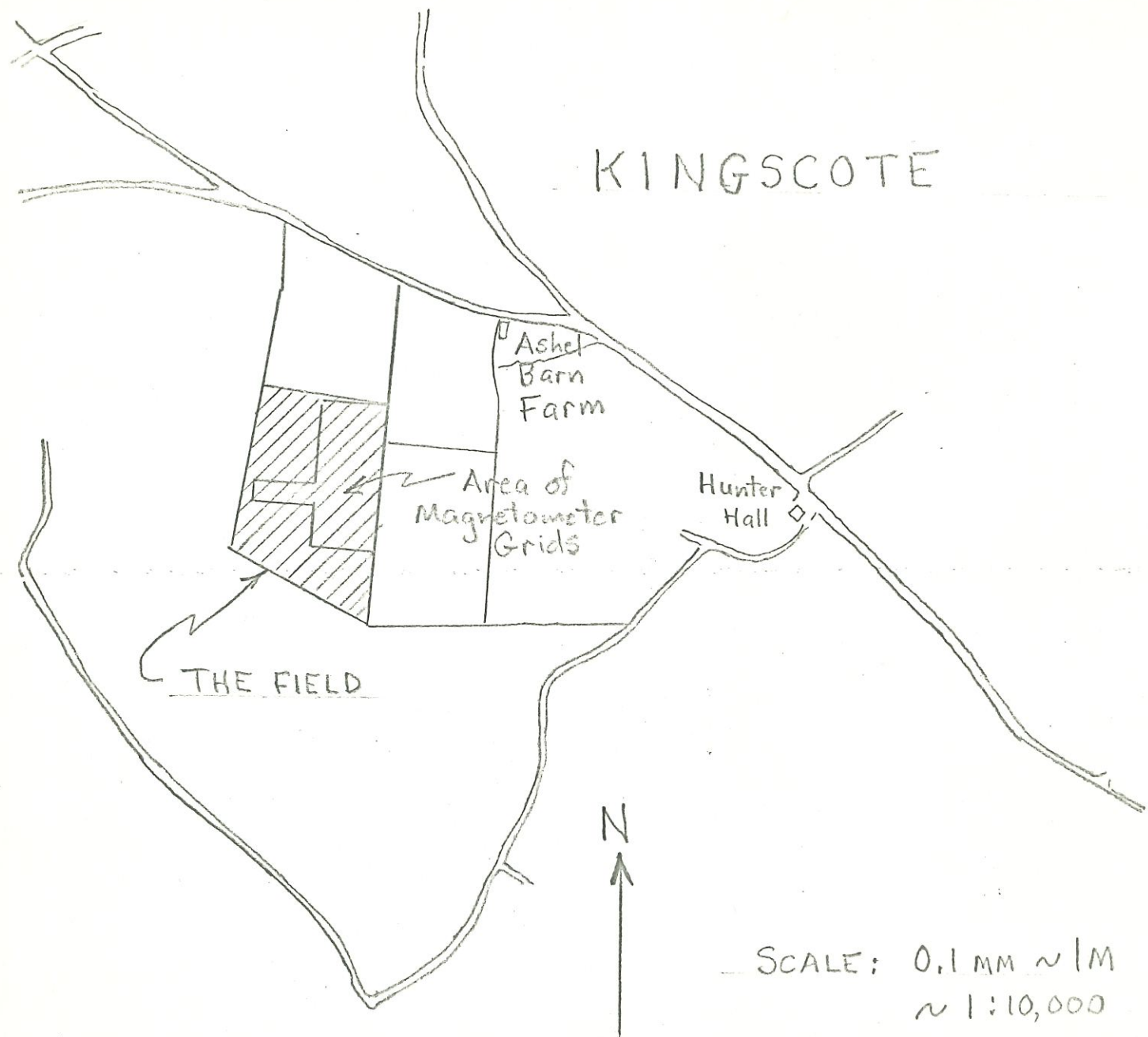


Fig. 1. Location of "the field" (hatched) at Ashel Barn, Kingscote and of the combined magnetometer grids within the field.

Fig. 2.

LOCATION OF INDIVIDUAL MAGNETOMETER
GRIDS AT ASHEL BARN,
KINGSCOTE

SCALE - 1:1000

MAGNETIC
NORTH

G #4



G #2

3

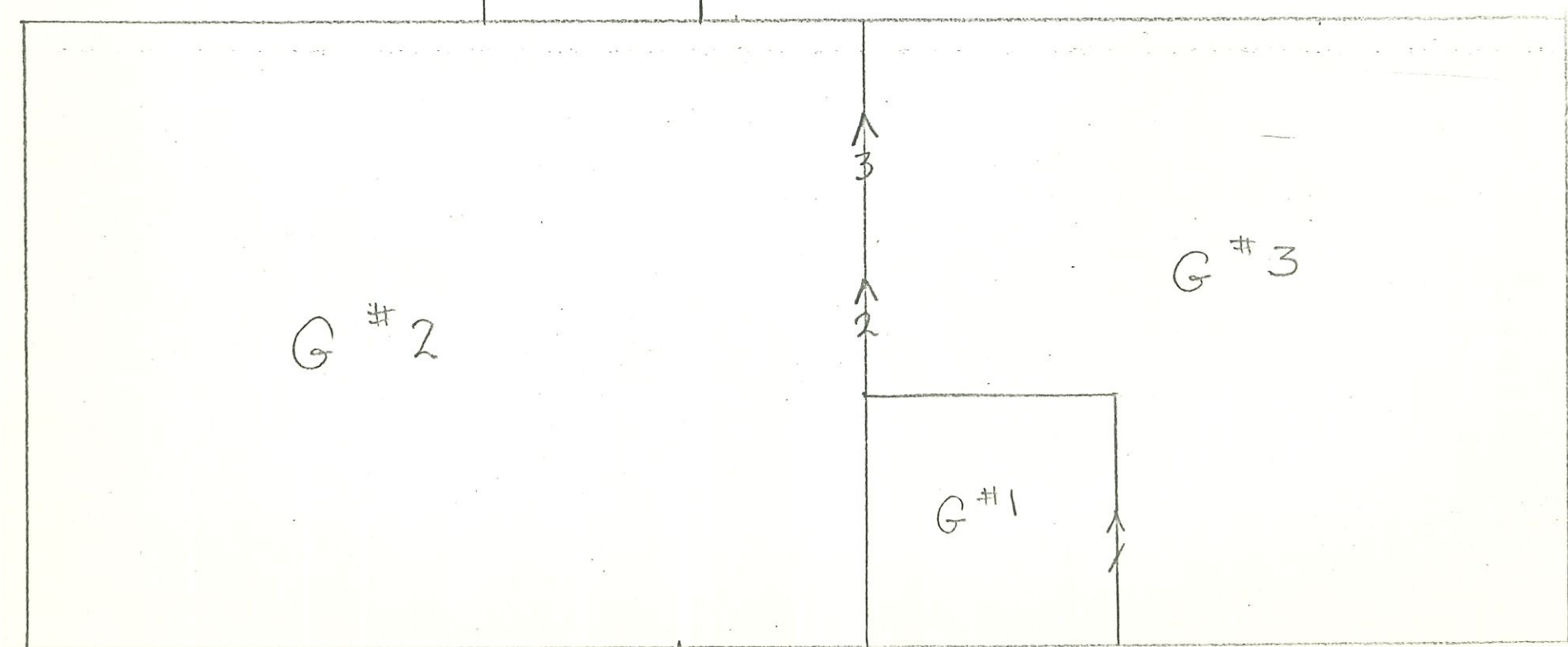
2

G #3

G #1

bench mark

stone wall



GRID # 1



KINGSCOTE - ASHEL BARN

CONTOUR INTERVAL = 10 UNITS ~ 5 γ

BASE LEVEL ~ 20 UNITS

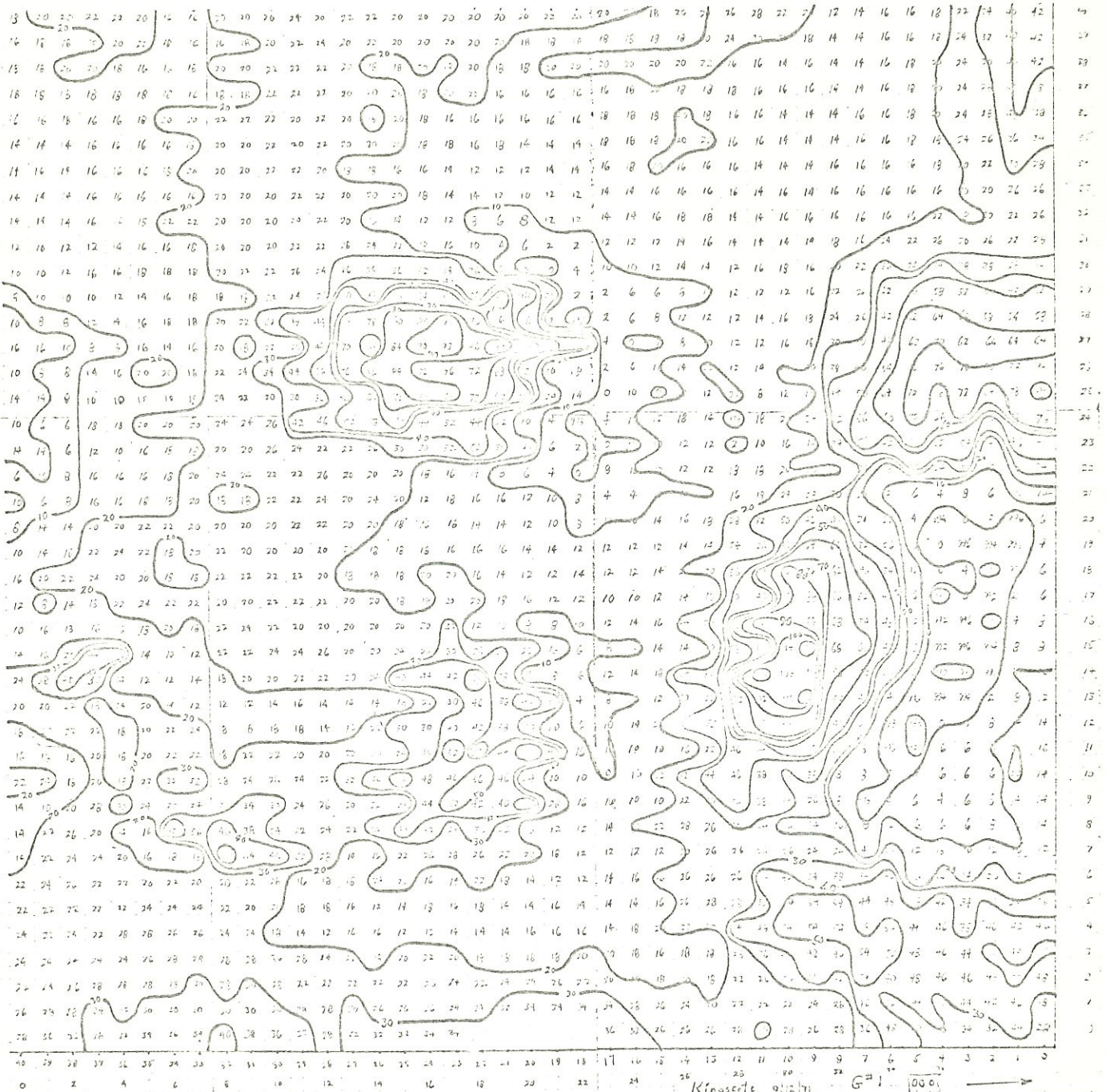


Fig. 3. Magnetometer Grid No. 1 made at 1-meter spacing. Magnetic contours are drawn at intervals of 10 units.

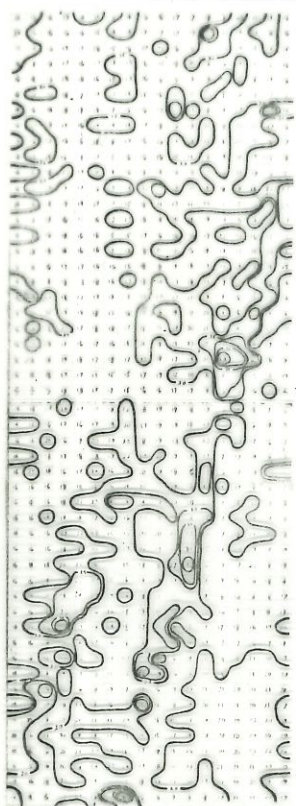
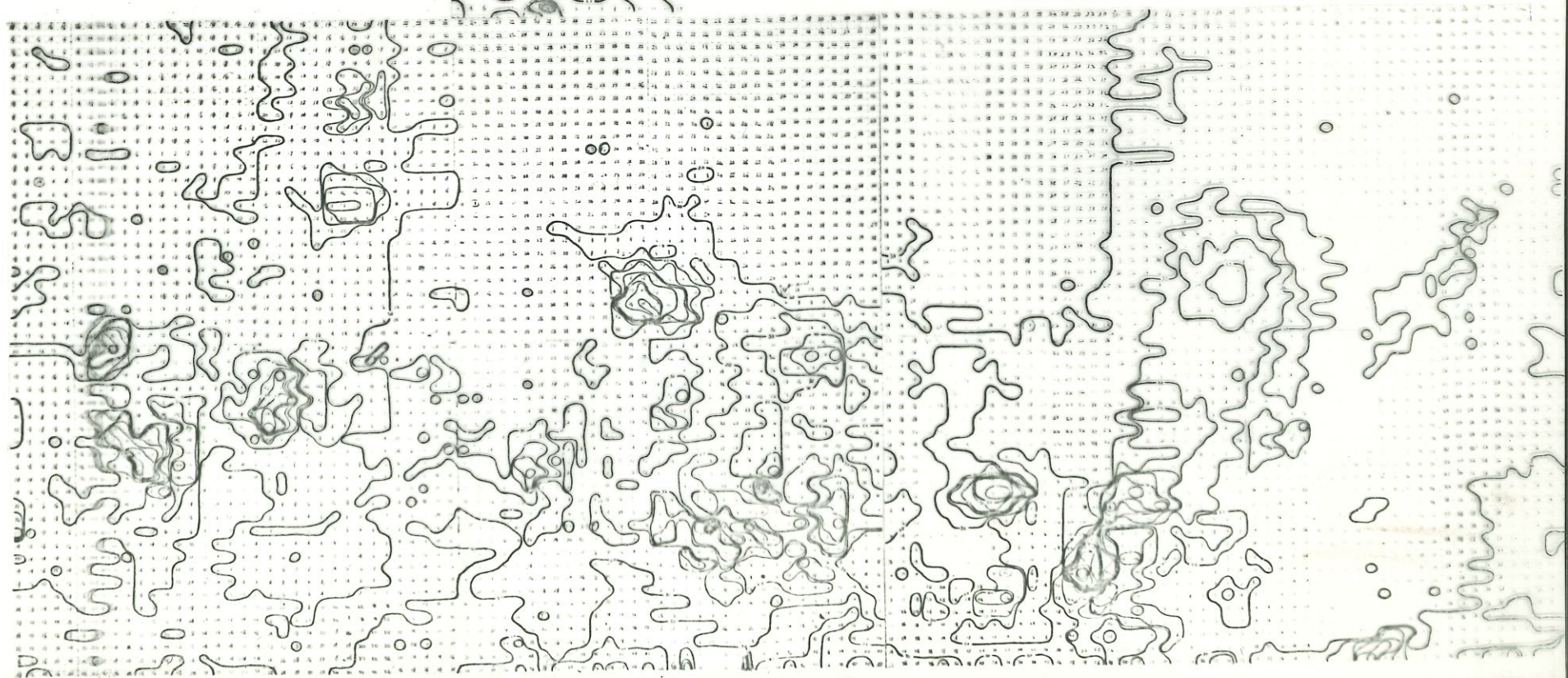


Fig. 4. Combined plots of Grid Nos. 2,
3 and 4 made at 2-meter spacing. Contours
of Nos. 2 and 3 are drawn at 10-unit
intervals; and No. 4, at 5-unit intervals.

