ICELAND
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British CONTINENTAL Intelligence
U.S. OSS

CONFIDENTIAL

From: Air Ministry, A.D.I.(PH).

To: Commanding General, Office of Strategic Services, Washington, D.C.

Copy to: Director of O.S.S. Mission, London.

Date: 22nd January, 1944.

Ref.: ADIPH/734/1/P.1/MM

OBLIQUE PROJECTION

It is desired to express appreciation for the loan of Lt. N.N. JURAN U.S.N.R. of your organisation, who was sent to R.A.F. Station Medmenham to demonstrate the methods evolved by you for producing topographical relief models from oblique photographs.

2. Throughout his stay Lt. JURAN has been most helpful and has shown keenness and ability in developing the various applications of your methods which have evolved during his stay.

3. The original demonstration consisting of the production of a relief model from two oblique photographs, while interesting had little practical application in this theatre owing to the availability of vertical air photographs of all areas. It was seen at once, however, that the basic method could be used to solve a number of problems previously insoluble here.

4. Lt. JURAN has full details of these applications which he can make available to you. Details are not therefore given herewith. Briefly they covered the following:

(i) Measuring of ships photographed in convoy from obliques obtained during bombing and torpedo attacks to give sizes of ships, convoy layout, etc.

(ii) Production of silhouettes and deck plans of ships from oblique photographs.

(iii) Measuring of enemy installations, e.g. wireless stations obtained on oblique photographs.

(iv) Production of a simple viewing box for use in aircraft for determining the size of ships seen, using only the reading given by the aircraft's altimeter.

5. Some use has already been made here operationally of the principles demonstrated by Lt. JURAN. Details have also been passed to similar units overseas, where the applications are likely to be greater, particularly in India where for certain seasons of the year oblique photographs are the only ones that can be obtained.

T. Margin McNeil Sqn Ldr

Assistant Director of Intelligence
(Photographic)

[illegible]/JB

Memo to Comdr. Ford 25 January 1944

3. It is felt that additional work and experiments should be carried out by our office on the matter of determining underwater depths by oblique photography. For this purpose, it is suggested that Lieut. Juran be sent to a Pacific area where the proper environment for such experiments can be found. It is estimated that two or three months will be required to do this work. In the meantime, however, the data thus far developed on underwater depth determination should be turned over to the Bureau of Aeronautics so that they may make use of the information.

4. The Pilot's Scale Estimator is ready for use, and should be turned over to the Army and Navy Departments. A small amount of further work should be done to produce a very small model of the pilot's scale estimator which can fit into the palm of one hand and which will require only one hand to operate. For this purpose Lieut. Juran is making a trip to Rochester, New York, to consult with lens experts and as to the feasibility of the small size model.

OFFICE OF STRATEGIC SERVICES

WASHINGTON, D.C. 25

25 January 1944

From: N. E. Juran, Lieut., USNR.

To: Commander John Ford

Via: Lt. E. R. Kellogg

Subject: Iconography, Disposition of Material in

The work which has been done and the developments brought forward in Iconography divide themselves up into four general units:

(a) Iconography
(b) Perspective Iconometer
(c) Underwater Depth Determination
(d) Pilot's Scale Estimator

In order to make the best use of these units and to get them into the field as quickly as possible, the following suggestions are made for their disposition.

1. The work of iconography divides itself into two uses, 1) an aid to photo interpretation, 2) an aid in landfall technique (model building). It is suggested that the work on iconography already accomplished be turned over to the Bureau of Aeronautics where they can put it to use both in the Photo Interpretation School at Anacostia under Commander Green, and in the Landfall School of the Bureau of Special Devices Division under Lieut. Vogelgesang. It is felt that these organizations with their superior equipment, space, and personnel allotment are in the best position to further the interests of and to make use of these innovations in iconography.

2. It is suggested that information on the perspective iconometer be made available to the Bureau of Aeronautics and the Office of Naval Intelligence as well as to the Army. This device will greatly facilitate making sketches in the field, and has marked application in the making of target maps. However, further work should be done by our office in order to develop the perspective iconometer along particular lines to make it of value to the Office of Strategic Services. It is felt that a small collapsible unit can be produced and issued to O.S.S. agents for the purpose of making quick and accurate sketches of anything they see in areas where the possession of a camera would be a serious danger to themselves.

In reply address not the signer of this letter, but "Commanding Officer, U.S. Naval Air Station, Anacostia, D.C."

Refer to [illegible]
[illegible]/[illegible]

U. S. NAVAL AIR STATION
ANACOSTIA, D. C.

[illegible] January 1944

From: Officer-in-Charge,
Photographic Interpretation Center,

To : Brig. General [illegible] Donovan, [illegible],
Office of Strategic Services,
30th and E Streets, N.W.
Washington, D.C.

Via : Lt. E.A. Kellogg, Field Photographic Section.

Subject: Material Regarding Use of Oblique Photographs - Request for.

1. It is requested that this office be furnished with oblique photographs and descriptive matter gotten together by Lieut. F.E. Juren, USNR of your office.

2. The subject data includes:

a. illustrations and examples of practical problems in oblique photo interpretation encountered at headquarters and other photo interpretation units.

b. pilots scale estimator.

c. target isometer.

d. underwater depth determination.

RICHARD O. [illegible]
Comdr., USN.

[redacted]

In reply addressee the chief of this bureau, not "Commanding Officer, U.S. Naval Air Station, Anacostia, D.C."

Refer to No. [redacted]
[redacted]

U. S. NAVAL AIR STATION
ANACOSTIA, D.C.

[redacted] 1944

From: Officer-in-Charge,
Photographic Interpretation Center.

To : [redacted] Director,
Office of Strategic Services,
[redacted] and E Streets, N.W.
Washington, D.C.

Via : Lt. [redacted], Field Photographic Branch.

Subject: Material Regarding Use of Oblique Photographs - Request for.

1. It is requested that this office be furnished with oblique photographs and descriptive matter gotten together by Lieut. [redacted], USNR of your office.

2. The subject data includes:

a. illustrations and examples of practical problems in oblique photo interpretation encountered at headquarters and other photo interpretation units.

b. pilot's scale estimator.

c. target locomotor.

d. underwater depth determination.

[redacted]
Comdr., USN.

In reply address not the signer of this letter, but "Commanding Officer, U.S. Naval Air Station, Anacostia, D.C."

Refer to No. CONFIDENTIAL
EC122/EAS

U.S. NAVAL AIR STATION
ANACOSTIA, D.C.

26 January 1944

From: Officer-in-Charge,
Photographic Interpretation Center.

To : Brig. General Wm. Donovan, Director,
Office of Strategic Services,
25th and E Streets, N.W.
Washington, D.C.

Via : Lt. E.R. Kellogg, Field Photographic Branch.

Subject: Material Regarding Use of Oblique Photographs - Request for.

1. It is requested that this office be furnished with oblique photographs and descriptive matter gotten together by Lieut. N.H. Juran, USNR of your office.

2. The subject data includes:

a. illustrations and examples of practical problems in oblique photo interpretation encountered at Medmenham and other photo interpretation units.

b. pilots scale estimator.

c. target iconometer.

d. underwater depth determination.

RICHARD O. GREENE
Comdr., USN.

Op-16-V-S-[illegible]
(SC)

NAVY DEPARTMENT
OFFICE OF THE CHIEF OF NAVAL OPERATIONS
WASHINGTON

Serial: 0528016

CONFIDENTIAL

27 JAN 1944

From: Chief of Naval Operations.
To: The Director, Office of Strategic Services.
Attn: Chief, Field Photographic Branch.

Via: Lieut. Comdr. D. Ravenal, Jr., U.S.N.R., Naval Liason Officer (OSS).

SUBJECT: Information and written Instructions on the use of Instruments and Devices pertaining to Iconography - Request for.

1. It is requested that this office be supplied with subject data for use in connection with a confidential manual now being prepared for publication on the making of Terrain Models.

2. It is requested that all subject data be made available for inspection to Lieutenant Squire of Op-16-V and that such material as he may select be sent to Services Section (Op-16-V-S), Air Intelligence Group, Division of Naval Intelligence, Room 1W-12, Navy Department, Washington, D.C.

G. T. MUNDORFF, Jr.
By Direction

CONFIDENTIAL

OFFICE OF STRATEGIC SERVICES
WASHINGTON, D. C.

NavLiaison
R401152
DK:ghj

29 January 1944.

CONFIDENTIAL

MEMORANDUM for Lieut. E. R. Kellogg, U.S.N.R.

SUBJECT: Information and written instructions on the use of instruments and devices pertaining to Ieonography - Request for.

Enclosure: (A) Op-16-V-S-B38 Conf. ltr. (SS) Serial: 0328016 dated 27 January 1944.

1. Enclosure (A) is forwarded for your information and action with the request that any and all action be made via this office.

Daniel Rivenel, Jr.
Lt.Comdr., U.S.N.R.

CONFIDENTIAL

3 February 1944

Group Captain C.S.M. Du Boulay
British Joint Staff Mission
Offices of the Combined Chiefs of Staff
Washington, D. C.

Dear Group Capt. Du Boulay:

I wish to acknowledge with thanks your very kind note transmitting the appreciation of the work of Lt. W. N. Juran, USNR of the OSS.

The communication has been referred to the Director for the records of Lt. Juran.

Sincerely yours,

JOHN MAGRUDER, Brig. USA,
Deputy Director, OSS -- Intelligence Service

JM:AMc

CONFIDENTIAL

February 24th, 1944

Dear General Magruder,

The enclosed letter has been forwarded to me by the Air Ministry for onward transmission to you. It refers to the Air Ministry's appreciation of the work which is being carried out by Lieutenant N.N. Juran, U.S.N.R. of your organization.

You will note that a copy has been sent by the Air Ministry to the Director of the O.S.S. Mission in London.

Sincerely yours,

G.G.H. De Bunley,
Group Captain.

Brigadier General John Magruder,
Officer of Strategic Services.

CONFIDENTIAL

BRITISH JOINT STAFF MISSION
OFFICES OF THE COMBINED CHIEFS OF STAFF
WASHINGTON

AIR STAFF

February 1st, 1944

Dear General Magruder,

The enclosed letter has been forwarded to me by the Air Ministry for onward transmission to you. It refers to the Air Ministry's appreciation of the work which is being carried out by Lieutenant N.W. Juran, U.S.N.R. of your organization.

You will note that a copy has been sent by the Air Ministry to the Director of the O.S.S. Mission in London.

Sincerely yours,

G.G.H. Du Boulay,
Group Captain.

Brigadier General John Magruder,
Officer of Strategic Services.

OFFICE OF STRATEGIC SERVICES
WASHINGTON, D. C.

MEMORANDUM

2 February 1944

To: General W. Donovan

Via: Secretariat

From: Commander John Ford

The importance of this effort should be called to your attention and the requests from the various branches of the service more than bear this out.

I am convinced we should train at least four competent officers thoroughly in this work and dispatch them to the various commands as soon as possible. There is a great need for this work in the field and its worth is unmeasurable.

John Ford
JOHN FORD
Commander, USNR

Enclosure (4)

CONFIDENTIAL

Date

To: Col. Buxton.

With reference to the attached, it would seem that Comdr. Ford simply wishes to call to your attention the particular work being done by his branch in Iconography and to get your general views on the question of training 4 officers in the work for ultimate dispatch to the theater.

Comdr. Ford has informed us that the formal requests from U.S. Naval Air Station in Anacostia and from the Office of the Chief of Naval Operations for material and data relating to this work are being handled by Lt. Kellogg and Lieut. N. H. Juran, and that no action by the Director's office is necessary at this time.

C. A. Bane

C. A. Bane.

Office of the Secretariat

CONFIDENTIAL

3. [illegible] The [illegible] tion of [illegible] [illegible] mark to prevent [illegible] enemy targets from [illegible] It enabled [illegible] to [illegible] in approximately 30 minutes [illegible] tives which would require [illegible] 6 hours to [illegible]. It is [illegible] ful in the field in comparison with [illegible] sketching. The same device makes [illegible] sketches to be projected as a drawing [illegible] into true plan.

4. Studies in [illegible] It is possible [illegible] favorable conditions, to determine from [illegible] bination of oblique and vertical photographs [illegible] underwater depths of enemy beaches. Conditions are favorable for this method when they are unfavorable for the wave interval method of underwater depth determination. The two methods therefore supplement each other.

Should you be interested, I hope that it will be possible to arrange for the demonstration in the relatively near future, since Lt. Juram will not be in Washington for long.

Sincerely yours,

G. Richard Buxton
Acting Director

9 February 1944

Lieutenant General Lewis J. McNair
Commanding General
Army Ground Forces
Fort Lt, Army War College
Washington 25, D. C.

Dear General McNair:

Mr. L. E. Juran, USNR, of our Field Engineering Branch, has developed certain devices and methods in the field of Iconography which may be of interest to you. If you are interested, I shall be happy to have Mr. Juran arrange a demonstration for you, or officers in your command, at a time and place convenient to you.

The developments are as follows:

1. Clark's Estimator. This is a portable device which a pilot may use with one hand while flying. It enables him to make a better guess than is otherwise possible as to the length of ships he sights, and as to the distance between the ship and the pilot. It is also usable for estimating length of runways, etc. in low level country.

2. Ship Recognition. This principle is of use in connection with photo interpretation, particularly in the field where more complex devices may not be practicable. It requires the use of only a single oblique photo. This development may be used to determine silhouettes of enemy shipping, to plot convoys, and to measure enemy ships, enemy military installations, sea walls, low level bearing obstructions, tank traps and deep beach gradients.

CONFIDENTIAL

[illegible]

[illegible]

[illegible]

Sincerely yours,

[illegible]
Acting Director

CONFIDENTIAL

APPENDIX E

1. Iconography--Photo interpretation of oblique photographs. This development makes possible the interpretation of oblique photographs in a manner not heretofore possible. It also makes possible measurements of objects such as enemy military installations, sea walls, low level bombing obstructions, tank traps, enemy beach gradients, etc. A full description of this development in contained in the attached Annex E A, entitled "Iconography".

2. Underwater Depth Determination. It is possible by this application of the principle described in the preceding paragraph to determine from a combination of oblique and vertical photographs taken at approximately the same time. It requires favorable conditions, but conditions are favorable for this method when they are unfavorable for the wave interval method of underwater depth determination. The two methods therefore supplement each other. A full description is contained in the attached Annex B, entitled "Under Water Depth Determination".

3. Periscope. This is a device which makes possible the production of perspective drawings of target maps from any desired viewpoint. It enables untrained personnel to produce in less than 30 minutes accurate perspectives which would otherwise take trained personnel six hours to complete. It is especially useful in the field in connection with panoramic field sketching, and is therefore of special interest to the Army.

The principle may also be used to determine silhouettes of enemy shipping, plot convoys and measure the length of unknown ships.

4. Pilot's Iconometer. This is a simple, portable device which a pilot may use while flying. It enables him to make a better estimate than is otherwise possible as to the length of ships he sights, and as to the distance between the ship and pilot. It is also usable for estimating lengths of runways and ground distances.

[illegible] has initiated a number of scientific developments in the field of photography. They include:

1. Oblique photographs
2. Pilot's Estimator
3. Target Locator
4. Studies in underwater depth determination.

[illegible] invited to attend a display of these developments on [illegible] November [illegible].

1. Oblique photographs, developed by a member of this organization at [illegible], England, have been used to determine silhouettes of enemy [illegible], for example, to measure enemy ships, to measure enemy military installations, and, in the while, low level bombing determinations, bomb drops, and to measure [illegible] gun positions.

2. The Pilot's Estimator is a device which will enable a pilot seeing an enemy ship to estimate its length as well as the distance between the ship and the pilot. It can be used to calculate the length of runways, distances, etc., on land as well as at sea.

3. The Target Locator is designed to produce perspective drawings of enemy targets from any desired viewpoint. With it, untrained personnel can produce in approximately 30 minutes, accurate perspectives which would require trained personnel 8 hours to complete. This device can be used [illegible] by the Army, and should revolutionize the present method of field [illegible]. A collapsible unit has been designed for use by underwater [illegible] in areas where the possession of a camera would be too dangerous. [illegible] can, by using the same instrument with which they were drawn, [illegible] objectives on a drawing board into true plan.

4. Studies in underwater depth determination have been made which will [illegible] interest. By a combination of oblique and vertical photos the determination of underwater depths of enemy beaches is possible under favorable [illegible]. Conditions are favorable for this method when they are unfavorable for the more universal method of underwater depth determination. It is [illegible], therefore, that these two methods will supplement each other. Preliminary experiments have been carried out in the field, and further studies are being made by this office.

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x Field Data Branch

OFFICE OF STRATEGIC SERVICES
WASHINGTON, D. C.

Submitted by
Lt. Jones

This office has initiated a number of scientific developments in the field of Iconography. They include:

a. Oblique Projections
b. Pilot's Estimator
c. Target Iconometer
and d. Studies in underwater depth determination.

You are invited to attend a display of these developments at your convenience.

1. Oblique projections, developed by a member of this organization at Medmenham, England, have been used to determine silhouettes of enemy shipping, to plot convoys, to measure enemy ships, to measure enemy military installations, sea walls, low level bombing obstructions, tank traps; and to measure enemy beach gradients.

2. The pilot's estimator is a device which will enable a pilot seeing an enemy ship to estimate its length as well as the distance between the ship and the pilot. It can be used to calculate the length of runways, distances, etc. on land as well as at sea.

3. The Target Iconometer is designed to produce perspective drawings of enemy targets from any desired viewpoint. With it, untrained personnel can produce in approximately 30 minutes, accurate perspectives which would require trained personnel 6 hours to complete. This device can be used in the field by the Army, and should revolutionize the present method of field sketching. A collapsible unit has been designed for use by undercover agents for sketching in areas where the possession of a camera would be too dangerous. These sketches can, by using the same instrument with which they were drawn, be later projected on a drawing board into true plan.

4. Studies in underwater depth determination have been made which will be of interest. By a combination of oblique and vertical photos the determination of underwater depths of enemy beaches is possible - under favorable conditions. Conditions are favorable for this method when they are unfavorable for the wave interval method of underwater depth determination. It is felt, therefore, that these two methods will supplement each other. Photographic experiments have been carried out in the field, and further studies are being made by this office.

[illegible] February 1944

Mr. E. Howard Hunton,
Acting Director,
Office of Strategic Services,
Washington, D. C.

Dear Mr. Hunton:

Thanks for your letter of 8 February 1944 [illegible] Major offering to have Lieutenant [illegible], [illegible] certain devices and models in the field of [illegible].

Although it will be impossible for General [illegible] to witness these demonstrations, he wishes to inform you that [illegible] officers of the Army Ground Forces have already seen the [illegible] described in your letter. Several other representatives from this Headquarters will view the equipment this week in order to determine the extent to which it may be useful to the Army Ground Forces.

Thank you for your cooperation in this matter.

Sincerely,

(Signed) J. A. CHRISTIANSEN

J. A. CHRISTIANSEN
Brig. Gen., G.S.C.
Chief of Staff

Iconography Juran, H. T. H. Field Mail Bund

HEADQUARTERS
ARMY GROUND FORCES
OFFICE OF THE CHIEF OF STAFF
ARMY WAR COLLEGE
WASHINGTON, D. C.

16 February 1944

Mr. C. Edward Buxton,
Acting Director,
Office of Strategic Services,
Washington, D. C.

Dear Mr. Buxton:

Thanks for your letter of 8 February 1944 to General McNair offering to have Lieutenant M. M. Juran, USNR, demonstrate certain devices and methods in the field of Iconography.

Although it will be impossible for General McNair, himself, to witness these demonstrations, he wishes to inform you that certain officers of the Army Ground Forces have already seen the devices described in your letter. Several other representatives from this headquarters will view the equipment this week in order to determine the extent to which it may be useful to the Army Ground Forces.

Thank you for your cooperation in this matter.

Sincerely,

J. C. CHRISTIANSEN
Brig. Gen., G.S.C.
Chief of Staff

Copy sent to Juran

3. Jerioscope

The Jerioscope is a device which enables the production of perspective drawings of target areas from any desired viewpoint. It enables untrained personnel to produce in less than thirty minutes accurate perspectives which would otherwise take trained personnel more than six hours to complete and which, under field conditions, might not be possible at all. It is especially useful in the field in connection with positive field sketching and is therefore of special interest to the Army. A description of the Jerioscope is contained in the attached Annex "C" entitled "Perspective Through Jerioscope".

4. Pilot's Ionometer

This is a simple, portable device which a pilot may use while flying. It enables him to make a better estimate than is otherwise possible as to the length of ships he sights and the distance between pilot and ship. It is also useful for estimating lengths of runways and ground distances. It is fully described in the attached Annex "D" entitled "Pilot's Ionometer".

Subject of Intelligence Interest
Subject on Developments in the Field of Reconnaissance

ABSTRACT

1. **Introduction - Data Interpretation of Photographs**

This document makes possible the interpretation of oblique photographs in a manner not heretofore possible and thus broadens the field of usefulness of oblique photographs for intelligence purposes. It also makes possible measurement of objects such as enemy military installations, and enemy bridges, bombing destructions, tank traps, enemy tank positions, etc., directly from a single oblique photograph. The principle may also be used to determine silhouettes of enemy objects, to plot contrail and to measure the length of unknown ships. A full description is contained in the attached Annex "A" entitled "Introduction".

2. **Underwater Depth Determination**

It is possible by this application of the principle described in the preceding paragraph to determine underwater depths of many beaches from a combination of oblique and vertical photographs taken at approximately the same time. It requires favorable conditions. Not conditions are favorable for this method when they are unfavorable for the wave interval method of underwater depth determination. The two methods, therefore, supplement each other. Further work is being done on this problem. A full description is contained in the attached Annex "B" entitled "Water Depth Determination".

Memorandum for the Secretary,
Joint U. S. Chiefs of Staff

23 February 1954

4. Since these developments are of interest to all branches of the Armed Services, they have been made available to the Army Ground Forces, the Army Air Forces and the Navy. Mr. Jones is presently devoting his full time to the demonstration of his developments to representatives of these services and to the preparation of material for international purposes.

William J. Donovan
Director

CONFIDENTIAL

(55)

25 February 1944

MEMORANDUM FOR: The Secretary,
Joint U. S. Chiefs of Staff

SUBJECT: Report on Developments in the Field of Iconography

1. Developments which we believe to be of importance in the field of Iconography have been made by Lt. J. M. Juran, USNR, of our Field Photographic Branch.

2. The principles developed by Lt. Juran are of particular value in the field of photographic interpretation. Further adaptations of these principles provide a new method of underwater depth determination, a means for correct estimates by an aircraft pilot of the size of ships, runways, and the like, and a new method of producing panoramic field mosaics and perspective target maps in a fraction of the time formerly necessary for the purpose. Brief summaries of the foregoing are contained in the attached Appendix.

3. Lt. Juran has been working for over a year on the development of these principles and their application. During this time he worked in England for an extended period with the Central Photo Interpretation Unit, which is the photo intelligence center for all British Armed Services. He also worked with the North African Photo Reconnaissance Wing at Tunis and the Middle East Interpretation Unit, a branch of the British Central Interpretation Unit, at Cairo.

CONFIDENTIAL

1. Periscope

The Periscope is a device which makes possible the production of perspective drawings of target ships from any desired viewpoint. It enables untrained personnel to produce in less than twenty minutes accurate perspectives which would otherwise take trained personnel more than six hours to complete and which, under field conditions, might not be possible at all. It is especially useful in the field in connection with recognition field training and is therefore of special interest to the Army. A description of the Periscope is contained in the attached Annex "G" entitled "Perspective through Periscope".

2. Pilot's Inclinometer

This is a simple, portable device which a pilot may use while flying. It enables him to make a better estimate than is otherwise possible as to the length of ships he sights and the distance between pilot and ship. It is also useful for estimating lengths of runways and ground distances. It is fully described in the attached Annex "H" entitled "Pilot's Inclinometer".

Office of Strategic Services
Report on Developments in the Field of Photography

[illegible]

1. [illegible]

This development makes possible the interpretation of oblique photographs in a manner not heretofore possible and thus broadens the field of usefulness of oblique photographs for intelligence purposes. It also makes possible measurements of objects such as enemy military installations, ammunition, low level bombing obstructions, tank traps, enemy beach emplacements, etc., directly from a single oblique photograph. The principle may also be used to determine silhouettes of enemy shipping, to plot convoys and to measure the length of unknown ships. A full description is contained in the attached Annex "A" entitled "Photogrammetry".

2. Underwater Depth Determination

It is possible by this application of the principle described in the preceding paragraph to determine underwater depths of enemy beaches from a combination of oblique and vertical photographs taken at approximately the same time. It requires favorable conditions, but conditions are favorable for this method when they are unfavorable for the wave interval method of underwater depth determination. The two methods, therefore, supplement each other. Further work is being done on this problem. A full description is contained in the attached Annex "B" entitled "Water Depth Determination".

CONFIDENTIAL

Assistant for the Intelligence
Joint F. M. Chiefs of Staff

[illegible]

In view [illegible] all branches of the Armed Services, they have been made available to the Army Ground Forces for study [illegible] Navy. Mr. Jones is personally sending [illegible] demonstrations of his developments to representatives of these services and to the production of material for demonstration purposes.

William J. Donovan
Director

CONFIDENTIAL

CONFIDENTIAL

[illegible] February 1944

MEMORANDUM FOR: The Secretary
Joint U. S. Chiefs of Staff

SUBJECT: Report on Developments in the Field of Photography

1. Developments which we believe to be of importance in the field of photography have been made by Lt. [illegible] Furon, USNR, of our Field Photographic Branch.

2. The principles developed by Lt. Furon are of particular value in the field of photographic interpretation. Further adaptations of these principles provide a new method of underwater depth determination, a means for remaining orientated by an aircraft pilot of the size of ships, rivers, and the like, and a new method of producing panoramic field sketches and perspective target maps in a fraction of the time formerly necessary for the purpose. Brief summaries of the foregoing are contained in the attached appendix.

3. Lt. Furon has been working for over a year on the development of these principles and their application. During this time he served in England for an extended period with the Central Photo Interpretation Unit, which is the photo intelligence center for all British Armed Services. He also served with the North African Photo Reconnaissance Wing at Tunis and the Middle East Interpretation Unit, a branch of the British Central Interpretation Unit, at Cairo.

CONFIDENTIAL

3. Jerisscope

The Jerisscope is a device which makes possible the production of perspective drawings of target maps from any desired viewpoint. It enables untrained personnel to produce in less than thirty minutes accurate perspectives which would ordinarily take trained personnel more than six hours to complete and which, under field conditions, might not be possible at all. It is especially useful in the field in connection with panoramic field sketching and is therefore of special interest to the Army. A description of the Jerisscope is contained in the attached Annex "C" entitled "Perspective Through Jerisscope".

4. Pilot's Ionometer

This is a simple, portable device which a pilot may use while flying. It enables him to make a better estimate than is otherwise possible as to the length of ships he sights and the distance between pilot and ship. It is also usable for estimating lengths of runways and ground distances. It is fully described in the attached Annex "D" entitled "Pilot's Ionometer".

Office of Strategic Services
Report on Developments in the Field of Technology

[redacted]

1. [redacted]

This development makes possible the interpretation of oblique photographs in a manner not heretofore practice and thus broadens the field of usefulness of oblique photographs for intelligence purposes. It also makes possible measurement of objects such as enemy military installations, coastal, low level bombing obstructions, tank traps, enemy beach emplacements, etc., directly from a single oblique photograph. The principle may also be used to determine silhouettes of enemy shipping to plot convoys and to measure the length of unknown ships. A full description is contained in the attached Annex "A" entitled "Photogrammetry".

2. Underwater Depth Determination

It is possible by this application of the principle described in the preceding paragraph to determine underwater depths of enemy beaches from a combination of oblique and vertical photographs taken at approximately the same time. It requires favorable conditions, but conditions are favorable for this method when they are unfavorable for the wave interval method of underwater depth determination. The two methods, therefore, supplement each other. Further work is being done on this problem. A full description is contained in the attached Annex "B" entitled "Under Water Depth Determination".

Memorandum for the Secretaries
Joint U. S. Chiefs of Staff

23 February 1944

Page 2

4. Since these developments are of interest to all branches of the armed services, they have been made available to the Army Ground Forces, the Army Air Forces and the Navy. Mr. Donovan is presently devoting his full time to the demonstration of his developments to representatives of these services and to the preparation of material for instructional purposes.

William J. Donovan
Director

CONFIDENTIAL

[illegible]

23 February 1944

MEMORANDUM FOR: The Secretary,
Joint U. S. Chiefs of Staff

SUBJECT: Report on Developments in the Field of Photography

1. Developments which we believe to be of importance in the field of Photography have been made by Lt. H. E. Juren, USNR, of our Field Photographic Branch.

2. The principles developed by Lt. Juren are of particular value in the field of photographic interpretation. Further adaptations of these principles provide a new method of underwater depth determination, a means for accurate estimates by an aircraft pilot of the size of ships, runways, and the like, and a new method of producing panoramic field sketches and perspective target maps in a fraction of the time formerly necessary for the purpose. Brief summaries of the foregoing are contained in the attached Appendix.

3. Lt. Juren has been working for over a year on the development of these principles and their application. During this time he worked in England for an extended period with the Central Photo Interpretation Unit, which is the photo intelligence center for all British Armed Services. He also worked with the North African Photo Reconnaissance Wing at Tunis and the Middle East Interpretation Unit, a branch of the British General Interpretation Unit, at Cairo.

CONFIDENTIAL

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[illegible] 1944

Mr. [illegible]
Acting Director
Office of Strategic Services
Washington, D. C.

Dear Mr. [illegible]:

Tentative arrangements have been probably made with your Field Photographic Branch for a technically qualified representative from this Headquarters to examine Mr. [illegible]'s Photographic and Lenticular device.

Should the equipment and methods prove of value to the Army Air Forces, arrangements will be made at that time either for the adoption of the device to meet our requirements.

Your interest in bringing this equipment to our attention is appreciated.

Very truly yours,

[illegible] H. H. Arnold

General, U. S. Army,
Commanding General, Army Air Forces.

CONFIDENTIAL

Commanding General, Army Air Forces
Washington, D. C.

CONFIDENTIAL

Monography 11 of 16 B
Juran Lt. L. H.
Field Mus Bu

WAR DEPARTMENT
HEADQUARTERS OF THE ARMY AIR FORCES
WASHINGTON, D. C.

24 FEB 1944

Mr. C. Edward Buxton
Acting Director
Office of Strategic Services
Washington, D. C.

Dear Mr. Buxton:

Tentative arrangements have been verbally made with your Field Photographic Branch for a technically qualified representative from this Headquarters to examine Lt. Juran's Photogrammetric and Iconographic device.

Should the equipment and methods prove of value to the Army Air Forces, arrangements will be made with your office for the adaption of the device to meet our requirements.

Your interest in bringing this equipment to our attention is appreciated.

Very truly yours,

H. H. Arnold

H. H. ARNOLD,
General, U. S. Army,
Commanding General, Army Air Forces.

CONFIDENTIAL

(MB)

Iconography-11, 0463
x Juran, H. H.
CS 3964

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THE JOINT CHIEFS OF STAFF
WASHINGTON

24 February 1944

MEMORANDUM FOR THE DIRECTOR OF STRATEGIC SERVICES:

Subject: Report on Developments in the Field of Iconography

1. Your memorandum of 23 February 1944 on the above subject together with appendix and attached Annexes A, B, C, and D, has been received and examined.

2. It is desired to express appreciation of the extensive research in this field by Lt. N. H. Juran, USNR, and for his pioneering in the field of photographic interpretation.

3. It is noted with interest and approval that his work already has been made available to interested agencies and all branches of the armed services, as also is the fact that Lt. Juran is presently devoting his time to demonstration, further developments, and preparation of instructional material in the field of Iconography.

FORREST B. ROYAL,
Captain, U.S. Navy,
Secretary.

CONFIDENTIAL

THE JOINT CHIEFS OF STAFF
WASHINGTON

[illegible]

[illegible]

[illegible]

[illegible]

[illegible]

[illegible]

[illegible]

[illegible]

CONFIDENTIAL

Da

To Mrs O'Donnell

Gen. D: Are the original. Suggest photo... copies be sent to Comdr. Ford and Lt. Juan.

Minutes this has been done

Office of the Executive Officer

(3046)

Declassified and Approved For Release 2013/08/07 : CIA-RDP13X00001R000100290001-2

Iconography 11,046.B
x Juran, Lt. N.H.
x Fld. Photo. Bu.

OFFICE OF STRATEGIC SERVICES

INTEROFFICE MEMO

TO: General Donovan

DATE: 25 February 1944

FROM: Robert Thrun

SUBJECT: LT. JURAN'S ICONOGRAPHY DEVELOPMENTS

1. The booklets prepared by Lt. Juran explaining his developments will be in print within two weeks. It is therefore suggested that the letter to the President on this subject be deferred until the printed booklets are available.

RT
Robert Thrun

OK
WJD
IP

(45)

27 March 1944

MEMORANDUM FOR GENERAL CECIL J. SPECHT
Joint U. S. Chiefs of Staff
Public Health Building
Washington, D. C.

SUBJECT: Report on Developments in the Field of Immunology

I attach the four booklets about which I spoke with you on the telephone today. They are to replace the annexes to the 23 February 1944 memorandum on this subject. They contain the same material.

Robert Thrum
Assistant to the
Executive Officer

Attachments - 4

Thrum:Zirchard

3. **Jeriscope**

The Jeriscope is a device which makes possible the production of perspective drawings of target maps from any desired viewpoint. It enables untrained personnel to produce in less than thirty minutes accurate perspectives which would otherwise take trained personnel more than six hours to complete and which, under field conditions, might not be possible at all. It is especially useful in the field in connection with peninsula field exercises and is therefore of special interest to the Army. A description of the Jeriscope is contained in the attached Annex "C" entitled "Perspective Through Jeriscope".

4. **Pilot's Ionometer**

This is a simple, portable device which a pilot may use while flying. It enables him to make a better estimate than is otherwise possible as to the length of ships he sights and the distance between pilot and ship. It is also useful for estimating lengths of runways and ground distances. It is fully described in the attached Annex "D" entitled "Pilot's Ionometer".

[redacted]

1. [redacted]

This development makes possible the interpretation of oblique photographs in a manner not heretofore possible and thus enhances the field of usefulness of oblique photographs for intelligence purposes. It also makes possible measurement of objects such as enemy military installations, sea walls, low level bombing objectives, tank traps, enemy beach gradients, etc., directly from a single oblique photograph. The principle may also be used to determine silhouettes of enemy shipping, to plot surveys and to measure the length of unknown ships. A full description is contained in the attached Annex "A" entitled "Photogrammetry".

2. Underwater Depth Determination

It is possible by this application of the principle described in the preceding paragraph to determine underwater depths of enemy beaches from a combination of oblique and vertical photo aircraft taken at approximately the same time. It requires favorable conditions, but conditions are favorable for this method when they are unfavorable for the wave interval method of underwater depth determination. The two methods, therefore, supplement each other. Further work is being done on this problem. A full description is contained in the attached Annex "B" entitled "Underwater Depth Determination".

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We have made these developments available to the Army Ground Forces, the Army Air Forces and the Navy.

William J. Donovan
Director

HT:WW

(35) CONFIDENTIAL

27 March 1944

MEMORANDUM FOR THE PRESIDENT

I think you will be interested in work we have done which promises to be of value in photo interpretation. This work was carried on by Lt. M. E. Jurca, USNR, of our Field Photographic Branch. Some of it was carried on in the field with Major Elliott's North African Photo Reconnaissance Unit. The bulk of the work was done in England with the Central Photo Interpretation Unit, which is the British photo intelligence center.

The principles have other uses than photo interpretation. For example, they provide a new method of underwater depth determination, a means for enabling pilots to make accurate estimates of the sizes of ships they sight and a method which enables a person with no knowledge of perspective to draw panoramic field sketches and perspective target maps in a fraction of the time formerly required by trained personnel. Brief summaries of these developments are contained in the attached appendix, and I also attach printed booklets which deal with the separate applications in more detail.

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5. Jerioscope

The Jerioscope is a device which makes possible the production of perspective drawings of target maps from any desired viewpoint. It enables untrained personnel to produce in less than fifty minutes accurate perspectives which would otherwise take trained personnel more than six hours to complete and which, under field conditions, might not be possible at all. It is especially useful in the field in connection with preliminary field sketching and is therefore of special interest to the Army. A description of the Jerioscope is contained in the attached Annex "C" entitled "Perspective Through Jerioscope".

6. Pilot's Ionometer

This is a simple, portable device which a pilot may use while flying. It enables him to make a better estimate than is otherwise possible as to the length of ships he sights and the distance between pilot and ship. It is also usable for estimating lengths of runways and ground distances. It is fully described in the attached Annex "D" entitled "Pilot's Ionometer".

[redacted]

1. Iconography - Photo Interpretation of Oblique Photographs

This development makes possible the interpretation of oblique photographs in a manner not heretofore possible and thus broadens the field of usefulness of oblique photographs for intelligence purposes. It also makes possible measurement of objects such as enemy military installations, sea walls, low level bombing obstructions, tank traps, enemy beach gradients, etc., directly from a single oblique photograph. The principle may also be used to determine silhouettes of enemy shipping, to plot convoys and to measure the length of unknown ships. A full description is contained in the attached Annex "A" entitled "Iconography".

2. Underwater Depth Determination

It is possible by this application of the principle described in the preceding paragraph to determine underwater depths of enemy beaches from a combination of oblique and vertical photographs taken at approximately the same time. It requires favorable conditions, but conditions are favorable for this method when they are unfavorable for the wave interval method of underwater depth determination. The two methods, therefore, supplement each other. Further work is being done on this problem. A full description is contained in the attached Annex "B" entitled "Under Water Depth Determination".

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- 5 -

We have made these developments available to the Army Ground Forces, the Army Air Forces and the Navy.

William J. Donovan
Director

CONFIDENTIAL

OFFICE OF STRATEGIC SERVICES CONFIDENTIAL
WASHINGTON, D. C. (25)

27 March 1944

MEMORANDUM FOR THE PRESIDENT

I think you will be interested in work we have done which promises to be of value in photo interpretation. This work was carried on by Lt. E. E. Juren, USNR, of our Field Photographic Branch. Some of it was carried on in the field with your son Elliott's North African Photo Reconnaissance Wing. The bulk of the work was done in England with the Central Photo Interpretation Unit, which is the British photo intelligence center.

The principles have other uses than photo interpretation. For example, they provide a new method of underwater depth determination, a means for enabling pilots to make accurate estimates of the sizes of ships they sight and a method which enables a person with no knowledge of perspective to draw panoramic field sketches and perspective target maps in a fraction of the time formerly required by trained personnel. Brief summaries of these developments are contained in the attached appendix, and I also attach printed booklets which deal with the separate applications in more detail.

