

## SCHOOL OF MILITARY SURVEY PRECIS – AN INTRODUCTION.

References : -

- A The Royal Engineer by the Right Honourable Sir F.B. Head Bart., 1869.
- B The School of Military Engineering 1812 – 1909 by Col B.R. Ward, R.E.
- C The History of the School of Military Survey and its predecessors by Major B.L. Davies, 1967.
- D History of the School of Military Survey by Lt Col (Retd.) M.J.K. Davies, 1983.
- E SMS 3843 dated 3 Apr 92.
- F Geo/PP (SMS) /3843 dated 13 Dec 93.

The training of the British military surveyor from, say, the mid nineteenth century to the very recent past is a subject which has not, as far as is known, been documented in detail. The various volumes of the History of the Corps of Royal Engineers and the Royal Engineers Journal contain much data as do Refs A and B. The archives of the Ordnance Survey both in The National Archives and in its own library also probably contain relevant material. Good overall summaries are in the two published histories of the School of Military Survey, References C and D.

However, these brief notes are not intended to address such a wide remit as that subject. The aim is that they should simply serve as a background to some of the training aids used in the training of military surveyors, especially to Précis used at the School of Military Survey, sets of which were archived in the Cambridge University Library and the Bodleian Library, Oxford in 2008.

The SMS Précis are but one of a series of training aids that have been used over the years in support of survey training and these notes will, hopefully, put them into some sort of context with other training aids.

Although the military surveyor was for many years the backbone of the Ordnance Survey, training of the military surveyor on Ordnance Survey employment as such is not addressed in these notes. The Ordnance Survey or the Charles Close Society doubtless has considerable data on that subject.

Prior to 1833 cadets from the R.M.A. Woolwich wishing to enter the Royal Engineers had to attend a course in survey under the superintendence of the Director of the Ordnance Survey, but in late 1832 it was decided that the survey course for candidates for the R.E. should be moved to the R.E. Establishment at Chatham and Lt. W.T. Denison was placed in charge of that branch of instruction. In 1835 Surveying was added to the R.M.A. syllabus and Cadets were no longer sent to Chatham; however an advanced course for officers was initiated at about that time.

Possibly the earliest relevant reference manual for officers was the “**Aide Memoire to The Military Sciences – Volume I - 1845**, Parts A.B.C. Abbatis to Contours”, an alphabetically listed series of reference notes, this first volume being “Framed from Contributions of Officers of the Different Services, and Edited by A Committee of the Corps of Royal Engineers in Dublin 1845”. Compilation of this manual probably resulted from an initiative by Lt Col Reid R.E. who contributed Hints on the Compilation of an Aide-Memoire for the Corps of Royal Engineers as a Professional Paper of the Royal Engineers in 1844. Prominent amongst its various authors was Captain Henry James R.E., later D.G.O.S.

For reference to the survey techniques of the day one generally turns to the Manuals or Text Books of the day. Pre-eminent amongst these was General Frome’s “**Surveying**”. Frome had been Instructor in Surveying at the S.M.E. from 1835 to 1840. This text-book was revised and enlarged in 1873 by Capt. C. Warren R.E. Another example of these is “**Text Book of Military Topography, including the Courses of Instruction at R.M.A., R.M.C., The Staff College, For Garrison Classes and For Examinations for Promotion**” by Col. W.H. Richards, H.M.S.O. London 1884.

Teaching notes were probably used and issued to students at the School of Military Engineering (SME) at Chatham and typical of these may have been “**Notes on Astronomy, 1902**” by Lt. Colonel A.C. MacDonnell, Instructor in Survey 1895-1902. It is doubtful if many of these have survived.

Later, the “**Text Book of Topographical and Geographical Surveying**” was produced by Major C.F. Close R.E. while Instructor in Survey from 1902 - 1905. It ran to three editions, the third being published in 1925.

Little is known by the compiler of these notes of the training aids used during soldier training before the First World War at the School of Military Engineering, Chatham and at the Ordnance Survey but **Notes on the 1<sup>st</sup> Printing Company R.E.** printed at the SME Chatham in 1912 was doubtless a timely training or reference aid.

During the First World War training in the new techniques of Sound Ranging and Flash Spotting was conducted on the Western Front and examples of the note-books used by students on these courses survive in places like the Imperial War Museum. After the War the Royal Artillery undertook the training of artillery surveyors. The 1924 edition of the **Manual of Artillery Survey** probably gives a very good insight into the subject of field survey as it was developed during the first World War. A scanned version of this publication may be consulted on the DSA website.

The difficulty experienced by students on all the post-war courses of Trigonometrical Surveying was hopefully partly met by the publication of **Elementary Trigonometry For Surveyors**, printed at the Ordnance Survey in 1925, Part I of which duplicated what students should already have covered on their Army Certificate of Education correspondence courses.