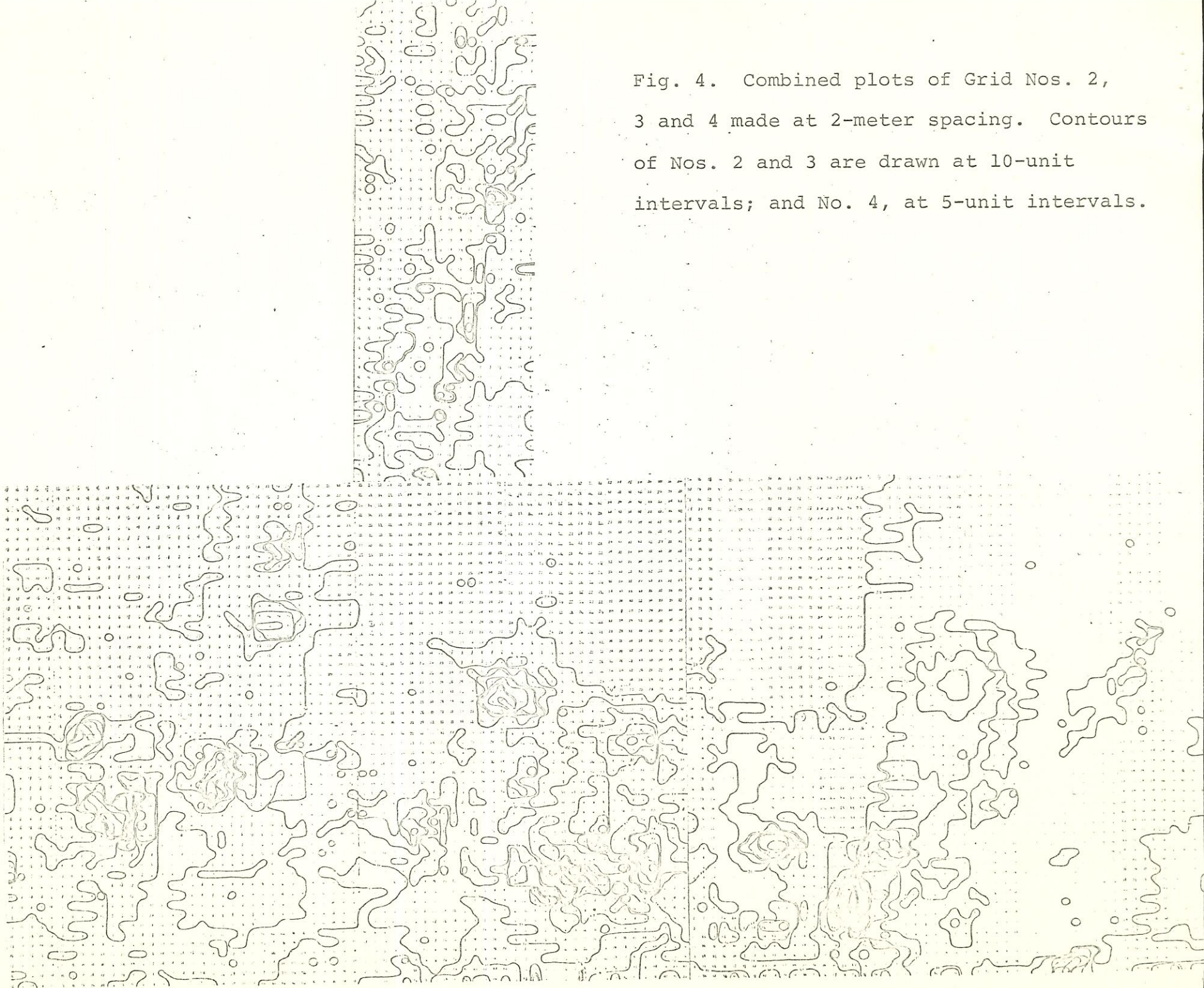
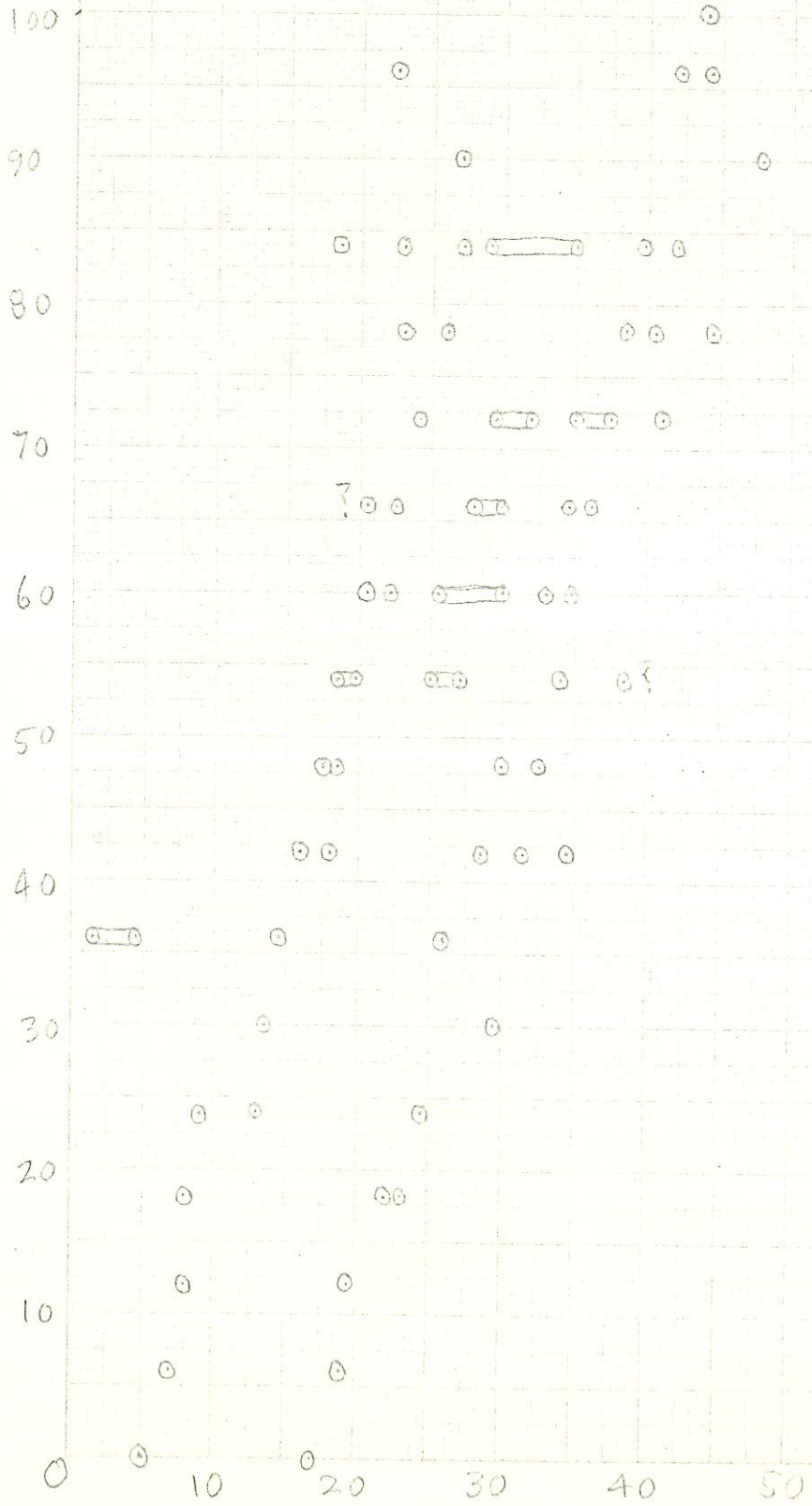


Fig. 5 Plot of anomalies detected with the Audio Readout in the region of Grid No. 4

METERS



→ N
SCALE: 1 CM = 5 M

10 X 10 TO THE CENTIMETER 46 1515
 MADE IN U.S.A.
 RICHARDSON & WOODSON CO.

From Beth
Mrs seen this
11/17 of 15/11/71

ROYAL COMMISSION ON HISTORICAL MONUMENTS (ENGLAND)
NATIONAL MONUMENTS RECORD,
Air Photographs Unit
Wellington House, Buckingham Gate, London, S.W.1.
Telephone 01-930-9652, ext 536 & 537

Dear Miss Guegenack

Thank you for your letter. I will
send you copies of some of the densitometer tracings: but
can they be plotted by you — or Miss Ralph —? As
I remember we gave Beth a photograph which did not
show these: so we had better include a trace showing
their disposition.

Beth did mention to me verbally, the report was
of some urgency: so I can expect a letter for her! I
am working on it now, so hopefully it should not be
too long.

Copies of tracings & trace to follow in a day
or so.

Yours sincerely
John Hampl

To open

Sender's name and address: *J. N. HAMPTON*

ROYAL COMMISSION ON HISTORICAL MONUMENTS (ENGLAND)
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BY AIR MAIL
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AEROGRAMME



NATIONAL & CAMPING SHOW
10-20 NOV

Miss F. Giegengack
M.A.S.C.A.,
The University Museum,
University of Pennsylvania,
33rd + Spruce Streets,
Philadelphia,
Pennsylvania 19104
U.S.A.

NATIONAL MONUMENTS RECORD
(INCLUDING THE NATIONAL BUILDINGS RECORD)

Air Photographs Unit
Wellington House, Buckingham Gate, LONDON S.W.1
Telephone: 01-930 9652, ext. 536 & 537

19th Nov. 71

Dear Beth,

I have now received your packet of overlays, photographs & preliminary report. I will not comment in detail at this stage as I fancy - in view of Miss Guegenack's letter - how important to send you data.

I therefore send you:

- ① Xerox copies of the densitometer tracings (only every fifth one)
- ② overlay for AP showing position of tracings.
- ③ overlay for AP " " of grid squares. I rather fancy your written grid 4 is incorrectly positioned: think it should be as shown on this trace.
- ④ Negative scale for use with photographs.
- ⑤ Copy of enhanced print showing archaeologically caused growth anomalies.

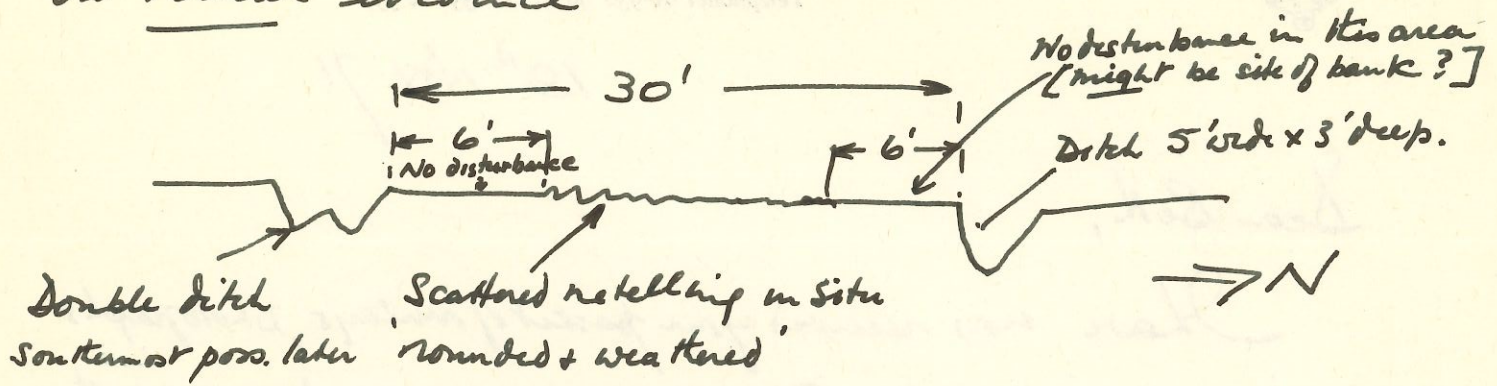
Quick answers to questions in your letter.

- ① yes, can provide photographs: densitometer plots (some) enclosed I will refer to them - but so should you if you think them significant
- ② will let you know later.
- ③ fig 4 think it oversize - see scale enclosed: fig 5 see overlay showing grid squares

Excavation:

— see over →

The last report I had v. good see sketch below based
on verbal evidence



Penned this in some haste so it may get the weekend post:
will read you paper in detail

Sincere regards

Yours

John

ROYAL COMMISSION ON HISTORICAL MONUMENTS (ENGLAND)



NATIONAL MONUMENTS RECORD
(INCLUDING THE NATIONAL BUILDINGS RECORD)

Air Photographs Unit

Wellington House, Buckingham Gate, LONDON S.W.1

Telephone: 01-930 9652, ext. 536 & 537

30th November 71

Dear Beth,

Herewith one version of the overlay. Hope it meets with approval. I feel very pleased with the result: the confirmatory nature of the witness, as in the dotted area, and additional information west of the building go together to make it all well worth while.

Who is going to say what about this?

Would you like me to make a statement from the photo point of view and the interpretation, and you could then comment from the geophysics p.o.v.?

Will write in detail later. am nearly at the end of the multi-spec paper.

Best wishes

Beth Rapp,
MasCA.

John

NATIONAL MONUMENTS RECORD
(INCLUDING THE NATIONAL BUILDINGS RECORD)Air Photographs Unit
Wellington House, Buckingham Gate, LONDON S.W.1
Telephone: 01-930 9652, ext. 536 & 5378th Dec. 1971.

Dear Sir,

I enclose a Xerox of the field drawing of the section cut across the Kingscote 'roadway'. As you will see, it just couldn't be better: a splendid confirmation of your geophysics and the air photography. The excavator didn't complain that our line was .4m off centre!

Reverting to your letter of the 3rd Nov., I look forward to meeting Mr. Hass, and will take the opportunity to welcome him to London, and show him the results of our work. My delay in writing to you has been largely due to the need to finalize the Multi-spectral paper. I shall be sending a draft to Richie Williams in about Tuesday's time for comments, and hope he will be able to add — as I feel sure it is desirable — notes on the spectral responses we recorded. And after making sure the mix is correct it should then be ready for publication. One factor concerns me a little: ideally we should have about six or so colour plates, and this is likely to be costly!

In case I do not have the opportunity to write you again before Christmas I send you and your family our greetings, and wish you all a happy & peaceful Christmas.

Prof. F. Raine

Yours sincerely
John

December 16, 1971

Mr. John Hampton
Royal Commission on Historical Monuments
Wellington House, Buckingham Gate
London, S.W.1
England

Dear John:

Fro and I thank you for your letter of 8th December and for the copy of the drawing of the excavation, which was certainly a marvelous confirmation of the anomalies. The fact that the true center was displaced to the south makes sense too because of the normal displacement of magnetic anomalies due to the angle of dip.

About the color plates, I do not know just what to say at the moment. We have used up the funds in the Park Service grant, but will receive a little more money when we submit our final report. When you have time to write your part of the Kingscote survey, we can put it and mine together, add a few other things, and submit our "final" report.

Just to confuse matters, Fro has mentioned that Glen Daniel (editor of Antiquity) is also writing about the Kingscote survey, but I may not have understood him correctly.

In the meantime, if you happen to be writing, could you let me know what the cost of the six or so color plates would be.