CONFIDENTIAL

THE JOINT CHIEFS OF STAFF
WASHINGTON 25

MEMORANDUM

Date, 29 March 1944

To: Mr Robert Thrum, Asst to the Executive Officer

Subject: Developments in the Field of Iconography

Many thanks for the four booklets reporting on developments in the field of Iconography which arrived this morning.

CARL J. GRIDLEY
Colonel, G.S.C.
Assistant Secretary.

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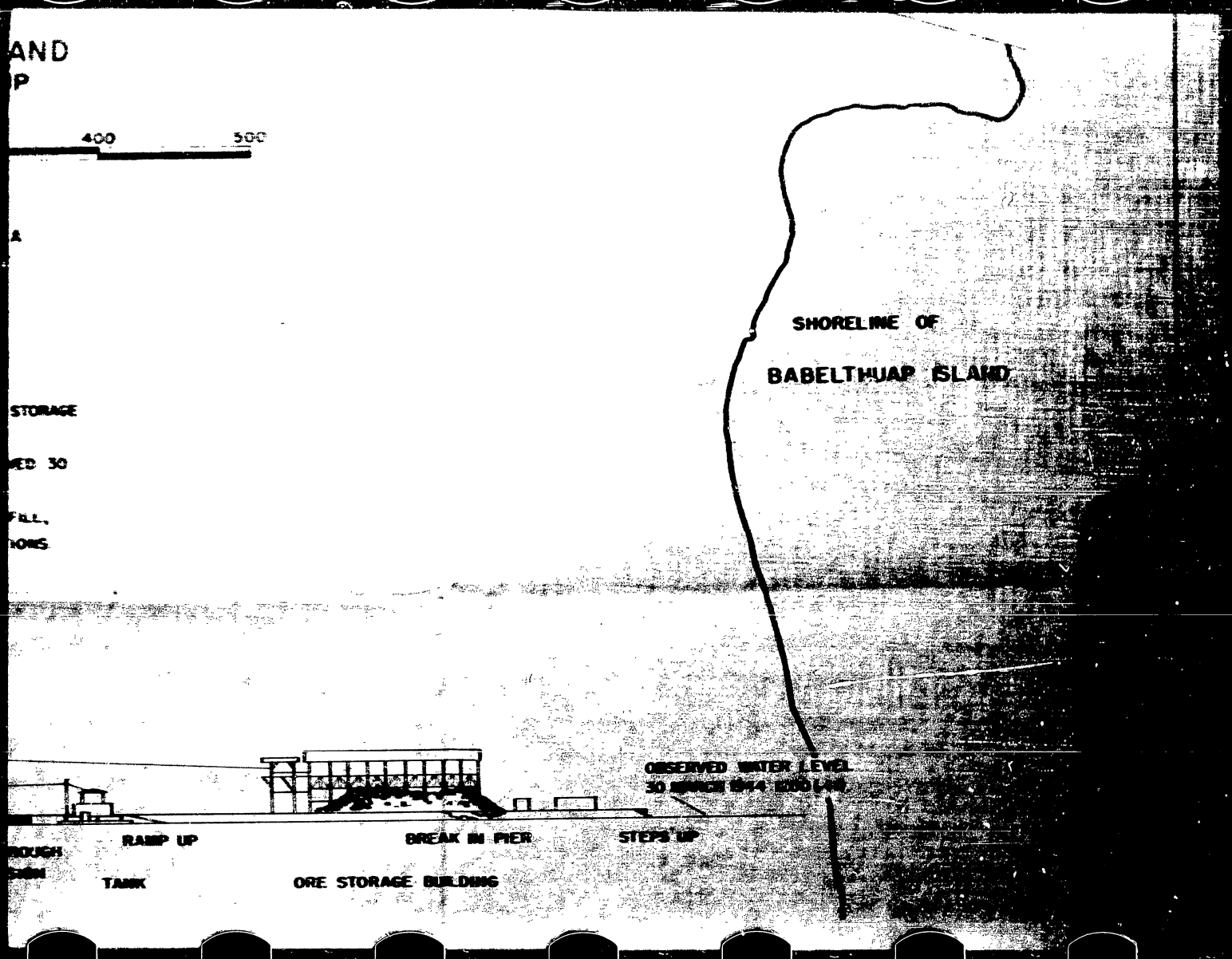

NORTHWESTERN BABELTHUAP ISLAND
PALAU ISLANDS, CAROLINE GROUP

APPROXIMATE SCALE IN FEET

100 0 100 200 300 400 500

PLAN OF PIER INSTALLATION PROJECTED FROM A SINGLE OBLIQUE PHOTOGRAPH USING *OFFICE OF STRATEGIC SERVICES'* ICONOSCOPE.

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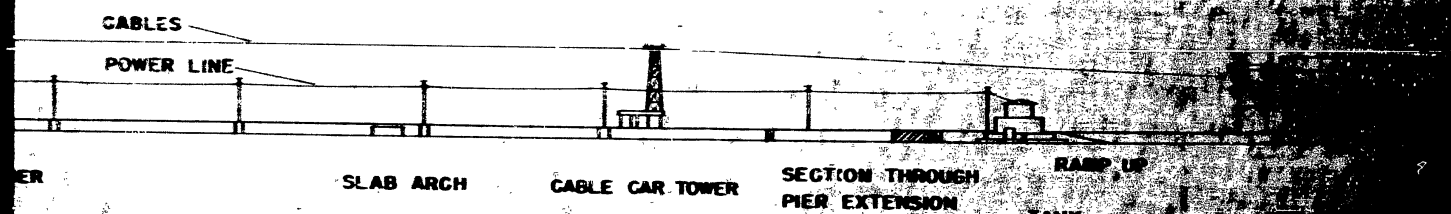
NOTES –

1. PIER OBSTRUCTED WITH PILE OF BAUXITE IN ORE STORAGE BUILDING.
2. HEIGHT OF PIER IS 6' 0" ABOVE WATER LINE OBSERVED 30 MARCH 1944, 1200 (-11 ZONE).
3. MAIN PIER 20' 0" WIDE, MONOLITHIC CONCRETE ON FILL, WITH TWO OPENINGS SPANNED BY SLAB ARCH SECTIONS.



SECTION AA

NORTHWESTERN BAS
PALAU ISLANDS,

APPROXIMATE

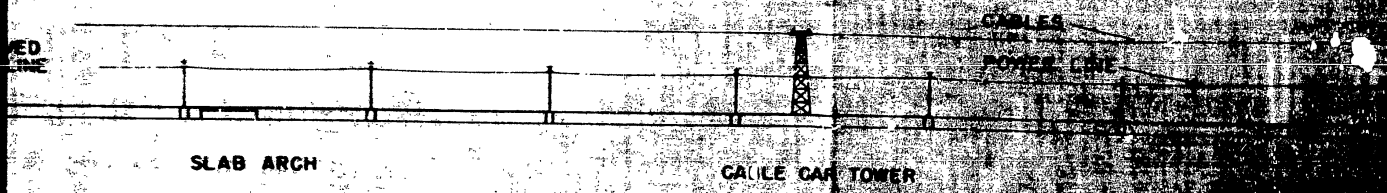
100 0 100

PLAN OF PIER INSTALLA
SINGLE OBLIQUE PHOTOG
STRATEGIC SERVICES

GONF

NOTES -

1. NEW WESTERN
BUILDING
2. HEIGHT OF
MARCH 1945
3. MAIN PIER



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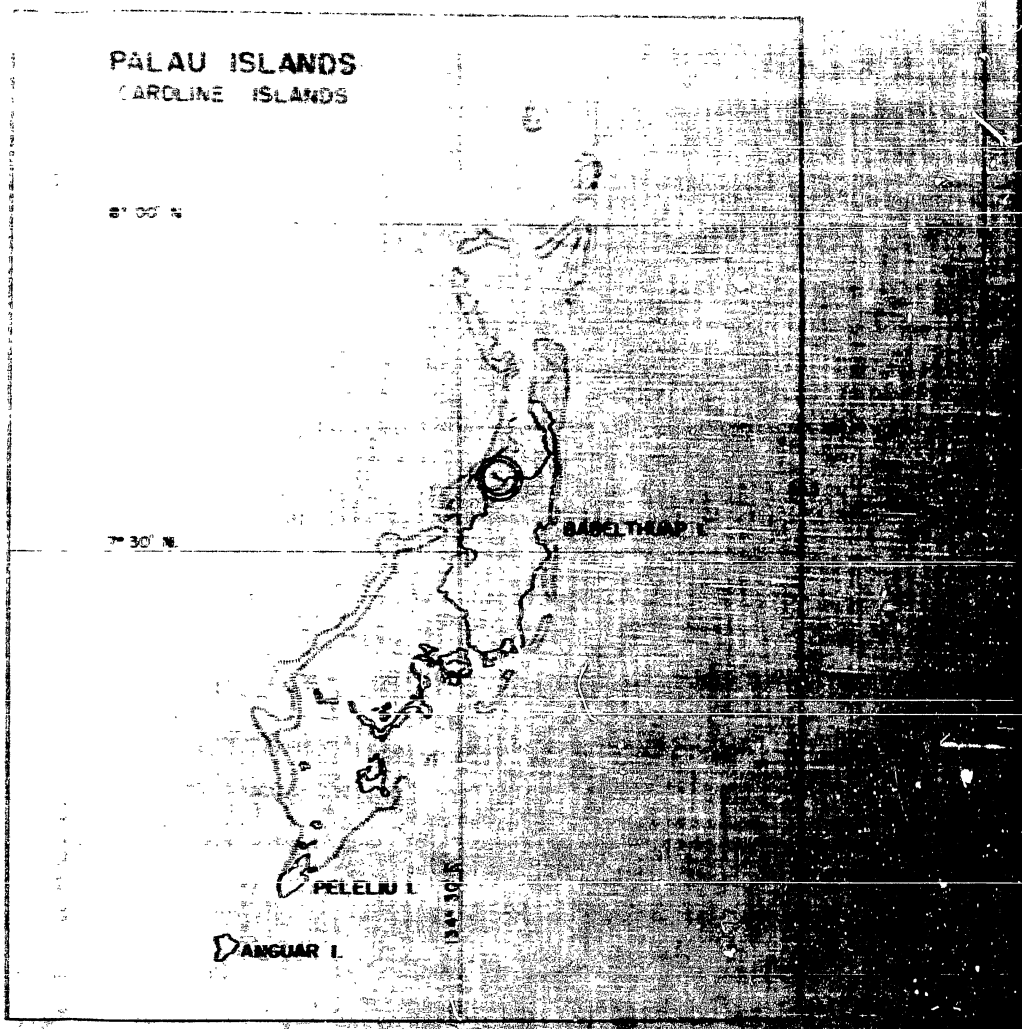
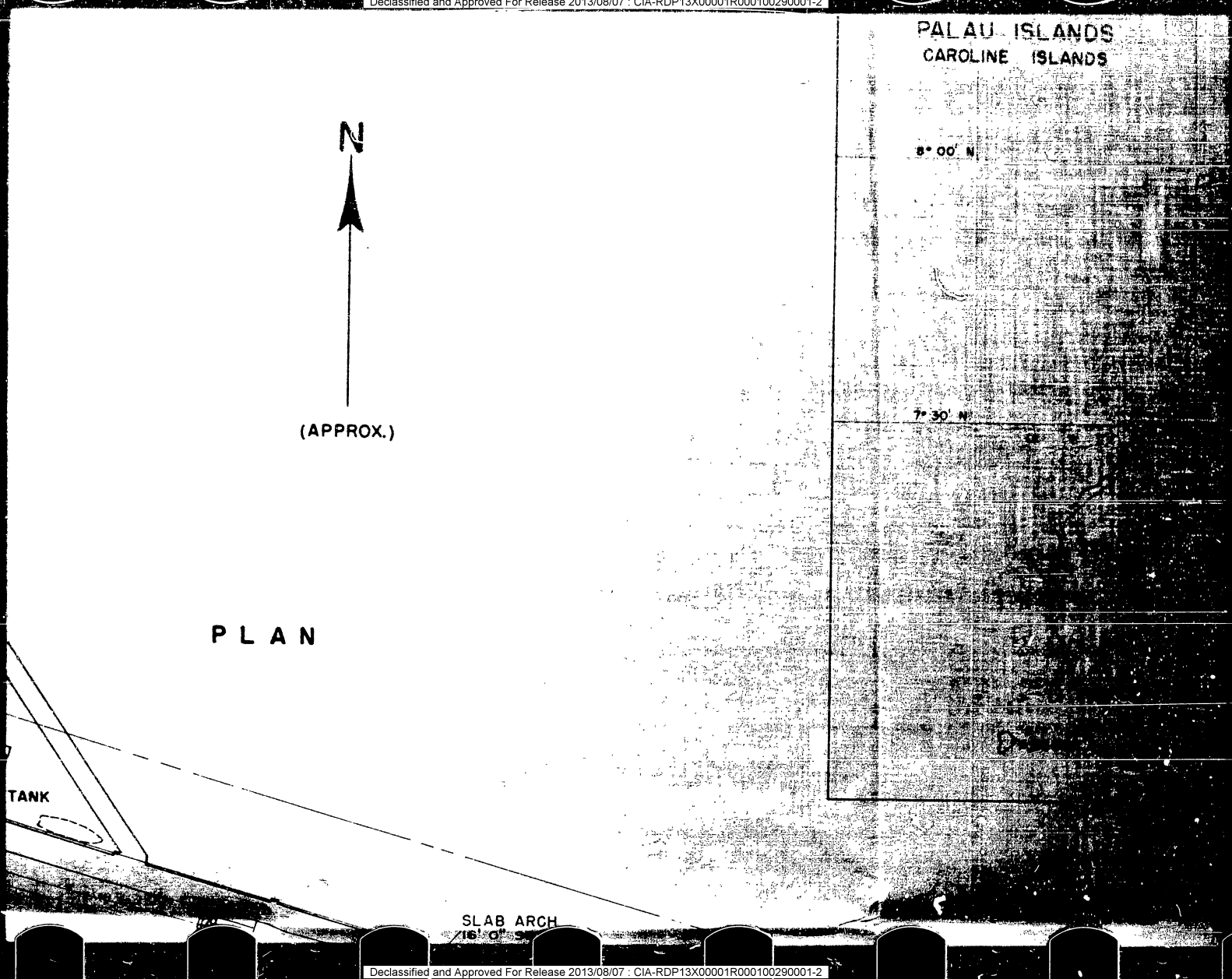
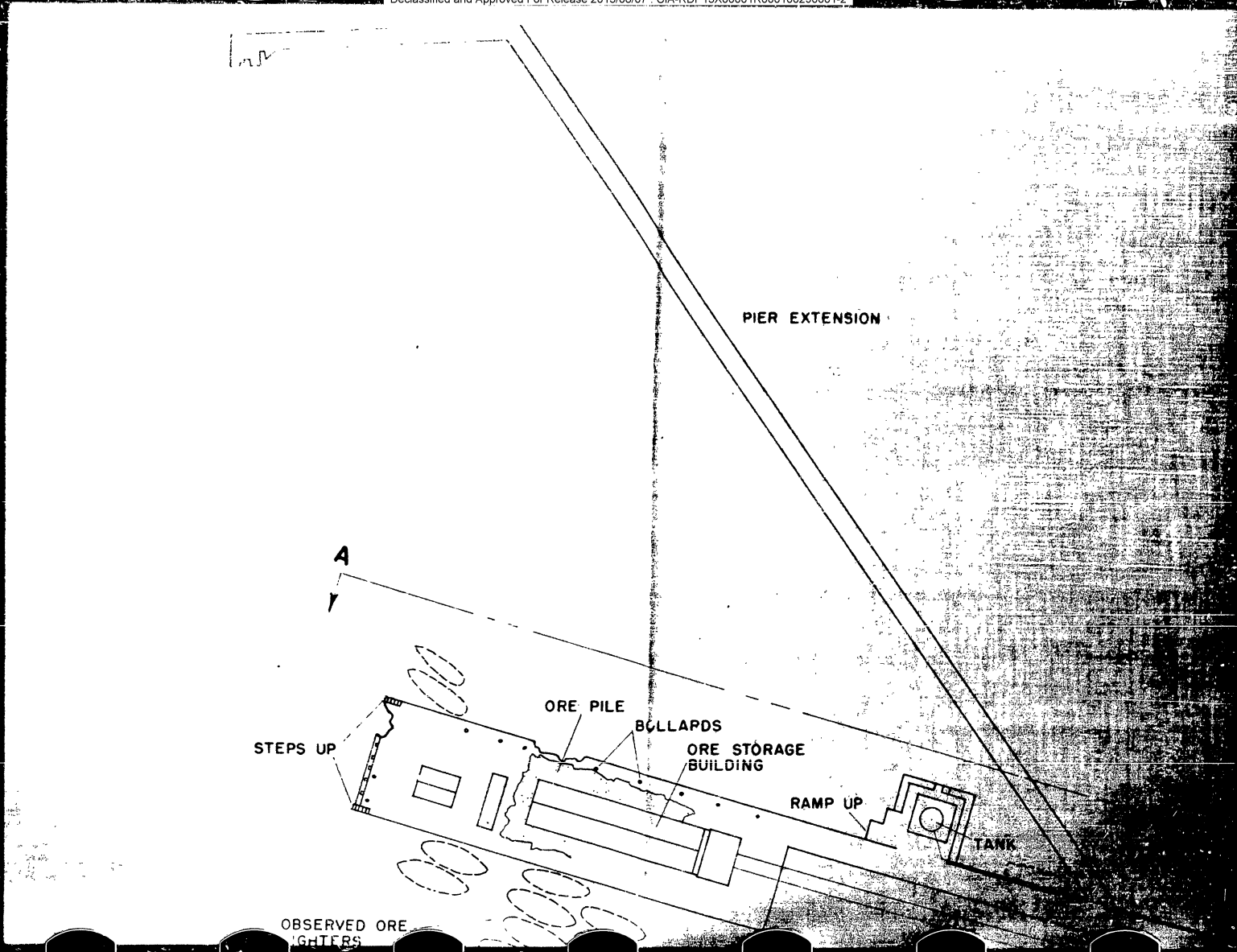
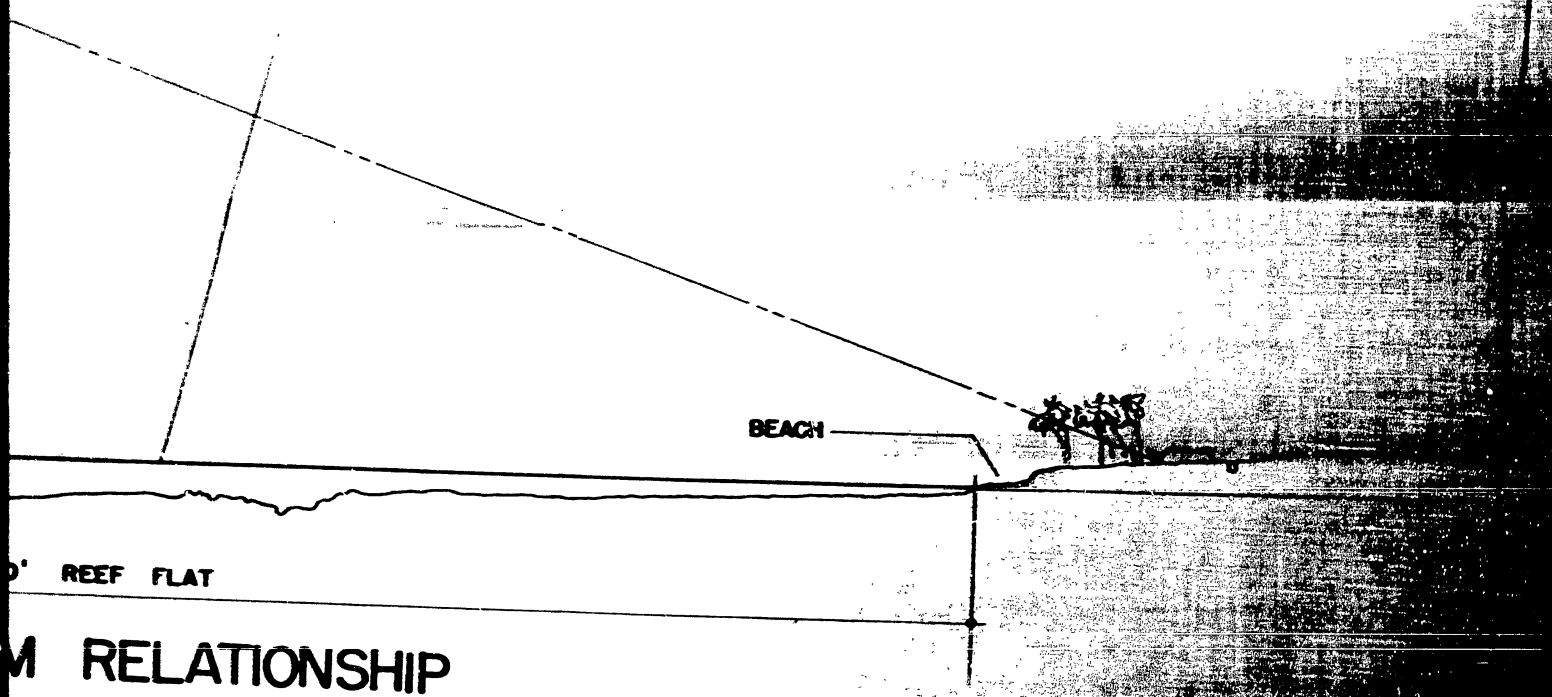




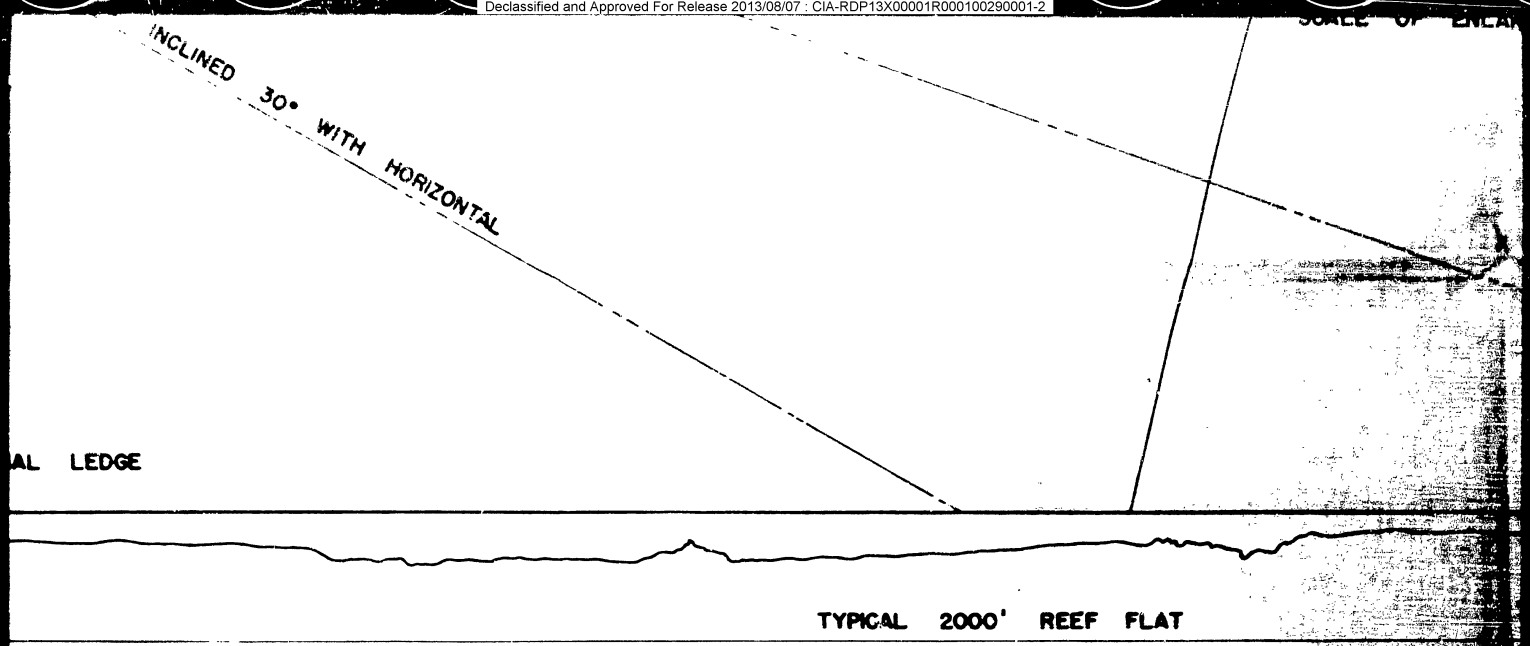


VERTICAL PHOTOGRAPH TAKEN WITH 24" FOCAL LENGTH 9" x 18" CAMERA - FROM 20,000' ALTITUDE - SELECTED AREA OF VERTICAL PHOTO ENLARGED 10 TIMES - MAKING SCALE OF ENLARGEMENT 1/1000.

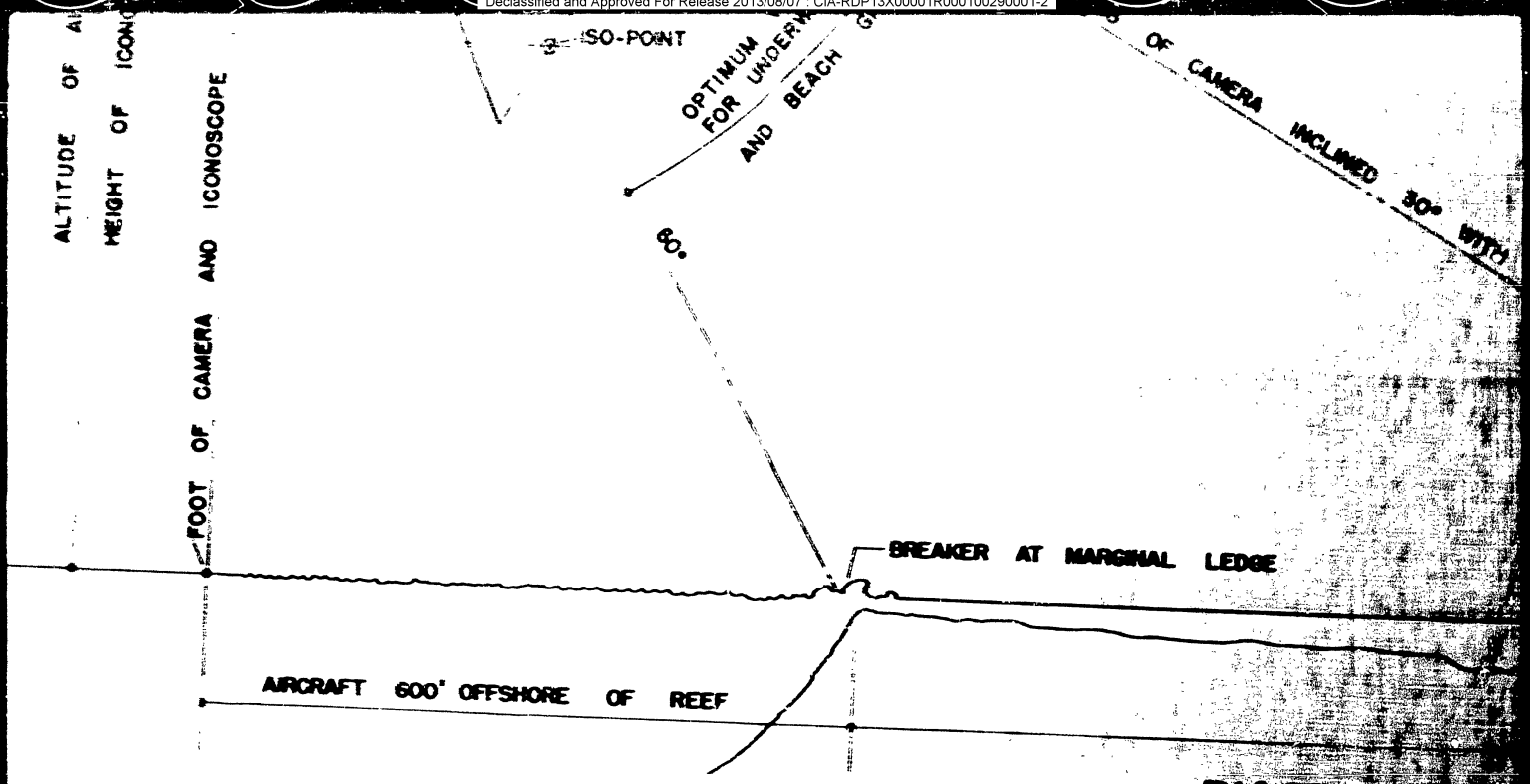


M RELATIONSHIP
CAMERA - AND
TERMINATION OF
CH GRADIENTS.

RECOMMENDED PHOTOGRAPHY FOR
UNDERWATER DEPTH DETERMINATION
BY OFFICE OF [illegible]
WASHINGTON, D.C.



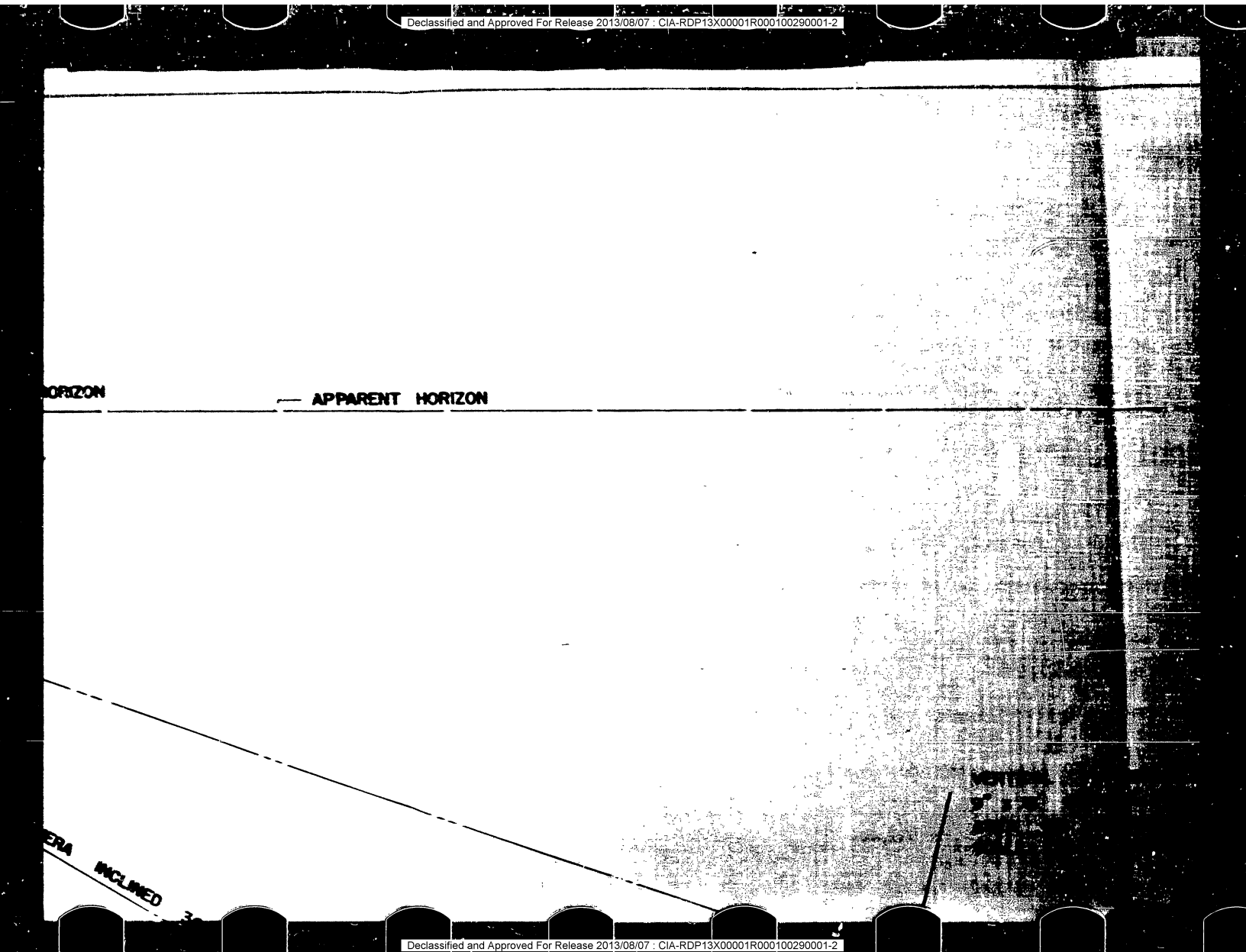
DIAGRAMMATIC LAYOUT OF OPTIMUM RELATIONSHIP OF AIRCRAFT POSITION - TYPE OF CAMERA - AND SET-UP OF ICONOSCOPE FOR DETERMINATION OF UNDERWATER DEPTHS AND BEACH GRADIENTS



DIAGRA
OF AIR
SET-UP
UNDER

CONFIDENTIAL

VERTICAL PHOTOGRAPH TAKEN WITH 24" FOCAL LENGTH 9" x 18" CAMERA - FROM 20,000' ALTITUDE - SELECTED AREA OF VERTICAL PHOTO ENLARGED 10 TIMES - MAKING SCALE OF ENLARGEMENT 1/1000.



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OFFICE OF STRATEGIC SERVICES
CENTRAL PACIFIC AREA

HONOLULU, T. H.

16 May 1944.

FROM: Lt. N. W. Juran, USNR
Iconography Section, Field Photographic Branch
Office of Strategic Services, Washington, D. C.

TO: R. D. Halliwell, Comdr., USNR
Office of Strategic Services
Central Pacific Area
Honolulu, T. H.

SECRET

SUBJECT: BABELTHAUP ISLAND
PALAU GROUP

PLANS & ELEVATION OF BAUXITE PIER
(from single oblique photograph)

ENCLOSURES: (A) Oblique photograph, exposure 14 sortie Mat 6.
(B) Plan of Bauxite Pier, Babelthaup Island.

1. The height and true plan of the subject pier was requested by Photographic Reconnaissance and Interpretation Section Intelligence Center (PRISIC). Only oblique photo coverage was available.

2. Oblique photo, enclosure (A), was traced on an acetate sheet and placed in the Iconoscope. This tracing was then projected on to the drawing board, and an accurate rectified plan produced. (The Iconoscope was oriented using "lines of position").