In the inter-war years “**Survey Computations**”, to be used in conjunction with the Text Book of Topographical and Geographical Surveying was first published in 1926, followed by a second edition in 1932. “**Field Astronomy**” was also published in 1932. **Notes On Map Projections** by Captain J.C.T. Willis, R.E. was published at the Ordnance Survey Office Southampton in **August, 1932** to serve the purpose of introducing the subject to Officers and other ranks of the Survey Battalion. The year 1937 saw the publication of the first edition of “**Notes on the Making of Plans and Maps**”. A second edition followed in 1951.

In the 1930's, also, employment on the Ordnance Survey particularly on overseas detachments was materially assisted by a few of the Ordnance Survey's training pamphlets aimed primarily at the military surveyor :-

**Ordnance Survey Training Series No. 1 - Organized Plane Tabling, HMSO, 1931.**

**Ordnance Survey Training Series No. 2 - Topography In The Tropical Forest Belt By Traverse And Aneroid, HMSO, 1931.**

**Ordnance Survey Training Series No. 4 - Notes On Geodetic Subjects, HMSO, 1932.**

**Ordnance Survey Training Pamphlet No. 5 - ??????????????????????, HMSO, 1939.**

The use of aerial photography for map-making in World War 1 resulted in a rapid expansion of interest in the subject in the immediate post-war years and one of its foremost proponents Lt Col M.N. Macleod led the way with **Mapping From Air Photos**, issued under the authority of the General Staff, War Office and published by HMSO in 1920.

There then followed a series of pamphlets, or Professional Papers, produced by the Air Survey Committee which were widely used in the Survey Training Centre, including :-

**Graphical Methods of Plotting from Air Photos, by King, HMSO, 1925.**

**Simple Methods of Surveying from Air Photographs, by Hotine, HMSO, 1927.**

**Flying for Air Survey Photography, by Timms & Porri, HMSO, 1927.**

**Calibration of Surveying Cameras, by Hotine, HMSO, 1929.**

**The Stereoscopic Examination of Air Photographs, by Hotine, HMSO, 1927.**

**Extensions of The “Arundel” Method, by Hotine, HMSO, 1929.**

**The Fourcade Stereogoniometer, by Hotine, HMSO, 1931.**

**The Stereoscopic Examination of Air Photographs, a Simple Method of Surveying from Air Photographs, by Salt, HMSO, 1939.**

**Parallax Tables, Supplement to Professional Paper No. 8, HMSO, 1932.**

**The Stereocomparator, HMSO?, 1930.**

Much of his work on the Air Survey Committee was later brought together by Captain M. Hotine R.E. as **Surveying From Air Photographs** published by Constable and Company in 1931.

The Second World War saw the publication of several Training Pamphlets.

**Field Survey Pamphlet No. 1 – Training of Survey Personnel 1941.**

**Field Survey Pamphlet No. 2 – Machine Computing 1941.**

**Field Survey Pamphlet No. 3 – Map Compilation 1941.**

**Field Survey Pamphlet No. 4 – Field Astronomy 1941.**

**Field Survey Pamphlet No. 5 – Lithographic Processes 1941.**

**Field Survey Pamphlet No. 6 – The Use of Oblique Air Photographs 1941.**

These were later reissued as volumes of Military Engineering, for instance :-

**Military Engineering Volume XIII, Survey, Part 3, Map Compilation, 1941.**

This was later superseded by “Cartography”, 1962.

**Military Engineering Volume XIII, Survey, Part IV, Field Astronomy, War Office, 1941.**

This replaced Field Survey Pamphlet No. 4.

**Military Engineering Volume XIII - Survey - Part V Lithographic Processes 1941, reprinted June, 1945.**

**Military Engineering Volume XIII Survey Part VI – The Use Of Oblique Air Photographs 1942.**  
(Formerly Field Survey Pamphlet No. 6).

**Military Engineering Volume XIII Survey - Part VII – Lithographic Proving 1942, reprinted June, 1945.**

Numerous miscellaneous publications also survive from this period :-

**“The Direction Method as used in the Computation of Minor Triangulation”.**

**“Engineer Information From Air Photographs”** by Capt. J.W. Tayler, R.E.

**“The Five Inch Rectifier”** - Survey Directorate G.H.Q., Middle East. Technical Pamphlet No. 11, 1942.

**“Parallax Without Tears - The Determination Of Heights From Vertical Photographs”, 2<sup>nd</sup> Edition**  
Revised July 1943 by Major L.G. Trorey Royal Canadian Engineers.

**“Cartographic Photography”** by Captain C.C. Redman R.E.

For the Western Desert Campaign and other operations in the Middle East training aids were produced in-theatre : -

**Directorate of Military Survey Training Memorandum No. 2 - The MELF Astro-Clinometer.**  
This may be a post-war reprint/issue of a collection of the GHQ MELF technical notes issued in 1943.

**“Survey Directorate G.H.Q. Middle East Technical Pamphlet No. 18 – The Stereocomparator – Part II Planimetric Control”** by Major E.H. Thompson R.E. Cairo June 1944.

Simple duplicated Précis of instruction from the Middle East theatre in the Second World War also survive in some of the Field Survey Company war diaries and these can be found in The National Archives at Kew.

For the training of surveyors in the Far East Theatre in World War 2 one must also consult the numerous relevant pre-war and wartime publications of the Survey of India.