With best wishes to you and Peggy, and to Roger for a Merry Christmas,

Sincerely yours,

E.K. Ralph

February 23, 1972

Mr. John Hampton
Royal Commission on Historical Monuments
Wellington House, Buckingham Gate
London, S.W.8
England

Dear John:

I suspect that my letter of December 16th got lost in the Christmas mails, so I have included a copy of it.

There is not much more to write about except that I am still wondering about our joint article, or whether it is being written by Glen Daniel. Fro seems to be a bit vague too.

With best regards,

Elizabeth K. Ralph

EKR/ek
Enclosures

ROYAL COMMISSION ON HISTORICAL MONUMENTS (ENGLAND)



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Air Photographs Unit
Wellington House, Buckingham Gate, LONDON S.W.1
Telephone: 01-930 9652, ext. 536 & 537

JNH/SDB

9th March, 1972.

Miss E.K. Ralph,
MASCA,
The University Museum,
University of Pennsylvania,
33rd and Spruce Streets,
Philadelphia,
Pennsylvania 19104,
U.S.A.

Dear Beth,

Thank you for your letter - it heaps ashes on my head; indeed, I can only apologise for the long delay in answering your letters. Yes, I did receive your letter of the 16th December, and cannot use that excuse. Actually, Peggy broke her ankle just before Christmas, and is now hobbling on sticks. Fortunately I had some leave available, so was not in the office much during January: hence chaos! And thank you for the MASCA Newsletter.

Now, to deal with the points raised by your letters.

December 16th letter

Colour Plates. These are now no longer required as we have used a technique of printing the colour out to black and white prints. However, one colour print still seems desirable.

Final report. * I have now completed my paper as a draft with illustrations, except for two illustrations wanted from Kodak showing the spectral response of film types 8442 and 2448. Under our Civil Service rules, any paper using information acquired as a result of official duties has to be vetted. This has yet to be done. But I intend to send a copy possibly at the end of this week. This will enable you to proceed with your part, but you should bear in mind some modifications may be required, although I hope - and think - they will not be substantial. I also propose to send a copy to Richie Williams, as he may wish to add on further appendices. It may be you two would wish to consult on this.

Glyn Daniel, ANTIQUITY. We discussed the projected article about a fortnight ago. I am doing a resume of our work, and, subject to confirmation, it should appear in the autumn or spring of next year.

November 4th letter

I return your draft with one or two minor notes.

1. Photo copies will be sent with draft noted above. *(with its 'final copy' on the 1970 experiment)* Densitometer plots: we have not been able to use these in a significant way, thus contradicting my statement of intent. Can they be related to your magnetometer results? I have only mentioned them in the "acknowledgement" of my paper. If you can use them in any form, please do, otherwise this reference will be excluded.

Miss E.K. Ralph, University of Pennsylvania.

9th March, 1972.

2. Fig. 1: would you like us to draw this with contours?

I have had a letter from Professor Harp suggesting the multi-spectral paper could be published in the forthcoming "Photography and Archaeology", under the aegis of the School of American Studies at Santa Fe. This seems to me to be an excellent idea, and I am writing to Fro supporting this suggestion. And I gather they have no problems on the number of illustrations!

I hope this somewhat overdue letter will answer all the outstanding matters. Again, my apologies for the delay.

Yours sincerely,



J.N. Hampton

*As 'Final Report' in this context means on the 1970 M/S series: my work on the 1971 series - in which I hope Richie will assist - has yet to be written
JR.

P.P.S. we are moving office about the second week in May
will advise you of details later: have included two of Regan's
photos of Kingsdon. A

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Air Photographs Unit

Wellington House, Buckingham Gate, LONDON S.W.1

Telephone: 01-930 9652, ext. 536 & 537

21st March 72.

Dear Beth,

Herewith six enhanced prints of the
Knipsode site as requested. Also included is a
copy of Nigel Spry's section of the Roman road.

I hope you have received my draft of the M/S
experiment - as far as we have gone. Am looking forward
to flying Julian Whittlesey with his camera
some time in May: this will give us an opportunity
to check some of the conclusions.

Best wishes

Yours sincerely

John

Miss E.K. Ralph.

See article in Surrey file



ROYAL COMMISSION ON
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(ENGLAND)

NATIONAL MONUMENTS RECORD
(INCLUDING THE NATIONAL BUILDINGS RECORD)

Air Photographs Unit

Fortress House, 23 Savile Row, LONDON, W1X 1AB

Telephone: 01-734 6010

3rd Jan 73

Dear Bert,

I enclose a slightly modified version
of your paper, a copy of which has been forwarded
to Elmer Harp & Photo-Engineering. Your comments
on the earth burning we thought best not used.

Yours ever

John.

Miss E. K. Ralph

M.A.S.C.A.

P.S. you will notice the redrawn maps & overlay. It.

17th April 1972

Dear Beth.

I wonder how things progress: presumably you have now received my own tardy replies to your letters, and the various photographs sent you. We shall be sending you some slight amendments to my draft on the M/S experiment. Conversation with a gentleman from N.A.S.A. showed a clear need for a statement of the relationship of the archaeology to the existing ^{Surface} eg can anything be seen. Therefore I am including sections of Silchester and Long Wittenham by kind permission of the excavators of the two sites. Thus we shall have sections for three (inc Kingscote) of the four sites. But I have not heard anything from Richie Williams about his contribution, although I am told he is very busy.

Early Spring has been very disappointing: low clouds, haze, etc. have presented more than their usual problems - and as you probably know, Julian W. is coming over in May - I only hope the weather behaves.

Best wishes

Tom Smeeth
John.

Miss. E. K. Raupl.

← To open cut here →

Sender's name and address: *J. HAMPTON.*

*Royal Commission on Historical Monuments,
Air Photographs Unit*

Wellington House,

Buckingham Gate, SW.1.

LONDON, ENGLAND

AN AIR LETTER SHOULD NOT CONTAIN ANY
ENCLOSURE; IF IT DOES IT WILL BE SURCHARGED
OR SENT BY ORDINARY MAIL.

← Second fold here →

First fold here →



Miss E. KRALPH

M. A. S. C. A.

The University of Pennsylvania

33rd & Spruce Streets

PHILADELPHIA, PA 19104

U.S.A.

May 19, 1972

Mr. John Hampton
Fortress House
26 Saville Road
London W1X1AB
England

Dear John:

Thanks for your letter of April 17th and please excuse my delay in replying. I have received your letters, report, and photographs, but not the amendments. Thanks very much.

Things are hectic here at the moment because I am planning to leave for Arizona next week and expect to be there for the month of June. I am going to study some lava flows covering archaeological sites, etc.

Please excuse the haste.

With best regards to you and Peggy,

E.K. Ralph

EKR/emm

ROYAL COMMISSION ON HISTORICAL MONUMENTS (ENGLAND)
NATIONAL MONUMENTS RECORD
Air Photographs Unit
Fortress House, 23 Savile Row, London, W1X 1AB
Telephone: 01-734 6010

Dear Beth,

14th Dec 72.

At long last I have finalized the multi-spectral paper & I have been advised to send it to Photogrammetric Eng. for publication, as well as the School of America Studies at Santa Fe. In the process I have had your drawings recompiled - rather redrawn and will send you copies. The overlay ^{with} grids 1, 2, 3, 4 combined now looks fine on the photograph: but whether it will be possible to publish in this form is doubtful. Antiquity think they will have to print over the photograph, and are sending me a sample before long: Hopefully it will appear in the March issue. This of course will be a somewhat reduced version of the paper.

I trust you had a good year. Look forward to our next meeting: perhaps next year?

Peggy joins with me in sending you very good wishes for Christmas & the New Year. Very sincerely
John.

← To open cut here →

J. N. HAMPTON

Sender's name and address:

ROYAL COMMISSION ON HISTORICAL MONUMENTS (ENGLAND)

NATIONAL MONUMENTS RECORD

Air Photographs Unit

Fortress House, 23 Savile Row, London, W1X 1AB

Telephone: 01-734 6010

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ENCLOSURE; IF IT DOES, IT WILL BE SURCHARGED
OR SENT BY ORDINARY MAIL.

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MISS E. K. RALPH,
M.A.S.C.A.,
The University Museum,
University of Pennsylvania,
PHILADELPHIA,
PENNSYLVANIA
USA 19104

January 10, 1973

Mr. J. N. Hampton
Royal Commission on Historical Monuments
Air Photographs Unit
Fortress House, 23 Savile Row
London W1X1AB

Dear John:

Thank you for your letters of 14th December and 3rd January, and for the copy of my appendix. I am sorry that I didn't take the time to have the figures prepared properly, etc., and thank you for doing it.

We are looking forward to seeing the complete article in Photo Engineering, Antiquity, or wherever it appears.

I am hoping to leave for Egypt about 1st February, and may stop in London for about 24 hours en route. If so, I'll try to telephone you.

In the meantime, best wishes to you and Peggy for the New Year.

Sincerely,

Elizabeth K. Ralph

EKR/11

Cesium Magnetometer Survey at Kingscote, Gloucestershire, England

by

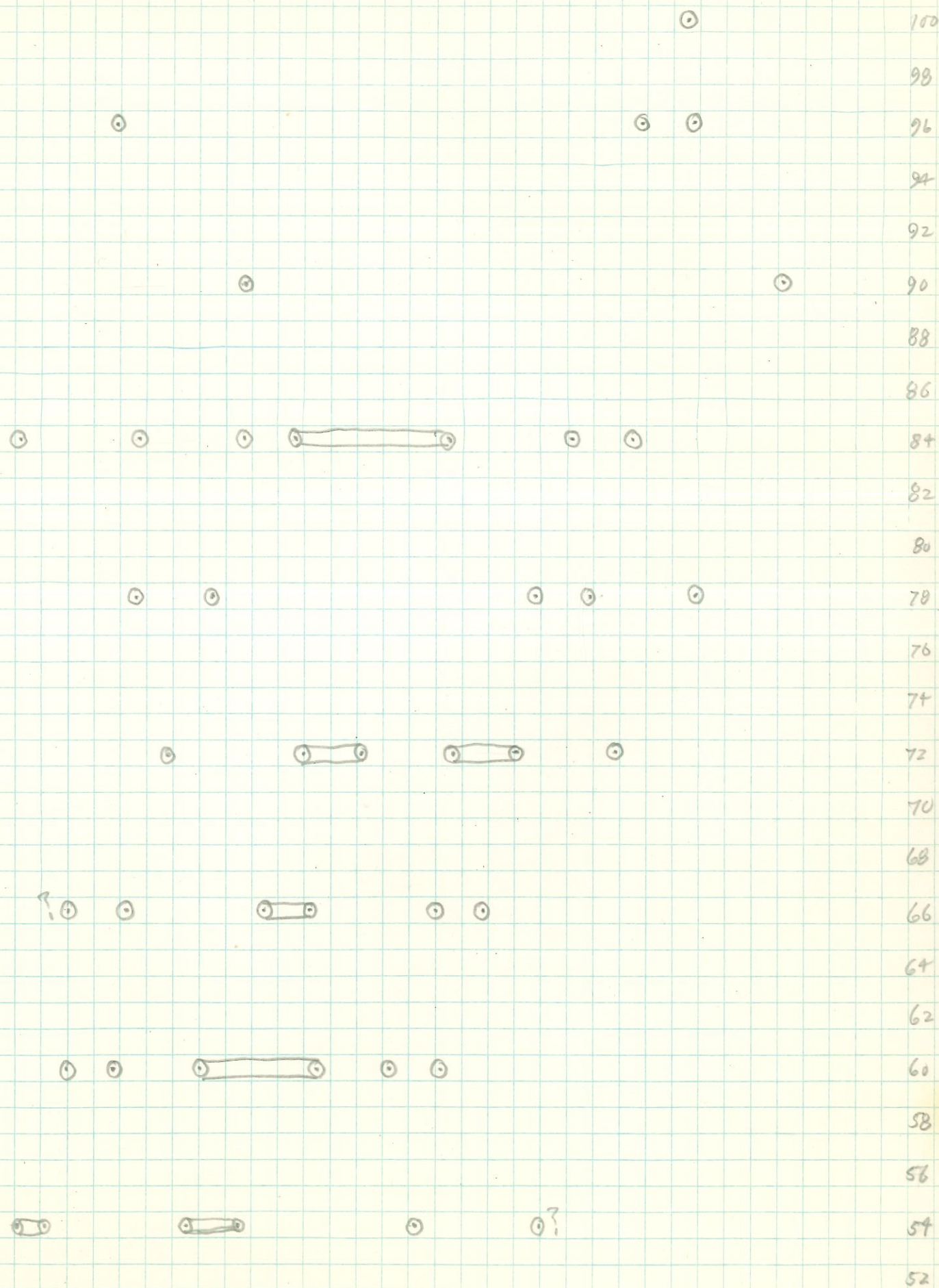
Elizabeth K. Ralph, Museum Applied Science Center for Archaeology
University Museum, Philadelphia

ABSTRACT

In the region of Kingscote, Gloucestershire, aerial photographs were taken on the 19th of June, 1970. Studies of the photographs revealed anomalies, that is, the possibility of buried structures, in one large field in the area called Ashel Barn. (See Fig. 1), In this region of Kingscote, but not especially in this field, many Roman coins and sherds had been found previously.

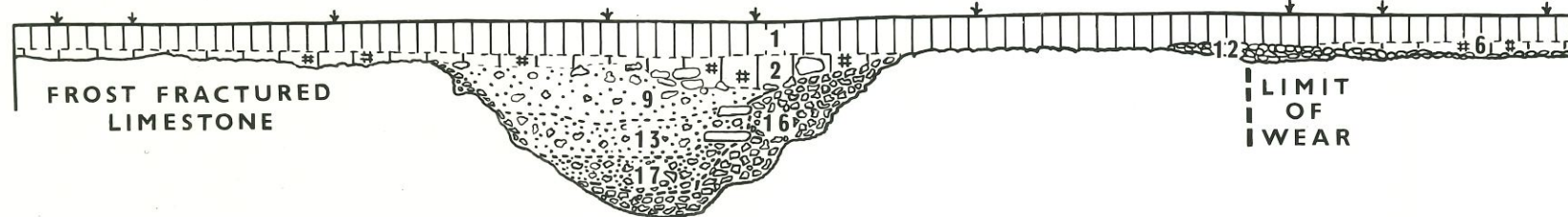
Therefore, this field was chosen for a cesium magnetometer survey from 12th to 17th September, 1971, by members of the Museum Applied Science Center for Archaeology (MASCA) and of the Royal Commission on Historical Monuments. Four detailed grids were made with the MASCA Precision Cesium Magnetometer in the region of the photographic anomalies (See Figs. 1 and 2) and indeed pronounced magnetic anomalies were detected (see Fig. 4), which were in excellent correspondence with those in the aerial photographs. An overlay of the contours of equal magnetic intensity on top of a sample photograph illustrates this good agreement.