3. A number of scale estimates were made, and the average estimated scale was applied to measure the height of the pier.

4. Time required for entire solution - 1 man, 3 hours.

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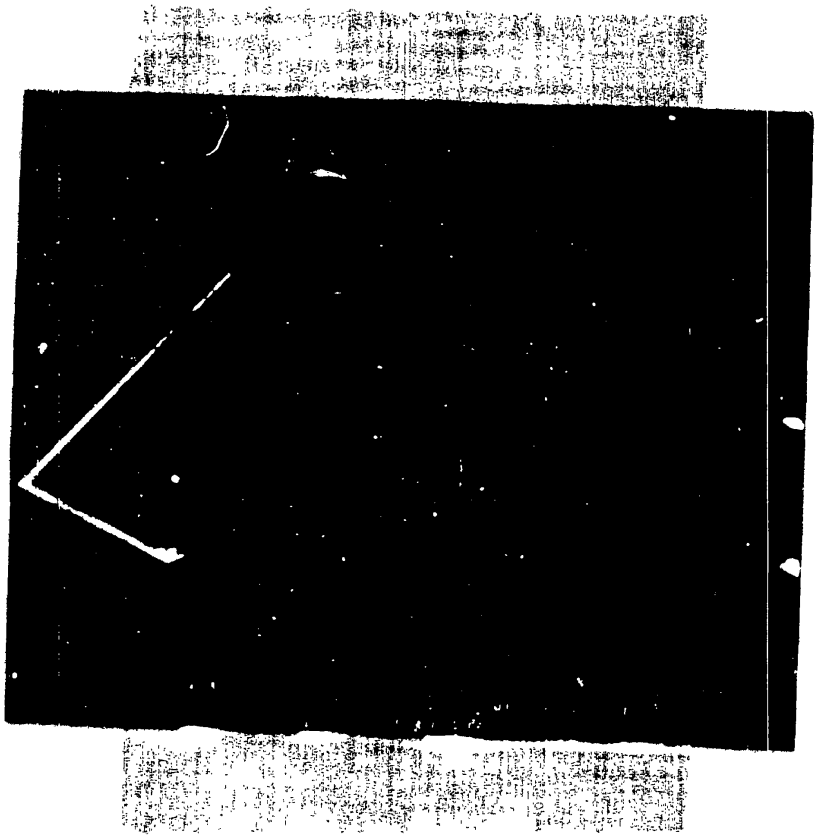


[illegible] 2
(Continued)

Point No.	Protractor Reading	Refraction Factor	F.E. Distance 1/1000 Sq.	Depth 1/1000 Sq.	(Feet) Actual Depth
50	25°	1.074	.012	.013	22.3
51	25°	1.074	.01	.0107	18.4
52	25°	1.074	.0085	.009	15.5
53	25°	1.074	.01	.0107	18.4
54	25°	1.074	.012	.013	22.3
55	26°	1.0907	.01	.0109	18.7
57	26°	1.0907	.008	.009	15.5
58	25°	1.074	.01	.0109	18.7
59	25°	1.074	.009	.0097	16.7
60	26°	1.0907	.0085	.009	15.5
61	25°	1.074	.0085	.009	15.5
62	25°	1.074	.01	.0107	18.4
63	25°	1.074	.008	.009	15.5
64	25°	1.074	.009	.01	17.1
65	25°	1.074	.008	.0085	14.6
66	25°	1.074	.01	.0107	18.4
67	25°	1.074	.01	.0107	18.4
71	24°	1.0881	.013	.014	24.0
72	23°	1.0431	.01	.0104	18.0
73	23°	1.0431	.0035	.0037	6.4
74	22°	1.0283	.0035	.0036	6.2
75	22°	1.0283	.007	.0072	12.4
76	22°	1.0283	.0095	.01	17.2
77	22°	1.0283	.008	.008	13.8
78	22°	1.0283	.007	.0072	12.4
79	22°	1.0283	.0095	.01	17.2
80	21°	1.0146	.0075	.008	13.8
81	23°	1.0431	.01	.0104	17.9
82	21°	1.0146	.0035	.0036	6.2
83	21°	1.0146	.005	.005	8.6
85	21°	1.0146	.011	.011	18.9
86	21°	1.0146	.013	.013	22.3
87	22°	1.0283	.015	.015	25.8

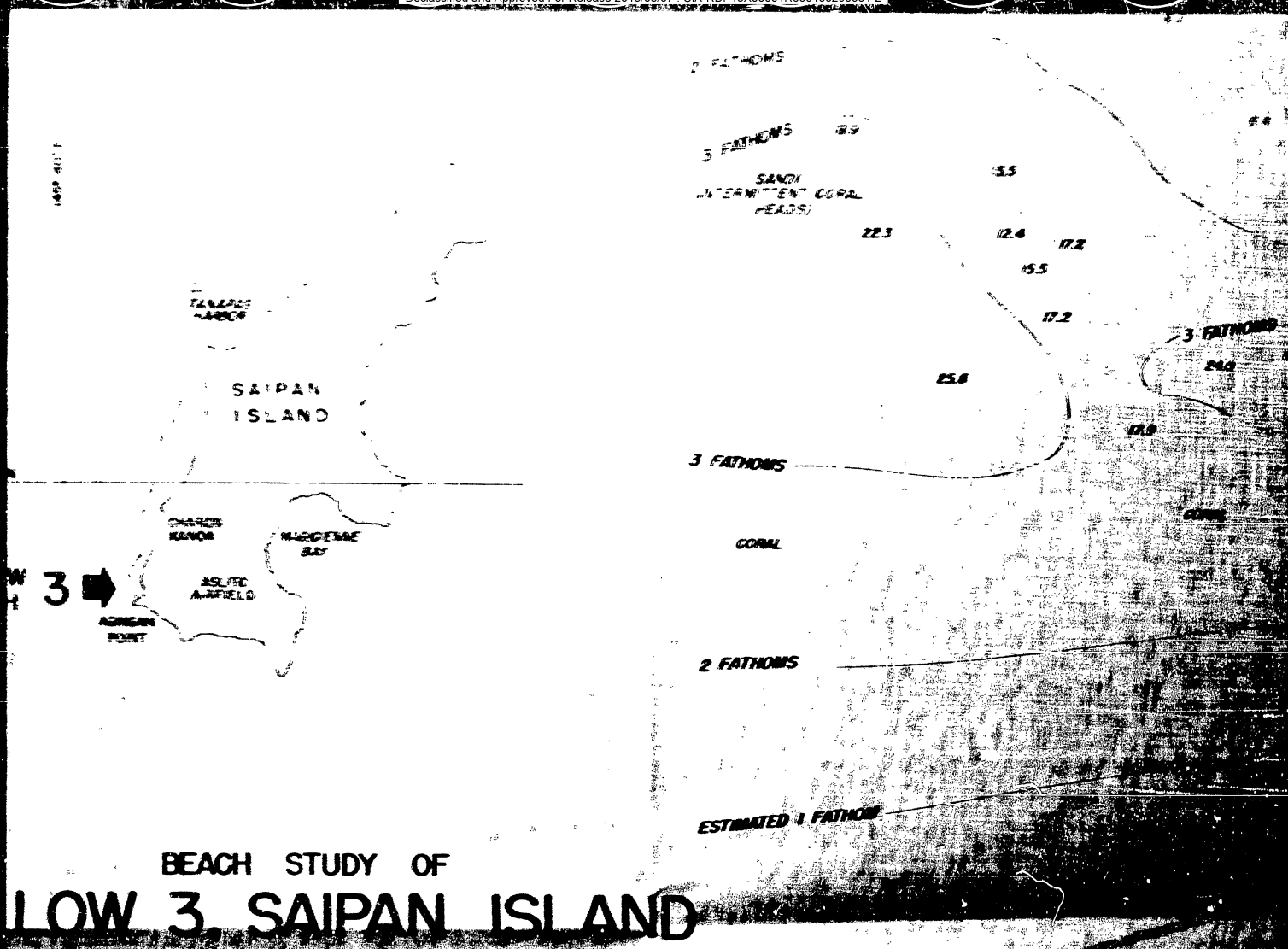
[redacted]

DEPTH DETERMINATIONS

[redacted]

Scale: 1/1717

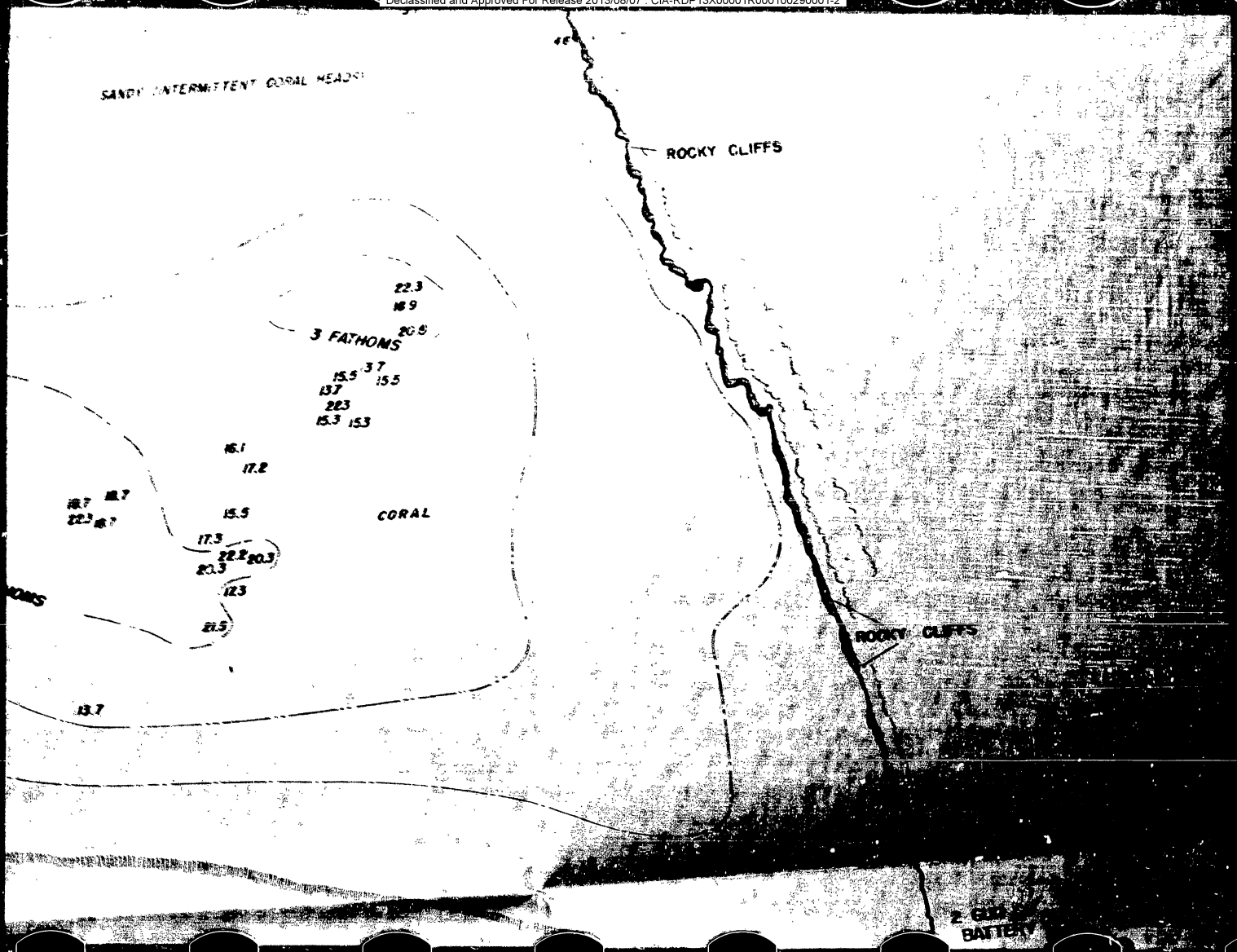
Point No.	Protractor Reading	Refraction Factor	F.E. Distance 1/1000 Ft.	Depth 1/1000 Ft.	(Feet) Actual Depth
6	27°	1.108	.0088	.0094	16.1
7	27°	1.108	.009	.01	17.2
8	29°	1.1264	.008	.009	15.4
9	29°	1.1264	.0105	.0118	20.3
10	29°	1.1264	.0115	.0129	22.2
11	28°	1.1264	.009	.0101	17.3
12	29°	1.1264	.0105	.0118	20.3
13	28°	1.1264	.009	.0101	17.3
14	29°	1.1264	.01	.01264	21.8
15	26°	1.0907	.01	.0109	18.7
16	26°	1.0907	.01	.0109	18.7
17	26°	1.0907	.012	.013	22.0
18	26°	1.0907	.01	.0109	18.7
19	23°	1.0431	.0025	.0026	4.5
21	23°	1.0431	.0005	.0005	.9
22	23°	1.0431	.001	.001	1.7
23	23°	1.0431	.00	.00	0.0
24	23°	1.0431	.001	.001	1.7
25	23°	1.0431	.0005	.0005	.9
26	23°	1.0431	.00075	.00075	1.3
29	24°	1.0581	.0007	.00074	1.3
30	24°	1.0581	.00	.00	0.0
31	24°	1.0581	.00	.00	0.0
32	24°	1.0581	.00	.00	0.0
33	25°	1.074	.0017	.0018	3.1
34	25°	1.074	.0025	.0027	4.6
35	27°	1.108	.008	.0089	15.3
36	27°	1.108	.008	.0089	15.3
37	27°	1.108	.012	.013	22.3
38	27°	1.108	.0073	.008	13.7
39	27°	1.108	.008	.009	15.5
40	27°	1.108	.007	.008	13.7
41	27°	1.108	.008	.009	15.5
42	27°	1.108	.011	.012	20.6
43	27°	1.108	.01	.011	18.9
44	27°	1.108	.012	.013	22.3
45	27°	1.1264	.0046	.005	8.6
49	28°	1.1264	.007	.008	13.7

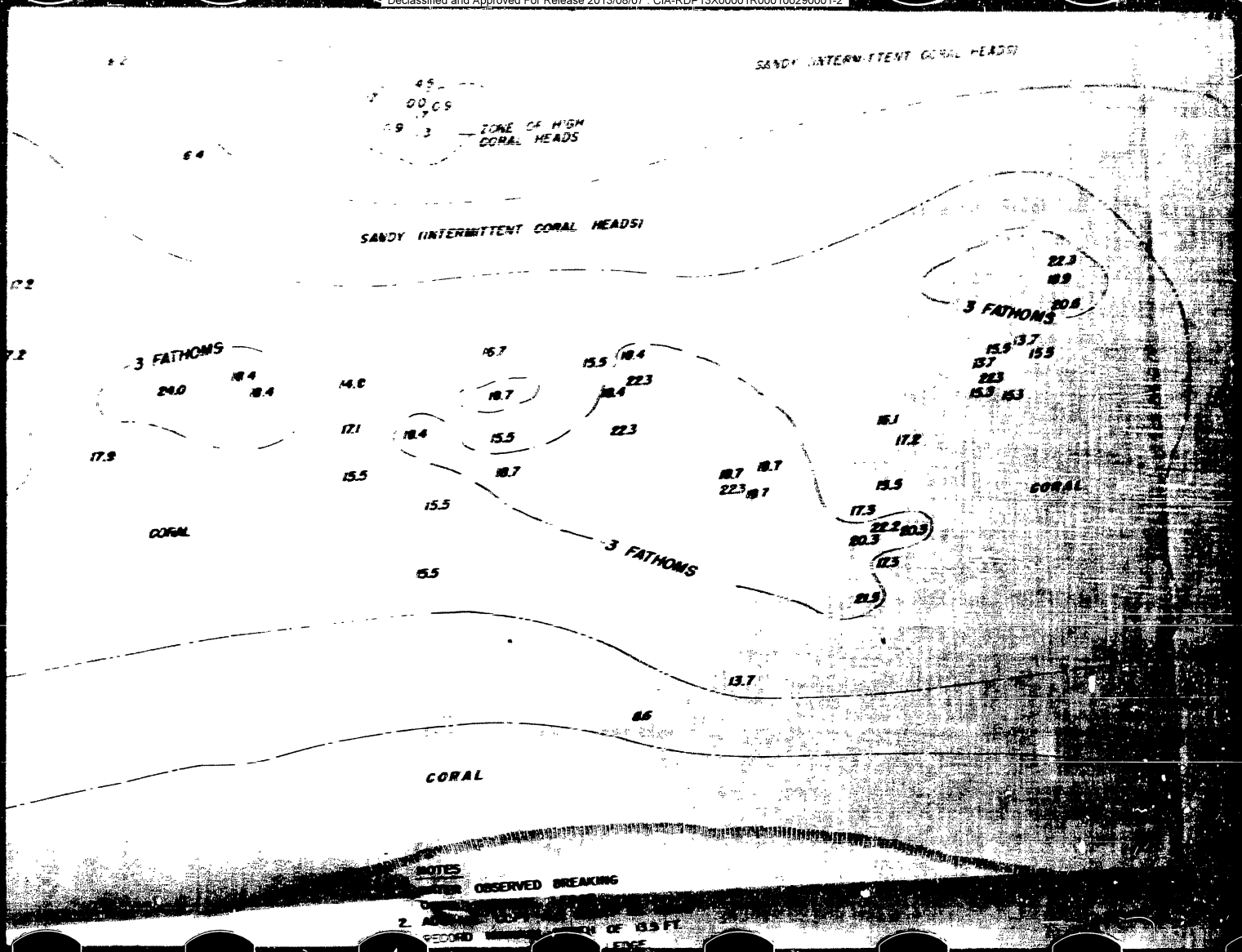


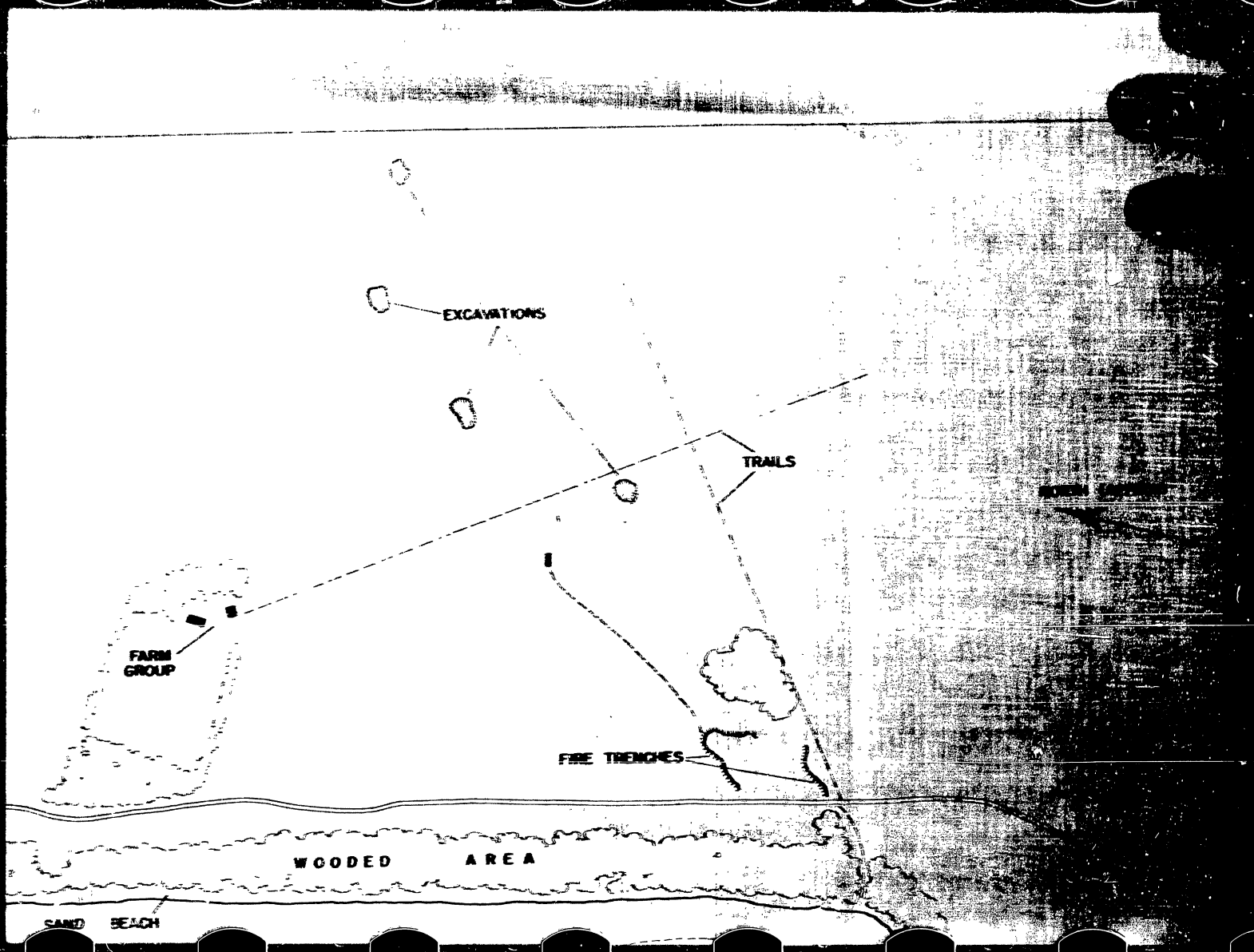
BEACH STUDY OF

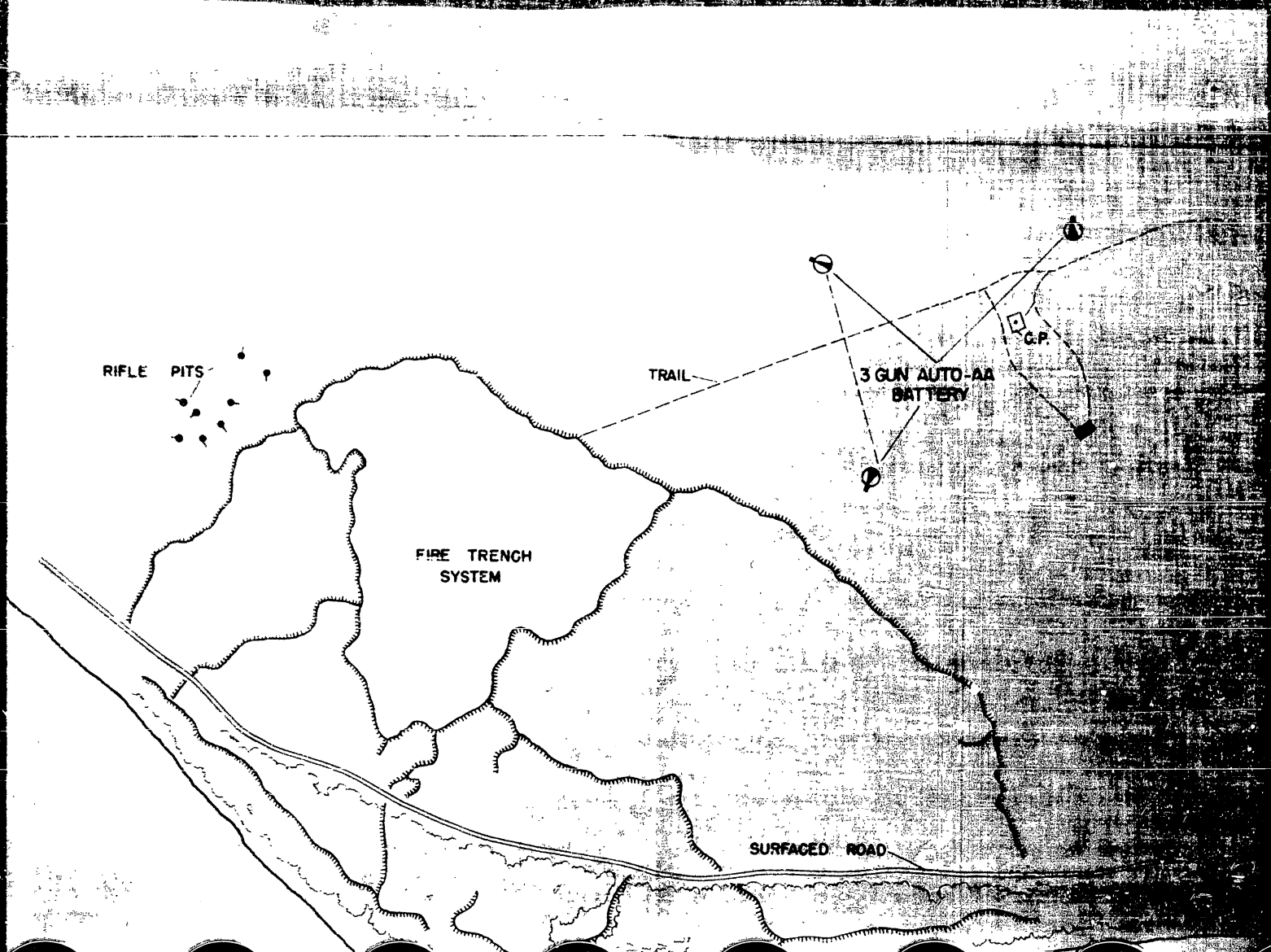
LOW 3, SAIPAN ISLAND

MARIANAS ISLANDS









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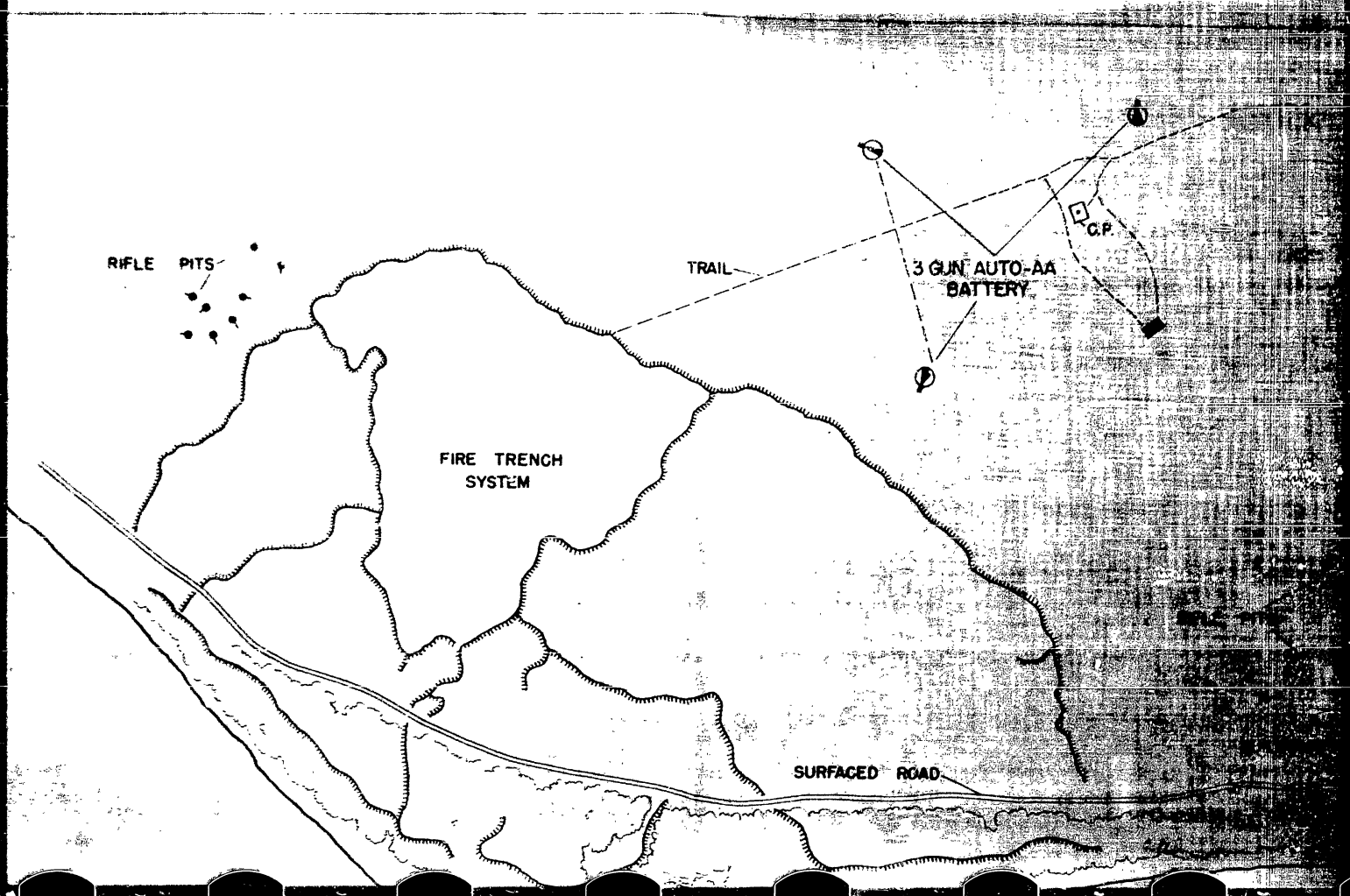
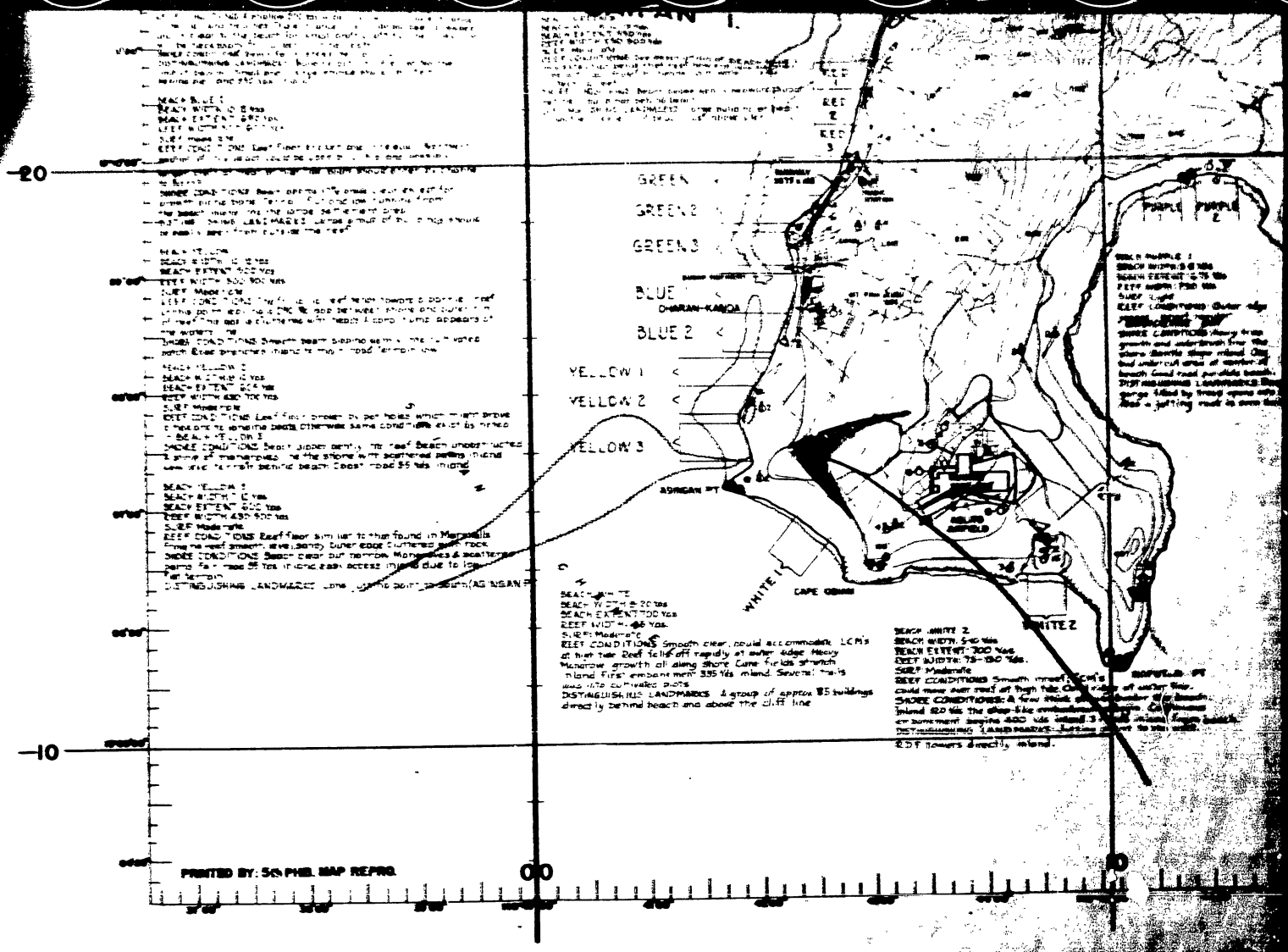
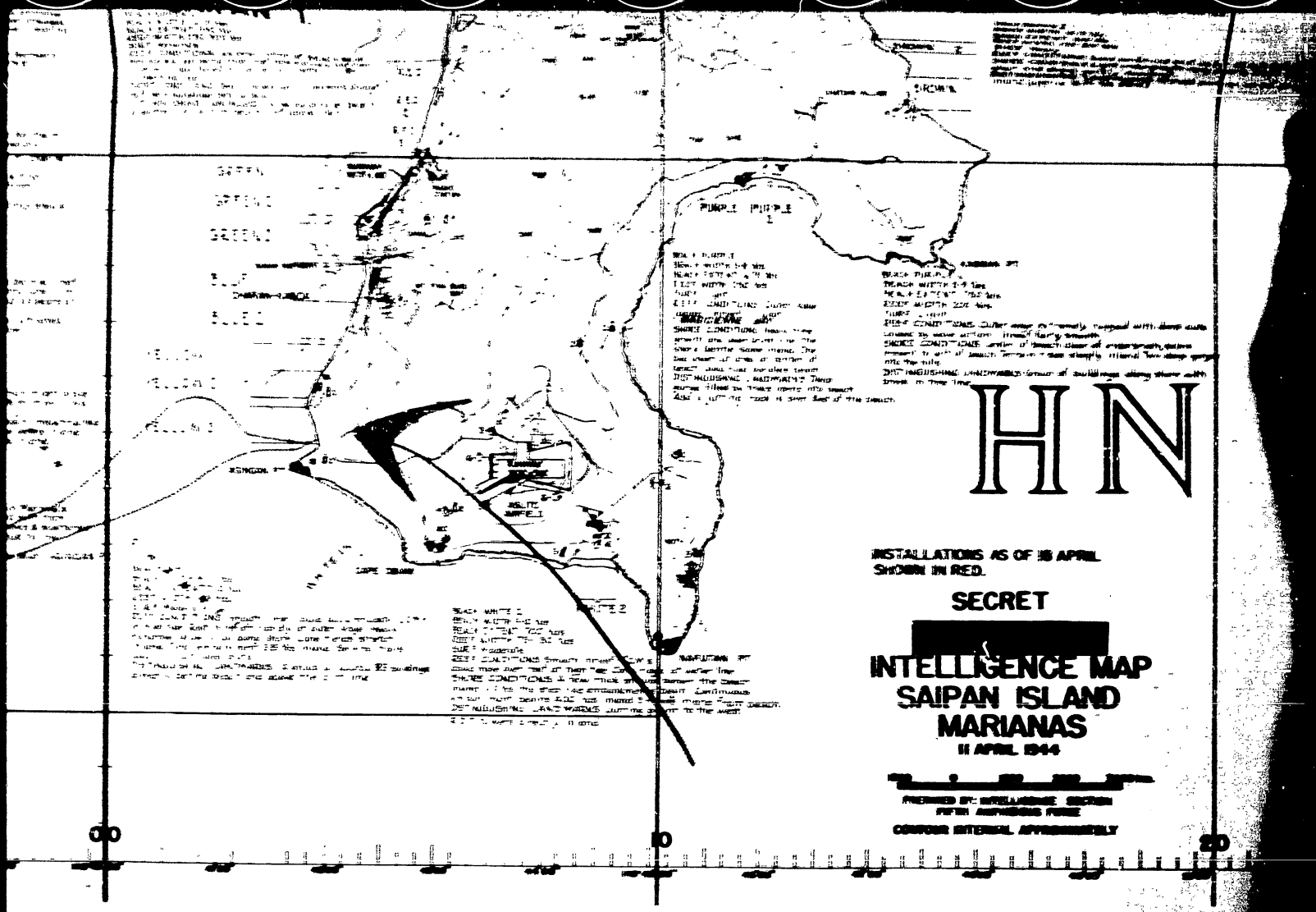






LEGEND

- COSTAL DEFENSE GUN
- SINGLE MOUNT DUAL PURPOSE GUN
- TWIN MOUNT DUAL PURPOSE GUN
- TWIN MOUNT DUAL PURPOSE GUN POSITION
- HEAVY AA
- HEAVY AA POSITION (EMPTY)
- MEDIUM AA (AUTO A.A.)
- MACHINE GUN
- RIFLE PITS OR FOXHOLE
- COMMAND POST — COV'D ARTILLY
- RANGE FINDER — PILL BOX
- RADAR — BLOCKHOUSE
- SEARCHLIGHT
- RADIO TOWER
- OBSERVATION TOWER
- MAST OR TOWER
- BUNKER
- REVETTER BUILDING
- TENT
- AIR RAID SHELTER
- EARTH COVERED STRUCTURE
- TANK
- WATER STORAGE
- REVETMENT
- EXCAVATION
- TRENCH
- EMBANKMENT
- MAIN ROAD
- SECONDARY ROAD
- TRAIL
- RAILROAD
- TRANSMISSION LINE
- TELEPHONE LINE
- DRAINAGE DITCH
- LOOSE STONES
- INDICATES DAMAGED INSTALLATION
- UNIDENTIFIED INSTALLATION
- POSSIBLE INSTALLATION
- SWAMP

BEACH BLUE 1

BEACH BLUE 2

BEACH GREEN 2

BEACH GREEN 3

BEACH BLACK 1 & 2

BEACH RED 1

BEACH RED 2

BEACH RED 3

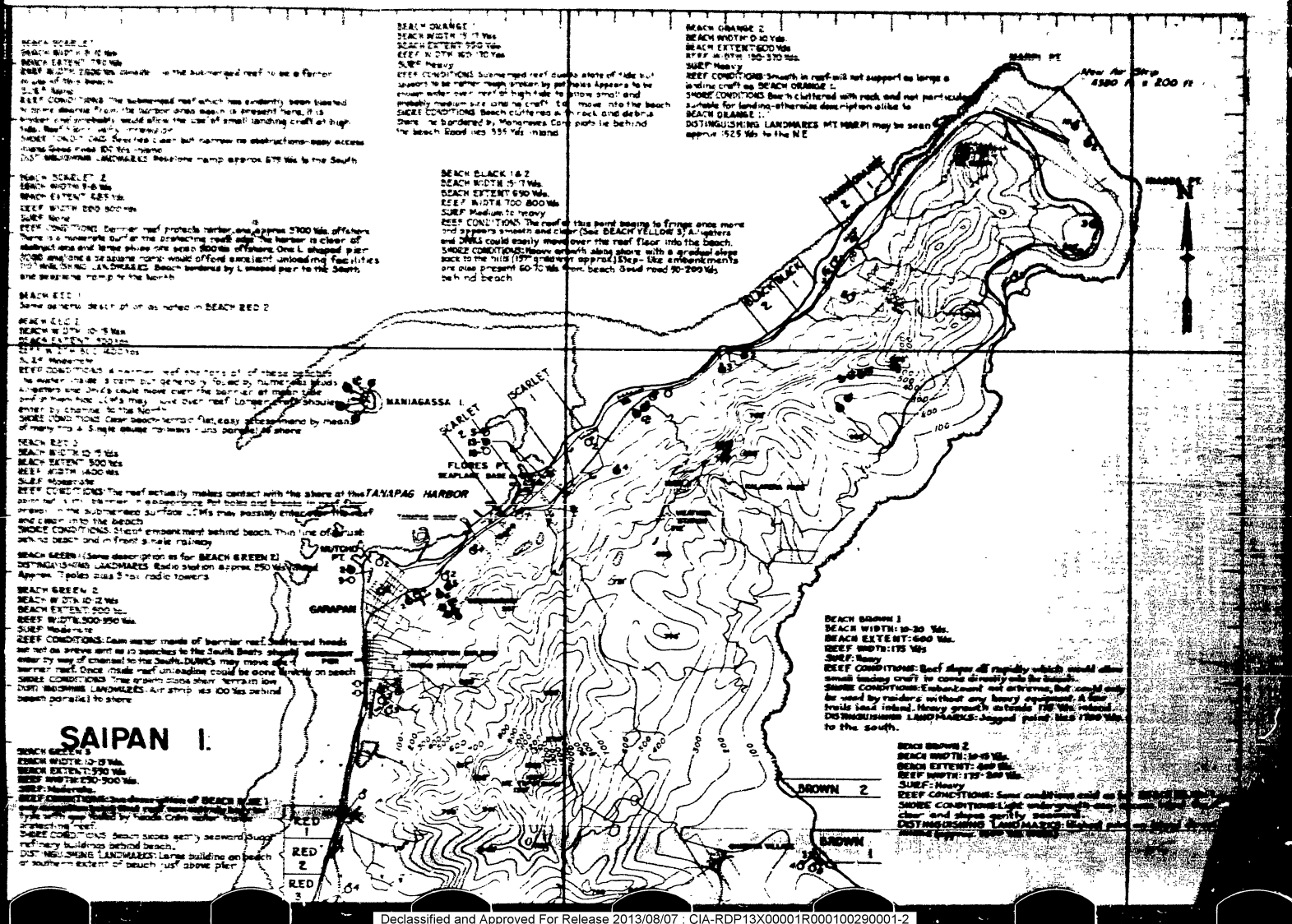
SAIPAN I.

RED 1

RED 2

RED 3

GREEN 1



(g) All under-water points were then projected through the Iconoscope and their positions on the vertical enlargements marked.

(h) From the center of the vertical photograph, radial lines were drawn through each of the selected points on the vertical enlargement.

(i) From the plumb-point of the Iconoscope, radial lines were drawn through each of the projected points on the vertical enlargement.

(j) The intersection of each pair of radial lines was noted, and the distance from each intersection point to its corresponding projected point was measured (FE value).

(k) A chart was prepared (encl.(D)), and the FE value of each point recorded.

(l) By means of a protractor, placed at each projected point, the angle of each sight line from the Iconoscope to the projected point was read. (Protractor reading.) Each of these readings was recorded on the chart.

(m) From page 18 of the Office of Strategic Services' booklet on Underwater Depth Determination, the refraction factor for each point was noted on the chart in accordance with its corresponding protractor reading.

(n) The FE value of each point was multiplied by its corresponding refraction factor, giving the depth of the water in thousandths of a foot. These values were marked on the chart.

(o) The depth of the water in thousandths of a foot was then multiplied by the scale of the enlargement, 1/1717, giving the actual under-water depth of each point in feet. (See encl.(D).)

CONCLUSIONS AND RECOMMENDATIONS

For best results of under-water depth determination and beach gradient of many beaches, particularly where no ground control is available, the following recommendation is offered:

VERTICAL PHOTOGRAPHY should be simultaneous with the oblique photography (within one half hour), using a 24" focal length, 9" x 18", camera at 30,000' altitude. The vertical photos, particularly in the absence of ground control, should be flown very true, with a minimum of tilt, and should be flown directly over the reef area.

OBLIQUE PHOTOGRAPHY should be simultaneous with the vertical photography (within one half hour), using a 6" focal length, 9" x 9" (Trimetrogon), camera at 1000' altitude. The angle of depression of the oblique camera with the horizontal should be 30°. This will insure the inclusion of the horizon on the photograph which will be an aid in orientation of the oblique whenever sufficient orientation control is not available in the photo itself. The oblique flight should be made 600' offshore of the breakers at the marginal ledge of the reef. This will insure the reef area and the beach area being on the oblique photo. An Aero 8 haze filter should be used on the oblique camera to give a sharper definition to the horizon line. Further recommendations will be made for experimental flights in an effort to produce obliques which will produce the most accurate results in computing under-water depths.

See enclosure (E) for sketch of photographic scheme.

4. **RESULTS** were obtained on Yellow 8 Beach at Agingan Point, Saipan. While not optimum, the photos of this beach were sufficient for providing orientation and the required under-water detail. Under-water depths determined in this beach area are listed on the enclosed Table of Under-water Depths (encl.(D)). These depths have been charted on the enclosed chart, (encl.(C)).

5. **TIME REQUIRED** for completing an average landing beach study is estimated at one day for two men.

6. **ACCURACY** of results depends on factors found in the photos themselves. Results on Yellow 8 Beach of Saipan are within 1.7' of the true depths. With optimum photographic coverage, readings within 1' of the true depths can be provided.

7. **PROCEDURE** for determining under-water depths by Iconography is described in the Office of Strategic Services' booklets on "Iconography" and Underwater Depth Determination". An outline of the procedure followed in this problem is described.

(a) A pair of oblique and vertical photos was selected (See enclosures (A) and (B)).

(b) Orientation points along the beach at the water's level were selected and identified on both photos.

(c) An area was marked off on the vertical photo containing these orientation points, the principal point of the vertical photo, and all of the under-water portion of which the depths were required. This area was then enlarged photographically so that the scale of the enlargement became 1/1717. The enlargement was mounted on a 5'x8' table.

(d) The oblique photo (24" focal length) was reduced to exactly half size so that a 12" focal length Iconoscope could be used. This reduced print was taped to a drawing board and a thin stiff sheet of acetate taped over it. The selected orientation points were then pricked on the acetate and the collimation lines scratched on the acetate. All under-water points recognizable as being common to both the vertical and oblique photo were then pricked both on the acetate sheet and on the vertical enlargement. Corresponding points were designated with corresponding numbers.

(e) The pin pricks in the acetate were filled with black ink so that the acetate sheet showed very tiny black specks with the corresponding number at each speck for identification. The corresponding points on the vertical enlargement were also numbered with the corresponding numbers. The acetate sheet was then mounted into the face of the Iconoscope so that the collimation scratches lined up with the marked centers of the sides of the Iconoscope.

(f) The Iconoscope was then oriented to the vertical enlargement by making the orientation points of the acetate sheet coincide with the corresponding points on the vertical enlargement when viewed through the Iconoscope.
Settings of the Iconoscope were noted as:
Vertical post reading = 18.78"
Tip = 0-00' - 00"
Tilt = 20 - 00' - 50"

11,946.D

Transmitted

OFFICE OF STRATEGIC SERVICES

CENTRAL PACIFIC AREA

HONOLULU T. H.

16 May 1944

FROM: Lt. N. H. Juran, USNR
Iconography Section, Field Photographic Branch
Office of Strategic Services, Washington, D. C.

TO : R. Davis Halliwell, Commander, USNR
Office of Strategic Services
Central Pacific Area
Honolulu, T. H.

SECRET

SUBJECT: S A I P A N I S L A N D

UNDER WATER DEPTH DETERMINATION
OF DESIGNATED LANDING BEACHES

ENCLOSURES: (A) OBLIQUE PHOTO. AREA YELLOW 3
(B) VERTICAL PHOTO. AREA YELLOW 3
(C) CHART OF UNDERWATER DEPTHS. AREA YELLOW 3
(D) TABLE OF UNDERWATER WATER DEPTHS. AREA YELLOW 3
(E) DIAGRAM FOR RECOMMENDED PHOTOGRAPHY. AREA YELLOW 3

1. THIS REPORT is on the solution of an under-water depth determination problem posed to the Office of Strategic Services by Brigadier General Joseph Twitty of the Joint Intelligence Center, Pacific Ocean Area. Under-water depths were requested of twenty designated landing beaches on Saipan Island.

2. PHOTOGRAPHIC COVERAGE supplied showed a number of usable pairs of vertical and oblique photographs, only one pair of which was on a designated landing beach area. (YELLOW #3 BEACH.)

Other photographic coverage on designated beach areas was either lacking in sufficient orientation information, or, as in some cases, critical areas were cloud covered.

An attempt was made to determine the under-water depths of Blue 1 Beach, but lack of orientation data in the oblique photo made it impossible to get accurate readings.

3. PHOTOGRAPHS USED in the study of Yellow 3 Beach were oblique photo 21 York 9C 23 February 1944 0820 GCT 24°20'00' Saipan (conf) Prisic. (See encl. (A)) and vertical Photo 43 (P43B-VD-3) Saipan 18 April 1944 24°20'00' 0043 GCT Rest. (See encl. (B)).

The oblique photo was taken approximately 8000' from shore. This is somewhat too distant for best results. (See recommendations at end of report.) The vertical and oblique photos were not simultaneous (as recommended) but were taken two months apart. This condition made it difficult to identify as many points common to both photos as would be desireable.

Subject: ICONOGRAPHY - Its application to specific problems, etc.

5. It is desired to make acknowledgment of the cooperative efforts of Major Levitt, DUAN FRISIC, and the officers whom he detailed to work with Lt. Juran.

6. Please advise me of your further desires in respect to the application of Iconography in this area.

R. Davis Halliwell

Enclosures: Original and one copy of this ltr
Original Iconography Report 18 May 1944
Original Iconography Report 15 May 1944

Copies to: Director, OSS Washington
Field Photographic Branch OSS Washington
L. A. Pope, Capt. USN, Chief Photographer BuAir
File 8 File 9

(Revised Copy)

OFFICE OF STRATEGIC SERVICES
HONOLULU, T. H.

SECRET

30 May 1945

R. Irvin Hallinell, Comdr. USNR.
Office of Strategic Services
Central Pacific Area

[illegible] H. Will, Capt. USN. OINCPOA

[illegible] information and forwarding to General Joseph J. Twitty, PIA, [illegible]

[illegible] - Its application to specific problems designated by [illegible] (JICPOA) and the solution of these problems from [illegible] photographs as were available at PRISCA.

[illegible] May at their suggestion the writer and Lt. W. H. Juran, [illegible] of the Field Photographic Branch of OSS called on [illegible] and offered to be of assistance in working his organization [illegible] the results which could be derived from the many and various [illegible] of Iconography to the problems of underwater depth determination [illegible] of accurate charts, maps, photographic reconnaissance, etc., [illegible] described in the four booklets on this subject issued recently [illegible] vessels and agencies.

[illegible] Twitty in the short conversation stated that while the [illegible] Iconography and the techniques already proven in the field might [illegible], his immediate interest was in having Lt. Juran attempt [illegible] depth determinations on proposed landing beaches on the [illegible]. He [illegible] that aerial photographs of these beaches were [illegible] and requested that Lt. Juran see what could be done. He [illegible] that there were only ten days available before the results

The results of this study are attached herewith - photographs [illegible] purpose would have, of course, permitted complete

[illegible] as is requested in the recommendations in Lt. Juran's [illegible] that the adoption of these recommendations will lead [illegible] that they may prove substantially feasible and pro[illegible] have been made standard photographic procedure.

SECRET

JOINT INTELLIGENCE
CENTER, PACIFIC-POLAR AREAS

19 June 1944

From: Officer-in-Charge
To: [illegible], Comdr., FEAF - GHQ.

1. Permission is granted on this Mem to forward report of Intelligence dated 16 May 1944, to Washington, D. C.

Jos. J. Tilty
Brig. Gen., G.S.C.

SECRET

4. In addition to your copy, an additional one is provided for the Field Photographic Branch and it is requested that Capt. L. A. Pope, USN, Chief Photographer BuAir, receive a copy in order that he may be aware that this system is being used in this area and was used in the current operation.

5. Probably a copy should be shown to Dr. Stanley Lovell as we are advised in your cable No. 184 that the NDRC & OSRD relationship will be carried out by him.

6. Further reports will follow after the receipt of the Iconoscopes, ordered by Capt. Hill about 25 May, about which we have cabled Mr. Kellogg today.

RET

OFFICE OF STRATEGIC SERVICES
HONOLULU 1, T. H.

SECRET

INTEROFFICE MEMO

TO: The Director, OSS Washington DATE: 22 June 1944

FROM: W. Dwyth Hallowell, Comdr., USNR

SUBJECT: ICONOGRAPHY

Enclosures: 3 Copies Report of the writer to Capt. Hill, USN - CINCPOA, for transmission to General Twitty, USA - JICPOA, 16 May 1944

Each containing covering letter
Mr. Juran's report to RDH, 16 May 44
PRISIC Photos - York 9C
VDS-P45B
PRISIC Chart O-40517-1
Diagram - recommended photography technique
Mr. Juran's report to RDH, 15 May 44
PRISIC Photo 699-56
PRISIC Chart O-40516-1

- - - - - - - - - - - -

RDH's memo to General Twitty, 19 June 44
Reply from above, 19 June 44

- - - - - - - - - - - -

1. Under date of 17 June, addressed to Mr. Putzell, we forwarded an interim report on the subject of ICONOGRAPHY and Mr. Juran's activities. We also reported on the status of this matter with General Richardson and his staff.

2. As will be observed from our report to you under date of 2 June 44, we were unable to secure permission to release the original Iconography report to Capt. Hill and General Twitty due to its TOP SECRET nature.

3. However, the SAIPAN operation now being conducted has permitted the reclassification of this material which is now being forwarded.

SECRET

OFFICE OF STRATEGIC SERVICES

HONOLULU T. H.

SECRET

INTEROFFICE MEMO

TO: The Director, OSS, Washington

DATE: 25 June 1944

FROM: Lt. Levin Halliwell, Comdr., USNR

SUBJECT: Iconography — Saipan

Enclosure: 5th Amphibious Force
Intelligence Map, HM
11 April 44

1. The attached chart will show you the area covered by the underwater depth determination made by Mr. Juron in his report, 16 May 44, enclosed in this pouch.

2. "Yellow 5", as indicated, is the position. It is understood this was the area of the first group of major landings.

SECRET

To

The general would like an approximation made of this material by someone who knows the subject.

B.E.Z.

Director's Office

(3308)

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JOINT INTELLIGENCE CENTER
Pacific Ocean Areas
Headquarters, Navy 128
c/o Fleet Post Office
San Francisco, Calif.

JJTieb

11 June 1944.

To : R. Davis Halliwell, Commander, USNR
Office of Strategic Services, OPA

From: Officer-in-Charge, Joint Intelligence Center
Pacific Ocean Areas

Subj: Iconography and Correlative Developments

1. Reference is made to your interoffice memorandum, dated 31 May 1944, addressed to Captain Hill.

2. It is suggested that Lt. Juran remain in Honolulu until the two iconoscopes ordered from Washington have been delivered and personnel from JIOPOA have been instructed in their use.

3. Your cooperation in this matter will be appreciated.

(Signed)
JOS. J. TWITTY,
Brig Gen, GHQ.

OFFICE OF STRATEGIC SERVICES

HONOLULU 1, T. H.

INTEROFFICE MEMO

TO: E. J. Putzell, Jr. Lt. (j.g.) USNR

FROM: L. Davis Rathbun Capt. USMC

SUBJECT: Dispatch 101, 10 June 1944
[illegible] -- Juran

CONFIDENTIAL

1. Thank you for the above dispatch. The services of Mr. Juran have repeatedly been offered to General Richardson's staff, both orally and in writing, ever since Juran has been here but thus far about the best that could be accomplished is the distribution, thru the General's staff, of the [illegible] which were requested in our letter of May 4th to Field Photographic [illegible] (Incidentally I requested twenty copies of each and only five [illegible] -- [illegible] put a bloodhound on the trail of the missing fifteen.

2. Juran is now running a class in Iconography for about [illegible] officers of the JICPOA - Pacific staff as a result of General Twitty's letter of 11 June 1944, a copy of which is attached in order that the record be complete. You will observe that this reply supplements my letter to [illegible] of 2 June 1944 and also that to Capt. Hill of 31 May 1944.

3. It is hoped that the Army will feel free to use Mr. Juran when [illegible] completed his work with JICPOA, but it must be remembered that the situation here is rather delicate and Mr. Juran's orders read for duty to [illegible] 14th Naval District and I rather suspect that in spite of the "Office of Strategic Services" notation on these orders it is considered [illegible] to stir up the waters.

4. This memo is being sent in duplicate in the event you care to pass a copy on to Iconography section of Field Photographic. Please [illegible] Rathbun's seeing a copy.

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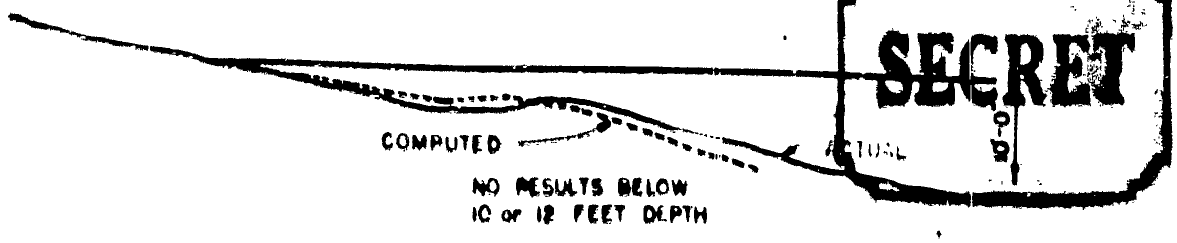
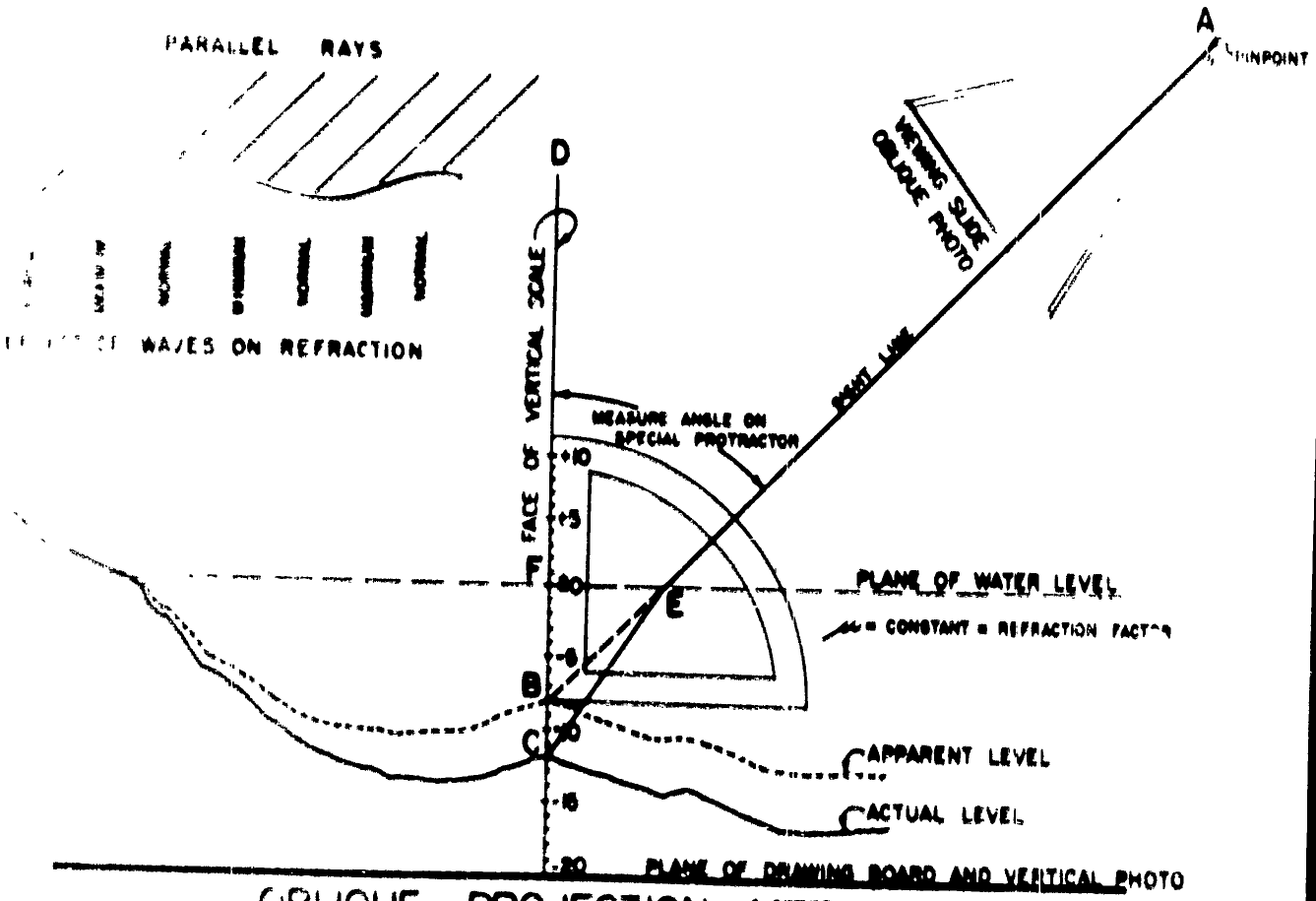


WAVE INTERVAL METHOD



OBLIQUE PROJECTION METHOD

SIN ABD / SIN DCE = SIN ABD / SIN DCE

SOLVE FOR FE

SIN ABD / SIN DCE

SOLVE FOR ∠ DCE

AND FE KNOWN, SOLVE FOR FC

WILL BE NECESSARY AFTER CHARTS ARE PREPARED

the depth below water is required. Place the vertical scale at elevation of this point on the vertical enlargement and look through the pinhole to see where the corresponding point of the oblique photo falls upon the vertical scale. The result will be a negative reading giving the apparent depth of the point below water level.

True depth = μ visible depth.

Where μ = index of refraction.

Other required points can be solved in the same manner.

It is hoped that further research and practical applications along the lines of this report will simplify the procedure somewhat and make it practical for use in both the laboratory and in the field.

Flight tests showed that good results were obtainable in photographing underwater detail in sunshine between 1100 and 1500 hours when the sun is high. Best results are obtained when the azimuth of the sun is within the 160° arc behind the camera. A 7" focal lens camera was used in a P-38 reconnaissance ship and pictures were taken at 1/900 of a second at an air speed of 380 miles per hour at about 1[illegible]0 feet altitude above the water level.

Procedure

Select a suitable oblique and vertical photo of the beach area. Make a photographic enlargement of the vertical photo, and mount it on a drawing board. Make a diapositive of the oblique photo, and mount it in a viewing box, the length of which is equal to the focal length of the camera used to take the oblique picture. Provide a viewing pinhole in the viewing box opposite the diapositive. Select three points on the diapositive which correspond to three points identifiable on the vertical photo. These three points should lie in the same horizontal plane, and be so taken that a triangle drawn between them will contain as large an area of the oblique photo as possible. Draw a vertical line over each of the three points selected on the vertical enlargement and make a [illegible] mark on these vertical lines at 20 feet (at the scale of the vertical enlargement) above the surface of the vertical enlargement. Fix the viewing box in position over the vertical enlargement so that when viewing through the pinhole the three points on the oblique photo will be in coincidence with the corresponding three points marked on the vertical lines above the vertical enlargement. Make a vertical scale, the calibrations of which correspond to the scale OF THE VERTICAL ENLARGEMENT, WITH THE ZERO CALIBRATION BELOW THE DRAWING TABLE (at the scale of the vertical enlargement) so as to allow for negative readings below the zero mark for the underwater depths.

Select a point common to both the vertical and oblique photos of which

SECRET

From: Lt. (jg) N. M. JURAN, U.S.N.R.

To: Officer in Charge - Field Operations, N.A.P.S.W.

Subject: Reconnaissance Flights

Enclosure: Sketches of optimum types of obliques.

Col. Dunn has authorized that photos be taken for experimental use as follows:

1. Areas to be photographed:- Areas along beaches where underwater rocks and seaweed are visible. (Col. Dunn has suggested areas along the points between here and Biserte.)

2. Type of photos required:- Simultaneous (within 15 minutes of each other) vertical and oblique photos. The vertical should be made at the usual operational reconnaissance height (with a 36" lens if possible). The obliques should be made at what operational reconnaissance pilots would consider the safest height and angle which approaches the following requirements:

   (a) 6" focal length Camera to be used, with photos so close to the beach that the obliques will exclude everything except the beach and rock area.
   (b) The axis of the Camera should make an angle of about 35° with the horizontal.
   (c) The speed of the plane should be noted by the pilot at the time of the taking of the pictures, and the speed should be as fast as possible to get good photos with the least risk of danger for the pilot.

3. Coordination base:- Since the oblique and vertical photos will be used together, special care should be taken in photographing the obliques so that the shoreline of the beach will sort of zig zag across the photo in same manner as sketched on the enclosed sheet, and as discussed, so as to provide a good broad triangular "base" with which to orient the oblique to the vertical.

4. Conditions of flight:- It is hoped that this experiment may lead to new intelligence on beaches, and, therefore, the reconnaissance photos should be made under practical flying conditions which could be repeated at well defended enemy beaches.

had to the beach area at the instant the oblique photo was taken. With the two photos thus related, it is possible to measure the apparent depth of any point underwater which can be identified both on the oblique and the vertical photos. This apparent depth must be corrected by applying a corrective factor due to refraction. The refraction factor can be ascertained for each depth computation.

Good photos are the first requisite for good results. In poor light or in heavy weather it will be impossible to get oblique photos showing underwater detail. In the case of gentle waves the distortion of the apparent position of underwater objects due to the prismatic effect which the waves cause will introduce errors in the result. However, these prismatic distortions are not cumulative, and are limited to a maximum distortion (depending on the surface of the wave). Upon reaching this maximum, the apparent position of the underwater object will again return to normal. The cycle of distortions follows closely to a sine wave. The maximum distortion in fairly smooth water should not be enough to cause a prohibitive error in the depth measurements. It should also be noted that the distortions occur to an appreciable extent only in the oblique photo and that the vertical photo, which is a component part of this operation, is generally free from distortions. Errors caused by wave distortion therefore are not compounded. In a case of heavy waves it would be well to use the wave interval method for determining the underwater characteristics. The method of oblique projection is seen therefore to be a counterpart to the wave interval method, the one working best in quiet water, the other best in heavier seas.

Suggestions for securing satisfactory obliques showing underwater detail are given in the following letter to the officer in charge, Field Operations, E.L.F.H.W.

danger to the pilot, since by the time he makes his fourth trip over the beach, enemy gunners are waiting for him. Repeated trips at close intervals also involve the loss of security as the enemy can guess the intention of the reconnaissance

Above water beach characteristics have been determined satisfactorily in a test case conducted by the photo intelligence unit at R.A.F., Medmenham. Simultaneous obliques and verticals were flown at Harlyn Bay, St. Eval, Cornwall. These photos were used in a manner described in the accompanying report on oblique projections and the results were compared with an independent engineers' survey of the beach area. The check showed the margin of error to be approximately 2 percent, but it is the opinion of the author that such results would not be consistently forthcoming and, based on past experience with oblique projection methods, errors up to ten percent can be expected. This error, however, is not serious in the matter of beach gradients and is well within the limits of accuracy produced by other methods. Only one sortie of simultaneous vertical and oblique photos is required for the obqlique method, and stereoscopic pictures are not necessary.

The method of oblique porjection can be applied to the determination of underwater depths. Such procedure requires oblique and vertical photos with good underwater detail in the pictures. Vertical photography of beach areas generally produces satisfactory underwater detail, but oblique photography requires special considerations in order to catch the underwater detail which is necessary to this operation. The method consists of correlating an oblique photo of a beach area with a vertical photo of the same area by selecting points common to both photos and using those points to orient the photos to each other. Such orientation places the oblique photo in the exact relationship to the vertical photo as the original camera

OFFICE OF STRATEGIC SERVICES
WASHINGTON, D.C.

Report on - MEASURING UNDERWATER DEPTHS BY OBLIQUE PROJECTION

by

Lt. N. H. Juran, USNR.

The determination of the underwater depths of obstructions and approaches to enemy beach territories presents a difficult problem. Stereoscopic examination, multiplex projector machines, and floating mark devices such as the Wild machine , fail to produce satisfactory results in measuring underwater depths. This is due to the difficulties inherent in judging vertical distances where the parallax is very small. Other methods, two photographic methods, have been used in recent operations in the E.T.O. One of these is the wave interval method. Subsequent checks on Sicilian beaches have shown this method to be within 2 or 3 feet of the actual depth measurements, and to produce an underwater silhouette of the ocean floor whose contour was quite similar to the actual contour. The calculations used in this method are highly involved, and a good wave pattern is essential for good results. Another method which has been in use by the R.A.F. to determine beach gradients between high water and low water tide stages is that of sending out 5 or 6 reconnaissance sorties at approximately two hour intervals so as to photograph the water line on the beaches at the various stages of the tide. These water lines are combined into a contour map of the beach at low water level, but tell little of the underwater characteristics. A serious drawback to this method is the

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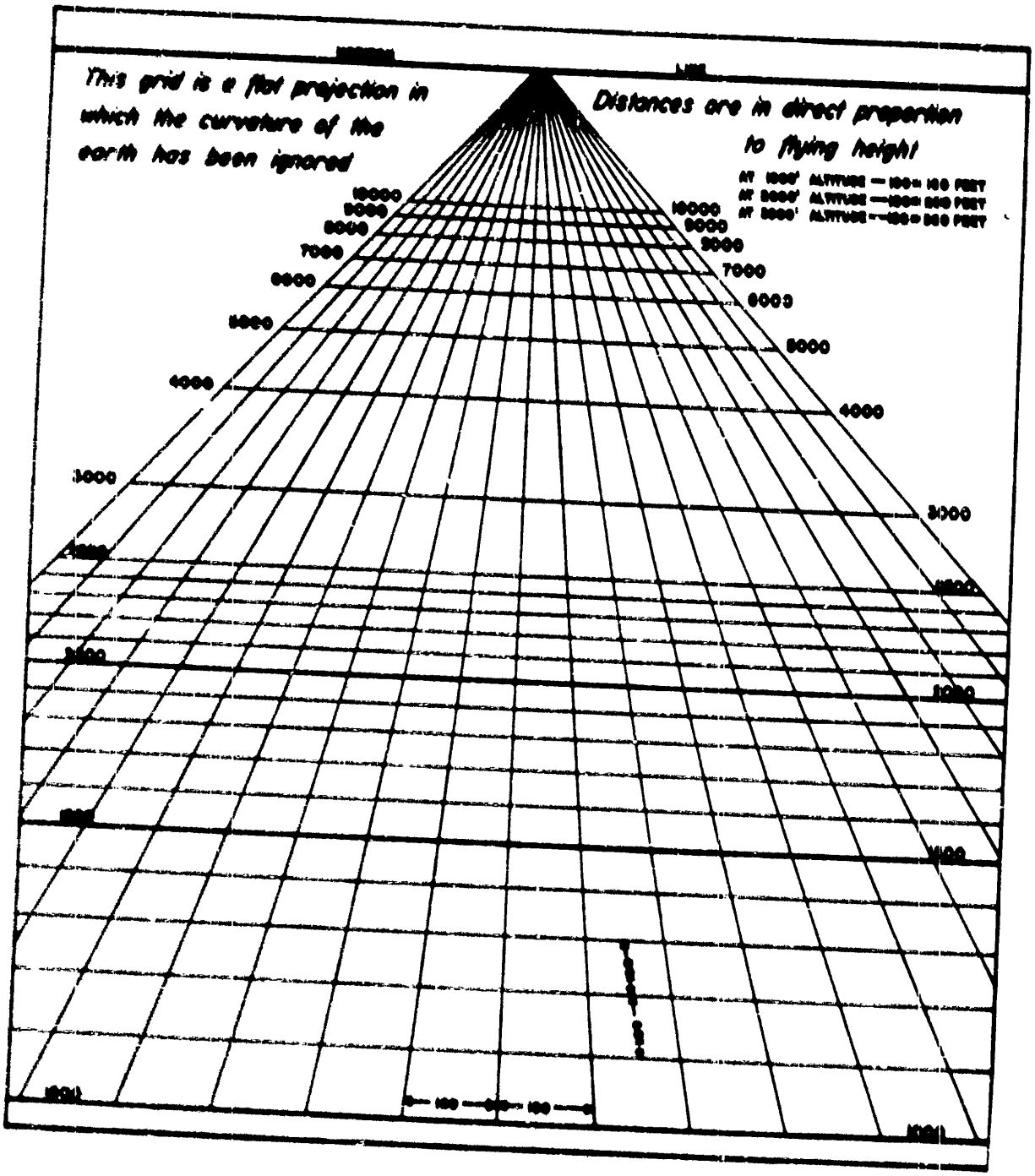
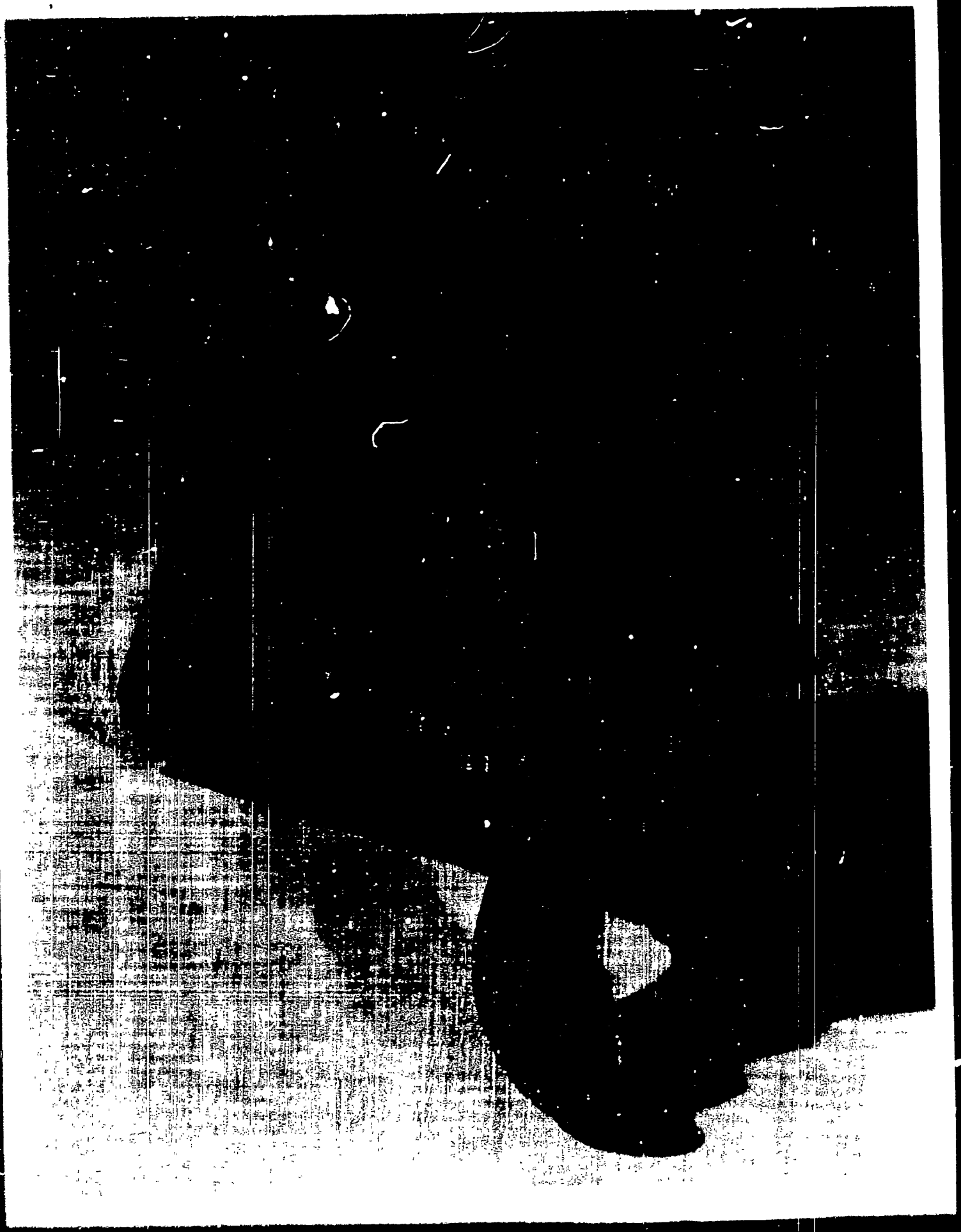


"GRID IN FACE OF PILOT'S SCALE ESTIMATOR"



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PILOT USING
SCALE ESTIMATOR.

OFFICE OF STRATEGIC SERVICES
WASHINGTON, D. C.

SECRET

Report on - PILOT'S SCALE ESTIMATOR

by

Lt. N. E. Juran

This device is a variation of the pinhole viewing box used in oblique projection work.

It consists of a viewing box in the form of a small pyramid with a pinhole in the apex and a transparent perspective grid in the base. A horizon line drawn on the transparent grid serves to orient the viewing box to the pilot's visible horizon.

The pilot sighting a ship in the grid can estimate its length by counting the number of units that the ship covers on the grid. Horizontal grid lines give the distance between the pilot and the ship.

The grid is calculated so that each unit of division represents 100 feet on the water at a flying altitude of 1000 feet.

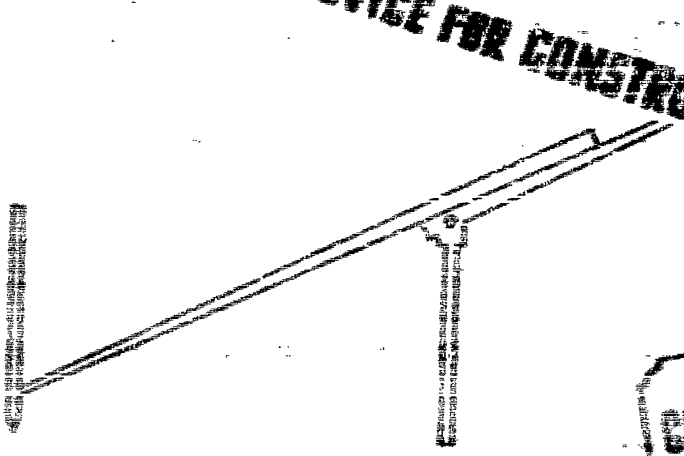
> If the pilot's altitude is 2000 feet, each unit will represent 200 feet on the water. At 3000 feet altitude, each unit will represent 300 feet, etc.

Grids can be made to suit any special flight condition. The device can also be used to measure land installations and to calculate length of runways, distances, etc. on land as well as at sea.

Variations of this design are possible so that this device can be used where no horizon is visible. This can be done by installing a levelling device similar to that used in the bubble octant.

HEHR-O-graph

A DEVICE FOR CONSTRUCTING PERSPECTIVES



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Delivery service at destination was/was not by the Government.

MARKS	NUMBERS OF PACKAGES	NUMBER AND KIND OF PACKAGES	DESCRIPTION OF ARTICLES (Observe strictly correct technical nomenclature. Avoid trade or [illegible] names)	WEIGHTS*
[illegible]	ONE	[illegible]	RECEIVED FROM LT. JURAN ONE CASE DRAWING INSTRUMENTS KNOWN AS "HEHROGRAPH" FOR USE IN NAPRU UNIT. E. S. Johnson Major, A.C.	78

Pick-up service at origin was/was not by the Government.

Bills of lading furnished ..... ft. Manifest furnished ..... ft. Data furnished ..... Initials ..... Car No. .....

TARIFF AUTHORITY
(To be filled in by person when rendering service)

AUTHORITY FOR SHIPMENT

[illegible] AIRLINES, INC.

[illegible] 19 [illegible]

CERTIFICATE OF ISSUING OFFICER
(To be filled out when the bill of lading is issued for use by contract in making shipment)

Contract No. ..... or Purchase Order No. ..... dated ..... 19.....

(If it is not signed in ink)
MEMORANDUM COPY

Delivery service at destination was/was not by the Government.

* Omit this information for shipments via motor carrier to cases where required.

† Furnish this information in case of marked shipments only.

UNITED STATES OF AMERICA

No. 716403

Bill to [redacted]

GOVERNMENT BILL OF LADING

MEMORANDUM COPY

Received from [redacted]

by the [redacted] the public property hereinafter described, in apparent good order and condition (contents and value unknown), to be forwarded subject to conditions stated on the reverse hereof, from [redacted] to [redacted] by the said company and transportation lines, there to be delivered in like good order and condition to [redacted]

AMERICAN EXPORT AIRLINES INC

via [redacted]

MARKS	NUMBERS	KIND OF PACKAGE	DESCRIPTION OF ARTICLES (Observe strictly correct U.S. Army nomenclature. Avoid trade or technical names)	WEIGHTS *
TO: SUPPLY OFFICER NAVAL AIR STATION FLOYD BENNETT FIELD BROOKLYN, NEW YORK FOR: COMMANDING GENERAL MEDITERRANEAN AIR COMMAND AND BRIGADIER GENERAL A. W. TEDERLANE	ONE	1 CASE	DRAWING INSTRUMENTS (HEHR-O-GRAPH)	78

Received 1 case drawing instruments for interpretation in the Middle East (MEIC and AAPID)

John H. Sandifer, Jr.
LT(jg) USNR

Pick-up service at origin was / was not by the Government.

(Date and signature)	ft. Men furnished	ft. Dog furnished	Initials	Car No.

TAMPS AUTHORITY
(To be filled in by person who is rendering account)

AUTHORITY FOR SHIPMENT

NAVAL AIR STATION
[redacted] AMERICAN EXPORT AIRLINES

CERTIFICATE OF INSPECTING OFFICER
(To be filled out when the bill of lading is issued for use by contractor in making shipment)

Contract No. [redacted] or Purchase Order No. [redacted], dated [redacted], 19[redacted]

(F. O. B. point named in contract) [redacted] (Inspecting officer)

SHIPPER'S RIGHTS TO SHIPPING CHARGES NOT AFFECTED BY FACTS SET OUT IN THIS CERTIFICATE

MEMORANDUM COPY

Delivery service at destination was / was not by the Government.

* Show the gross weight of shipments via motor carrier as prescribed in U.S. Standard Freight Rules.

† Furnish this information in case of carload shipments only.

(a) North African Reconnaissance Wing, La Marsa, Tunis

(b) Middle East Interpretation Unit, Cairo

(c) ISTD, Manchester College, Oxford, England

(d) U. S. Naval Headquarters, Algiers

(e) RAF, Medmenham, England - W/C Kendall.

(f) Colonel Milwit, U. S. Army Engineers, 45 Grosvenor Square, London, W. 1

(g) Major Gerald K. Geerlings, 8th Air Force, Pinetree, England.