In the region of grid no. 4 (the most westerly one), two parallel lines of anomalies about 10 meters apart were first detected on a very foggy morning with the smaller MASCA audio readout, and were pinpointed precisely with bamboo canes. Subsequently, the locations of the canes were measured and a detailed grid (no. 4) was made, in which the parallel lines were also detected. A test excavation, conducted later, revealed that these parallel lines of anomalies represented ancient ditches. (The excavation is described by)

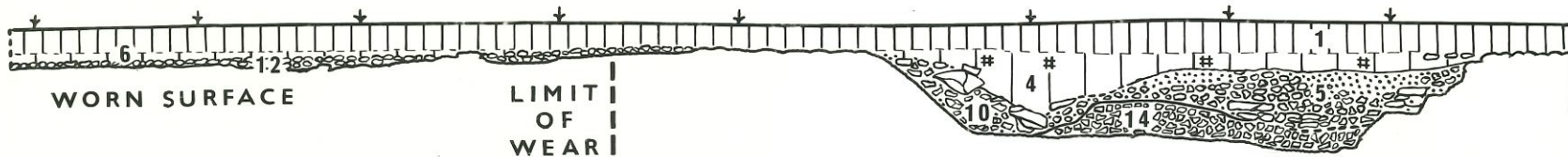


15 16 18 20 22 24 26 28 30 32 34 36 38 40 42 44 46 48 50
 1 2 4 6 8 10 12 14 16 18 20 22 24 26 28 30 32 34

N



S



DARK LOAM



BUFF CLAYEY LOAM



BROWN LOAM



LOOSE STONES

METRES



NPS

ST 8096/34
156
EMPHY 9605
L.A. TYPE No.
SUBJECT
FRAME No.
S.P. No. DATE PHOTOGRAPHED 1971

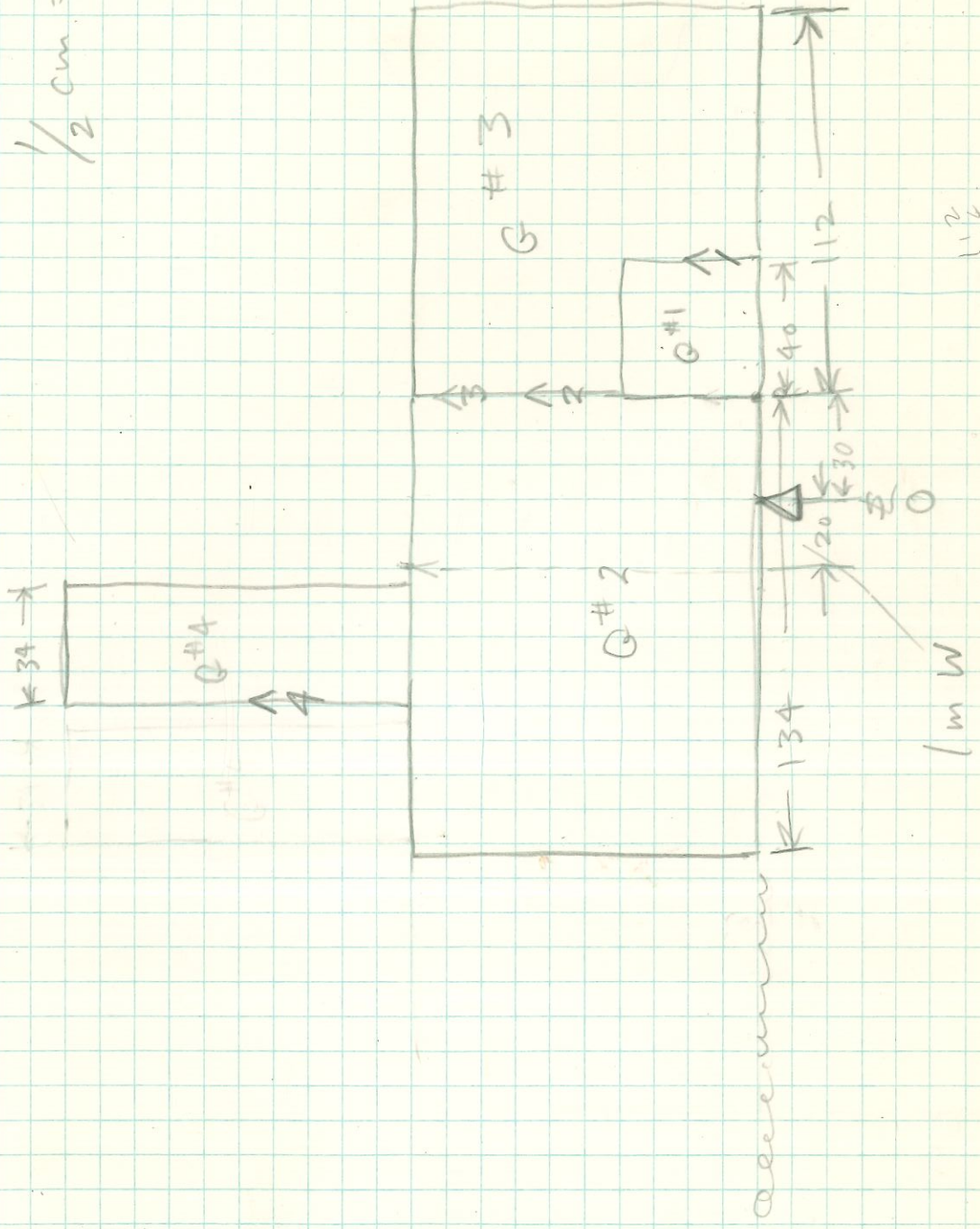
ST 80509602

COPYRIGHT : NIGEL SPRY, CHELTENHAM.

Hampton 24855
 5 Lindsay Close
 Epsom, Surrey

Ringscope

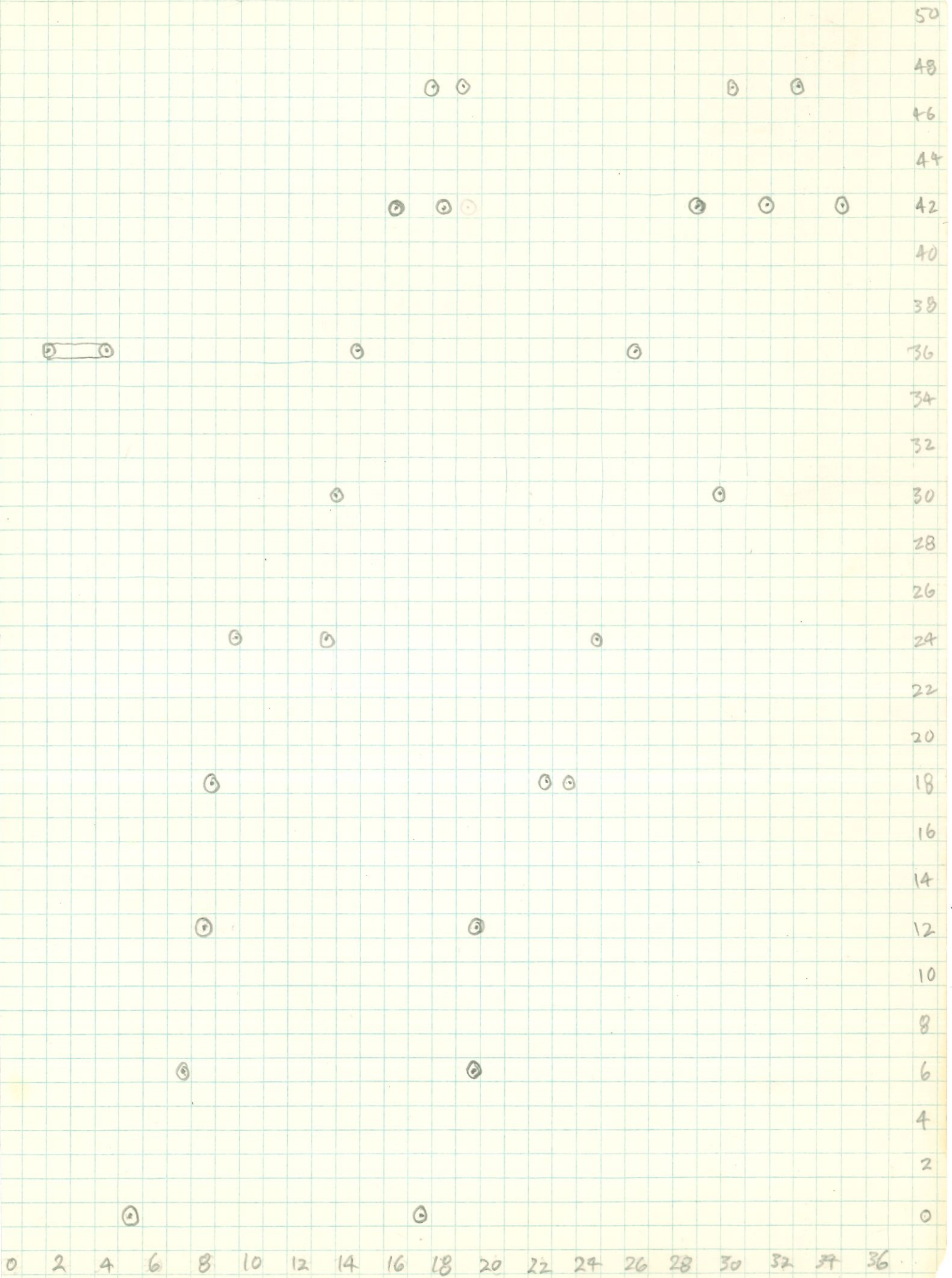
$\frac{1}{2}$ cm = 10mm



$\frac{24}{13} = 1.84$

$\frac{5.1}{2} = 2.55$

0 2 4 6 8 10 12 14 16 18 20 22 24 26 28 30 32 34



Cesium Magnetometer Survey
at Kingscote, Gloucestershire, England

by

Elizabeth K. Ralph

At this site, aerial photographs were taken by John Hampton of the Royal Commission on Historical Monuments (England) on the 19th of June 1970. Studies of the photographs revealed anomalies in one large field in the area called Ashel Barn, a farm which is now owned by Mr. G. H. Nicols. (Its location is shown in Fig. 1).

In this region of Kingscote, but not, especially, in this field, many Roman coins and sherds had been found previously, mostly south of this particular field. However, the aerial photographic anomalies were most pronounced in this one large field which measures approximately 225 x 300 meters. Therefore, this field was chosen for a comparison between a ground survey with magnetometers and aerial photo-interpretation.

The survey was conducted from September 12th to 17th, 1971 by members of the Museum Applied Science Center for Archaeology (MASCA) - namely, Froelich Rainey and Elizabeth Ralph, and volunteers Marina Bernaut and Sheelagh Murnaghan, with the capable assistance of John and Peggy Hampton and Roger Palmer (Royal Commission on Historical Monuments). The magnetometers used and the method of doing grids are described in the next pages.

MASCA CESIUM MAGNETOMETERS

1. Varian Associates Precision Portable Cesium Magnetometer Model 4920.

This instrument was designed specifically for archaeological prospecting by Varian Associates (611 Hansen Way, Palo Alto, California 94303, U.S.A.) at the request of the University Museum, University of Pennsylvania. The components are the read-out, cesium sensor (or sensors) and 30-volt battery pack. It is lightweight and readily portable. Its maximum sensitivity with one sensor is 0.1 gamma. The principles of operation as well as its application in the search for Sybaris in southern Italy are described by E. K. Ralph, Frank Morrison, and D. P. O'Brien in "Archaeological Surveying Utilizing a High-Sensitivity Difference Magnetometer", Geoexploration, vol. 6 (1968) pp. 109-122.

The Model 4920 contains also a difference circuit for use with two sensors. The second sensor may be used either in a gradiometer arrangement or it may be placed in a fixed location in the center of a grid. The second sensor serves to cancel out diurnal and other extraneous magnetic variations, and only the difference between the fixed and movable sensors is read. When operated as a difference magnetometer, the second sensor replaces the crystal oscillator to regulate the counting interval. The readings are no longer in gammas (γ),

but are adjusted to an arbitrary base reading of 80,000 units when the magnetic field at the two sensors is equal. The reading of the movable sensor may be converted to change in γ by the formula:

$$\Delta H = \frac{H_F}{80,000} [N - 80,000]$$

Where ΔH is the difference in γ between the fixed and movable sensors, H_F is the total field intensity (in γ) of the fixed sensor only; and N is the instrument reading in units. Since the total field intensity at Kingscote was approximately 47800 γ at the time of the survey, in the difference mode of operation, the sensitivity of the instrument is roughly double (0.6 γ /unit) than with one sensor only.

At sites with large anomalies of the order of 100 γ or more, this extra sensitivity is not required, but use of the difference circuit eliminates the tedious process of correcting readings for diurnal changes. The great advantage of cesium and of other alkali vapor magnetometers over proton magnetometers is speed. The measurement display interval in this instrument may be selected on the basis of desired speed of operation, from a minimum of 1.5 seconds to infinite (or manual). A built-in memory circuit "holds" the former reading after its 1.5 second measurement cycle. In practice, the readings can be viewed continuously by the operator who can see when significant anomalies are encountered and slow down to record changes in

readings when anomalies are large. This prevents measurement slew resulting from the averaging done by the readout.

This cesium magnetometer is especially suitable for recording readings in a grid pattern.

2. Varian Associates Portable Search Magnetometer Model V-4971 - Audio Type.

This instrument consists also of a readout, one cesium sensor, and battery pack. The big difference is with the readout. This readout is very much smaller and simplified. It contains an oscillator which can be varied with a control knob to match the Larmor frequency from the sensor. This match is made by obtaining a "null" or zero beat frequency on the readout's built-in speaker. Then a reading can be taken from the calibrated dial attached to the control knob. The dial range is from 1 to 1000 and each unit is approximately equal to $1\frac{1}{2}$ γ . (There is a coarser control for bringing the dial into range in any particular magnetic field.) This readout is particularly suitable for doing rapid exploratory lines. One sets the dial at "null" and then while walking along, one need only listen to changes in the audio tone from the loudspeaker to know whether or not anomalies exist. If desired, one may pause to take a reading to find out the approximate magnitude of each anomaly.

This readout, referred to later as the "audio" readout, is most useful for preliminary exploration, and for finding the limits of sites beyond the areas covered in detail by grids. It is also the more suitable of the two for detecting narrow linear features such as shallow ditches.

GRID PROCEDURE

In most cases, after preliminary exploration along lines with the audio readout, grids are laid out in the areas of interest, to be covered in detail with the precision readout. For each grid, two parallel lines (one at each end of the grid) are marked with stakes at 10-meter intervals with tape measures. A rope, calibrated in 2-meter intervals, is then strung between the end stakes of each line. The man carrying the sensor then walks along this line (the zero line) and the adjacent two- and four-meter lines and pauses at each two-meter marker for a reading to be taken. Upon the completion of the first three readings, he then moves 2 meters into the grid, three more readings are taken, and so on in a serpentine fashion along the edge of the grid. After the completion of three lines, the rope is moved between the and strung/ next 10 meter stakes, and the sensor man then moves to the six-, eight-, ten-, twelve-, and fourteen-meter stations at each two-meter marker on the rope, and traverses the grid again, but with a serpentine pattern now five measurements wide.

Each reading is called out by the man carrying the readout and batteries, and is recorded by a third person in a notebook oriented in the same direction as the grid being traversed. In bushy or rough terrain, a fourth person coils and uncoils the 100-meter cable leading to the fixed sensor. When the grid is finished, the pages of the notebook are then put together with

Scotch "magic-mending" tape to form the complete grid.

The differential mode with 2 sensors is usually used for all grids with the second sensor placed in a fixed position in the middle of each grid. The usual height of the movable sensor is in the comfortable position at arm's length at one's side - about 75 cm above the ground. Grids may be varied in size, but it is frequently convenient to lay them out in 100 x 100 meter squares. This area can be covered at 2-meter intervals in a six to eight hour work day, depending upon the terrain.

After a grid has been taped together, contour lines of equal magnetic intensity are then drawn for easy visualization of magnetic patterns. In these plots, "0" represents 80,000 units; "10" = 80,010 units; "990" = 79,990 units, etc. In most grids, with average anomalies, contours are drawn at intervals of 10 units, or approximately 5γ .

When several grids are made, one adjacent to another, the average base readings may be adjusted to be the same for each by placing an artificial anomaly such as a compass near the fixed sensor. Thus, a reading such as "40 units" in the second or subsequent grids represents the same difference in magnetism above background without anomalies (usually set at 20 units for convenience) as in the first grid. This aids in the interpretation of the final plots of magnetic contours by allowing adjacent grid maps to be connected directly together with no discontinuity.

At Kingscote four grids were made, the locations of which are shown in Fig.2. These areas were chosen to correspond with the anomalies in the aerial photographs (described by John Hampton).

Grid No. 1 was centered on the most pronounced aerial anomalies and was done on the first day of field work. Unlike the subsequent grids, No. 1 was run at 1-meter intervals for the purpose of a detailed first test of the terrain. As one can see in Fig. 3, we did indeed detect pronounced magnetic anomalies. One sees strong evidence of the "angle" anomaly corresponding with that in the aerial photograph, but in addition, west of the "angle" there is a definite rectangular feature, which is probably representative of a building.

After this trial, we proceeded to do Grid Nos. 2, 3, and 4, at 2-meter intervals. The combined plots of these grids are shown in Fig. 4. If we overlay the transparency of Fig. 4 on the aerial photograph (Fig.), we see the good correspondence of the "angle" anomaly as well as other magnetic anomalies.

The two lines of possible ditches running east-west just south of the center of the field were not detected in Grid No. 2, but they do show clearly in Grid No. 4. The contours of the latter were drawn at intervals of 5 units (rather than 10) since these "ditch" anomalies tend to be weaker than others detected previously.

Before Grid No. 4 was made, the region of the ditches was explored with the audio readout on a very foggy morning.

The magnetometer crew did short lines perpendicular to the possible lines of the ditches and while everyone else got lost in the fog, the crew, listening to the change in frequency, had pinpointed the lines of ditches precisely with bamboo canes. This was revealed about mid-day when the fog lifted. Grid No. 4 was made subsequently to see if the ditches could be detected with the precision readout and the more sensitive differential system. In this grid, they were detected, but not nearly so precisely as with the audio unit. The reason for this is that the grid was made at 2-meter intervals whereas with the audio, the change in tone was monitored continuously. The anomalies heard with the audio were a meter or less wide, and were therefore, not missed as they were in the grid system at 2-meter intervals. A plot of the audio anomalies is shown in Fig. 5.

When we first plotted and looked at Grid No. 1 (Fig. 3) and also Grid Nos. 2 and 3, we wondered why the anomalies were so strong. The earth was dark brown in color and did not appear to be magnetic. The stones in the wall and elsewhere were less magnetic. Therefore, we put the movable sensor in a fixed position on top of the long stone wall (shown in Fig. 2) and tested bags of earth. About 300 grams of earth put on top or under the sensor caused a magnetic change of 5 gammas. The susceptibility of this soil was subsequently measured in the laboratory by Mike Tite*. This measurement and others for comparison from other sites are listed below.

* We are grateful to Mike Tite (Department of Physics, University of Essex) and to Martin Aitken (Research Laboratory for Archaeology and the History of Art, Oxford University) who visited the site and transported the sample to him.

<u>Sample</u>	<u>Magnetic Susceptibility</u>
Kingscote soil	110 x 10 ⁻⁶ emu/g
"Non-magnetic" soil	50 x 10 ⁻⁶ emu/g
Burnt house floor	400 x 10 ⁻⁶ emu/g
Fired clay from a hearth	1400 x 10 ⁻⁶ emu/g

As Mike Tite has commented, "...the Kingscote soil is reasonably high and consistent with the fact that the site is on Jurassic strata which would have a high iron oxide content."

We observed also that the farmer follows the practice of burning the grain stubble. Even though each burning penetrates to a depth of only 1 cm, the yearly plowing and turning under of the top layer would tend to make the uppermost 20 cm more magnetic than the unburned earth. Perhaps, in the regions of the archaeological features, more of this earth piled up as the walls fell and disappeared and this may account for the positive magnetic anomalies.

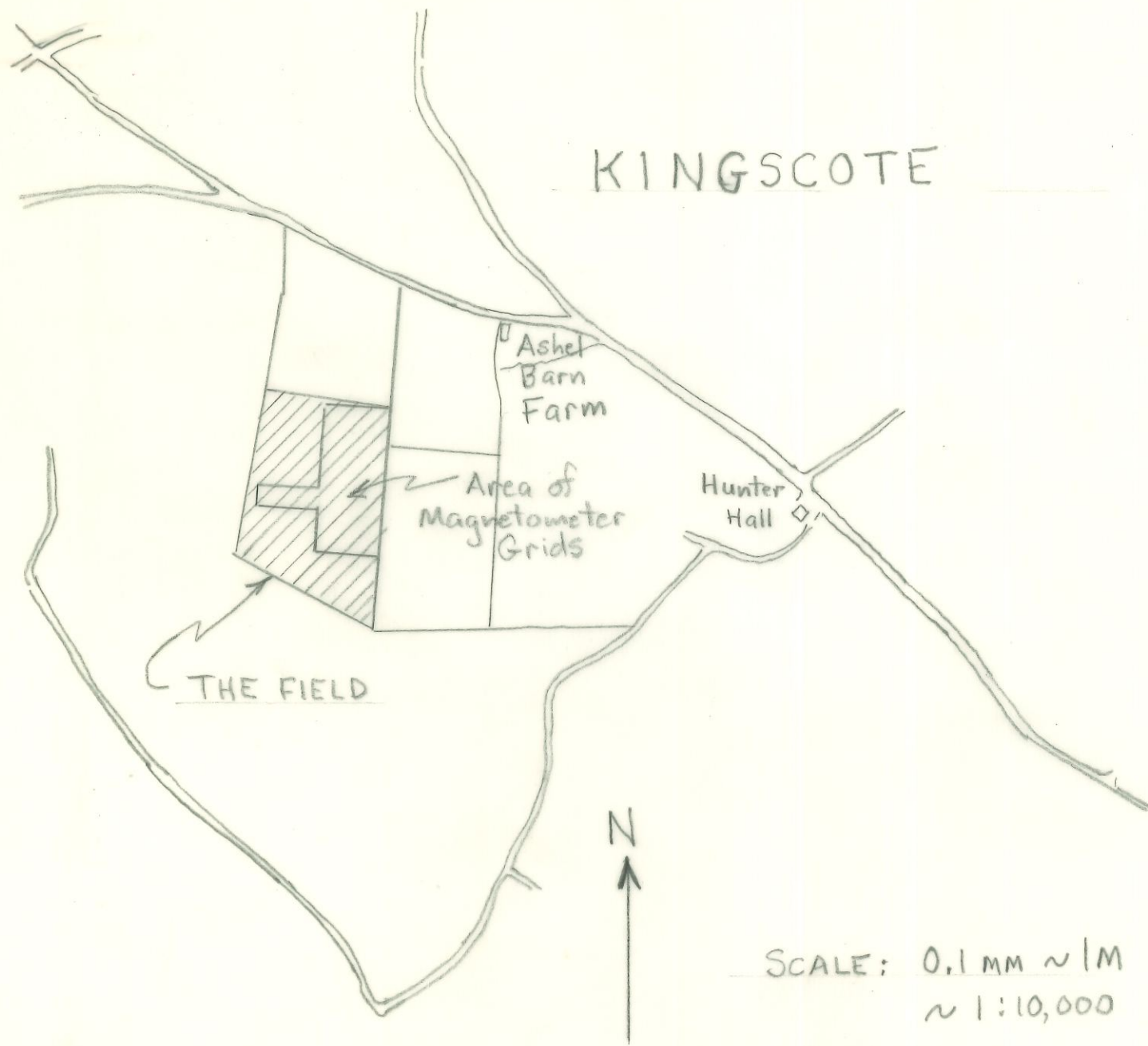


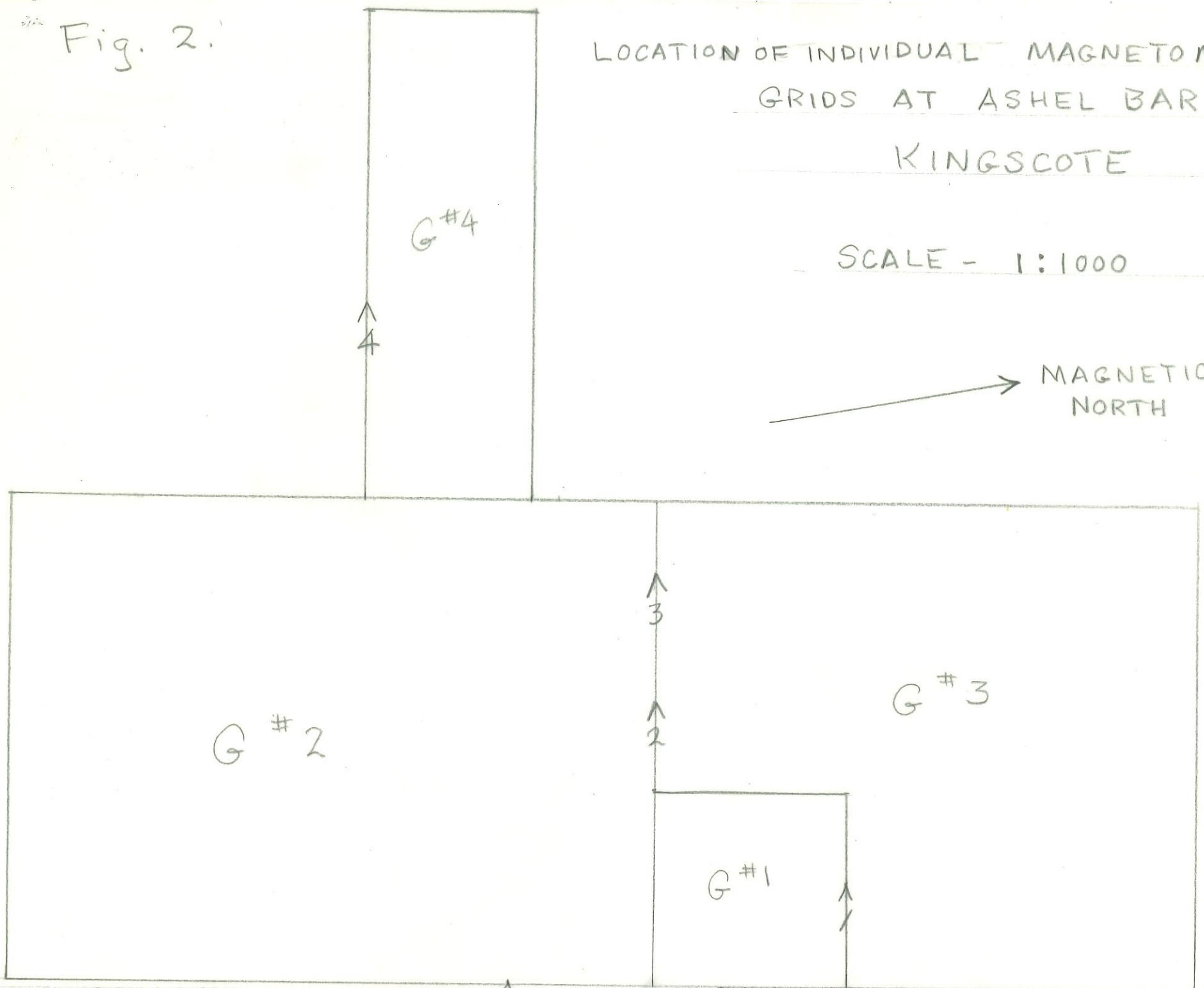
Fig. 1. Location of "the field" (hatched) at Ashel Barn, Kingscote and of the combined magnetometer grids within the field.

Fig. 2.

LOCATION OF INDIVIDUAL MAGNETOMETER
GRIDS AT ASHEL BARN,
KINGSCOTE

SCALE - 1:1000

MAGNETIC
NORTH



G # 2

G # 4

G # 3

G # 1

bench mark

stone wall

GRID # 1



KINGSCOTE - ASHEL BARN

CONTOUR INTERVAL = 10 UNITS ~ 5 γ

BASE LEVEL ~ 20 UNITS

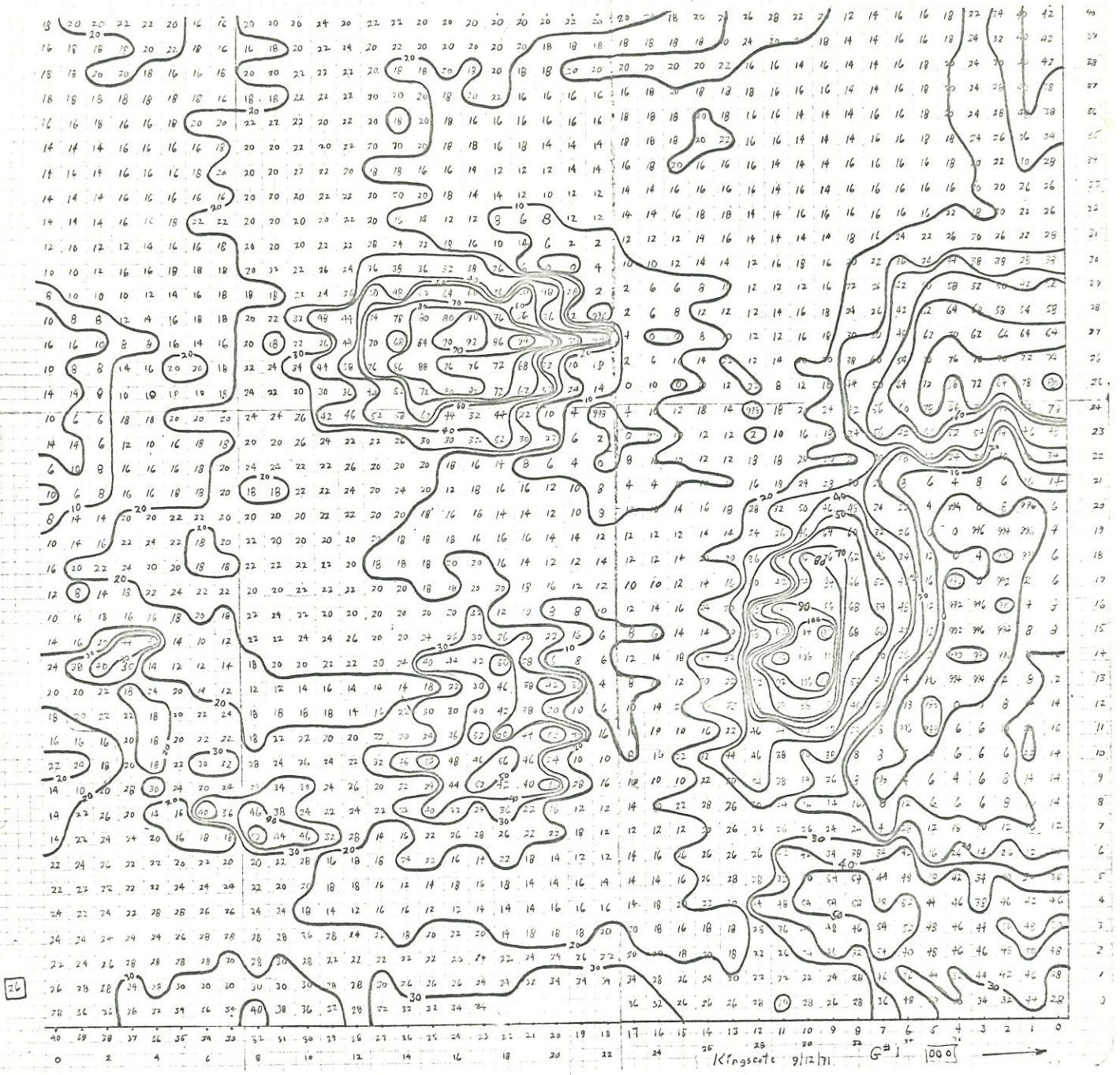


Fig. 3. Magnetometer Grid No. 1 made at 1-meter spacing.
 Magnetic contours are drawn at intervals of 10 units.