(h) Com. Seventh Fleet, A. H. McCollum.

Operation of the Devices in the Field (cont.)

characteristics of enemy terrain. Another use is the construction of the terrain perspectives used in coordination with three dimensional models to give a realistic background. Further uses will undoubtedly be made of the instruments.

3. Suggestions for Improvements

Users of the Mehrograph have pointed out limitations of the machine. The machine can not be used in its present form for the construction of ground view perspectives or of coastline recognition perspectives being drawn for submarine commanders. This type of drawing requires that the station point of the machine be set very slightly above zero. Such a setting is impossible on the machine in its present form. Uses out of the scope of the present design of the instrument are:

(a) ground level perspectives.

(b) perspectives from submarine periscope level.

(c) perspectives from the level of the deck of a ship.

Another limitation is that the size of the map area which can be covered by the tracing arm is too small. It is also suggested that the machine be made to fit into a smaller case and be reduced in weight.

4. Conclusion:

The Mehrograph should be revised so that

1. the altitude scale can be set to zero.

2. the tracing arm has complete freedom of movement.

3. the size and weight are considerably reduced.

5. Operating units who should be on the distribution list for revised Mehrograph machines are:

OFFICE OF STRATEGIC SERVICES
WASHINGTON, D. C.

CONFIDENTIAL

Report on - MEHROGRAPH PERSPECTIVE SKETCHER

by

Lt. N. H. Juran, USNR

1. Distribution

There are 5 Mehrograph units in use in the European Theatre of Operation.

Original Distribution by Special Devices Division:

2. General Timberlake, North African Air Forces, Allied Headquarters, Algiers.

3. Commander Hachman, U.S. Naval Headquarters, Algiers, North Africa.

Revised Distribution:

1 - North African Reconnaissance Wing at La Marsa, Tunis.

1 - Middle East Interpretation Unit, RAF, Middle East, Cairo.

1 - Commander Fryer, R. N., ISTD, Manchester College, Oxford, England.

1 - Commander Hachman, U. S. Naval Headquarters, Algiers.

1 - Somewhere in the field in Italy.

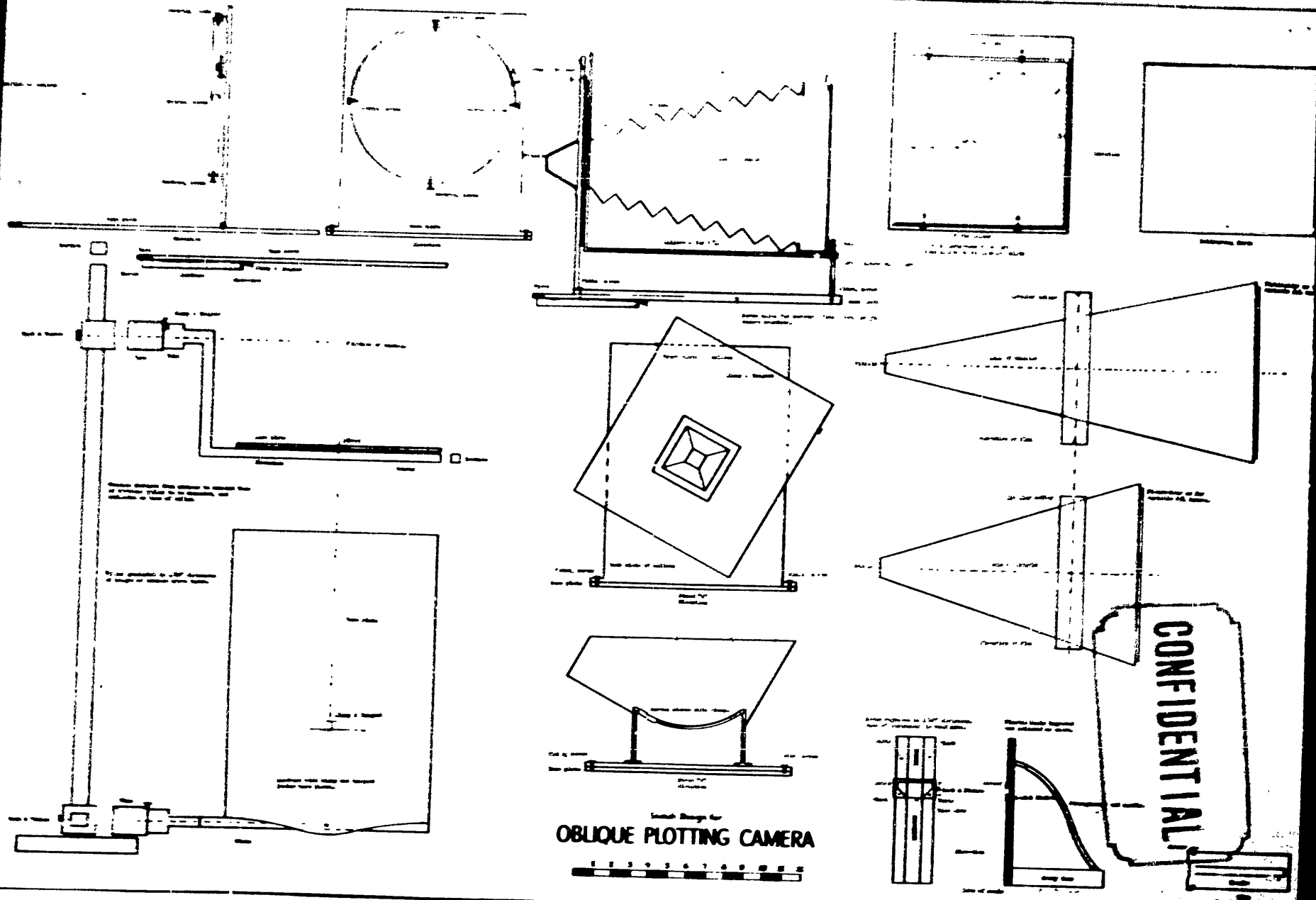
Receipts for the instruments are attached hereto.

2. Operation of the Devices in the Field

The Mehrograph device has been used for constructing recognition silhouettes by the U. S. Navy in preparation for the Sicilian campaign. It is being used for construction of imaginary perspectives from contour maps. These perspectives are used to illustrate booklets being made at Oxford, England, to acquaint military personnel with

OBLIQUE PORJECTIONS FOR AIRCRAFT

The oblique projection method described herein should be applicable in many cases to the measurement and identification of aircraft in space. It is expected that single photos of enemy aircraft can be reduced to plan and elevation by the use of this method. Results, however, will vary with the quality of the photos used.



NEW TYPE OF VIEWING BOX BEING BUILT BY BRITISH FROM ORIGINAL DESIGN BY LT. JURAN-USNR.

Declassified and Approved For Release 2013/08/07 : CIA-RDP13X00001R000100290001-2

A new type of viewing box is now under construction at Farnborough, England, for use in oblique projection work. See attached working drawing. This new viewing box will have all movements pivot about the axis of the pinhole, making coordination of viewing slide and drawing board much simpler.

An improvement being worked out by the Special Devices Division of the Bureau of Aeronautics consists of a pinpoint source of light placed at the position now occupied by the viewing pinhole. The light will project the image from the viewing slide onto the drawing board, making it unnecessary to view through the pinhole.

silhouette will result. The deck plan of the ship can be projected in a similar manner by orienting the transverse and longitudinal axes of the deck of the ship with a pair of perpendicular lines on the drawing board.

In the case of a convoy where the horizon has been used to orient the viewing slide, it is only necessary to mark the bow and stern points of each ship where they appear to strike the drawing board when seen through the pinhole. Plans of enemy installations can be similarily projected to the drawing board by tracing on the board what the operator sees through the pinhole.

Where a combination of oblique and vertical photos has been used the heights of any points on the oblique photo may be determined by placing the vertical scale on the corresponding point on the vertical enlargement. The height of the point in question can be read directly on the vertical scale when the viewing slide is viewed through the pinhole.

Target Maps

(See Separate Report on Target Maps.)

Target maps and perspective drawings can be made by reversing the process of oblique projection. A specially built viewing box (see photograph) allows the operator to draw on the viewing slide which in this case is a plain sheet of glass. With one eye at the pinhole and with a map or vertical photo mounted on the drawing board, it is only necessary to trace on the viewing slide what one sees through the pinhole. A perspective drawing of the plan will result. To get the perspective position of points in space above the plane of the drawing board, move a vertical scale about from point to point on the drawing table and draw the position in perspective of the points in space. The position of the pinhole can be adjusted to the plan at any desired station point. Its relation to the plan is the same relation that a camera in space would have to the actual terrain.

Inter-relation

Where two or more obliques are available it is possible by a tedious method of trial and error to orient these obliques with reference to each other so that the projection from each of the obliques falls into coincidence on the drawing board. This method is not recommended where speed or extreme accuracy is required but can be helpful in cases where no other data is available.

Other Methods

Other methods for relating the viewing slide to the drawing table are possible. These include cases where perfect circles or other definable geometric forms appear on the oblique photo. If one of these geometric forms is present it is only necessary to draw the true form on the drawing board and to hold the viewing box in such a position that the form seen on the viewing slide through the pinhole will coincide with the true form drawn on the drawing board. Other bits of clues may be found in shadows, as in the shadow of the plane itself on the ground. Familiarity with the methods of oblique projection will enable the operator to use any of these clues for orienting the viewing slide.

Projection

After orienting the viewing slide to the drawing board by any of the methods described in the preceding chapter, the operator is ready to project any of the information on the viewing slide into its vertical and horizontal components. In the case where the silhouette of a ship is required simply orient the viewing slide to the drawing board so that the vertical and longitudinal axes on the viewing slide are oriented to a pair of perpendicular lines on the drawing board. With one eye at the pinhole trace the centerline outline of the ship where it appears to fall on the drawing board. A

When more accurate work is required, and where it is desirable to take into consideration the curvature of the earth, the distance from the drawing board to the false horizon instead of being made equal to the distance from the pinhole to the drawing board, should be computed using the following formula:

$$D = H - d \tan 69 \sqrt{h}$$

Where, h = altitude of plane in feet
d = lateral distance of pinhole to false horizon
D = vertical distance of drawing board to false horizon
H = vertical distance of drawing board to pinhole

Land horizons are not dependable except in areas where the land is known to be low and flat such as in Holland and the Low Countries. Here the horizon may be used as though it were a sea horizon.

Coordination with Map

Where a map of the area is available, an oblique photo can be oriented to it. In selecting three points which are common to the map and the oblique photo (as is done in coordination with a vertical photo) a different type of selection is required. Only such fixed points as the corner of a dock, or a sharply defined point of land can be used for orientation. It may be convenient to use inland points such as corners of buildings, street intersections, and positions of church steeples which are usually marked on the map. In using inland points the height above sea level will be required and it will be necessary to erect a cross mark in space over the orientation points selected on the map in the event that the point selected is above the water line. This can be done by erecting a vertical line on a card and by marking the vertical position of the point on this line. The vertical measurement should be made at the same scale as the map on the drawing board. It may be well to enlarge the map before mounting it on the drawing board.

oblique photo may be oriented. (See illustration.) [illegible], such as the RDF station shown in the illustration, also lend themselves to similar orientation by means of lines of position.

Horizon

Oblique photos may be oriented simply and accurately where sea horizons are visible on the photo. The visible horizon line moves up and down with the lens of the camera that is taking the picture in an aircraft. Due to this fact, a visible horizon line on an oblique photo makes it easy to orient the photo to the drawing board as follows:-

Arbitrarily set the viewing box into any position over the drawing board. The viewing pinhole in the viewing box represents the position of the lens of the camera at the time the oblique photo was taken. Since the horizon line is known to be at the same height above the earth as the camera lens, it is possible to set up, on the drawing board, a false horizon line. This can be done by drawing a horizontal line on a cardboard which stands vertically on the drawing board. (See photo.) This horizontal line should be drawn at a distance above the drawing board equivalent to the distance of the viewing pinhole above the drawing board. By maintaining the viewing pinhole fixed in its position, the viewing box should be rotated so that the horizon line on the viewing slide falls into coincidence with the false horizon line above the drawing board. This will orient the oblique photo to the drawing board. If the subject matter of the photograph does not fall on the drawing board when viewed through the pinhole, lower the viewing box in its adjusted position until the subject does fall on the drawing board.

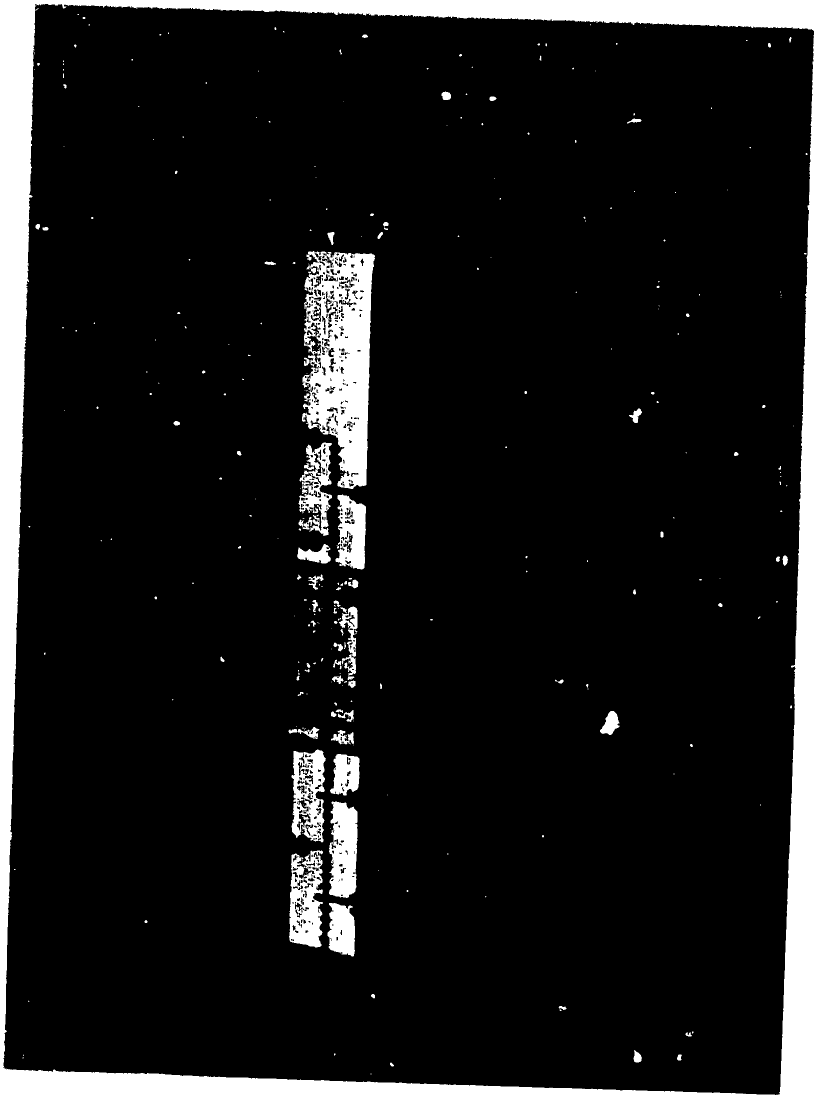
a combination of the following:-

a. Lines of position
b. Horizon
c. Coordination
   (1) with vertical photo
   (2) with map
d. Inter-relation
e. Other methods

Lines of Position

Where lines appear on the oblique photo which have a known relationship to each other or when it is possible to construct such lines on the photo, they may be used to orient the viewing slide to the drawing table. This is done by drawing the lines of position in their known relationship on the drawing table, and holding the viewing box in such a position as to make the corresponding lines on the viewing slide coincide with those on the drawing table. Many photos contain such lines of position. A rectangular building seen in perspective on an oblique photo provides three lines of position, the roof lines meeting at a corner are known to form a right angle in reality, and the corner of the building forms what is known to be a vertical line in reality. Thus we have three lines of position, transverse, longitudinal and vertical. These can be produced on the drawing table as a pair of perpendicular intersecting lines and a vertical line drawn on vertical card. There is only one position for the viewing box in which these same lines on the viewing slide will coincide with the lines on the drawing table, when viewed through the pinhole. Smoke stacks, telegraph poles, etc. are good for providing vertical axes as a means of relating the oblique photo to the drawing board.

In the case of a ship, transverse, longitudinal and vertical axes can be drawn in perspective on the oblique, and these can be represented by perpendicular lines on the drawing board. By relating the axes on the viewing slide to the lines on the drawing board, when viewed through the pinhole, the



VERTICAL SCALE -

Vertical Scale

A vertical scale is required for reading vertical dimensions from the oblique photo. This consists of a calibrated scale which stands vertically on the drawing board. The calibrations are always marked to the same scale as the scale of the plan on the drawing board. The illustration shows a precision type of vertical scale, half of which is black with white figures and the other half of which is white with black figures. This aids in reading vertical dimensions, as dark portions of the photo can be easily read against the light part of the scale and visa-versa. A rack and pinion enables the operator to move a hair-line up and down on the scale, making it possible to set a mark on the scale when the operator cannot read the vertical scale figures directly through the pinhole.

Preparation

When the viewing stand and the viewing box have been assembled it is necessary to provide a viewing pinhole at the apex of the viewing box. The pinhole can be made simply by placing a bit of Scotch tape across the apex of the viewing box and piercing a pinhole at the exact center of this area. An ordinary push pin or thumb tack will make the proper sized hole (approximately 1/16" diameter). Too small a hole will result in cutting out too much light, whereas too large a hole will impair the accuracy and focus. An excellent pinhole can be made by using a piece of black exposed and developed film with the pinhole pierced in it.

Secure the viewing slide to the open end of the viewing box by means of Scotch tape across the corners. If a diapositive or photographic plate is used, place the emulsion side facing into the box. If an acetate tracing is used, face the side with the drawing on it into the box.

Methods of Orientation

Obliques may be oriented to the drawing board by using any one or

When the viewing box has been assembled, it is necessary [illegible] viewing pinhole at the apex. The purpose of the pinhole is to provide a fixed point to which all lines of sight will converge. Since this point is focal distance away from the viewing slide, it has the same optical relationship to the viewing slide as the nodal point of a camera lens has to the film. Thus the pinhole reproduces the optical conditions that prevailed in the camera that took the original oblique photo. (Lens distortions are not corrected, however, and these distortions result in a slight error in the final measurements.) Another function served by the pinpoint is to provide universal focus for the eye of the viewer. This makes it possible to focus upon the viewing slide and the drawing board at the same time, which in turn makes it possible to mark on the drawing board what is seen on the viewing slide.

The Viewing Stand

The viewing stand which has been in use to the present date, consists of a vertical rod firmly anchored to a heavy base. Sliding up and down on this rod is a manner of universal joint which is connected to the viewing box. A winged nut through the universal joint locks the moving parts into any position desired. This type of stand is light, simple to build, easy to transport, and is satisfactory for field use. (See photograph.)

A new type of viewing box suitable for more accurate work and desirable for use at base operations is now being constructed by the RAF. This consists of a viewing box with a bellows providing an adjustable focal length. All moving parts are calibrated, and movement in any three directions is controlled by thumb screws which provide precision adjustments. The position of the viewing pinpoint remains fixed while the viewing box is adjusted to tip and tilt about the axis of the pinpoint.

drawing due to the thickness of the acetate. To avoid this, keep the eye directly vertical over the portions being traced.

Etched Plate

Another type of viewing slide which has been used with good results can be prepared by taping the oblique photo face up over a sheet of unexposed developed photographic glass plate, emulsion side up. Using a sharp needle or the point of a pair of dividers, the collimation marks and other points required can be pricked through the photo on to the emulsion of the glass plate. The photo should be kept for reference so that the pinpricks on the emulsion can later be identified as to their relationship to the photograph.

The Viewing Box

This box (in the form of a pyramid) may be built of 1/8" or ¼" plywood or masonite. If no plywood or masonite is available, any stiff cardboard or other material may be substituted.

The outside dimensions of the base of the pyramid should be equal to the size of the viewing slide. The apex of the pyramid should be cut off so that a hole about ¼" square is left at the small end. The overall height of the pyramid (after the apex has been cut off) measured along the vertical centerline should be equal to the focal length of the camera used to take the oblique photo. (If the photo mounted was not a contact print, the focal length of the viewing box must be increased or decreased in proportion to the enlargement or reduction of the photo.) Mark the centers of the four sides of the pyramid at the base as it will be necessary later to line up the collimation marks of the viewing slide with these centerlines in order to insure that the principle point of the viewing slide is in the center of the viewing box.

The Viewing Slide

In a camera, the lens is between the subject and the film. In the viewing box, the viewing slide is between the viewing pinhole and the drawing board. Therefore, a transparent viewing slide is required. This can be made in one of three forms.

(1) Diapositive
(2) Acetate
(3) Etched plate

Diapositive

A diapositive on glass of the oblique photo will give the most accurate results, since there is no chance for errors to be made in tracing. It is well to make a light print since it will be difficult to see through a dark print when viewing through the pinhole. However, care should be taken not to make the print too light as detail may be lost. A glass cutter will be necessary to trim the size of the diapositive to the size of the viewing box.

Acetate

If photographic facilities for making a diapositive are not available, satisfactory results can be had by making a tracing of the photo on acetate. To do this cut a sheet of stiff acetate to the size of the photo. Lay the photo face up on the drawing board and tape the acetate in place over it. First trace the collimation marks of the photo on to the acetate, then carefully trace the important features of the photo on to the acetate. These should include all the orientation points which have been selected as well as other points in the photo of which the vertical dimensions or horizontal positions are desired. (Note: If the oblique photo is to be used in connection with a vertical photo, any points selected on the oblique must be identified on the vertical photo as well before they can be of any value.) Care should be exercised in tracing the photo, it is easy to distort the

(e) Size of original negative.

Collimation Marks

Collimation marks on the photo are useful for lining up the viewing slide so that the principle point of the viewing slide will be located on the principle axis of the viewing box - just as the principle point of the photo lies along the principle axis of the camera.

Focal Length

Focal length of the camera that took the picture is required to determine the length of the viewing box -

Distance from pinpoint to principle point
of viewing slide must equal focal length
of camera used to take the oblique photo.

Short focal length obliques are preferable to long focal length obliques for two reasons. First, the long focal length photo means that the camera angle is narrow, and the photo will not cover as much of the area as would a similar photo taken from the same distance away with a short focal length lens. Secondly, the physical distance from the eye at the viewing pinhole to the vertical scale, on which elevations are read, increases proportionately with the focal length of the camera. Since the scale can be read more accurately at close range, short focal length obliques give better results.

Size of Original Negative

Size of original negative, or a contact print of the original negative must be available. If an enlarged or reduced print is being used in the preparation of the viewing slide, the length of the viewing box must be proportionately enlarged or reduced.

$$\frac{\text{length of viewing box}}{\text{original focal length}} = \frac{\text{size of print}}{\text{size of original negative}}$$

detail and clarity, thereby impairing the accuracy of the projection. (See examples.) An inclusive view of an entire beach taken from too great a distance to give enough detail for accurate projections may, however, be useful in determining the elevations of main points such as road intersections, bridges, buildings, etc. These main points may then be used as orientation points for coordinating another oblique which has good detail but an insufficient orientation base.

Scale

Close photos will give more accurate readings of elevation than those taken from a greater distance. This is due to the added amount of photographic detail generally prevailing in the close-up photos, and to the reduced distance between the vertical scale and the viewing pinhole. This reduced distance makes it possible to read the vertical scale with greater accuracy.

Quality of Print

Care should be taken to select prints of good photographic quality with ample detail in the pictures. Sometimes, prints from beach negatives will be printed for values of the surrounding terrain. This may result in the beach area (in which we may be most interested) being over-exposed, and in the loss of much detail on the beach. It is advisable, in cases of beach photos, to have the prints exposed for the beach area in order to get maximum detail on the beach itself. This applies to vertical photos as well as to obliques.

Photographic Data

The following data must be available before oblique photos can be used:

(a) Collimation marks

(b) Focal length

telegraph pole - or the corner of a building, are helpful clues. Horizontal lines such as parapet lines, window sills, etc., are useful, especially where two horizontal lines of known angle to each other are visible. Geometric shapes such as perfect circles as seen in oil tanks and circular military radar installations, gun emplacements, etc., or other forms like rectangular or triangular installations, are useful in orientation. A visible sea horizon, or land horizon of level country, is very useful. If the oblique is to be oriented with a map or vertical photo, it is necessary to have, in the oblique, an "orientation base". This consists of three or more points which can be identified both on the oblique and the vertical. Generally, it is better to get three points in the plane of the water (along a shoreline). A triangle drawn between the three points selected is known as the "orientation base". For best results, this base should cover as large an area of the oblique photograph as possible. In the illustrations, a side view of the beach in FIG. A. may give a broader orientation base than a head on view from the sea in FIG. B. A view of the beach from the land side as in FIG. C. may include some outlying rocks or islands whose shorelines may be used with those of the beach itself to form a very broad orientation base. If the three points do not lie in the same plane, their relative altitudes must be known (possibly by reference to available maps).

Inclusion of the Subject

Select those obliques which are taken as "close-up" to the subject as possible, but which include all the area about which information is required. An entire beach may be surveyed using only one oblique if it happens to be a good photo. Inclusion of irrelavant parts of terrain in the photo of

vertical dimensions from

The method employed in or

important part of this op

herein.

3. Photographic requir

this reason, the method i

operational bases. They i

a. The oblique photos

b. The viewing slide

c. The viewing box

d. The viewing stand

No illustrations are provided with the text of this report although many such illustrations are available.

It is the author's intention to produce an illustrated booklet on oblique projections for distribution within photo-interpretation units. This booklet, which will be available soon, will be well illustrated.

Oblique Photos

If a number of oblique photos are available, photos should be selected for use in accordance with the following standards:-

(1) Possibilities for orientation

(2) Inclusion of subject

(3) Scale

(4) Quality of print or negative

(5) Photographic data

Possibilities for orientation

The prime factor in the operation of this method is the orientation of the oblique photo to the drawing table into a fixed relationship. To accomplish this, various clues are required of the photo - these can be in the form of lines of position - geometric shapes - visible horizon - or orientation bases.

Lines of position such as the vertical lines of a smoke stack - a

vertical dimensions from oblique pictures by means of a vertical scale. The method employed in orienting the photo to the drawing table is the important part of this operation, and is fully described and illustrated herein.

3. Photographic requirements and working facilities are simple, and for this reason, the method is adaptable to field use as well as to use at operational bases. They include:

a. The oblique photos

b. The viewing slide

c. The viewing box

d. The viewing stand

Oblique Photos

If a number of oblique photos are available, photos should be selected for use in accordance with the following standards:-

(1) Possibilities for orientation

(2) Inclusion of subject

(3) Scale

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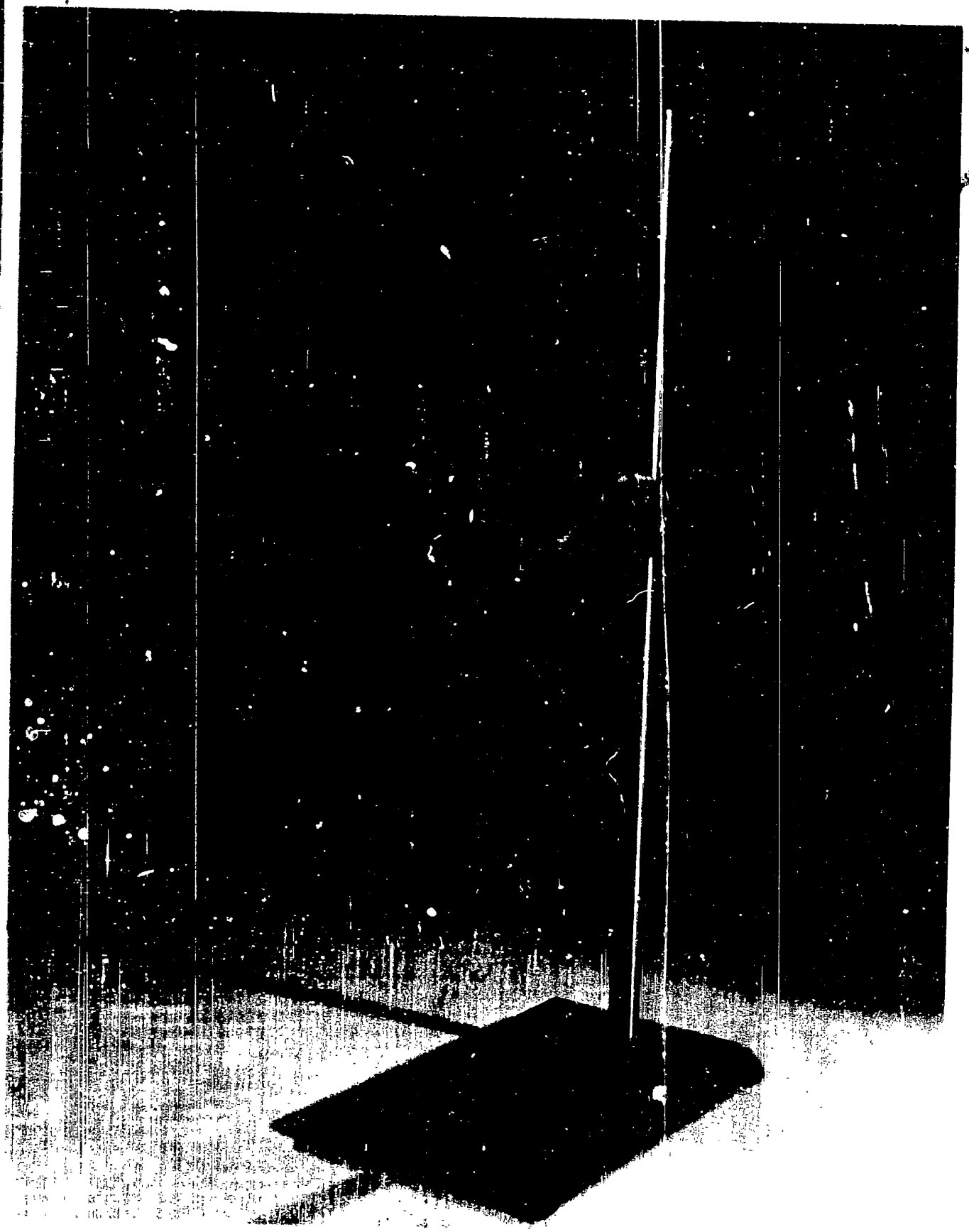
Possibilities for Orientation

The prime factor in the operation of this method is the orientation of the oblique photo to the drawing table into a fixed relationship. To accomplish this, various clues are required of the photo - these can be in the form of lines of position - geometric shapes - visible horizon - or orientation bases.

Lines of position such as the vertical lines of a smoke stack - a



VIEWING BOX AND STAND.

OFFICE OF STRATEGIC SERVICES
WASHINGTON, D. C.

Report on - USE OF OBLIQUE PHOTOS IN THE E.T.O.-

by

Lt. N. H. Juran, USNR.

1. The purpose of this pamphlet is to illustrate a method of determining horizontal and vertical dimensions from oblique photographs. Various functions already performed by this method at operational photo interpretation units include:

a. Determination of deck plans and silhouettes of enemy shipping.
b. Convoy plotting, and measuring of enemy ships.
c. Measurements of enemy military installations such as sea walls, low level bombing obstructions, RDF stations, tank traps, etc.
d. Measurements of beach gradients and obstructions.
e. Preparation of enemy target maps.
f. Miscellaneous military information.

The method is adaptable for the solution of many problems where oblique photos are available.

2. The principles involved are those of simple projection. In the main, they involve the re-creation of the scene that existed at the time the oblique photograph was taken. A drawing table is used to represent the horizontal plane of the earth's surface. A pinhole viewing box is used to represent the camera. At one end of this box is a pinhole representing the camera lens; at the other end is a transparent copy of the oblique photograph hereafter called a viewing slide. The distance from the pinhole to the viewing slide is equal to the focal length of the camera used to take the picture - thus the optical characteristics of the original camera are reproduced. The viewing box is then oriented to the drawing table in the same relationship that the camera had to the earth's surface at the time the picture was taken. By sighting through the pinhole, it is possible to project oblique pictures into true plan, and to measure horizontal and

3

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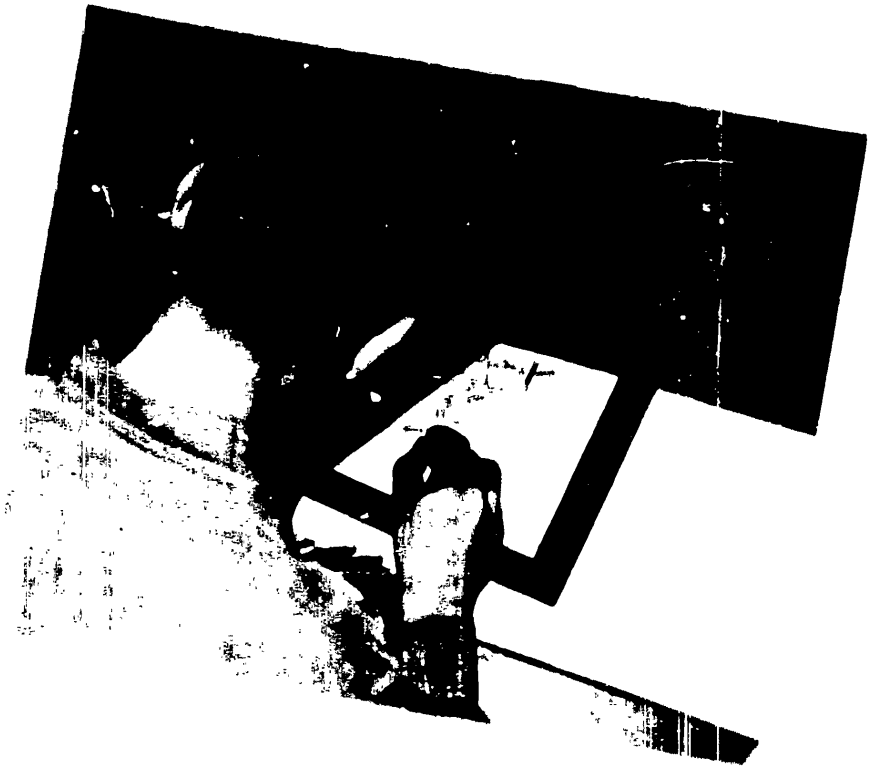

"Periscope"
Perspective Device.

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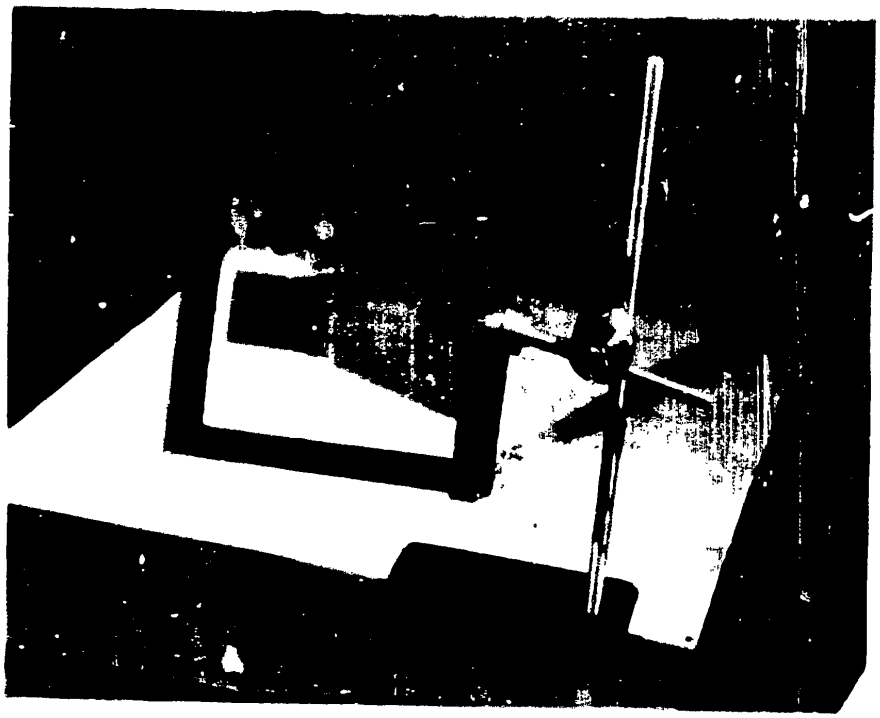
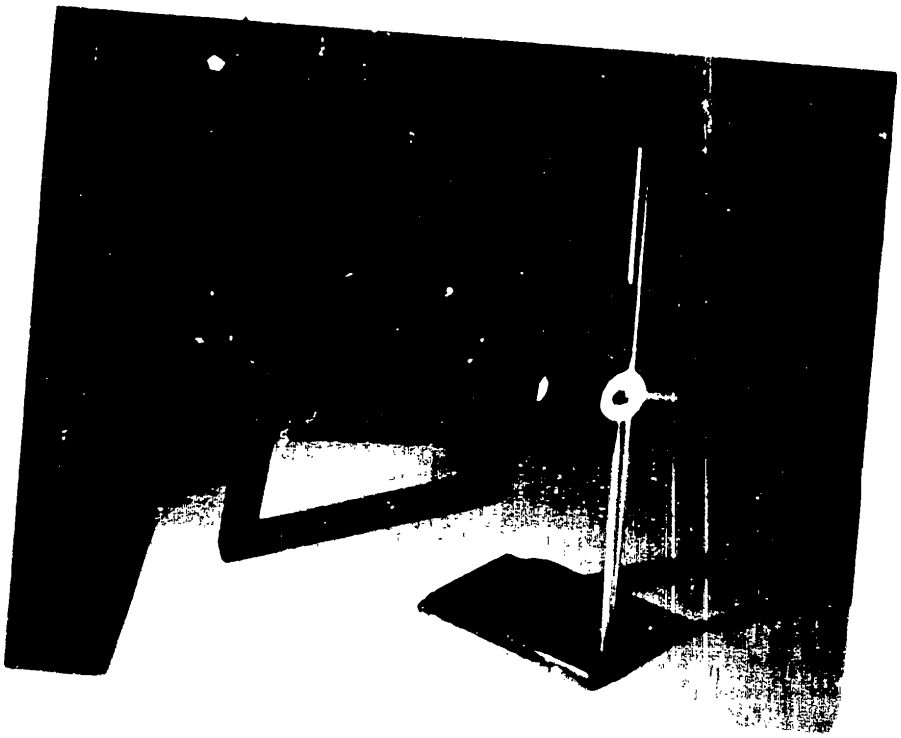


"JERISCOPE"
PERSPECTIVE DEVICE



"JERISCOPE"
PERSPECTIVE DEVICE.

of the point on the vertical scale as it appears on the transparent easel.