Fig. 4. Combined plots of Grid Nos. 2,
3 and 4 made at 2-meter spacing. Contours
of Nos. 2 and 3 are drawn at 10-unit
intervals; and No. 4, at 5-unit intervals.

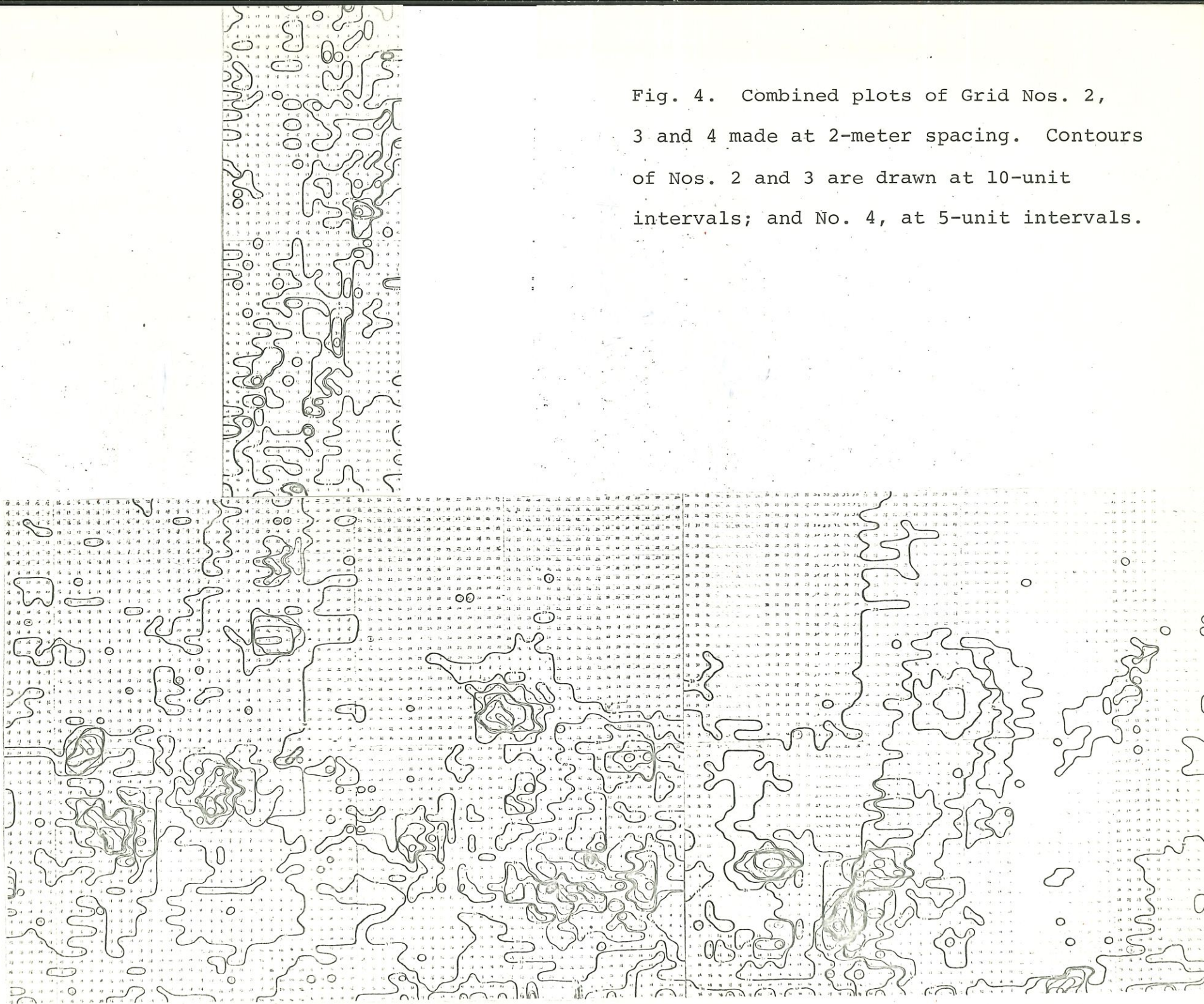


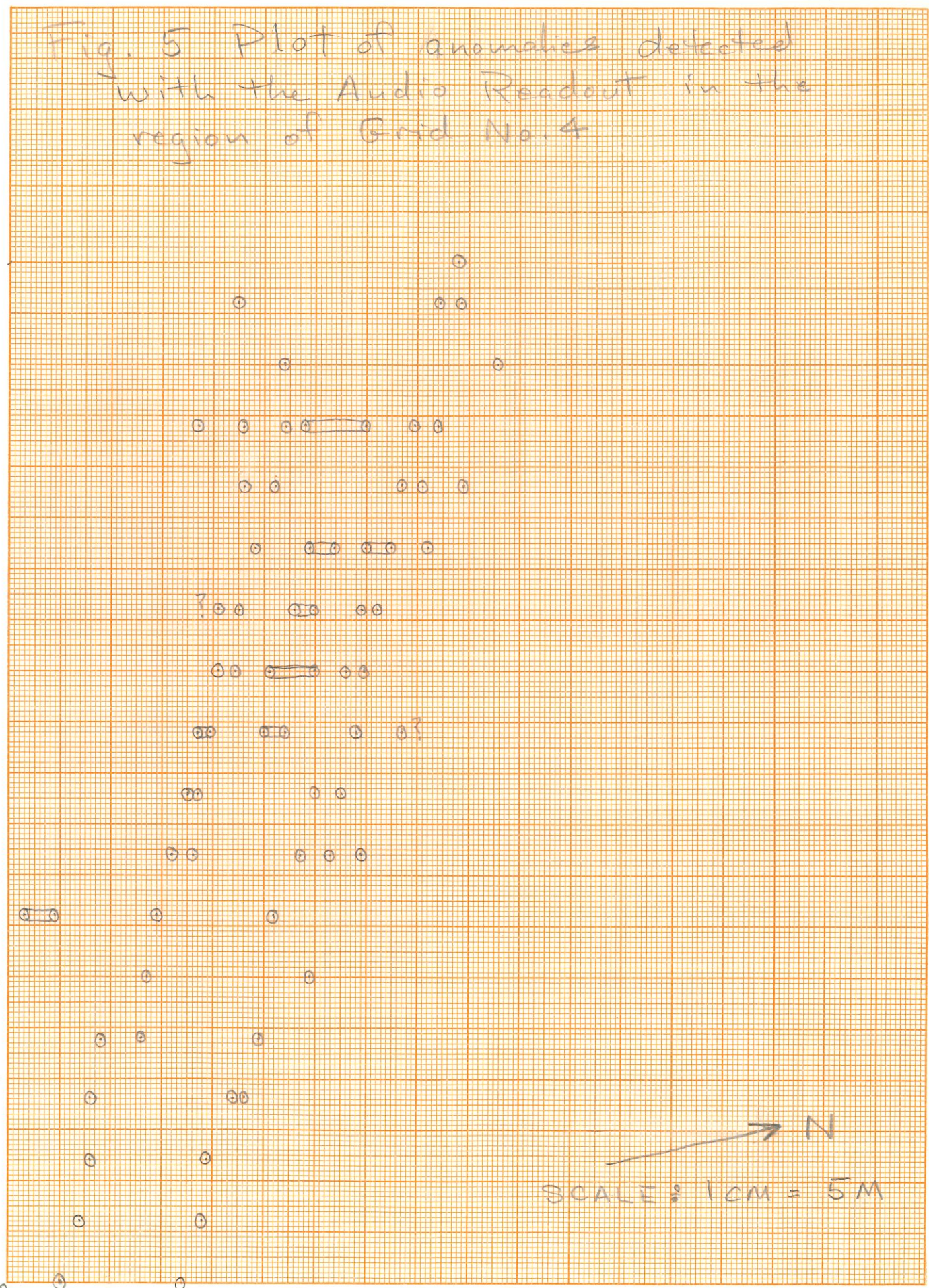
Fig. 5 Plot of anomalies detected with the Audio Readout in the region of Grid No. 4

METERS

K&E 10 X 10 TO THE CENTIMETER 46 1513
16 X 25 CM. KEUFFEL & ESSER CO. MADE IN U.S.A.