In the case of a contoured map it is possible to produce perspective views of each successive contour by lowering the Jeriscope in an amount equal to the contour interval for each tracing of each succeeding contour line. After all contour lines are drawn in perspective the outline of the high ground can be sketched.

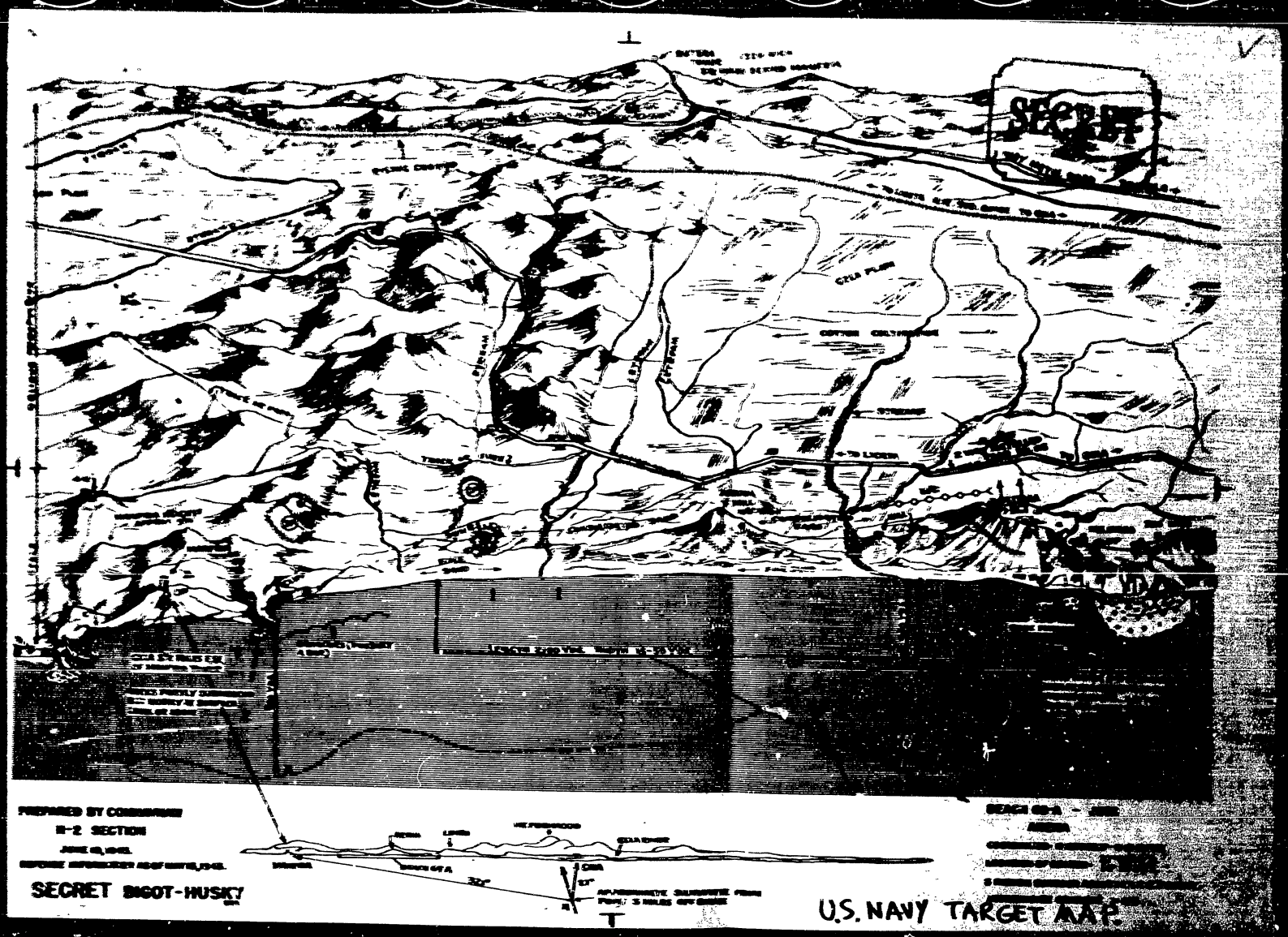
A vertical air photograph can be used instead of a map or plan if the ground is level or if the true appearance due to vertical elevations of the terrain is unimportant. This is the case in the Eighth Air Force target maps where the perspective characteristics due to varying elevations of the terrain have been ignored. The "Jeriscope" can be made to collapse into a compact flat unit which can fit into the photo-interpreter's kit. A small collapsible edition of the Jeriscope device could be used by undercover agents for making perspective drawings in areas where the possession of a camera would be too dangerous. These tracings would be as informative as photographs, and could later be projected into plan and elevation if necessary.

The method of producing perspectives by oblique photo has proved itself very efficient. In fact, the drawing of target perspectives, before the introduction of the photographic method, been a bottle-neck in the production of target maps.

A new device known as the "Jeriscope" will soon be available as a quick method of drawing perspectives for a predetermined point of view. This device, invented by Lt. Juran, USNR., on July 16, 1943, at RAF Medmenham, takes the form of a transparent easel mounted on an adjustable support. When this easel is placed between a pinpoint eye piece and the map or plan of an area of which a perspective is desired, the perspective drawing may be drawn directly on the transparent easel. Perspectives previously requiring 8 or 10 hours to construct may now be done in 8 or 10 minutes. The procedure in using this device is as follows:

Tack the plan (or contour map, vertical photo, etc.) of the area of which a perspective is required to a flat drawing board. Mark the principle point or center of the target area on the map. From this point draw a line on the map representing the direction from which the perspective view is desired. Place the Jeriscope in position so that a line passing through the pinpoint and the center of the transparent easel of the Jeriscope will lie in the same vertical plane as the line on the map. At the scale of the map, fix the position of the viewing pinpoint at the desired height and distance from the target.

To draw the perspective, draw on the transparent easel what is seen through the viewing pinhole. Instead of drawing directly on the transparent slide, sheets of acetate are provided and drawings may be made on these [illegible] and ink, grease pencil, or other drawing materials. To locate [illegible] position of a point lying above the plane of the map, place [illegible] (calibrated to the scale of the map) at the position of the [illegible] plan. While viewing through the viewing pinpoint draw the [illegible]



SECRET

LOW LEVEL BOMBING APPROACH TARGET MAP

8TH AIRFORCE - WIDEWINGS

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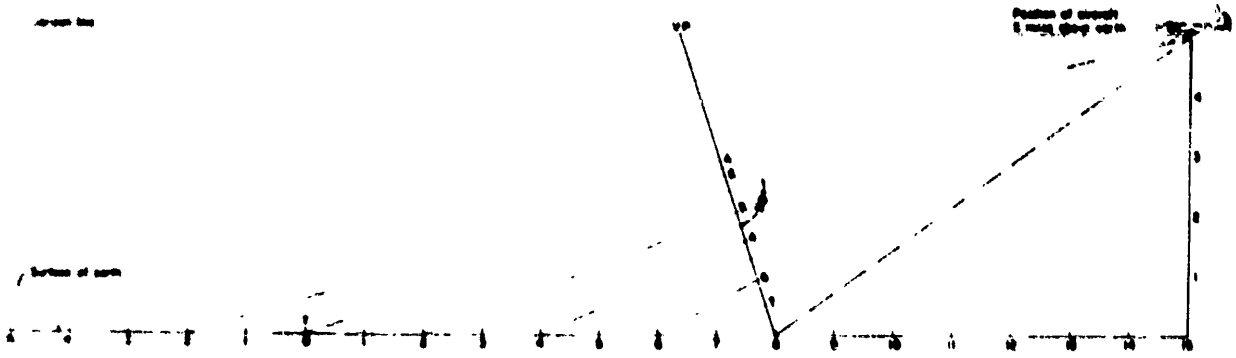
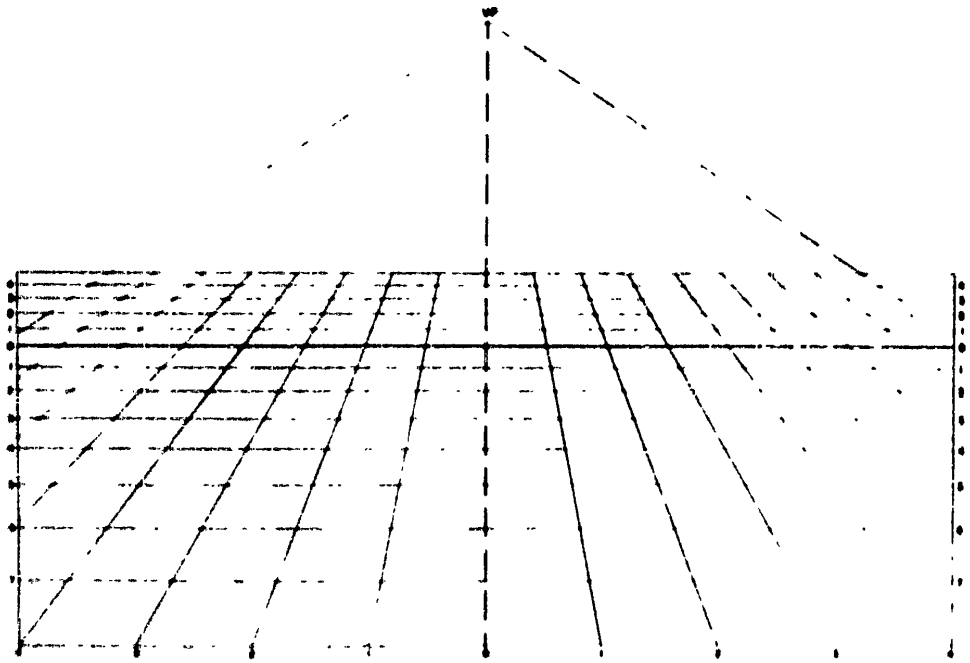
GRID PROJECTION
USED FOR
NAVIGATOR DRAWINGS

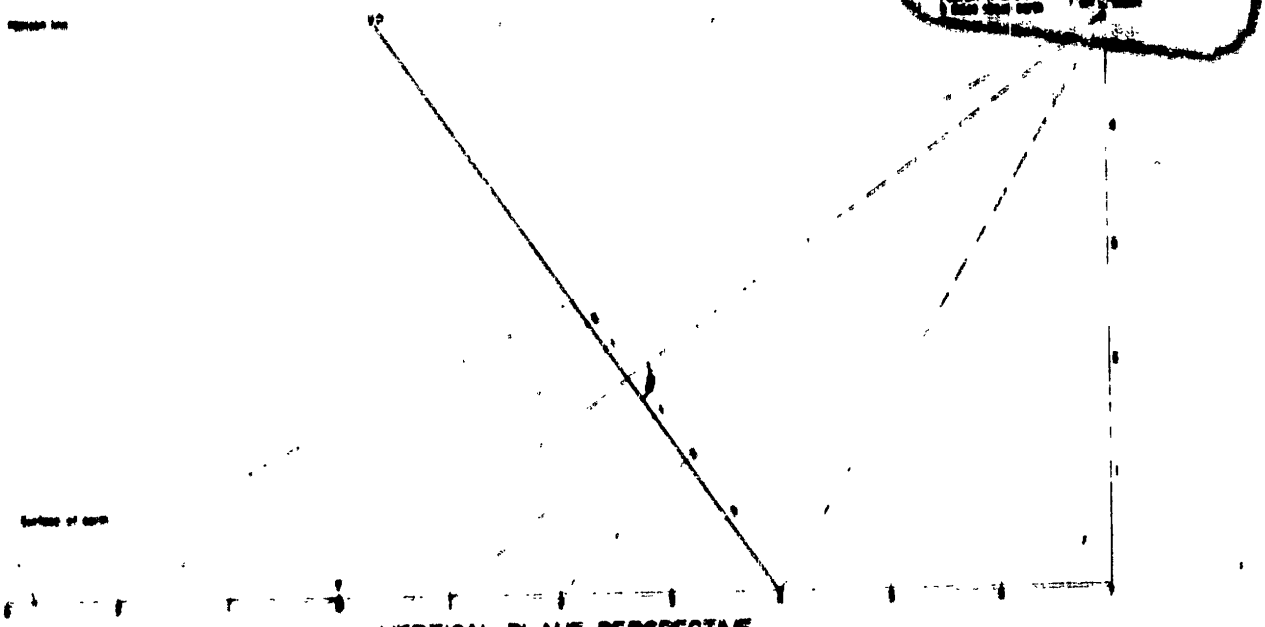


VERTICAL PLANE PERSPECTIVE
DISTANCE IN MILES

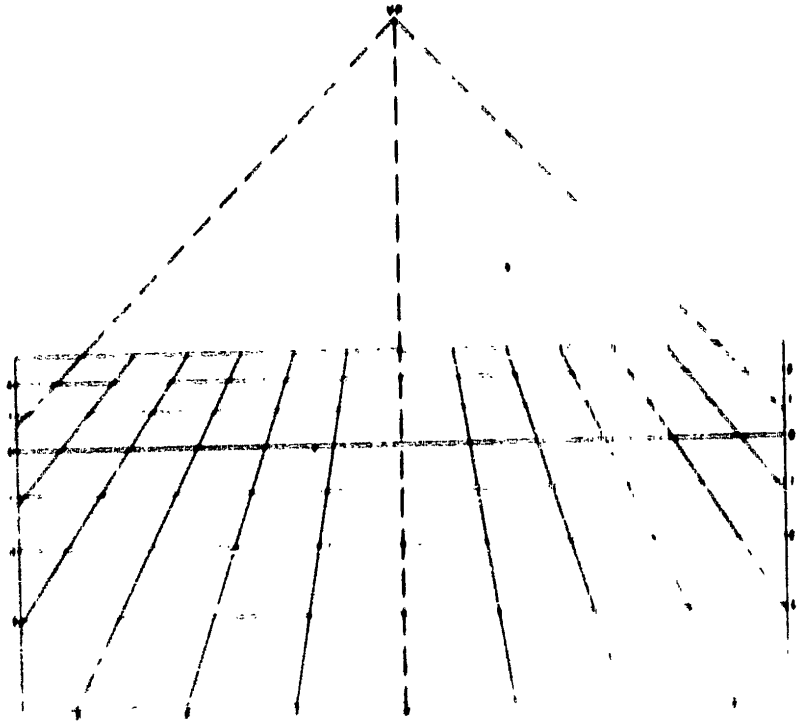


PERSPECTIVE GRID
DISTANCE IN MILES

GRID PROJECTION
USED FOR
BOMBARDIER DRAWINGS



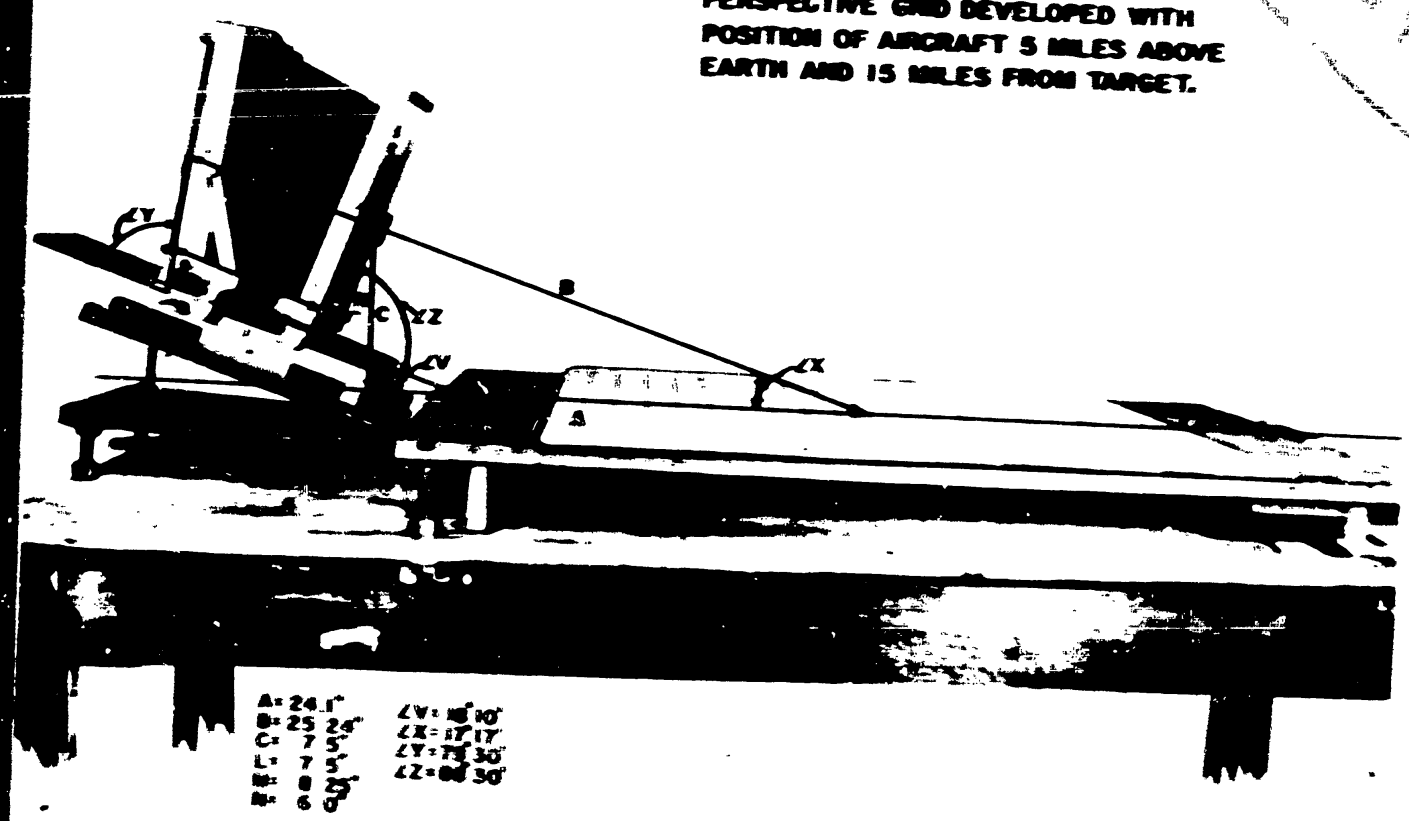
VERTICAL PLANE PERSPECTIVE
DISTANCE IN MILES



PERSPECTIVE GRID
DISTANCE IN MILES

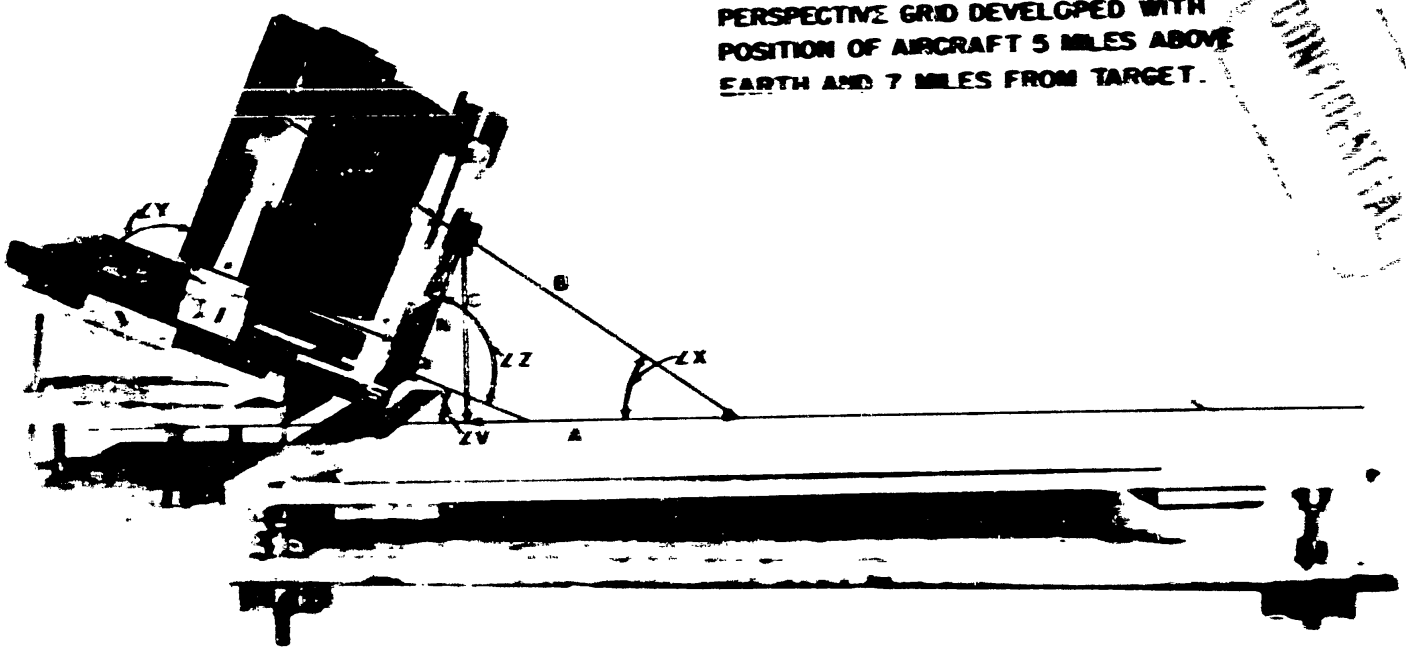
CAMERA SETUP
NAVIGATOR OBLIQUE DRAWINGS

PERSPECTIVE GRID DEVELOPED WITH POSITION OF AIRCRAFT 5 MILES ABOVE EARTH AND 15 MILES FROM TARGET.



CAMERA SETUP
BOMBARDIER OBLIQUE DRAWINGS

PERSPECTIVE GRID DEVELOPED WITH POSITION OF AIRCRAFT 5 MILES ABOVE EARTH AND 7 MILES FROM TARGET.



A: 12.5"
B: 15.04"
C: 8.37"
L: 10.0"
M: 0.12"
N: 6.75"

∠V = 22°30'
∠X = 33.48°
∠Y = 89.10°
∠Z = 89°30'

2. Contact print from above negative.

Exposed in printing frame
Type of paper....Ilford Bromide, extra contrasty, single weight, spec. smooth matt.
Exposure time....1-2 sec.
Developer.....Kodaline or D-72
Development time.45 sec.-1 min.

3. Grey contact print (for color break) from above negative

Same paper and developer as above.
Exposure time....Flash
Development by examination.

Bombardier & Navigator Drawings

1. Negative from center map contact print.

Exposed in oblique camera using 4 No. 2 Photoflods.

Type of dry plate....Kodak, process slow, B-5	:	Ilford, thin film, halftone
Exposure time		
Navigator....2 3/4 min	:	2½ min.
Bombardier...3 min.	:	2½ min.
Developer.....Kodalith	:	Kodalith
Development time.....4-5 min.	:	3-5 min.

2. Projection print from above negative.
Exposed by indirect projection using copy camera.

Type of paper.....Ilford Bromide, extra contrasty, single wt., spec. smooth matt.
Exposure time.....3/4-1½ min.
(Areas in back of and on the side of the target are given more time by dodging)
Type of developer.....D-154
Development time.....3/4-1 min.

CAMERA LENS

In developing this oblique photography two types of lenses were experimented with.

1. Long focus lens.

2. Short focus lens (wide angle)

Long focus lenses up to 30" focal length proved unsatisfactory because they only served to elongate the copy and could not bring in the required perspective grid.

Various short focus lenses were tried and it was found that a wide angle lens of 8" focal length and 65° field gave the required convergence and perspective. To overcome fussiness of detail in either foreground or background, the smallest aperature (F.64) possible was used with the above lens.

CAMERA

A Kodak Model B, 8" X 10" all metal, tilt back type camera is being used.

LIGHTING

Four No. 2 photo floods are being used.

MATERIALS AND EXPOSURE TIMES

CENTER MAP DRAWING

1. Negative from inked blue-line plate or acetate tracing.

Made in regular copy camera
Type of film.....Agfa Reprolith Ortho
Size of film.....24" X 30"
Exposure time.....70 sec.
Developer/.....Kodalith
Development.....2-2½ min.

OBLIQUE PHOTOGRAPHY FOR PERSPECTIVE MAPS

GRID PROJECTIONS

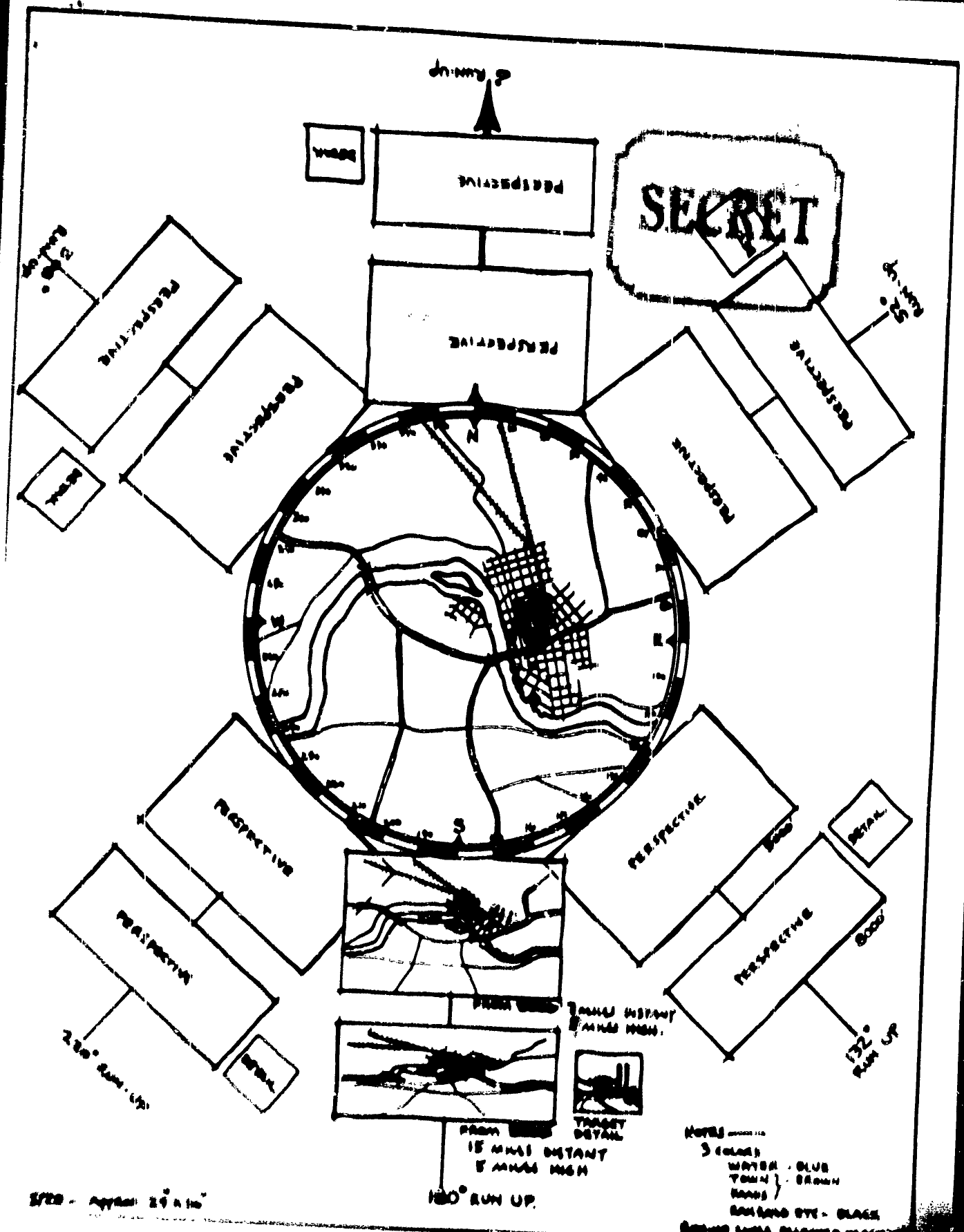
The oblique photography described herein is based on using the grid projections shown on pages 6 & 7.

CAMERA SET-UP

To readily adjust the relationship of the camera and copy, all elements the camera set-up must be adjustable with facilities for locking up once the final adjustment is made. In the accompanying drawings of the camera set-ups (see pages 4 & 5) note that the camera base and copy board are adjustable in any direction desired. For accurate checking of the set-up a master grid was drawn on lacquered plate glass to assure a plane surface. An oblique master grid to check the focusing image was made in positive on film to fit the focusing glass of the camera back.

A hole was drilled in the center of the master grid plate and placed over a metal pin located along the vertical projection of the optical axis of the camera. Two stop lugs on the same projection at both ends of the copy permit the use of a straight edge for rapid and accurate orientation.

After the entire system has been checked for final adjustment, to start actual operations, the master grid glass plate is replaced by a bromide print of the center map mounted on glass plate (same thickness as master grid plate) with the target centered over the drilled center hole. The plate can now be revolved through 360° to orient each run-up and the exposures made. The negative plates are retouched where necessary and projection prints made to drafting scale.



8th AIRFORCE TARGET MAP
WIDEWINGS.

layout of the target map as described herein is attached.

North African Air Force Target Maps

North African Air Force target maps are prepared in Algiers and are somewhat smaller in size (approximately 18" x 24") than those in England due to the difficulty of getting larger printing presses in the African area. The vertical view of the center of the target map is a photographic mosaic instead of being a drawn map as is in the case of the English target maps. However, drawn perspective views accompany the target map in a manner similar to that of the English maps. Colonel Eddington, R.A., is responsible for the preparation of these maps and his office was in the Shell Building, Algiers. His present whereabouts can be ascertained by inquiring through General Tinkerlake of the North African Air Forces.

U. S. Naval Target Maps

A unique type of naval target map was used by the U.S. Navy in the Sicilian invasion operations. This map consisted of a beach area drawn in plan view. Further inland from the beach areas, terrain was indicated in ever increasing perspective in such a manner that the distant hills in the background are seen in elevation as a silhouette against the sky. Silhouette outlines of the shoreline and terrain, as seen from the bridge of a naval vessel standing out at a given distance from shore, are provided at the lower margin of these target maps. Landmarks, landing beach areas, and background silhouettes are indicated both on these sketches and on the plan drawings. A copy of the type of target map described in this chapter is attached.

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Report on TARGET MAPS IN THE E.T.O.

by

Lt. N. H. Juran, USNR.

Three types of target maps have been noted in the E.T.O.

1. Eighth Air Force Target Maps
2. North African Air Force Target Maps
3. U. S. Naval Target Maps

Eighth Air Force Target Maps

These target maps (approximately 24" x 30") have been developed by Major Gerald K. Overlings, USAAF. They consist of a circular vertical plan of the target area in the center of a printed sheet. Radiating from this circular plan are six "run-up" lines. Two perspective views of the target are furnished at each of these "run-up" lines. These perspective views are constructed to represent the pilot's view from bombing altitudes of about 5 miles, and at distances from the target of approximately 17 miles and 7 miles respectively. A small perspective "close-up" of the target itself is also furnished for each of these "run-up" lines. The target maps are printed in two colors, brown and blue. Water areas are indicated in blue tones, and towns are indicated in brown. Road lines, etc., are printed in black. A unique method of construction, the perspective views is employed. The center target plan is prepared first. This plan is then photographed obliquely to produce the perspective views of the target area. This oblique photography is explained in the attached data, supplied by the U.S. Engineers Co. - New Yorkers, England. A sketch showing the

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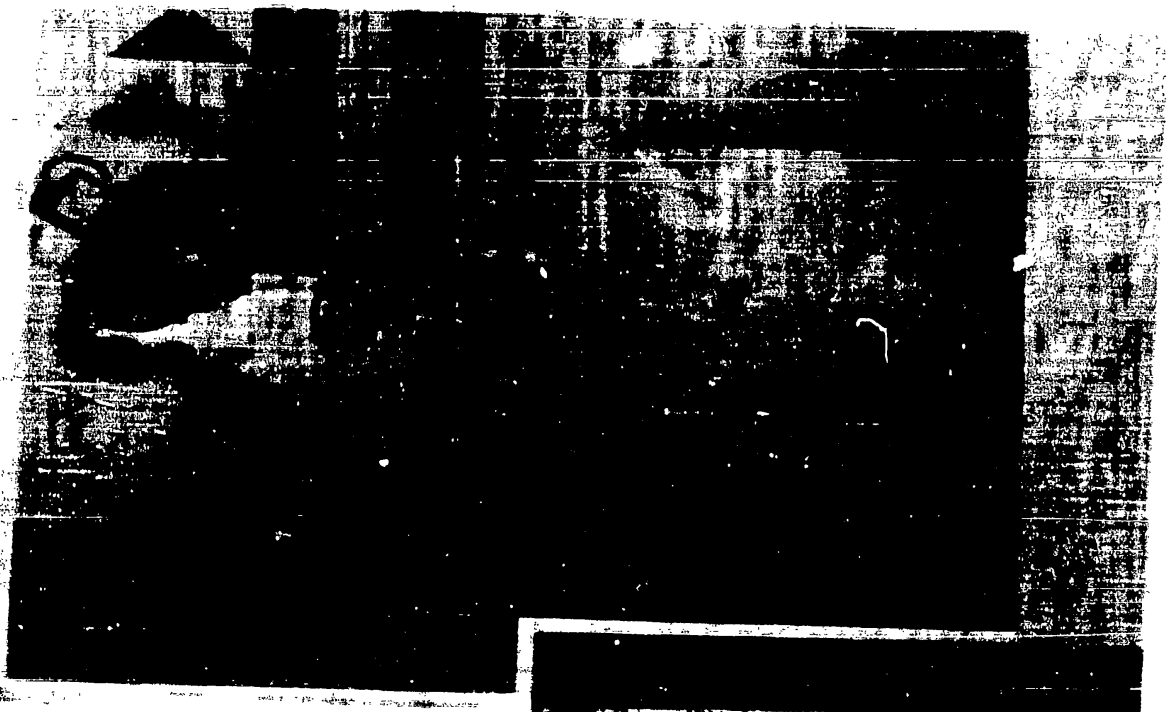


Preparing to photograph a model. The position of the 'sun' is being moved to throw shadows appropriate to the time of day and year for which the picture is required.

The base of the 'sun-dial' is laid on the model with its North point to the North. The pointer is turned to the angle from which the light is required. The light is moved horizontally to cast a shadow centrally on the slope, and vertically to give the correct angle of elevation.
This 'sun-dial' was made by the Special Section.

Color Scheme

Green	Grass - trees - etc. Shades of gree (trees dark)
Blue	Water - shade of blue (fathom strips getting lighter into shore)
Grey	Roads - beach - etc. Shades of grey
Brown	Earth - etc. Brown Grid lines (over each egg-crate) dark brown ink (ruled on with pen)
White - Red and Yellow	Army grid - bright red and bright yellow True north - bright yellow arrow Spot elevations and spot markers - white

Grade tones away from target slightly like a rendering.

Use modern lettering - style for letters and figures.

Edges of model to be painted very dark blue (or black).

An alternate method of Capt. Fletcher's model building unit does away with the masonite base, and substitutes for it a cardboard base.

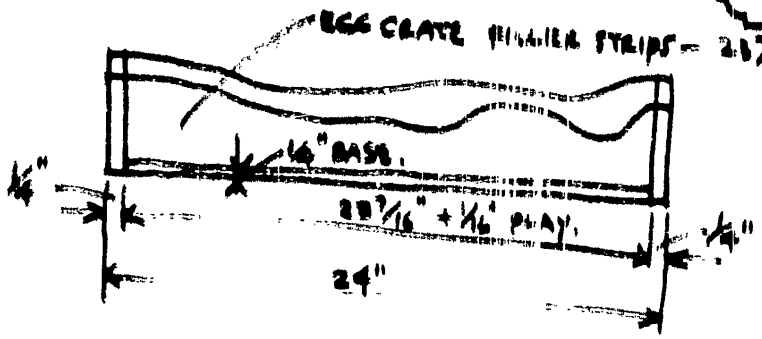
TOP AND BOTTOM CARDBOARD WITH 3/4' HIGH EGGCRATE BETWEEN

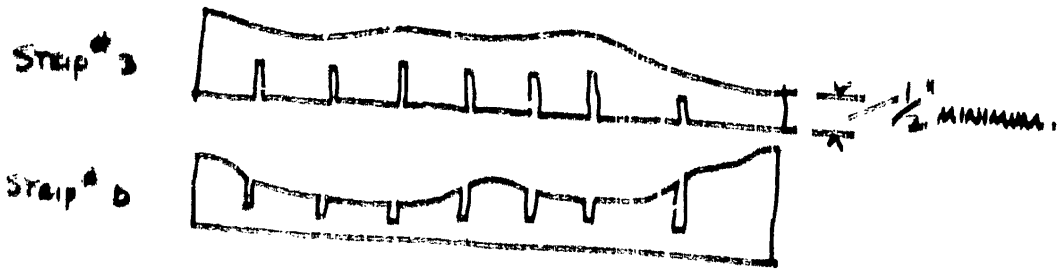
This is composed of a single level egg-crate construction with a sheet of cardboard top and bottom - all glued together with casein glue.

Assembly - Nail each contoured perimeter strip to the base board (with each strip lapping the other at the corners as shown on diagram). This is the FORM. Fit the egg-crate together, and after liberally spreading the inside of the form with casein glue, drop the egg-crate into place.

Soak a strip of calico in casein glue mixture, (the calico can be laid over the model and a rough cut to size made - only cut a bit more than needed). When the glue becomes very tacky and ready to set, work the cloth over the egg-crate with the fingers so as to make it take the shape of the egg-crate. Hold down with the fingers until it will grip by itself. If the calico seems to "sag down" into the egg-crate spaces, do not be disturbed as it will stretch out like a drum when dry. Trim edges at the base.

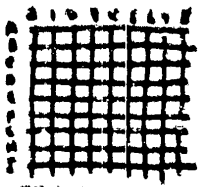
When dry, cover the skin with glue size and dry again. With casein glue, stick tree groups - buildings - etc., on to the model (but only after the initial values of land and water have been sprayed on).



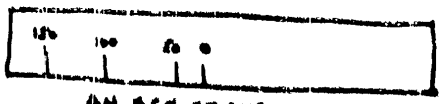


The egg-crate filler strips are 23 7/16" wide (so as to "drop" into the model box with an easy but snug fit). Each filler strip is notched out a little more than half of its height at each coordinate line. The numbered strips are all notched at the bottom; the lettered strips are all notched at the top.

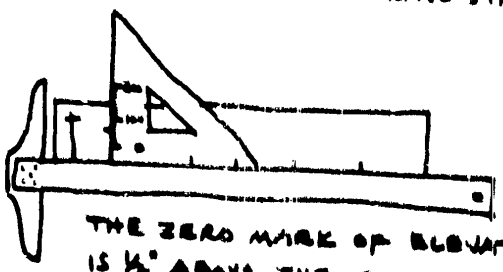
The outside strips are laid over their corresponding line on the contour map, and contour crossings with their corresponding levels are noted at the base of the strip. An ordinary celluloid triangle with a scale etched on to it (1" = 5280' on one leg and 1" = 10560' on the other leg) is used to rule the verticals on the strip and to note the point of the contour level. These points are connected with fair lines, and the contours cut.