100
90
80
70
60
50
40
30
20
10
0

0 10 20 30 40 50
METERS



→ N

SCALE: 1 CM = 5 M



Frampton Severn
1 1/2 mile

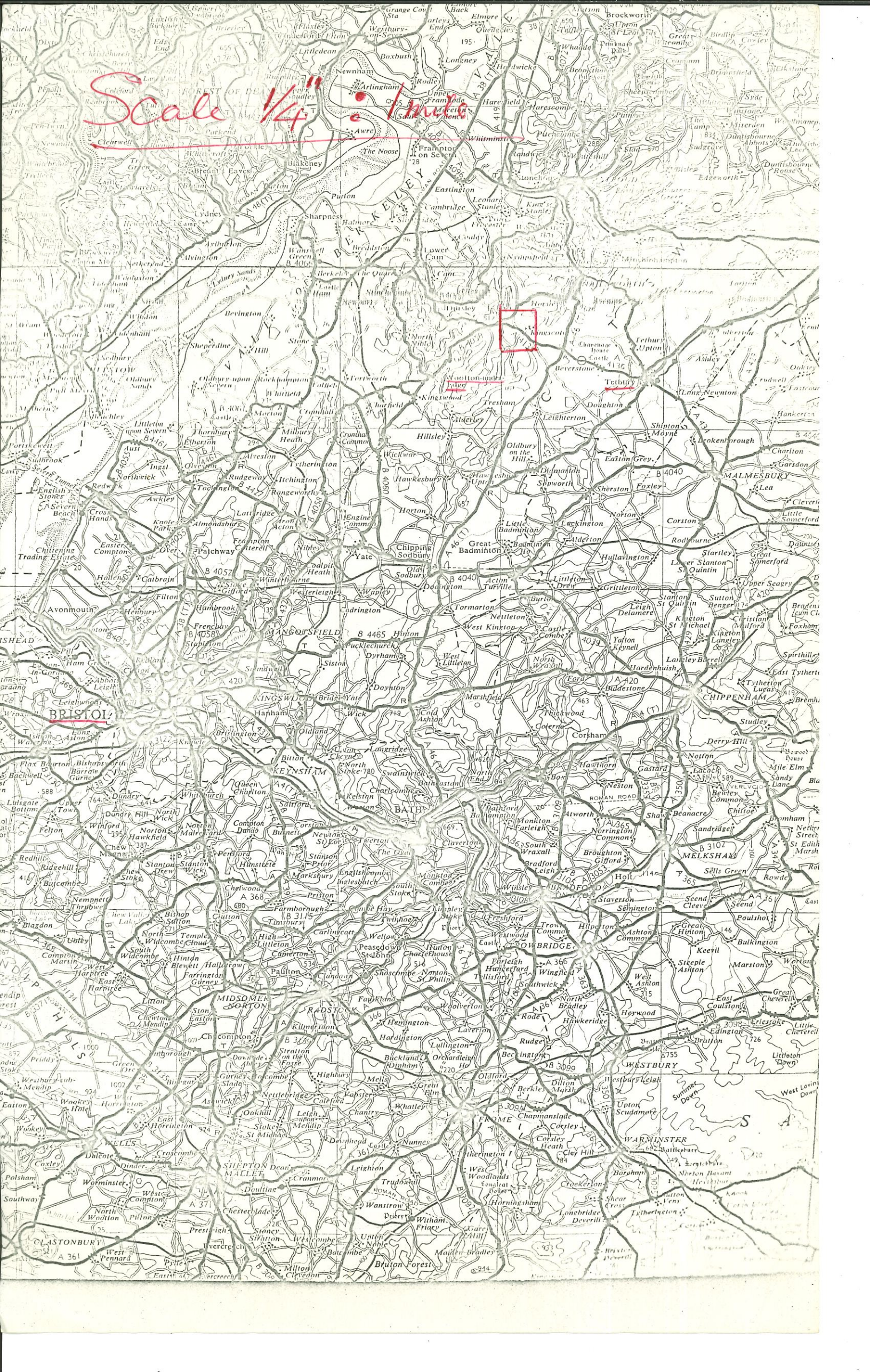
THE CLIFFS

WOLTON UNDER

AETBURY

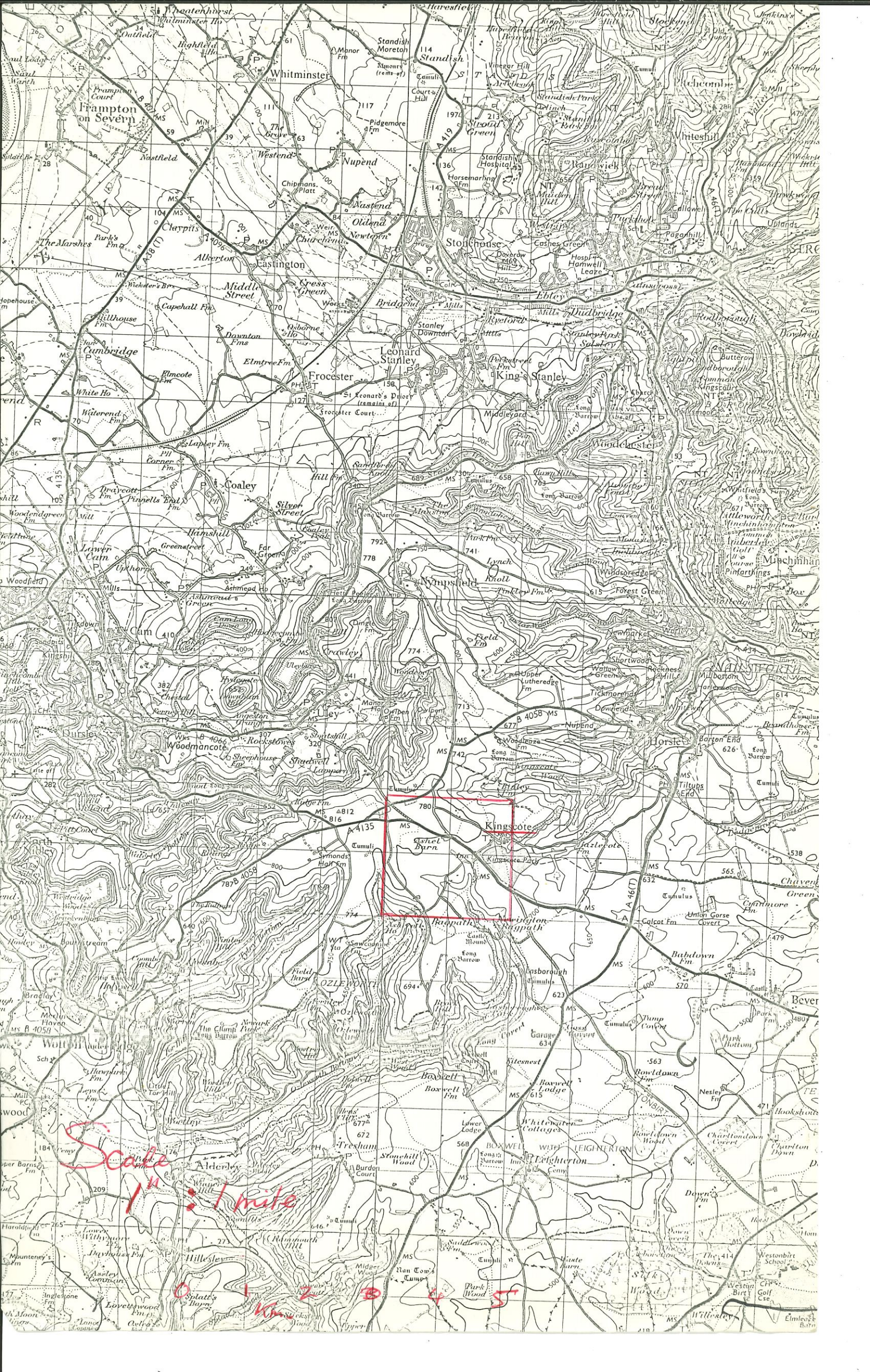
OZLEBORN

Scale 1/4" = 1 mile

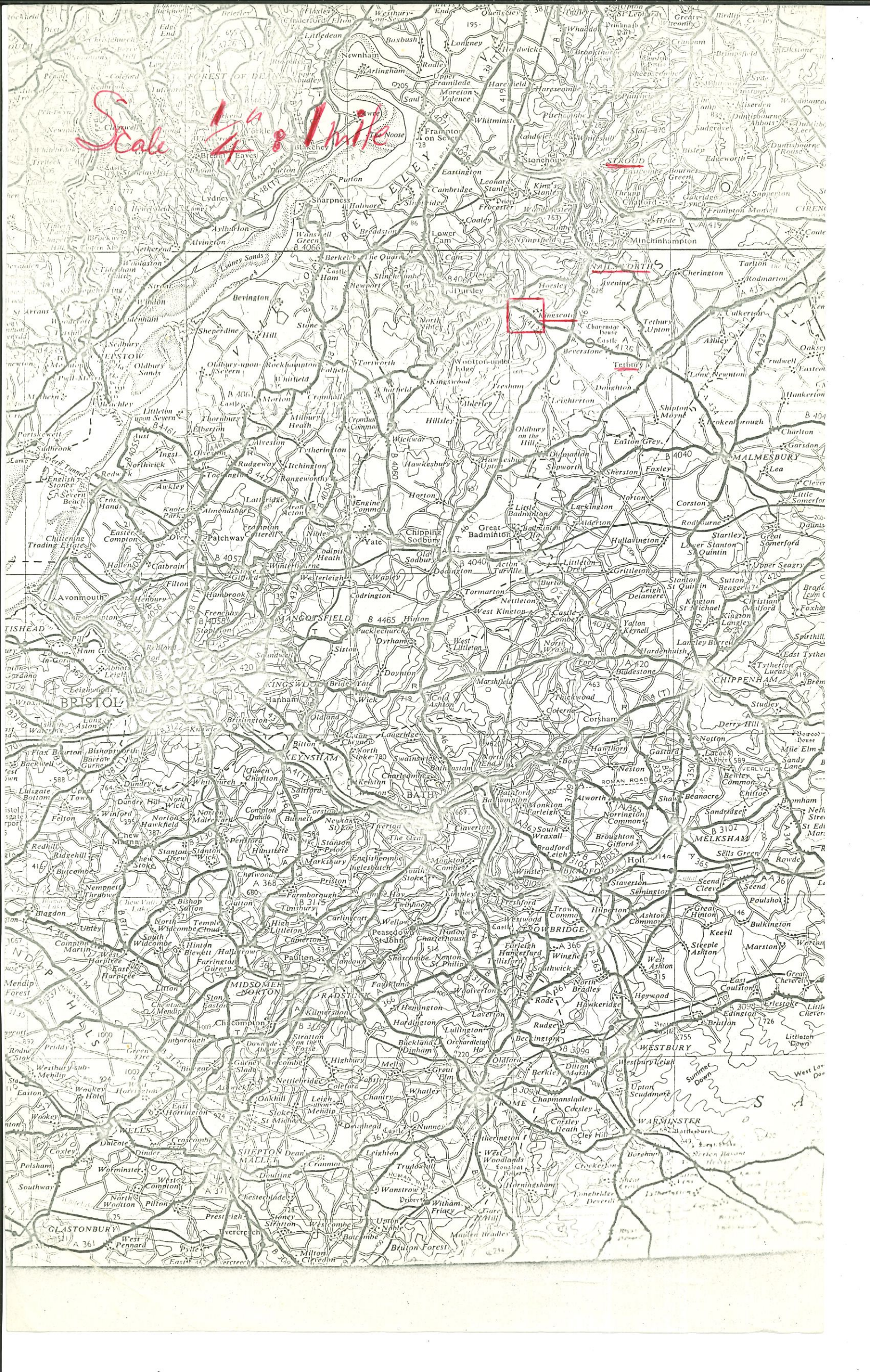


Scale 1/4" = 1 mile



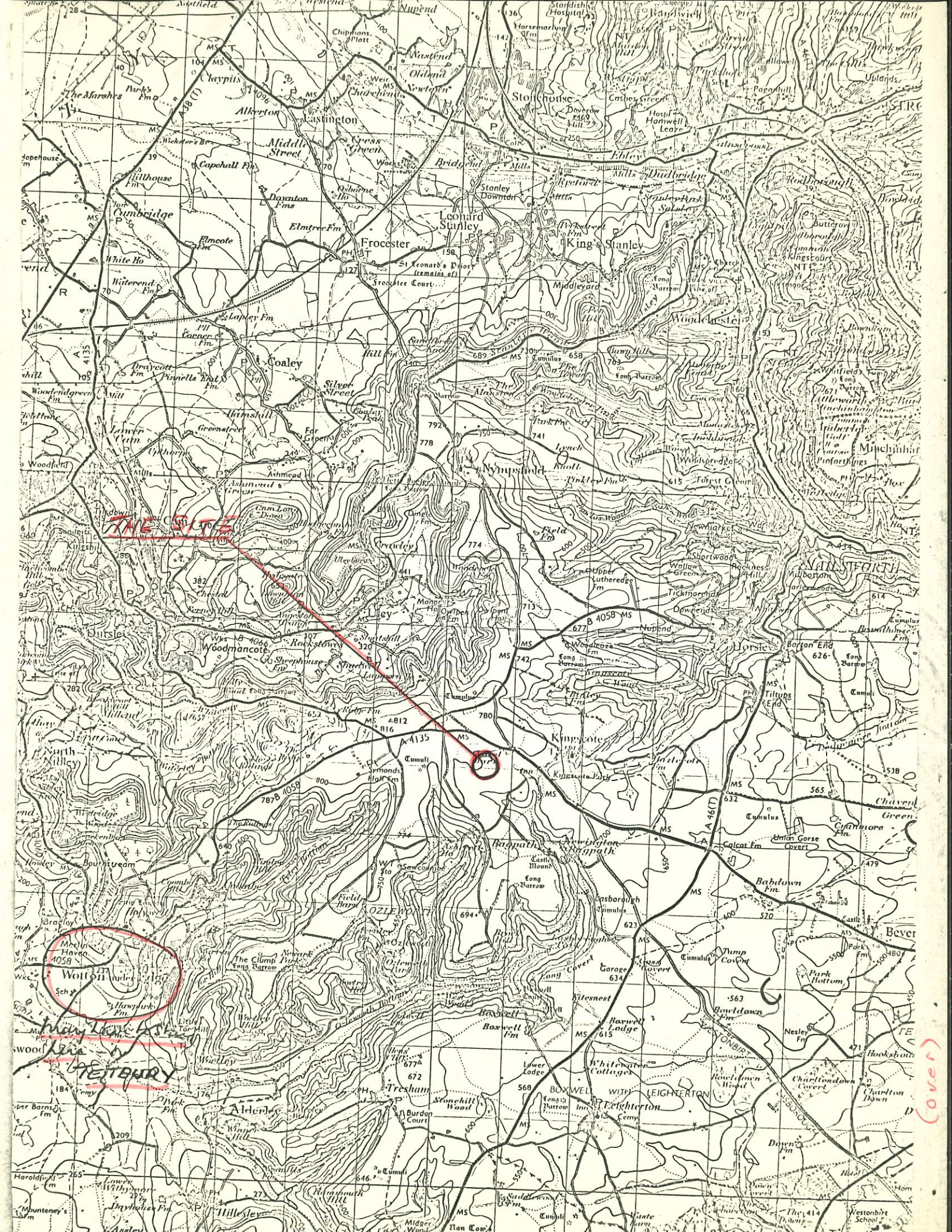


Scale 1/4 of 1 mile



Scale 1/4" = 1 mile





THE SITE

Wolfhill

(over)

SCALE 1" : 1 mile

Site: Kingscote, Gloucestershire

Farmer: Mr. G. H. Nicols
Home Farm
Kingscote

Tel. ULEY 254

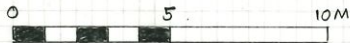
MASCA
Projects

MAGNETOMETER, KINGSCOTE, ENGLAND
(FIG 2)

G#1

PRINT/NEG

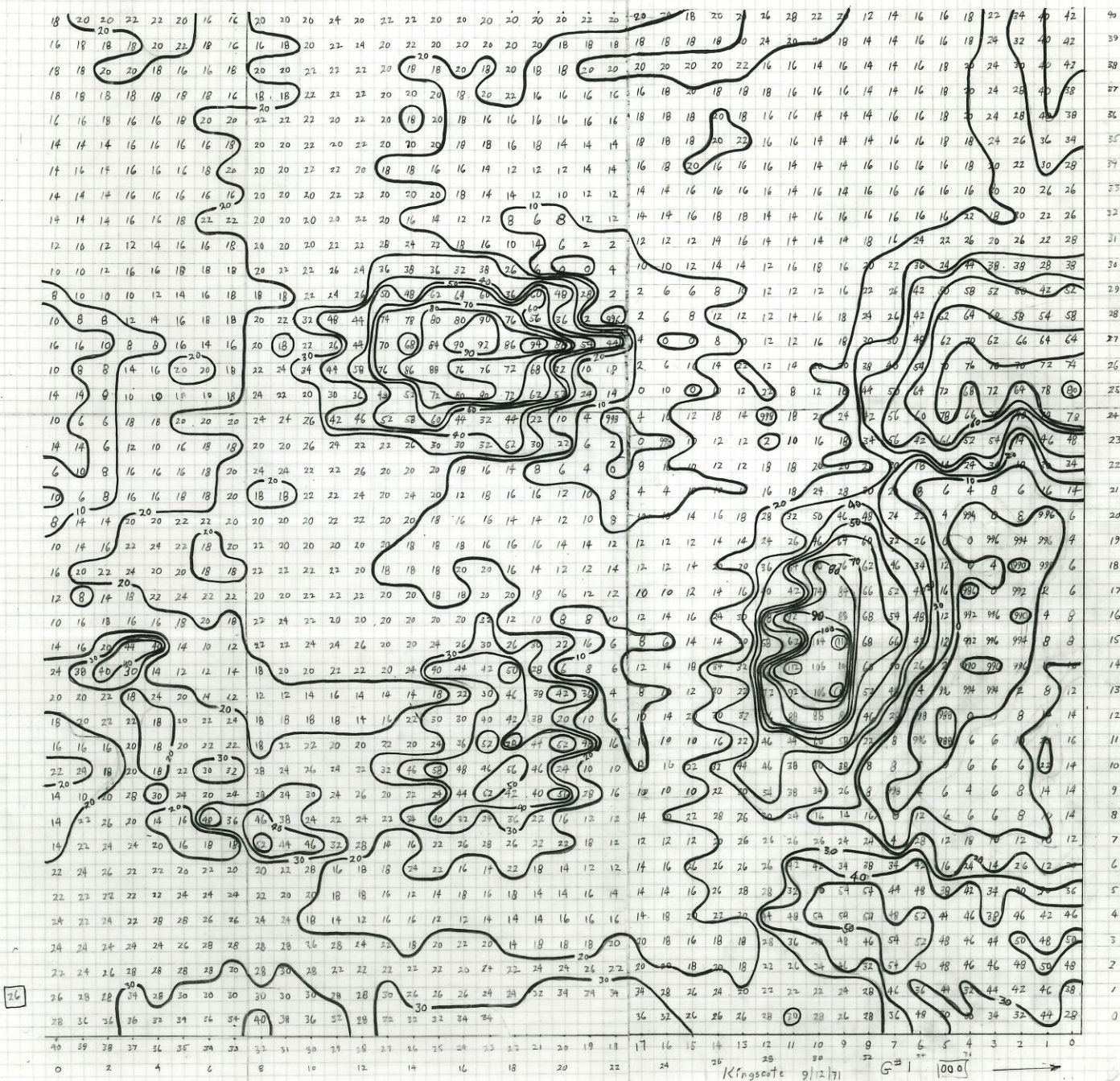
GRID # 1



KINGSCOTE - ASHEL BARN

CONTOUR INTERVAL = 10 UNITS ~ 5'