EGG CRATE LAYOUT.

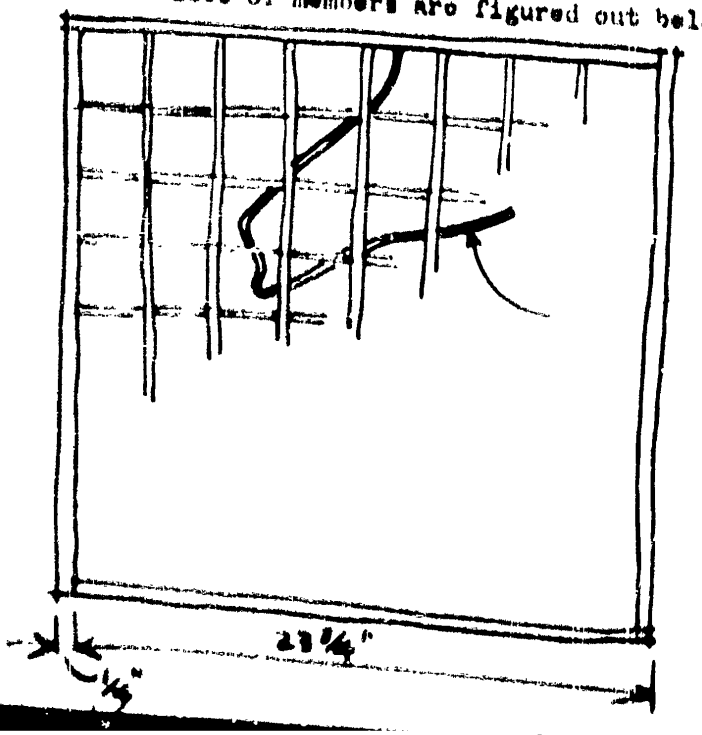


AN EGG-CRATE STRIP.



THE ZERO MARK OF ELEVATION IS ½" ABOVE THE BOTTOM OF THE STRIP.

½" of strip is always left (at sealevel) to give a base of ½" depth to the model at its shallowest point. The outside perimeter strips are cut with a hacksaw; the egg-crate strips are cut with scissors or sharp matt knife. Sizes of members are figured out below.



INTERMEDIATE CONSTANT HEIGHT PIECES ARE INSERTED TO ACCENTUATE CONTOUR LINES WHERE NECESSARY.

OFFICE OF STRATEGIC SERVICES
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RESTRICTED

Report on - EGG-CRATE MODEL MAKING

by

Lt. N. M. Juran, USNR

Notes on "egg-crate" terrain models as made by the U. S. Army (Capt. Fletcher - Sgt. Bud Eilers) at Phyllis Court, Henley, England. (Now moved to R.A.F. Medmenham)

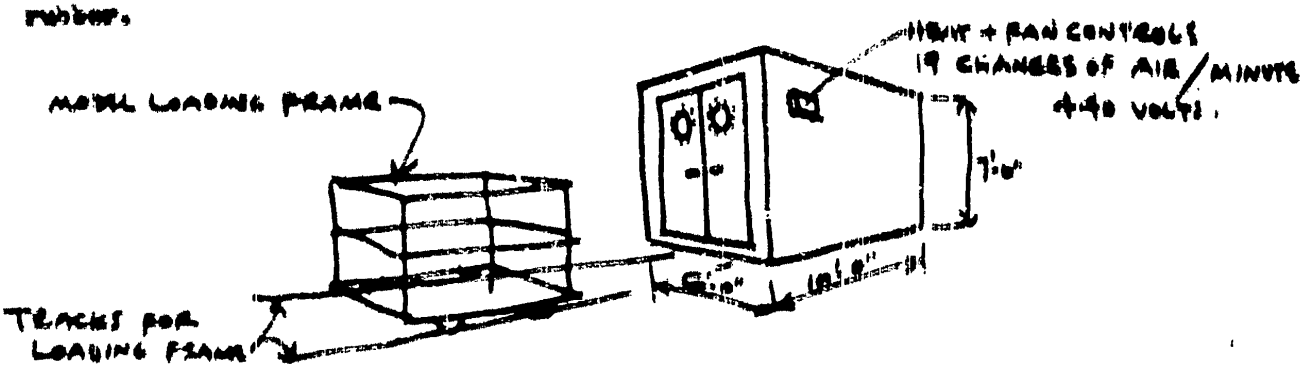
Scale - All models are made in multiples of 1" to a mile; 1" to 2 miles; etc.

Size - All models are made in panels 2'0" square which can be butted together to make a multiple unit model.

Materials - Calico (heavy muslin - unbleached) (or light duck canvas) is used for the surface skin. ¼" board (like masonite) is used for the base and outside form. 1/32" cardboard is used for contoured "egg-crate" form, and cuttings of this cardboard are used for tree areas and building, docks, etc. Casein glue is used to stick the egg-crate into the form, and to soak the calico before applying the skin. Glue size is used to prepare the skin for the paint. Paint - three primary colors are used - the paint is sprayed on to the model. Spray gun or blowpipe used for the painting. T-square - triangles - instruments, etc. for drawing. Hack saw, jig saw, scissors, brads, small hammer are the tools employed.

Method - The plan is ruled off into 64 squares - each of the coordinate lines are numbered 0-8 and A-I. The outside perimeter, (0 and 8 and A and I) are made of ¼" stock; the balance are made of cardboard.

Under S/L Wood, R.A.F. Medmenham has experimented with models made of synthetic rubber. The moulds are made by "spraying" metal on the original model. A new oven just being installed, is to be used in "baking" the rubber.



An experiment (still in its infancy) is being made with color photos being pressed into relief forms over moulds of the terrain.

in 16 man hours. The method of construction is [illegible] make it possible for personnel without architectural background to [illegible] at very consistent results. A complete description is attached in a special report on "Egg-Crate Model Making". The British reaction to this type of model is that it is interesting and should have some application in field modelling, but that it is not suitable for the type of models required by the British themselves. British model making is so organized that there is a good deal of advanced noting, and proper preparations can be made for producing very accurate models. It requires approximately 3 to 4 weeks from start to finish of a model made in the British manner. Some of their more extensive projects require 8 weeks and more.

which is generally followed in America. Models are [illegible] from the mould in the usual manner and are ready for painting.

Painting

All building up of values and painting of models is done in black and white. These tones are applied to give the same effect to the eye that aerial photographs give. In a 1: 10,000 model this effect is a general grey mixture of slightly varying tonal values. After the values have been established in black and white oil paint, an oil stain of soft green is rubbed over the model where green fields are indicated, and a soft brown stain is rubbed over those sections which represent plowed earth or bald terrain. The staining with a single soft pigment of preestablished values results in a colored model of photographic quality. This result is unique in the observer's content with models, and is altogether one of the most satisfying characteristics of terrain models yet seen by the observer. After the general tones of the terrain have been established and stained, the water areas are painted a greyish blue, the roads are painted light grey and the towns receive special attention depending on the locality of which the model is made. Various methods of applying shrubbery and tree areas are used. In very small scale models the tree areas are painted on the models with glue and colored sawdust is then sifted over the glued areas and allowed to set. In other cases sponge rubber, steel wool, etc. are used. The general characteristics of the finished model are those of extreme accuracy such as has been seldom noted in American Model Work.

Under the direction of Captain Fletcher, US Army Air Forces, the American model building unit at USAF Headquarters has developed a unique type of model building called the "egg-crate" model. These egg-crate models can be completed

the built up contour areas in order to produce a more [illegible] of the terrain as indicated in the stereoscopic photographic cover.

When the terrain modelling is thus completed, sections of the mosaics which have been supplied by the Wild section are mounted on the face of the model where practical. In flat terrain it is often possible to mount the mosaics over large areas, but in more undulating sections, it is necessary to leave gaps inbetween the sections of mosaics. Photographic detail is then painted on these sections where it has been impossible to mount the mosaics. This painting is done in black and white tones to match the tonal values of the black and white mosaics.

Preparation for Reproduction

In order not to lose the photographic detail on the model in the casting process, all detail on the model is represented in three dimensions. Roadways are traced over with a paint line which, even though it is very faint, can be recognized as a roadway on the casting made from the model. Hedge lines, field intersections, walls and other distinguishing characteristics of the terrain are drawn in relief on the model. To accomplish this a small hand gun filled with plastic material such as jesso, is used. These areas are outlined by tapping a series of dots or by squeezing a very fine line of material on to the model. While the bulk of the model is being assembled, a team of 2 or more model builders are busy making scaled representations of towns. These towns are built in relief over the mosaic plan of the town, and are ready to apply to the main model at the time the large mosaics are mounted. After all the roads, field intersections, town buildings, etc. have been indicated in paint lines or low relief indications, a plaster mould is made. The moulding operation is carried on in the usual plaster technique

Materials Used

Compo board similar to masonite, but of an inferior [illegible] approximately ½" thick is used for bases. 3/4" by 1½" wood stock is used for the base frames. Large sheets of compo board and cardboard of varying thickness are used for building up the contour layers of the model. Plaster is used both in the construction of the original model where it forms the "filler" between contour levels, as well as for making the moulds and castings of additional models. Oil paint is used for finishing the model; sawdust, sponge rubber, etc. are used for surface textures and foliage.

Equipment

The model shop consists of three inter-connected Nissen huts, each approximately 75' by 66' in floor area. Very little machinery is used. Hand saws, miscellaneous hand tools and an electric cut-awl machine comprise the tools. Occasional use is made of the power saw, band saw, shaper, and drill press operating in the American model wing.

Procedure

The model bases are cut first usually about 3' by 6' in size. They are then mounted on a wooden frame which is divided into approximately 1' squares in each direction. The bracing as well as the ~~additional~~ outline perimeter of the frame is made of the 3/4" by 1½". The base is nailed to the base frame. Contours are then cut from the compo board stock which is selected to be of the same thickness as the contour interval unit. These are mounted one over the other until the contours are all represented. The model is then glue sized and the notches between contours are filled in with plaster. Careful stereoscopic examination or photographic cover is carried on during this process to insure that the model will correspond to the actual terrain as shown on the photographs. Sometimes it is necessary to cut away some of

OFFICE OF STRATEGIC SERVICES
WASHINGTON, D. C.

Report on - MODEL BUILDING IN THE E.T.O.

by

Lt. N. H. Juran, USNR.

Model Building Units in operation in the E.T.O. are:

English Unit RAF Medmenham, under the direction of S/L Wood, RAF.
American Unit, RAF Medmenham, under direction of Capt. Fletcher, U.S. Army Air Forces
English Unit North African Photo Reconnaissance Wing, Tunis Under direction of Lt. Cox, RAF.
English Unit Middle East Interpretation Unit, Cairo. Under direction of Lt. Kim Allen, RAF.

1. The technique used in all of the English Model Building Units is virtually the same and the report on the technique used in RAF Medmenham will in effect cover that used in the NAPRW and the MEIU. The method follows.

Data Supplied

Contour maps and photographic mosaics of the area to be modelled are prepared by the Wild Section, through the use of the Wild Swiss mapping machine. These mosaics and contour maps are then turned over to the Model Section. Data is supplied at the scale of the model required. This scale varies with the purpose for which the model is being built. Small scale models covering large areas are generally made at a scale of 1: 10,000. Other models for more detailed operations are made at larger scales. Stereoscopic pairs of vertical photos of the area to be modelled are supplied to the modelling section.

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ADDENDA TO NIGHT PHOTO SECTION

Some of the rudiments of night photo interpretation can be easily explained, others require a long term of apprenticeship in actual night photo interpretation before the operator can acquire any measure of skill in recognition and interpretation.

Since the focal length of the night photo camera and the 7 inch width of the film plate are such as to make the lens angle 35 degrees, each inch on the 7 inch width of picture represents 5 degrees of movement. Thus when a light source on the ground moves 2" across the width of the film plate, a bank of 10 degrees has been made by the aircraft. When viewed on the emulsion face of the negative - with the direction of flight pointing vertically, movement of a point toward the left of the picture denotes the raising of the starboard wing or a bank to the left. Movements toward the right of the picture denote the raising of the port wing or a ~~bearing~~ BANK to the right. Movements toward the bottom of the picture denote a downward movement of the nose of the plane and movement toward the top of the picture denotes nose up or climbing action.

CONCLUSION

The most forceful impression received abroad was the tremendous advantages the British have acquired in pooling all their photo interpretation into one unit under one system. The advantages are evident and hardly need enumerating. They include:

1. Elimination of duplication of effort - unavoidable and scattered organizations.
2. Simplification of liaison with Army, Navy, Coast Guard, and Air Force, as well as with other allied units.
3. Central pool of information gives all branches of service access to all available information.
4. Formulation of standard policy of terms, nomenclature, symbols, etc. for interpretation reports.
5. Controlled security of activities and of dissemination of information.
6. Central library more complete than any single independent unit could possibly be.
7. Central unit can carry on research more economically than a number of independent units.
8. Central organization benefits by getting all improved methods and ideas since there is no competition.
9. Best talent available under one roof for joint action on policy and solution of special problems.
10. Better training available for incoming personnel.

When examining our various photo interpretation units now in existence in America, it is hoped that the existence of the obvious advantages enjoyed in this single, well organized, smooth functioning interpretation unit will be of value.

North African Photo Reconnaissance Wing

This unit located at La Marsa, Tunis, operates in [illegible] with R.A.F. Medmenham except that its operations are carried on a small [illegible] unit is headed by Colonel Elliott Roosevelt who is assisted by W/C Fuller. The photo interpretation work is carried on mainly by British personnel trained at R.A.F. Medmenham although there are a few Americans working with the British. Other services of the unit such as the Weather Bureau, the training school, and the reconnaissance air fields are operated by American personnel. Two reconnaissance squadrons equipped with P-38 aircraft supply the photographic data for the unit. A photographic interpretation school administrated by Americans for American students is carried on in connection with this unit. Instruction is given by British interpreters. A small model shop manned by British personnel trained at R.A.F. Medmenham is included in the unit. Current interpretation work is being done in the Italian and Dalmatian Coast areas.

Middle East Interpretation Unit

The Middle East Interpretation Unit at Heliopolis, Cairo, follows the pattern of the R.A.F. Medmenham, very closely and operates entirely with English personnel. This unit is divided into two main sections, R.A.F. and Army sections. American liaison is established through Lt. Vanderfern, USNR. At present, this unit is working on Greek islands. The unit has a small but very alert model shop under the direction of Lt. Kim Allen, R.A.F. The ~~acting~~ commanding officer of the unit is S/L Smith, R.A.F.

Other Units

Other Interpretation Units operating in the E.T.O. include:

Small field units of two or three interpreters operating with Allied forces in Italy.

U.S. Naval Headquarters in Algiers - Scuola Materneglia.

British Naval Headquarters in Algiers - Scuola Normale

LIBRARY - THIS ENTIRE BUILDING IS NOW CROWDED WITH METAL RACKS - FULL OF PICTURES OF ENEMY TERRITORY.

THIS PHOTO WAS TAKEN BEFORE THE LIBRARY MOVED IN.

all photographic sorties and are of great assistance to an interpreter in selecting the photo he requires from a large number of photos.

The Library

An extensive library is maintained for cataloging all reconnaissance photos. This library occupies an area of approximately 30' by 180', the greater part of which is devoted to metal racks filled with reconnaissance photos from all parts of the world. For easy identification each sortie is given a library number. This number is related to the geographic position of the sortie through an index. Maps of all sections of the world are provided as indexes. They are marked off in grid sections, each section having its own grid number. To find a sortie in the library, the interpreter consults the grid on the map and finds the grid number. He then ascertains the library numbers of the various sorties flown in this grid area with their corresponding dates. Since all photos are arranged in accordance with their library number, it is a simple matter to pick out the sortie required. Each sortie is contained in a small box which has the plotting map attached to the inside cover. This plot shows the geographic area covered by each photo contained in the box. Since this library is the central unit for the filing of all photo reconnaissance pictures made in Norway, Germany, France, and the Low Countries area, it is very extensive in size and more complete than it would be if all activities were not centered in this one interpretation unit. Other photos are on file from the African, Middle East and Far East areas.

The R.A.F. Lechemere Unit acts as a parent unit for the North African and Middle Eastern interpretation units and personnel is supplied to the subsidiary units from this parent unit. Only well trained personnel is sent abroad and in general the methods and policies of the parent organization are carried out in the field.

wrecked planes and the damage done to the field and installations. The appearance of new types of aircraft is continually watched.

Wild Section

The Wild section gets its name from the Wild machine, a Swiss mapping device. This section prepares contour maps and renders photogrammetric service. This section also makes photo mosaics of possible enemy targets which in turn are used by the Model Section as later described.

Model Section

The model section is described in greater detail in a special report on the model building in the E.T.O. Its function is mainly the building of models for briefing and intelligence purposes, and the data which the model builders use is supplied to them by the various sections.

Wireless Section

The Wireless Section maintains a complete record of all wireless, Radar, and other technical enemy communication stations. It estimates the power and range of these installations and provides working drawings where possible for further study by other branches of the service. New stations being built are noted by this section and included in the reports. Unusual designs of wireless station buildings are noted, and followed with inherent. [illegible] reports from this section have been followed with air attacks [illegible] to fields.

Plotting Section

A Plotting Section is operated for the purpose of making plotting charts of the geographic location of each individual photo taken by reconnaissance planes. These plots are made at a very small scale on tracing cloth over a map of the terrain photographed. A small square representing the area covered by each photo is drawn on the map. This is numbered in a corner with the number of the photo which it represents. These plotting maps accompany

a comprehensive report of the entire action. This includes [illegible] position of the path finder sticks, as well as the position of incendiaries and ~~heavy exploding~~ high explosive bombs dropped during the raid, to the ~~target area~~. Searchlight positions and anti-aircraft positions can also be determined from these night photos and this information is coordinated with the Army section who are responsible for the reports on searchlights, anti-aircraft, and coastal defense positions. {SEE ADDENDA TO NIGHT PHOTO SECTION AT END OF THIS REPORT.}

Submarine Section

The submarine section examines all coastal sorties and maintains a continuous log on submarine building program carried on at enemy bases. It also compiles information regarding the launching of these submarines and the laying down of new keels. A careful check of bombing results is made so as to determine the effect of the bombing of these areas on the building schedule of submarines.

Shipping Section

The shipping section tabulates all enemy shipping as shown in coastal reconnaissances. All these ships are identified as to name whenever possible. An unusual chart follows each ship from port to port with information regarding where last seen and all movement data relating to these ships. Another phase of the shipping section encompasses the movement of enemy convoys. Convoy reports are issued with a sketch of the traveling formation of the convoy including reports on the escort vessels as well as the tankers, freighters, and merchant men.

Air Field Section

The air field section examines all existing enemy air fields and notes the position of new air fields. Wherever possible these fields are examined for presence of planes, the number and characteristics of which are carefully noted. In the event of an action an assessment is made of the number of

A TYPICAL NIGHT PHOTO LIKE THIS G
A WEALTH OF INFORMATION TO A TRA

Declassified and Approved For Release 2013/08/07 : CIA-RDP13X00001R000100290001-2

Industry Section

Industry Section reports involve detailed examination [illegible] factories as well as an assessment of the amount of activity noted before and after the bombing. These indications serve as an index to the effectiveness of the factory operations and output after a raid. Rail movements of freight and supplies to and from factory areas supplement these industry reports.

Decoy Section

Periodic reports are issued regarding the positions and characteristics of enemy decoys. The decoy section examines all reconnaissance photos for the presence of new decoys as well as for a check up on existing ones. These decoys fall into both day decoy and night decoy classes.

Night Section

One of the most interesting of all sections is the night section which deals only with night photos. Inasmuch as the heaviest British raids are made at night this section is responsible for the interpretation of all photos made during the raid. Night photos contain a wealth of information although on the surface they seem to be only a confused mass of strange lights and wierd streaks. Special cameras used in night photography provide alternate frames of ¼ second and 8 second exposures. The ¼ second exposures pinpoint fires and searchlight positions as well as positions of flares and path finder attacks. The 8 second exposures are intended to hold the lens of a camera so as to pick up ground detail with the aid of flash bombs. These photos contain a track or light path made by a single source of light on the ground. This track makes strange streaks of light across the film and the characteristics of the shapes of these tracks are indices to the EVASIVE action and general movement of the aircraft containing the camera. By coordinating the information contained in the various pictures taken during a night raid by different aircraft during the progress of a raid, the night section is able to [illegible]

Section, Wild Section, Modelling Section, Wireless Section, and Plotting Section. An extensive library serves all sections.

Army Section

Army Section reports include coastal defenses, types of batteries, appearance of new batteries, assessment of other types of enemy defenses such as searchlight positions, flak batteries, tank traps, barbed wire entanglements, etc. In the more critical sections of the French coast daily reconnaissance photos are examined and compared with preceding photos. The Army section is administered by an Army captain and various members of the Army section are individually responsible for reports and up-to-the-minute condition of the defenses of their assigned section of the enemy coast.

Navy Section

This section prepares reports on landing beaches, movements of warships, etc., and has developed some interesting data on the relation of speed of ships to the wake. It has conducted a number of experimental photographic tests to determine the characteristics of underwater and above-water beach areas as contained in reconnaissance photos. This includes an assessment of various types of seaweed and rock formations and conclusions drawn therefrom.

Bomb Damage

Bomb Damage reports (of the third phase) are accompanied by maps of bombed areas showing the location of individual bomb hits within and without the target area. Types of hachures indicate total destruction, partial destruction, and slight damaged areas, and the general assessment as to the percentage of effective destruction is indicated. An American Army officer (Lt. Elliott Flaxman) who has spent a great deal of time in the Bomb Damage section at Medmenham, is now instructing at the Harrisburg, Pennsylvania Interpretation School.

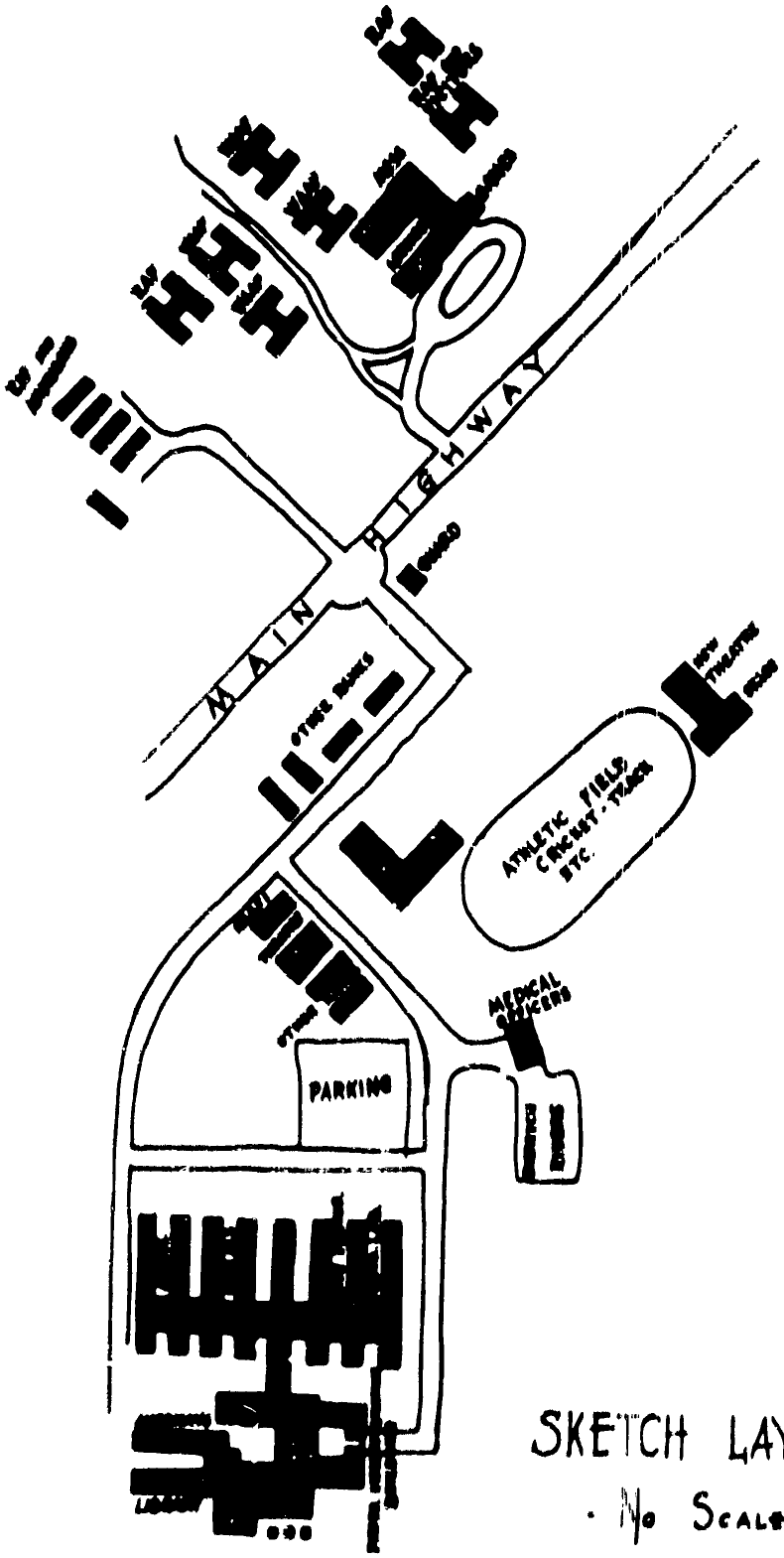
assisted by W/C Kendall and W/C Menshaw-Thomas. Various sections of the organisation are under the direction of squadron leaders.

Reconnaissance photos are supplied to the photographic interpretation unit by three reconnaissance units; one of these operates from northern England; one from Cornwall in southern England, and a third from Benson Field which is near R.A.F. Medmenham. The photographic interpretation work is divided into three phases.

First phase photographic interpretation is the immediate assessment of the photographic negatives. This work is done by a small group (3 or 4) of highly trained interpreters stationed at the reconnaissance air fields. As soon as a reconnaissance aircraft is landed, the negatives are developed and given first phase examination. Any important information found in this examination such as the whereabouts of enemy capital ships, the existence of unusual enemy concentrations, etc., is immediately relayed to proper authorities. The negatives are then sent by dispatch riders to R.A.F. Medmenham, where they are printed, and the prints are sent into second phase interpretation.

Second phase interpretations are made within 24 to 48 hours and contain a very quick, general report of shipping, air fields, aircraft, bomb damage assessment, condition of enemy defenses, etc. After the second phase examinations have been completed, the prints are turned over to the various third phase sections.

Third phase reports are issued in whatever time is required to make a very complete and accurate survey of enemy activities and of operational results. Included in the third phase sections are the following units: Army Section, Naval Section, Bomb Damage Section, Industry Section, Decoy Section, Night Section, Submarine Section, Shipping Section, Air Field



SKETCH LAYOUT

· No Scale · ·

THIS MEMORY SKETCH HAS BEEN INCLUDED TO GIVE SOME IDEA AS TO THE LARGE SCALE OF THIS CENTRAL INTERPRETATION UNIT.

OFFICE OF STRATEGIC SERVICES
WASHINGTON, D. C.

SECRET

Report on - PHOTOGRAPHIC INTERPRETATION UNITS OF THE M.T.O.

by

Lt. N. H. Juran, USNR.

Photographic Interpretation Units operating in the M.T.O. are:

1. R.A.F. Medmenham, England
2. North African Photo Reconnaissance Wing, Tunis
3. Middle East Interpretation Unit, Cairo
4. Other Units

R.A.F. Medmenham, England

Up to the present time photographic interpretation work in the M.T.O. has been done mainly by British Units although an increasingly large number of American interpreters are operating within these units. British personnel receives its basic training in photograph interpretation at Nuneham (near Medmenham) in a six weeks course. Heads of departments engaged in photographic interpretation work at Medmenham, lecture the students on specialized interpretation. The instruction at the school is practical and thorough and students arriving at Medmenham upon the completion of their course are able immediately to begin work as photographic interpreters. They are assigned to work under more experienced personnel until such time as their performance justifies confidence in their reports. Almost all photographic interpreters are commissioned officers.

The Photographic Interpretation unit at Medmenham in England, is the largest in the M.T.O. and very likely the largest in the world. It is comprised of approximately 1000 personnel of which about 60 percent are officers. Of the officer personnel WAAF's dominate in number (about 60 percent WAAF and 40 percent R.A.F.). The unit is under the direction of W/C Cator [illegible]

OFFICE OF STRATEGIC SERVICES
WASHINGTON, D. C.

SECRET

From: Office of Strategic Services

To: Office of Naval Intelligence

Subject: Report on Activities in the E.T.O.

The attached report for your information, contains first-hand observations made by a member of our organization who has been stationed at all of the photographic interpretation units in the E.T.O. within the past eight months. The report is divided into separate sections for your convenience. Only this original of sections 1 and 3 have been prepared. No copies have been made of these two sections.

1. Photographic Interpretation in the E.T.O.
2. Model Building in the E.T.O.
3. Target Maps in the E.T.O.
4. Use of Oblique Photos in the E.T.O.
5. Kohrograph Perspective Sketcher
6. Pilot's Scale Estimator
7. Measuring Underwater Depths by Oblique Projection

Additional details can be made available on any of the above reports by request to the Office of Strategic Services, Field Photographic Branch, Executive 6100, extension 2030.

REPORT

ON MISCELLANEOUS ACTIVITIES IN THE E. T. O.

Declassified and Approved For Release 2013/08/07 : CIA-RDP13X00001R000100290001-2

AIRMAIL

HEADQUARTERS MEDITERRANEAN THEATER OF OPERATIONS
SERVICES OF SUPPLY
OFFICE OF THE CHIEF ENGINEER
UNITED STATES ARMY
A.P.O. 887

Our ref: E/1

5 Oct 1943

Lieutenant (jg) N.M. Juran, U.S.N.R.,
Hq. NAVEU,
A.P.O. 520,
U.S. Army.

Dear Juran,

I was pleased to receive your letter of 18th. September regarding arrangements made to provide us with one of the Moregraph units. We shall be glad to study it and experiment with its use on our problems.

Captain Johnson of the 953rd. Engineers has furnished a preliminary report on his method of oblique photography for target charts. I hope that this will give you the information you need for your project.

Lt.Colonel McCrimmon joins in sending kindest personal regards.

For the Chief Engineer:

Sincerely yours,

H. MILNE.
Colonel G.S.
Chief, Intelligence Division.

Incl: 1.

Aer-PH-16
KMJ-1/PHL

NAVY DEPARTMENT
BUREAU OF AERONAUTICS
WASHINGTON

AIR MAIL

CONFIDENTIAL

OCT 1943

From: The Chief of the Bureau of Aeronautics.
To: The Naval Air Attache, American Embassy, London, England.

Subject: Plotting Data for Oblique Aerial Photographs, Request for.

References: (a) Captain A. F. Malstrom, USN, Naval Air Attache, American Embassy, London, ltr. PHL/(1010) dated 2 September 1943 (confidential) to Captain L. A. Pope, USN, Bureau of Aeronautics, with Enclosure.

1. It is noted in Paragraph 6 of the enclosure to Reference (a) that new developments recently completed by the RAF make it possible to make measurements in both the horizontal and vertical planes directly from oblique aerial photographs. This statement is of significant interest to this bureau. It is requested that all available data regarding this procedure be forwarded marked for attention of the Photographic Division.

2. Cooperation of the Naval Air Attache is appreciated.

L. A. Pope
Captain, USN
By Direction Chief of Bureau

[redacted]

Subject:- Oblique Photography.

[redacted]

Brigadier General Wm. Donovan,
Office of Strategic Services,
Washington D.C.
U.S.A.

Copies to:- J.I.C.A., U.S.A.F.I.M.S.
O.S.S., U.S.A.F.I.M.S.

Sir,

I have the honour to notify you that AAFIU have reason to be grateful to O.S.S. for the extremely interesting and most useful demonstration and lecture recently given here to our Army Interpreters by Lieut. N.H. Juran, U.S.N.R. of O.S.S. Field Photographic Branch.

This is to us an entirely new application of the science and which we hoped to see developed without delay. We are already trying experiments here.

If any equipment, such as used by Lieut. Juran, is available on loan from O.S.S. this would prove most valuable at the Army Air Photo Interpretation School, U.S.

I have the honour to be, Sir,
Your obedient servant,

E.F.K.Elliott,
Major, R.A.,
Officer Commanding,
AAFIU.

Offd. M.S.F.
[redacted]

SECRET EQUAL. MOIOAN CONFIDENTIAL.

Middle East Interpretation Unit,
Royal Air Force,
Middle East Forces.
27th October, 1943.

Ref. MEIU/S.129/Air/Ma.

Dear Turner,

I wish to take this opportunity of thanking you for the excellent lectures on the development of oblique projections which you delivered to this Unit on the 18th and 20th of October. These lectures have most certainly opened up a new field of research for our interpreters, who are making every possible use of the equipment handed over to them.

Should any new developments of the principles involved be discovered here, you will most certainly be apprised of them.

Yours sincerely,

A.S. Fiddes Sqn Ldr

Squadron Leader, Commanding,
M.E.I.U., R.A.F., M.E.F.

Lt. N.M. Turner, U.S.N.R.,
Office of Strategic Services,
Field Photographic Branch.

HEADQUARTERS
PHOTO RECONNAISSANCE WING [illegible]
A. P. O. [illegible]

[illegible]

SUBJECT: Services Rendered by [illegible]

TO: Commanding General, [illegible]

REFERENCE: Methods of obli[illegible]

1. This organization expresses its [illegible] for its contribution of the Obli[illegible] applied to photo interpretation and mode[illegible]

2. The methods have been incorporated [illegible] for the training of our photo interpreters. [illegible] been assigned to carry on this work in [illegible] We feel these methods are unique in [illegible] of oblique photographic cover.

3. Our Reconnaissance Wing has flown [illegible] sortie to assist your representative in experiments for the determination of underwater depths by obli[illegible] projections. We hope these photos will be of service to you in this work.

4. It is desired that you should be aware of the w[illegible] hearted cooperative attitude as shown by your representative, N. H. Juran, Lt. (S.Gr.), [illegible]. It is felt that with the knowledge which he has gained of the problems inherent in actual theater conditions that he can greatly increase the efficiency of the use of reconnaissance photography in future operations.

5. A request has been made of Lieutenant Juran by this Headquarters that an officer with complete training in this method of oblique projection be secured for assignment to this command in addition to the officers and men who have been partially trained during the visit of Lieutenant Juran.

[illegible]
Major [illegible],
Colonel, [illegible],
Commanding.

HEADQUARTERS
NORTHWEST AFRICAN PHOTO RECONNAISSANCE WING
ARMY AIR FORCES

(R-L-ene)

APO 520, U.S. Army
19 June, 1943.

SUBJECT: Temporary Services of Lt. (jg) N. H. Juran.

TO : COMMANDER OF NAVAL FORCES IN EUROPE, U. S. Embassy, London.

1. This organization is interested in having Lt. (jg) N. H. Juran placed on Detached Service with it for a period of time sufficient to determine the value of his Mohr-o-graph and oblique projection apparatus in field operations.

ELLIOTT ROOSEVELT,
Colonel, Air Corps,
Commanding.

From: 11 November 1943.

To: Commander of U.S.Naval Forces in Europe.
Director, O.S.S.Mission in London.

Subject: Lieut.N.N.Juran,USNR. Request for Orders.

Enclosure: Copy of Report on Duty.

1. Since May,1943,subject-named officer, under the direction of this office, has been developing a new method for determining plans and measurements of military installations and beach gradients directly from oblique photos. He has worked at the British Central Interpretation Unit at R.A.F.Medmenham, North African Photo Reconnaissance Wing and the Middle East Interpretation Unit.

2. During his work this officer has uncovered a number of unique improvements in the field of photo interpretation. He is on the track of additional developments which may lead to the determination of under water depths from oblique photos.(See Enclosure (a) of attached report).

3. It is important that this officer be sent to Washington, D.C. in order that he may bring these developments to the attention of the Bureau of Aeronautics and the Office of Naval Intelligence immediately. (See Enclosure (b) of attached report).

4. It is desired that this officer indoctrinate a group of photo interpretation trainees in Anacostia, D.C. to operate the system of oblique projections, and that he prepare a comprehensive illustrated booklet on the method for use by the Interpretation Units of our armed forces.

5. It is further desired that this officer work with the Special Devices Division of the Bureau of Aeronautics in Washington, D.C. to prepare improved instruments for the operation of this method, to revise the hahrograph perspective sketcher to meet field conditions, and to work out an instrument for pin pointing military objectives directly on to maps from oblique and vertical photos.

6. When this work is completed, subject named officer should be sent to the Pacific Theater to work on the method of measuring under water depths of coral reefs and landing barriers surrounding enemy beaches.

7. This office recommends that the subject named officer be sent immediately to Washington, D.C.for the purposes of carrying out the above outlined work.

/s/ Vice-Admiral Wilson.
COMNAVEU.

Tel No. Abbey 3411.
Ext

AIR MINISTRY,
KING CHARLES STREET,
WHITEHALL, S.W.1.

4th June, 1943.

Dear Lt Juran

Thank you very much for your letter of the 3rd June, together with a copy of that written to Major Hart.

I shall be very glad to have your model of the hehrograph which I will have copied.

I shall be glad to see you any time you care to call.

Yours sincerely

Lieut. N.H.Juran,
U.S.N.R.,
Office of Strategic Services,
United States Government,
London.

Telephone No.: Extn. 10.
Pimlico 1000-4.

Please reply to the officer in charge.

GEOGRAPHICAL SECTION,
GENERAL STAFF. (A)
THE WAR OFFICE,
LONDON, S.W.1.

Ref. No. AS.403A/G.S.G.S.A.

Your Reference...

29th May, 1943.

Dear Lt. Jurin,

I have read with great interest your pamphlet on the use of oblique photographs in making contoured maps and three dimensional models.

I should be most grateful if you could let me have any information as to any models you have so far constructed, with particular relation to any tests you may have carried out in estimating the accuracy of the method against known standards.

I understand that you will be in the country for some time, and so perhaps I shall have the opportunity of meeting you.

Yours sincerely,

(Cameron Matheson)

Lieutenant Jurin,
U.S.A.,
c/o 20 Grosvenor Square, W.1.

M.O'D

OFFICE OF STRATEGIC SERVICES
WASHINGTON, D. C.
Field Photographic Branch

22 March 1944

Mr. Robert Thrun,
Room 124, Adm. Bldg.,
OSS.

Dear Bob:

Enclosed please find three copies each of our four booklets. If you need additional copies, please advise.

Would you kindly return the original dummy booklets which are in your files.

Sincerely,

M. H. Juran,
Lieut., USNR.

file

Bob - You will recall you wanted to exchange the copies in the Chief of Staff Office with these printed ones.

Jerry

Iconography - 11,046

Duran
Field Photo Br.
Follow-up

April 7

April 14 18

IN REPLY ADDRESS THE DIRECTOR
U. S. COAST AND GEODETIC SURVEY
AND CITE THE SERIAL OF THIS LETTER

AND REFER TO NO. 527-RCR

DEPARTMENT OF COMMERCE
U. S. COAST AND GEODETIC SURVEY
WASHINGTON 25

April 4, 1944

To: Brigadier General William J. Donovan
Director, Strategic Services
25th and E Street, N. W.
Washington 25, D. C.

From: The Director
U. S. Coast and Geodetic Survey

Subject: Literature on Iconography

It is understood that your office will, in the near future, publish some special literature on its research on Iconography.

It is believed that the knowledge of this science might be applicable to the use of this Bureau in certain phases of its work with aerial photography. Therefore, it is requested that this Bureau be placed on the list of agencies to be supplied with this literature.

L. O. Colbert
Director

CONFIDENTIAL

28 April 1944

Mr. L. F. Colbert, Director,
U. S. Coast and Geodetic Survey,
Department of Commerce,
Washington 25, D. C.

Dear Mr. Colbert:

Ref: ADT-HOU

The special literature on lensmapping which you requested in your letter of 4 April 1944 is being sent to you under separate cover by our Field Photogrammetric Branch. I hope that it will be of assistance to the Survey in connection with its work on aerial photography.

We have also added the Survey to the list of agencies to be supplied with similar literature which may be available in the future.

Sincerely yours,

G. Edward Buxton,
Acting Director.

Bauerle

CONFIDENTIAL

GENERAL HEADQUARTERS
SOUTHWEST PACIFIC AREA
Office of the Chief Engineer

APO 500
29 August 1944

GH 461 (29 Aug 44)X

SUBJECT: Request for Publications.

TO : Office of Strategic Services, Washington, D.C.
Attention: Iconography Section, Field Photographic Branch.

It is requested that fifty (50) copies each of the following publications of the Office of Strategic Services be forwarded to this office for distribution to interested headquarters and engineer topographic units, via surface shipment, if available:

Underwater Depth Determination
Perspective Thru Jerisscope
Iconography
Pilots Iconometer

For the Chief Engineer:

O. E. WALSH
Colonel, CE
Executive Officer

Secret

OFFICE OF STRATEGIC SERVICES
WASHINGTON, D. C.

INTEROFFICE MEMO

TO: Director's Office
Administration Building

11 September 1944

FROM: Field Photographic Branch

SUBJECT: Request for Publications.

Enclosure A, letter from General Headquarters, Southwest Pacific Area, dated 29 August 1944, same subject, is enclosed for your information.

On 9 September 1944, we forwarded 50 copies each of Iconography and Perspective Thru Jeriscope, and 40 copies of Pilots Iconometer.

The balance of the order will be forwarded upon receipt of additional copies in this office. Copies are now on order with Reproduction Branch.

JOHN W. ENGLISH
Lieut., USNR
Executive Officer
Field Photographic Branch

Encl. A - Letter dated 29 August 1944.

11,046 B

OFFICE OF STRATEGIC SERVICES
Schools and Training Branch
2334 P Street, N.W.
Washington, D.C.

SECRETARIAT
424 5

1944 SEP 12 AM 11 02

11 September 1944

SUBJECT: Attached Correspondence from Fleet Marine Forces 088

TO: The Secretariat

The attached correspondence was forwarded to this branch. It is our belief that possibly Field Photographic Branch has dealt with the IOGEOGOOX'S and VARIGOPES.

For Colonel Robinson:

JOHN H. TOMPKINS,
1st Lt., Infantry,
S-4.

11,046 B

OFFICE OF STRATEGIC SERVICES
Schools and Training Branch
2324 F Street, N.W.
Washington, D.C.

SECRETARIAT
9/24 8

1944 SEP 12 AM 11 02

11 September 1944

SUBJECT: Attached Correspondence from Fleet Marine Force 088

TO: The Secretariat

The attached correspondence was forwarded to this branch. It is our belief that possibly Field Photographic Branch has dealt with the IOSCOPE and VERIDOPE.

For Colonel Robinson:

JOHN G. TOWERS,
1st Lt., Infantry,
S-4.

FORM 4001a

Date 11 September 4

To: Mr. Clayton

We have forwarded a copy of the attached to Field Photographic with the request that they prepare a reply for your signature.

W. Bartlett

OIC

cc

Office of the Secretariat

(2139)

HEADQUARTERS
TRAINING COMMAND, FLEET MARINE FORCE
SAN DIEGO AREA, CAMP PENDLETON
OCEANSIDE, CALIFORNIA

5 September, 1944.

FROM: Commanding General
to : Director, Office of Strategic Services
25th and "E" St., N.W., Washington, D.C.

Subject: Equipment request for.

1. This command is desirous of obtaining one (1) ICONOSCOPE (oblique rectifier) and six (6) JERISCOPES (perspective sketcher) which were demonstrated here on the morning of 2 September.

2. It is our intention to use the ICONOSCOPE in connection with the Mapping and Surveying Section and the JERISCOPES for training purposes in the field.

3. It is further requested that six (6) copies of the ICONOGRAPHY Booklet and twenty-five (25) copies of the JERISCOPE Booklet be furnished.

J. N. FRISBIE,
By direction.

OFFICE OF STRATEGIC SERVICES
Stoneall and Washington Buildings
[illegible] Street, N.W.
Washington, D.C.

12 September 1944

SUBJECT: Attached Correspondence from First Marine Force

TO : The Secretariat

The attached correspondence was forwarded to this branch. It is our belief that possibly Field Photographic Branch has dealt with the [illegible] and PERISCOPES.

For Colonel [illegible]

JOHN A. VOORTES
1st Lt., Infantry,
S-4.

RESTRICTED

To: Commanding General
Headquarters - Training Command
Fleet Marine Force
San Diego Area
Camp Pendleton
Oceanside, California

From: Director, Office of Strategic Services
Washington, D. C.

Subject: Equipment - Request for.

Ref.: (a) A letter from the Commanding General to Director, Office of Strategic Services, same Subject, Dated 3 September 1944.

1. Reference (a) requested one (1) Z periscope and six (6) Jerisscopes; six (6) copies of the Z periscope booklet and twenty-five (25) copies of the Jerisscope booklet to be sent to Headquarters Training Command of the Fleet Marine Force.

2. This request has been referred to Field Photographic Branch, Office of Strategic Services, which expects to be able to ship one (1) Iconoscope and six (6) Jerisscopes on or about 10 November 1944.

3. Six (6) copies of the Iconoscope booklet and twenty-five (25) copies of the Jerisscope booklet will be shipped immediately.

WILLIAM J. DONOVAN
Director

RESTRICTED

[illegible]

[illegible] November 1944

To: [illegible]
Commanding General, [illegible]
Chief Signal Officer, [illegible]
Camp Pendleton, Oceanside
California

Att: J. M. Frimble

CONFIDENTIAL

From: E. H. Kellogg, Lt., USNR
Acting Chief
Field Photographic Branch

Sub: Boresscope, request for

Ref: (a) Letter to Director, O.S.S. from the Commanding General dated 5 September 1944.
(b) Letter from Director, O.S.S. to Commanding General dated 20 October 1944.

Encl: (A) Copy of letter of 5 September from Commanding General.
(B) O.S.S. Property Transfer Papers.
(C) Set of keys for Boresscope case.

1. We are sending this date by R.R. Express one (1) Boresscope (photo complete with accessories and power unit (Encl) in partial completion of your request in Reference (a). Please sign all four sheets of the Property Transfer Papers and return to this office. Mr. J. M. Frimble can sign as the RECEIVING OFFICER and Mr. Frimble or some other authorized officer as the RECEIVING OFFICER after these papers have been certified by the O.S.S. Property Section, one copy will be returned to you.

2. The carrying case for the power unit will be shipped by December 10th.

3. Two keys to the Boresscope case are enclosed, herewith.

4. Lecture charts for use with the instrument and a motion picture training film will be sent approximately the first week in December.

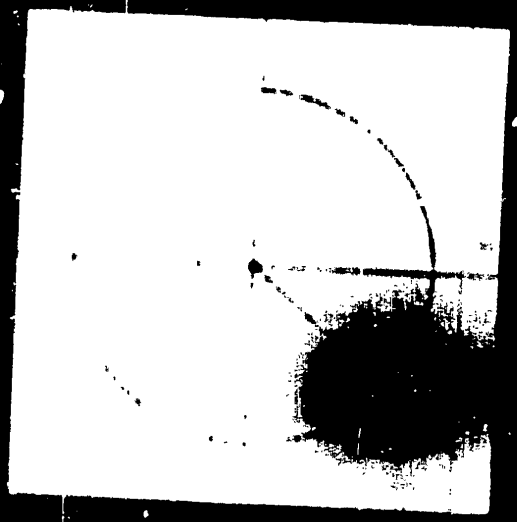
5. The six (6) Periscopes requested in Reference (a) are expected from the manufacturer approximately the first week in December and will be sent at that time.

E. H. Kellogg
Lt., USNR
Acting Chief
Field Photographic Branch

cc: To Director
cc: Comdr. Jarvis

Declassified and Approved For Release 2013/08/07 : CIA-RDP13X00001R000100290001-2

Declassified and Approved For Release 2013/08/07 : CIA-RDP13X00001R000100290001-2



Declassified and Approved For Release 2013/08/07 : CIA-RDP13X00001R000100290001-2

OFFICE OF STRATEGIC SERVICES
HONOLULU, T. H.

SECRET

INTEROFFICE MEMO

DATE: [illegible]

TO: [illegible], Capt., USN, [illegible]

FROM: [illegible] Willwell, Commdr., USN
Office of Strategic Services, OSS

SUBJECT: [illegible]

1. Attached herewith is Mr. Jyrne's duty report of 18 May 1945. [illegible] of the General Board in Pearl Harbor [illegible] Tuesday, 22 May 1945.

2. As will be observed, Mr. Jyrne has completed under Turtle and [illegible] with the subject of [illegible] in order to [illegible] upon the application of effort, has [illegible] that in respect [illegible] of water water depth determination.

3. With respect to:

Water Tap & Tilt Indicator

Ex-Ray Target Map

Water Water Depth Determination by Shadowgraph
Vertical Photographs

It is believed these methods are deserving of trial and, if found satisfactory, their dissemination throughout all theatres for the information and use by appropriate units. The question consequently arises, should these methods be proven in this area or would it be advisable to have Mr. Jyrne return to the regular station in Washington and collaborate with the respective Navy and Army units in the development and dissemination of the proposals.

6. It is recognized that Mr. Jyrne's services may be useful in this theatre for work in connection with current or future operations or that possibly the dissemination can best be managed by additional temporary duty here while remaining on attached or wait for permanent duty in Washington here rather than proceeding to his home station to insure the further dissemination of these methods.

7. Please advise of your further desires.

[illegible] Willwell

SECRET

Underwater Depth Determination, Report on

6. You will recollect that at the time the Immediate Evaluation was issued by CNO the ECM made an attempt to [illegible] wished to issue this material as a Navy project. You made a [illegible] subject to the JCS which I believe was instrumental in continuing it as an CNO matter.

OFFICE OF STRATEGIC SERVICES
HONOLULU, T. H.

INTERDEPARTMENTAL MEMO

TO: Director, OSS Washington

DATE: 2 [illegible]

FROM: R. Davis Halliwell, Comdr., USNR

SUBJECT: Underwater Depth Determination, Report on.

REF: (a) Report on Underwater Depth Determination by Vertical Photography.
(b) Report on Solar Tip and Tilt Indicator.
(c) Report on "X-Ray" Target Map.

SECRET

1. Enclosure (a) represents a new method of Underwater Depth Determination developed by our Lt. Juren presently working with the Joint Intelligence Center, Pacific Ocean Area. The importance of this development to the armed forces is considerable.

2. Prior to Lt. Juren's arrival, three scientists from NDRC, namely Dr. Flood, Professor Hixson and Commander Forbes, were working here on underwater depth determination problems. However, after Lt. Juren demonstrated the OSS method, it was agreed by all (including the NDRC representatives) that the OSS method was in accomplished fact the solution that the scientists were seeking. Accordingly, the NDRC mission is returning to Washington.

3. It has been revealed that the NDRC men intend to begin work on A NEW METHOD for the determination of underwater depths by simultaneous vertical photographs. Their decision to do this may be coincidental with Lt. Juren's efforts, or it may be the result of conversations between Lt. Juren and members of JICPOA who in turn passed the idea on to the NDRC people; but the fact is that Lt. Juren, before coming to Honolulu, had already worked out the details of this method, using photographs supplied him by Lt.(jg) Kistler and Lt.(jg) Wise, USNR, of the Photo Interpretation Unit of the Photo Science Laboratory, Anacostia, D.C. He states this work was started in Washington on or about 1 April 1944.

4. It is felt, therefore, in view of the potential importance of this method to the armed forces (Lt. Juren seems to feel that it is preferable to his oblique method) that the enclosed report should be made available to you in the event that you should desire to transmit it to the Joint Chiefs of Staff, to Capt. Pope (Chief of Photography-Bureau of Aeronautics) or to the NDRC to avoid duplication of effort, and to keep our leadership in the field of Underwater Depth Determination.

5. Two additional reports, Incl (b) and (c) are included. Possibly copies of the reports on Solar Tip and Tilt Indicator should be interesting to:

Lt.(sl) Morris Parks, USNRF OSS/OSS Pentagon Building
Col. Loper, U.S. Engineers, War Department Building
Capt. Pope, USN, 18th Navy Building
Fairchild Camera Co., New York City

OFFICE OF STRATEGIC SERVICES

INTERDEPARTMENTAL MEMO

DATE: [illegible]

The Director, OSS, Washington

[illegible] Cowell, Comdr., USNR

SUBJECT: Lt. Patrick M. Furse, USNR

CLASSIFICATION

Mr. Furse arrived here on May [illegible] with orders to report to the Washington Naval District for temporary duty and was sent to the Commandant's Office to report to Capt. E. B. Hill, USN, [illegible] assistance officer on the CHECKER and SHACKLE project. [illegible] the writer was ordered to report for Eighteen duty by [illegible] in his oral instructions of April 26th.

Mr. Furse has since this time been serving in this [illegible] Division [illegible] and it is believed he has accomplished some [illegible] work.

Under date of May 14th a full report on subjects assigned [illegible] was made to Capt. Hill for his information and for review to [illegible] Pritty who is the (X) of ZIGZAG. Because of the [illegible] nature this report we were asked to withhold it from distribution until we [illegible] authorized to release it. Copies for the following are enclosed [illegible] letter and will be forwarded as soon as released:

Director, OSS, Washington
Naval Photographic Branch, OSS, Washington
L. A. Pope, Capt., USN, Chief Photographer [illegible]

It is believed that IGLOO/PET and its particular development [illegible] in this theatre but that progress has been slow [illegible] of realistic direction and adaptation by those who are responsible for the production of results.

It will be our object to keep you advised of developments and [illegible] to the two enclosures herewith as received.

ANNEX C

Hydrography 11.046 C.

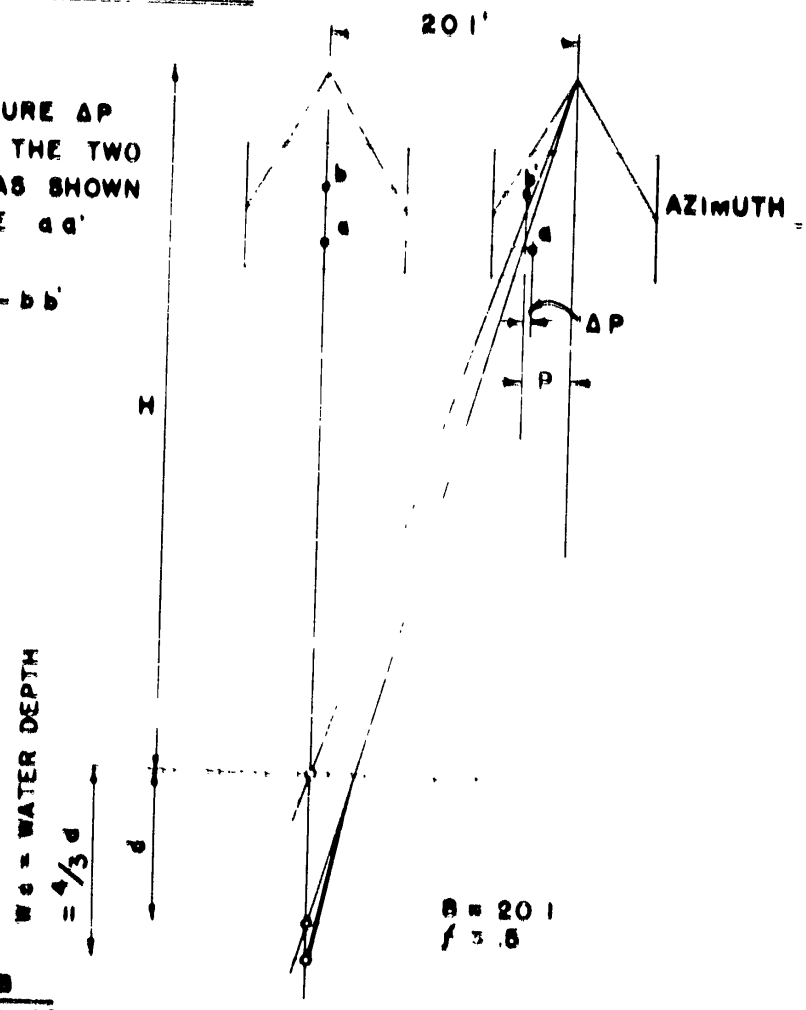
OFFICE OF STRATEGIC SERVICES
WASHINGTON D.C

ENCL (C)

30, MAY 1944

COMPUTATION OF DEPTHS

TO MEASURE ΔP
LINE UP THE TWO
PHOTOS AS SHOWN
MEASURE a a'
AND b b'
ΔP = a a' - b b'



$$\frac{H + d}{f} = \frac{B}{P - \Delta P}$$

$$d = \frac{Bf}{P - \Delta P} - H = \frac{10.05}{P - \Delta P} - H, \quad \text{IF } H = 200,$$

$$d = \frac{10.05}{.05025 - \Delta P} - 200$$

DUE TO THE NARROW RANGE OF VERTICAL ANGLES, THE DIFFERENCE IN LINES OF INCIDENT RAYS WILL BE VERY SMALL, AND FOR PRACTICAL PURPOSES,

Wd (DEPTH OF WATER) = $\frac{4}{3}$ d

30 May 1944

Aircraft speed calculations and exposure intervals.

If cameras are mounted port and starboard, full 200' width of reef area will be covered in each pair of photos in the direction of travel of the aircraft. This cuts down the exposure interval necessary, which is advantageous when travelling at extremely high speed and low altitude.

@ 100 miles/hr., the aircraft travels—
200x5280 - 1,056,000'/hr. - 17,600'/min. - 293.3'/sec.
@ 200 miles/hr., the aircraft travels - [illegible]
@ 400 miles/hr., the aircraft travels - [illegible]

It will be necessary to fly a new strip of photos for every 250' width of reef.

At 200 miles/hr it will be necessary to take 11 exposures every 10 seconds.
At 250 miles/hr. it will be necessary to take 14 exposures every 10 seconds.
At 300 miles/hr. it will be necessary to take 17 exposures every 10 seconds.
At 350 miles/hr. it will be necessary to take 19 exposures every 10 seconds.
At 400 miles/hr. it will be necessary to take [illegible] exposures every 10 seconds.

This will give approx. 20% overlap on each pair of photos in the direction of flight.

The side overlap (for identification purposes) will be 50%. This is on the large side to allow for drift, etc., of the aircraft.

Size of area of reef covered on each pair of photos - [illegible]' x 200' area.

 X A

Photogrammetry 11,046 C

OFFICE OF STRATEGIC SERVICES
WASHINGTON D.C.

30, MAY 1944

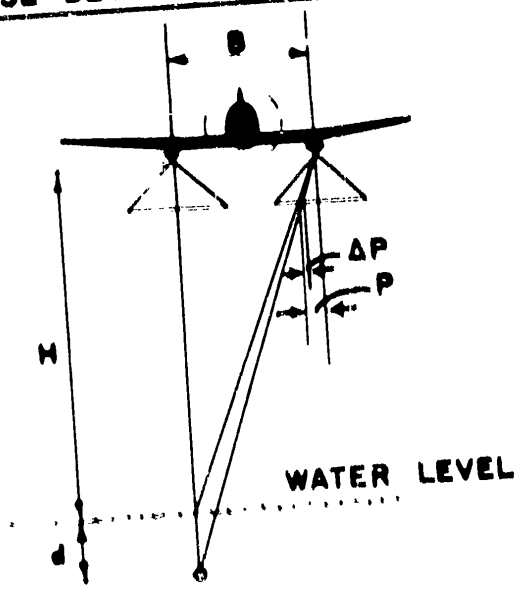
ENCL A.

FLYING HEIGHT AND AIRBASE BETWEEN CAMERAS

BASIC PARALLAX FORMULAE.

$$\frac{B}{P} = \frac{H}{f}$$

$$\frac{P - \Delta P}{B} = \frac{f}{H + d}$$



ASSUME

H = FLYING HEIGHT = 200'

ΔP = MINIMUM MEASUREMENT POSSIBLE WITH SCALE = .00025'

h = MAXIMUM ERROR TOLERABLE = 1'-0"

REQUIRED

B = AIRBASE = ?

P = BASIC PARALLAX = ?

$$\frac{P - \Delta P}{B} = \frac{f}{H + d}$$

$$\frac{P - .00025}{B} = \frac{.5}{200 + 1}$$

$$.5B = 201P - .05025$$

$$B = 402P - .1005$$

BUT $\frac{P}{B} = \frac{f}{H} = \frac{.5}{200} = \frac{1}{400}$ $\therefore B = 400P$

SUBSTITUTING $400P = 402P - .1005$

$P = .05025$

$B = 20.1$

$\therefore$ FLYING HEIGHT = 200' AIRBASE BETWEEN CAMERAS = 20.1'

[redacted]

Underwater Depth Determination by Simultaneous Vertical Photography

Appendix

Annexes: A. Computations of Flying Height and Addition of Images.
B. Aircraft's speed determination, GE exposure interval.
C. Computation of depths.

1. Two simultaneous vertical photographs, taken at low altitude (800') from a single aircraft, [illegible] on part and [illegible] used to determine underwater depths of [illegible].

2. The determination of the depths as herein described will not require any special equipment. Using [illegible] drafting [illegible] and NV measuring dividers on photographs in [illegible] of a [illegible].

3. A complete [illegible] can be [illegible] in approximately three hours by one man. Many are [illegible] computations to [illegible] than addition, subtraction, multiplication and division.

4. With photos taken according to specifications, depths can be ascertained to within one foot of the actual depth.

5. Standard cameras, now available, may be used to take the pictures.

[redacted]

CONFIDENTIAL

[illegible] June [illegible]

To: The Secretary,
Joint U. S. Chiefs of Staff

Subject: Report on Developments in the Field of Iconography

Ref: (a) Letter same subject from OSS [illegible] dated 20 February 1946

1. You were informed by reference (a) of developments in the field of iconography made by Lt. [illegible], USNR, of our Field Photographic Branch. Further developments have now been made concerning application of iconography to the problem of underwater depth determination, a subject treated in Paragraph 8 of Appendix to Reference (a).

2. The new development eliminates the necessity of an oblique photograph and permits use of two simultaneous vertical photographs for the purpose of determining underwater depths of beaches. This method is described in the attached Appendix. It is believed that it will constitute a valuable contribution in this field.

3. Information on this further development will be made available to interested agencies and appropriate branches of the War and Navy Departments.

William J. Donovan
Director

CONFIDENTIAL

CONFIDENTIAL

Mr. Lovell

Mr. Turner

1. [illegible] are fully aware of [illegible] study of [illegible] which [illegible] determination of [illegible] study of [illegible] photography. For [illegible] if you [illegible] your [illegible] and IBMC.

2. I [illegible] also [illegible] that you will [illegible] Lt. Kelly, see that the proper [illegible] receive information on this new [illegible] such dissemination.

3. Also, after talking with Lt. Kelly, will you please see that the other developments [illegible] Commander Billiwell's report (the tip-off [illegible]) are made available to those agencies which should have the information.

Robert Turner
Assistant to the
Executive Officer

CONFIDENTIAL

CONFIDENTIAL

Iconography Home C
Underwater Dept.
Dist Tech Tech

THE JOINT CHIEFS OF STAFF
WASHINGTON

17 June 1944

MEMORANDUM FOR THE DIRECTOR OF STRATEGIC SERVICES:

Subject: Report on Developments in the Field of Iconography

1. Your memorandum of 16 June 1944 on the above subject together with appendix and attached Annexes A, B, & C has been received.

2. It is noted that the foregoing deals with further developments in the stated field, and that this further development concerning the application of Iconography to the problem of underwater depth determination will be made available to interested agencies and appropriate branches of the War and Navy Departments.

Edwin D. Graves
EDWIN D. GRAVES,
Captain, U.S. Navy,
Deputy Secretary.

CONFIDENTIAL

CONFIDENTIAL

With special cameras and special photographic flights, a test was run in the Bahamas at Cat Cay. The results from the photographs were checked with soundings and the error was found to vary from .55 feet to 1.4 feet. With the standard aerial photographs supplied Mr. Juran, he was able to come within 1.7 feet. It can be seen that he is filling a great need at present with remarkable accuracy, in spite of the material with which he must work.

Due to practical and tactical difficulties in the use of special cameras and special photographic flights, it is not possible to say when they will be able to put them into use. Mr. Juran's method is one which works and which is being used for operations now with available and standard photographic coverage.

It is the opinion of the Field Photographic and Research and Development Branches that this work of Mr. N. H. Juran, Field Photographic, constitutes a major contribution toward the success of the landings at Saipan, and that it brings great credit to O.S.S. Supplied with inferior information, he has shown great ingenuity and ability in providing vital information which was so necessary for this operation and will be likewise for operations in the future.

Respectfully submitted,

C. R. Kellogg

E.R. Kellogg
Lieut., USNR
Acting Chief
Field Photographic Branch

All of them also agree that this work of Mr. Juran's is most valuable and important. One of the greatest needs in the Pacific theatre of operations is a knowledge of under-water depths around proposed landing beaches. There are no accurate maps or charts. Other methods of determining under-water depths are not ready for tactical application. Mr. Juran is the only person who has a working system going at the present time in this theatre.

Reference is made to enclosures sent out by Rear Admiral Furer on the subject of Photogrammetry dated 26 June 1944. These reports clearly state the great need for this kind of work in the Pacific areas. In them is included an estimate of the work which Mr. Juran is doing at present. It says as follows:

"O.S.S. Method. This method requires a vertical and an oblique which are properly selected to include the area from the proper angle and with proper lighting. The vertical is blown up and the position of the oblique is reconstructed with a pinhole box viewer and photogrammetric computation is applied."

"Since often such photographs are on hand, the method can frequently be applied without special photographic flights. The accuracy is not high as small errors in the process create large errors in the result. Lt. Juran attached to O.S.S. is now testing the method at Honolulu. The method should be adopted by the Navy and used wherever possible."

CONFIDENTIAL

OFFICE OF STRATEGIC SERVICES
WASHINGTON, D. C.

18 July 1944

TO: Brig. Gen. William J. Donovan

FROM: Deputy Chief, Field Photographic Branch

SUBJECT: Report: Iconography - Pearl Harbor

The following appraisal has been made of the report sent by Comdr. R. Davis Halliwell on the work of Mr. N. M. Juran of the Field Photographic Branch.

With the information available, namely one good vertical photograph and one adequate oblique photograph, the results of the figures of Mr. Juran were found to be within an average of 1.7 feet of the true depths. As the report states, if an optimum oblique had been available, the average error would have been one foot.

People who have seen this report include Comdr. Alexander Forbes of the Hydrographic Office, Professor Phillip Kissam of Princeton University, who is working on this problem of under-water depth determination for the National Defense Research Council, and Lt. Phillip Kistler of the Photo Science Laboratory, Anacostia. These men are the recognized authorities on the subject of under-water depth determination. They are unanimous in saying that Mr. Juran's results are extremely good considering the photographic information with which Mr. Juran had to work.

CONFIDENTIAL

[illegible]

7 September 1944

MEMORANDUM FOR THE DICTATOR, JOint D.C. CHIEFS OF STAFF

Subject: Report, "Underwater Depth Determination by Simultaneous Vertical Photography."

1. Reference is made to memorandum dated 16 June 1944, subject: Report on Developments in the Field of Photography concerning determination of depth of water at beaches by simultaneous vertical photography, a method recently developed by Lt. H. H. Juren, U.S.N.R., of OSS.

2. For the purpose of testing this method, aerial photographic missions have been flown in the Pacific Ocean Area. The results of these tests are set forth in the subject report, which is forwarded herewith as the joint effort of OSS and CinCPOA.

3. This report has been submitted to the Office of the Coordinator, Research and Development, Navy Department, as well as to a joint committee, composed of representatives of the National Defense Research Council and all branches of the armed forces, established for study of photogrammetry and underwater depth determination. The method developed by Lt. Juren has been turned over to the Photo Reconnaissance Laboratory, Bureau of Aeronautics, Anacostia, for study and development, a committee appointed by the National Defense Research Council collaborating with the Photo Science Laboratory in anticipation of further experimental flights to be made at Norfolk.

4. Although there are other systems of underwater depth determination now under consideration, the method set forth in the attached report appears unique in that it is already proven and ready for use in the Pacific.

Charles A. Cheston
Acting Director

Att. Incl

Without

CONFIDENTIAL

Date [illegible]

To: Mr. Chesson

1. The attached memorandum [illegible] to [illegible] subject of the [illegible]

2. To report to you on the [illegible] of [illegible] and [illegible] systems.

3. To forward to you a copy of the Israel report on this subject, available in Mr. [illegible]. Copies of this report have been sent to Admiral [illegible], General Arnold and the War and Navy Departments.

W. B. Kunz
W. B. Kunz
Capt., A.C.
Reports Officer

Attachment

CONFIDENTIAL
Office of the Secretariat

(6139)

Date [illegible]

To: [illegible]

1. Forwarded herewith is the letter of report of [illegible] submitted in [illegible] 4 [illegible] and in [illegible] of Dr. Lovell for [illegible] to CINCPOA.

2. The report which is to be forwarded under cover of this memorandum may be [illegible] from Mr. [illegible]

[illegible]
[illegible]
[illegible]
Executive Officer

CONFIDENTIAL

Office of the Secretariat

4. The attached report was completed as a joint report of OSS and CINCPAC CINCPOA. It was submitted to Commander Dyson, USN, and to General Twitty, AUS, on 28 July 1944. General Twitty requested that all names be removed from the report. Lieut. Juran felt that an attempt was being made to cover the true origin of the method and supplied this office with a copy of the report and these facts.

5. On the morning of 1 August 1944, the report was submitted to Commander Dyke, at a joint committee, studying photogrammetry and under water depth determination composed of representatives of all services and the N.D.R.C. as well. The report was very well received and appears to be the only one of a number of methods under consideration which has been proved and is ready for use in the Pacific.

6. At this conference, Lt. Colonel Cox, USMC, attached to the Photo Science Laboratory, BUAIR, suggested that his Unit and OSS should collaborate in getting the method in operation. An agreement was reached to this effect.

E. R. Kellogg

E.R. KELLOGG
Lieut., USNR
Field Photographic Branch

Iconography 11,046-C

OFFICE OF STRATEGIC SERVICES X OSS operations POA

WASHINGTON, D. C. X Underwater depth determination

2 August 1944

MEMORANDUM

To: General Donovan

From: Lieut. E. R. Kellogg

In compliance with your request for the facts surrounding the Under Water Depth Determination Report, which was shown you on 31 July 1944, the following is submitted:

1. On the 29th day of April, Lieut. Juran was dispatched to Pearl Harbor for the purpose of acquainting personnel there with Iconography, and with the method for determination of under water depths by oblique projection. Seven officers at Pearl Harbor were given 4 weeks training in the theory and practice of rectification of obliques, and the class executed many solutions including the rectification of a number of Jap airfields and factories from captured Jap obliques. They determined heights of terrain at Palau and Yap, lengths of airstrips, size of enemy shipping, the turning radius of a Jap carrier photographed in the Philippine Sea, and other varied and unique solutions. Temporary equipment has been supplied to the Unit until we can ship new improved instruments now being checked and tested. A unit will also be supplied to the Intelligence Officer, U.S.S. Mt. McKinley, for trial aboard ship.

2. Before leaving Pearl Harbor, Lieut. Juran took with him certain data relating to a new method for determining under water depths by simultaneous vertical photography. These data were submitted in an OSS report from the Pacific Ocean Area, a copy of which was handed to Captain Hill, USN, on 31 May 1944. A copy of this report was sent to the Joint Chiefs of Staff in Washington on 16 June 1944.

3. The method was later discussed with Commander Dyson, USN, who agreed to make arrangements for an aircraft, so that the method might be tested. Lieut. Juran was requested to work together with Lieut. Kirsher, USNR, of CINCPAC CINCPOA.

SECRET

2--Acting Director--26 August 1944

5. The report "Under Water Depth Determination by Simultaneous Vertical Photography" has been submitted to the Office of the Coordinator, Research and Development, Navy Department.

6. This method has been placed in the hands of the Photo Science Laboratory, Anacostia, by the Chief of Operations, Navy Department. A committee appointed by the National Defense Research Council is working with the Photo Science Laboratory in the supervision of further experimental flights to be made at Norfolk by VD-2. At the present time no flights have been made. The work done so far has been in connection with the installation of the cameras in a plane.

John W. English
Lieut., USNR
Executive Officer
Field Photographic Branch

SECRET

SECRET

OFFICE OF STRATEGIC SERVICES

WASHINGTON, D. C.

Iconography - Oil opn - POA
Underwater Depth Det
Ref

26 August 1944

From: Field Photographic Branch

To: Acting Director, OSS

Subject: Iconography - reports

1) Iconography - Its application to specific problems designated by Gen. Twitty (JICPOA) and the solution of these problems from such photographs as were available at PRISCA - dated 16 May 1944.

2) Under Water Depth Determination by Simultaneous Vertical Photography.

1. The first report dated 16 May 1944 was shown to various authorities in this country. They were unanimous in saying that Lt. Juran's results were extremely good considering the photographic information with which Mr. Juran had to work.

2. No report has been received by this Branch of soundings made on Yellow Beach 3, Saipan, which could be compared with the findings of Lt. Juran. We also do not have any information covering the use of this report in the landing operations.

3. Reference is made to enclosures sent out by the office of Admiral Furer on Photogrametry dated 26 June 1944. These reports state the great need for work on under water depth determination in Pacific areas. In them is included an estimate of the work done by Lt. Juran there. It says as follows:

"O.S.S. Method. This method requires a vertical and an oblique which are properly selected to include the area from the proper angle and with proper lighting. The vertical is blown up and the position of the oblique is reconstructed with a pinhole box viewer and photogrammetric computation is applied.

"Since often such photographs are on hand, the method can frequently be applied without special photographic flights. The accuracy is not high as small errors in the process create large errors in the result. Lt. Juran attached to O.S.S. is now testing the method in Honolulu. The method should be adopted by the Navy and used wherever possible."

4. Due to practical and tactical difficulties in the use of special cameras and special photographic flights, it is not possible to say when they will be able to be put into use. Lt. Juran's method is one which works and which is being used for operations now with available and standard photographic coverage.

SECRET

WA FORM 4001a

Date 2 August 1944

To: Captain Kautzsch

From:

You will probably want the attached since you have been working on iconography there.

J W Auchincloss
J. W. Auchincloss
1st Lt. AAF

SECRET

Office of the Secretary

(9199)

[illegible]

[illegible]
X 0 35 97 [illegible]

[illegible] August 194[illegible]

MEMORANDUM

To: Brig. General William J. Donovan

From: Lieutenant E. R. Kellogg

Subject: Report - Under Water Depth Determination by Simultaneous Vertical Photography.

1. Under separate cover we are sending six copies of our report:

"Under Water Depth Determination by Simultaneous Vertical Photography"

2. At our last meeting you expressed the intention of sending one copy each to:

Joint Chiefs of Staff
War Department
Navy Department
Admiral Nimitz
General Arnold

E. R. Kellogg

E. R. KELLOGG
Lieut., USNR
Acting Chief
Field Photographic Branch

SECRET

11,046-C

Iconography

OFFICE OF STRATEGIC SERVICES

WASHINGTON, D. C.

Underwater depth data

August 1944

MEMORANDUM

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Lieut., USNR
Acting Chief
Field Photographic Branch

SECRET

24 March 1948

MEMORANDUM FOR THE SECRETARY OF THE NAVY

SUBJECT: Report on Measurement of Underwater Depths

We are forwarding herewith for your information a report on measurement of underwater depths recently prepared by Will Hanby and CINCPAC CIRCPOA.

This report describes a method of measuring underwater depths by simultaneous vertical photography, which is shown, upon stereoscopic examination, to have captured the surface of the water. This method was developed by Lt. M. H. Juran, USNR, of the Field Photographic Branch of this Agency.

Charles B. Cheston
Acting Director

Attachment
Secret
Same memo to Secy of War and Gen. Arnold

SECRET

OFFICE OF STRATEGIC SERVICES
WASHINGTON, D. C.

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MEMORANDUM

27 November 1944

OSS

MUD - Plan

RESTRICTED

To: Mr. Robert Tarum,
Room 1[illegible], Adm. Bldg.,
O.S.S.

From: Acting Chief, Field Photographic Branch

Subject: Iconoscopes, Jeriscopes, and Booklets, classification of

1. The Field Photographic Branch of the Office of Strategic Services is the originating source of classifications on Iconoscopes and Iconography, Jeriscopes and Jeriscope booklets.

2. All classification on Iconoscopes and Jeriscopes is removed, effective immediately.

3. All booklets and instruction brochures on Iconography and the Jeriscope are classified down from CONFIDENTIAL to RESTRICTED, effective immediately.

E. R. Kellogg

E.R. Kellogg
Lieutenant, U.S.N.R.

OFFICE OF STRATEGIC SERVICES

Washington, D. C.

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MEMORANDUM

RESTRICTED

MOP

To : Mr. Robert Thrun
Rm. 124, Administration Building, OSS

From : Executive Officer, Field Photographic Branch

Subject : Under Water Depth Determination with the Iconoscope

Reference (a): Booklet "Under Water Depth Determination", undated, prepared by Field Photographic Branch, OSS

1. Further developments in Under Water Depth Determination indicate the possibility that some part of the methods outlined in Reference (a) is now obsolete.

2. It is requested that your copies of Reference (a) be returned for correction. As an alternative it is requested that you forward a certificate that they have been destroyed.

Returned 3/23/45

John W. English
Lt., USNR
Executive Officer
Field Photographic Branch

(65813)