BASE LEVEL ~ 20 UNITS





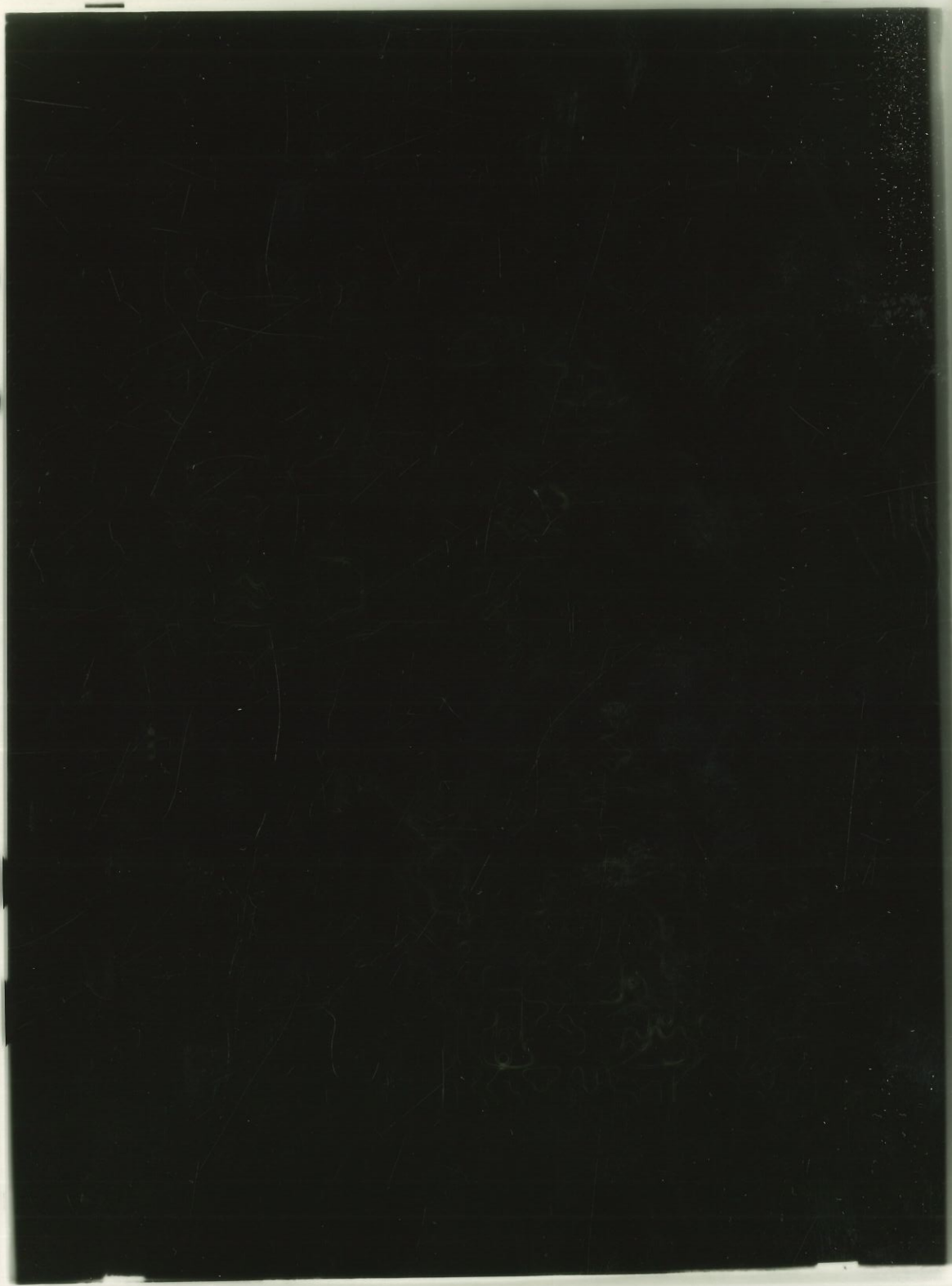
KODAK SAFETY FILM

MASCA
Projects

MAGNETOMETER SURVEY, KINGS COTE, ENGLAND

G#2

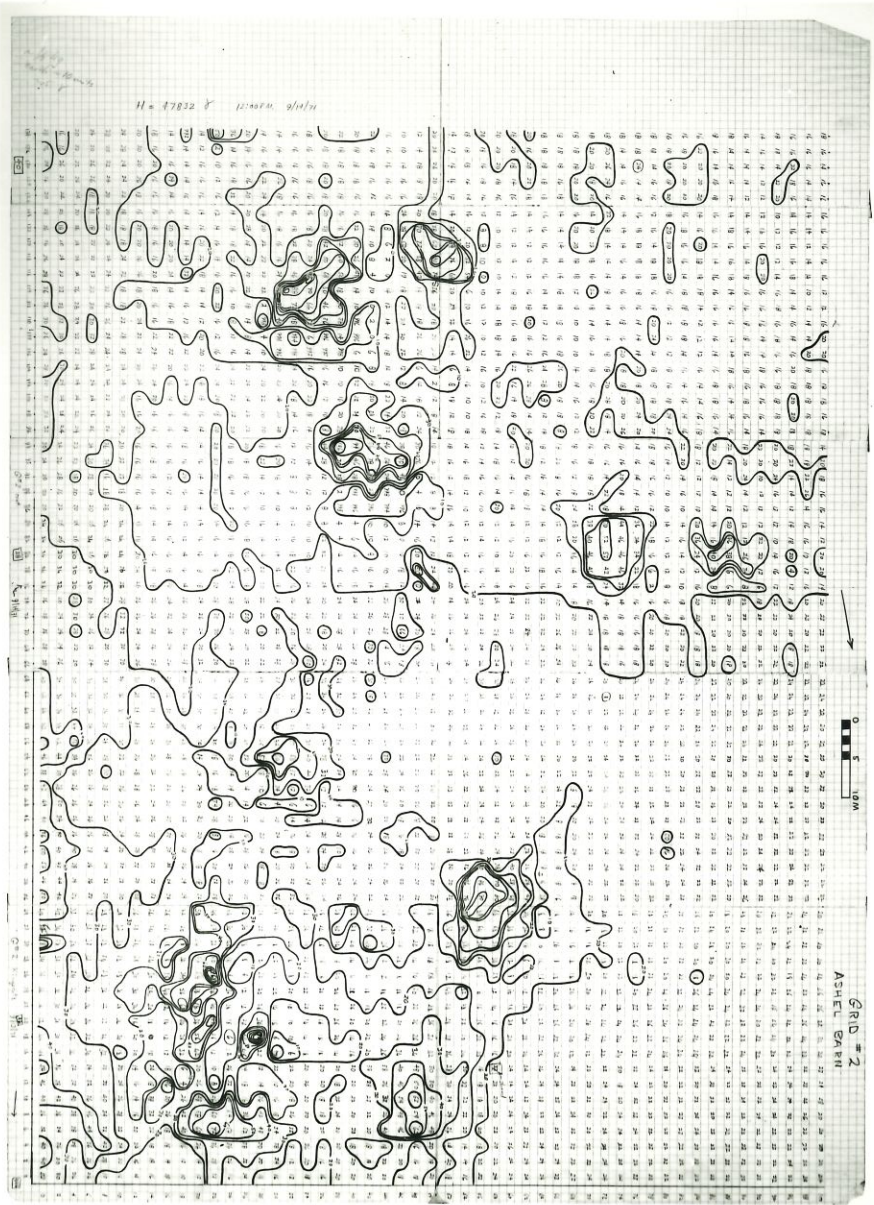
PRINT / NEG



11



11

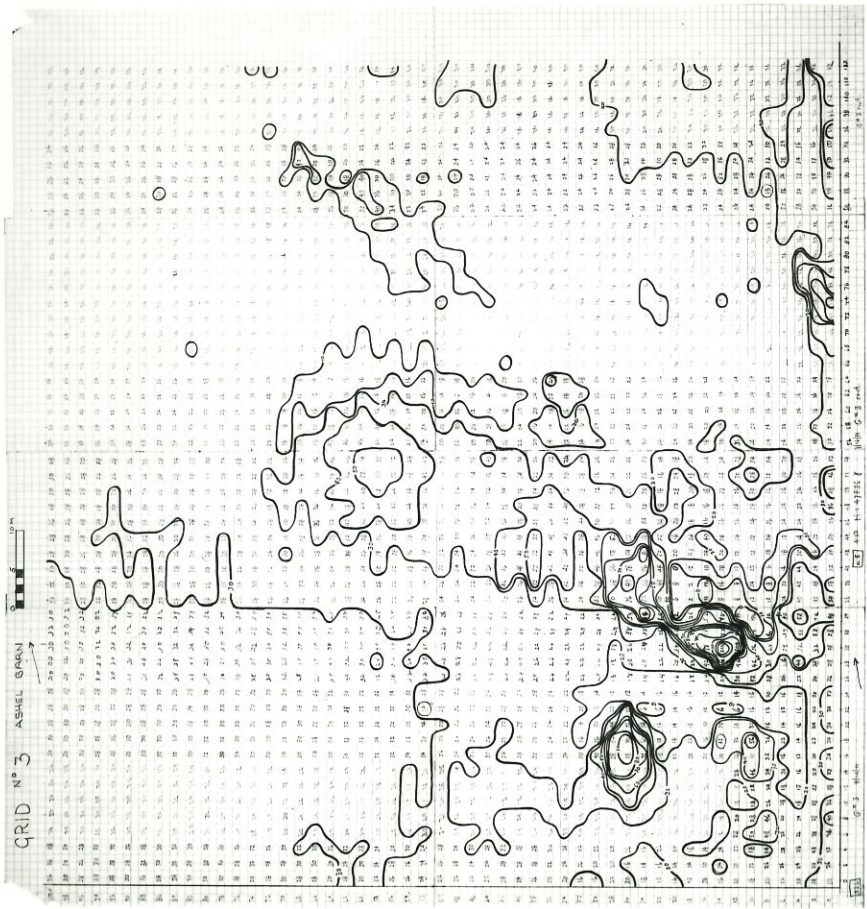


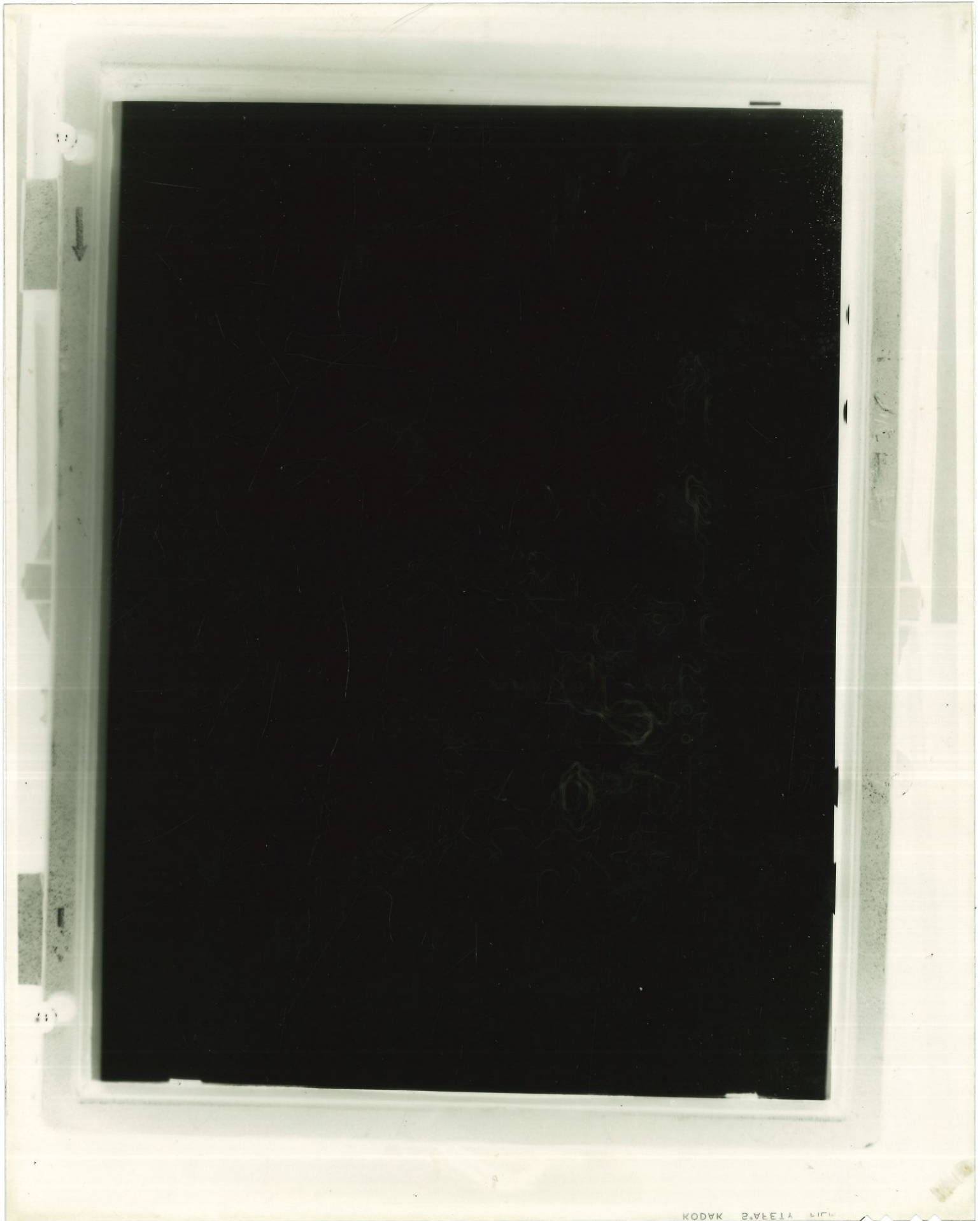
MASCA
Projects

MAGNETOMETER SURVEY, KINGSCOTE, ENG.

G#3

PRINT/NEG





KODAK SAFETY FILM

MASCA
Projects

MAGNETOMETER SURVEY, KINGS COTE, ENG.

G #4

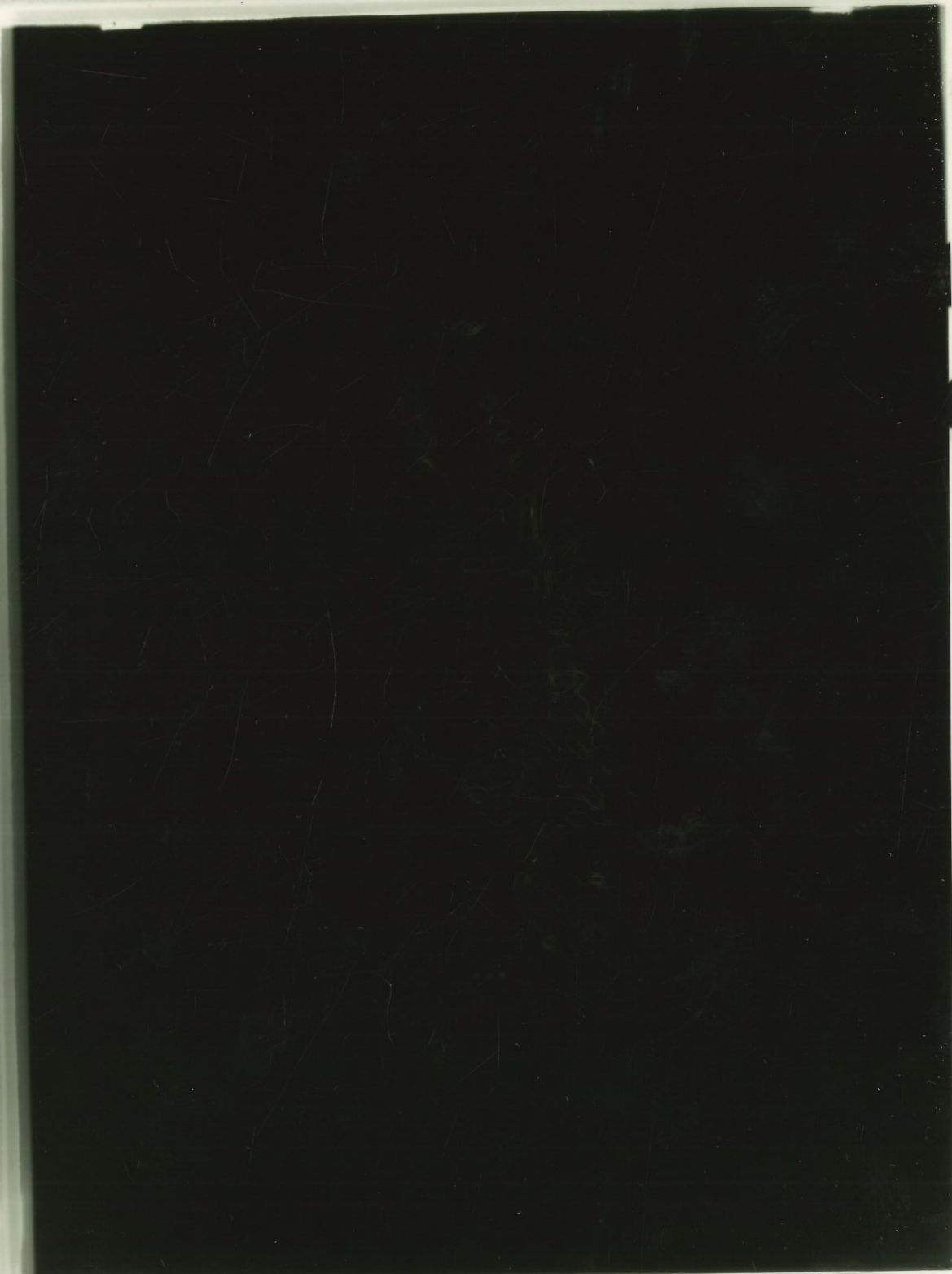
PRINT / NEG.

MASCA
Projects

MAGNETOMETER, KINGSCOTE, ENGLAND

G# 4

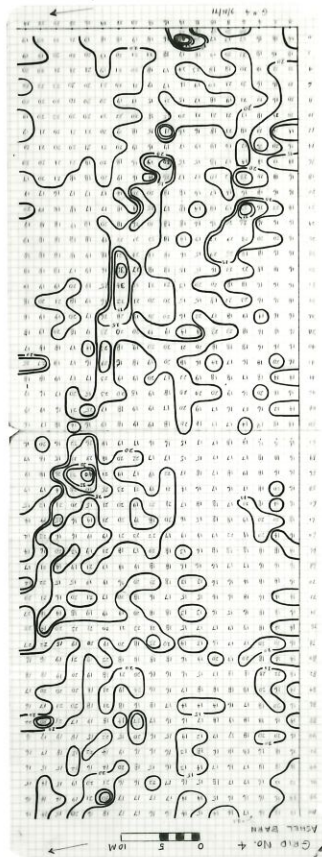
PRINT/NEG



11



12



MASCA
Projects

Ref in overlay?