In the immediate post-war years some Training Memoranda were produced : -

**Directorate of Military Survey Training Memorandum No. 1 - The Hunter Short Base and Methods of Providing Ground Control during Operations, 1954.**

**Directorate of Military Survey Training Memorandum No. 4 - Field Survey - Air Survey -**

**Cartography - Map Reproduction, 1955. (Various notes on).**

**Directorate of Military Survey Training Memorandum No. 7 - A Simplified Sun Compass.**

**Directorate of Military Survey Training Memorandum No. 8 - Notes On Observations For Laplace Stations** prepared by A.R. Robbins MA, BSc, PhD., Oct 1957.

The continuing emphasis of field astronomy also saw the introduction of two standard references : -

**“The Star Atlas for Land Surveyors 1953”.**

**“The Text Book of Field Astronomy 1958”.**

These were followed by the resumption of production of Survey Manuals as part of the Military Engineering Volume XIII series, initially as bound books but later as loose-leaf publications : -

**Military Engineering Volume XIII Part IX Manual of Field Astronomy 1960.**

**Military Engineering Volume XIII Part XII Cartography 1962.**

**Military Engineering Vol XIII - Part IV Traverse & Base Measurement 1965.**

**Textbook of Topographical Surveying, 1965.**

**Military Engineering Vol XIII - Part 10 Surveying from Air Photographs (Practical) 1960's?**

**Military Engineering Vol XIII - Part 6 Survey Computations 1966.**

**Military Engineering Vol XIII – Part XIII Map Reproduction 1967.****Military Engineering Vol XIII - Part II Engineering Survey 1967.**

This publication superseded M.E. Vol XIII Part IIA, Railway Survey, 1940.

**Military Engineering Volume XIII - Part XII Cartography 1971.**

This superseded Cartography, 1962. In 1986, Amendment 2 for this loose-leaf manual replaced all but the title page & Annex C of the original work thus virtually creating a new edition.

**Military Engineering Vol XIII - Part X Air Survey, 1972.****Military Engineering Vol XIII - Part IX Field and Geodetic Astronomy 1976.**

At least Amendments 1-3 were produced for this loose-leaf book.

**Military Engineering Vol XIII – Part XIII Map Reproduction 1976.**

At least Amendments 1-2 were produced for this loose-leaf book.

**Operating Procedures for Numerical Photogrammetry for the Military Survey Service 1976.****Military Engineering Vol XIII - Part III Field Survey 1978.**

At least Amendments 1-2 were produced for this loose-leaf book.

**Military Engineering Vol XIII - Part VI Survey Computations 1978.****Military Engineering Vol XIII - Part X Air Survey, 1979.**

At least Amendments 1-5 were produced for this loose-leaf book.

A separate subject which perhaps deserve passing mention is that of training in Map Reading. Although “Military Survey” was involved in the production of Manuals of Map Reading for many years, it was only in 1980 that it assumed the responsibility for map reading training at recruit level by agreeing to run a course for recruit map reading instructors of all arms at the School of Military Survey. For the short, two-week, Map Reading Instructors Course (MAPRIC) a set of student hand-outs, similar to précis, was initially produced. At the same time a **Map Reading Instructors Training Package** comprising two “flipatrans” volumes was produced in 1983 containing lesson plans and vufoils for overhead projection, these being printed in the Litho Wing of the school. Later, a 35mm film-strip version of this package was produced by the Services Kinema Corporation.

A few, recent, map reading training aids, from the wealth that have been produced, follow : -

**Manual of Map Reading & Field Sketching, HMSO, 1921.****Manual of Map Reading, Photo reading & Field Sketching, HMSO, 1929.****Manual of Map Reading, Photo Reading & Field Sketching 1929, HMSO, Reprinted 1939.****Manual of Map Reading, Photo Reading & Field Sketching 1929 (Reprinted with Amendments (Nos 1 to 4), HMSO, 1939.****Manual of Map Reading, Air Photo Reading & Field Sketching Part I Map Reading, HMSO, 1955.****Manual of Map Reading, Air Photo Reading & Field Sketching Part II Air Photo Reading, HMSO, 1958.****Manual of Map Reading, Air Photo Reading & Field Sketching Part III Field Sketching, HMSO, 1957.**

**Manual of Map Reading, Army Code No. 70947. A/GS Trg Publications/3524, 1978.**

This publication superseded Parts I (1955), II (1958), and III (1956) of the Manual of Map Reading, Air Photo Reading, and Field Sketching (WO Code Nos 8868, 9484, and 9085), and Hints on Map Reading Instruction (1943) (WO Code No 7197).

**Manual of Map Reading & Land Navigation, 1983, Army Code No. 70947 (Revised 1988).**

This publication supersedes The Manual of Map Reading 1978 Army Code 70947, First published 1974. Second edition 1988.

**Manual of Map Reading & Land Navigation, Army Code No. 70947 (Revised 2007), M.O.D. 2007.**

However, these notes deal mainly with the teaching aids rather than general reference material and in the post-war period the SMS Précis developed as the main teaching and study aid at the School of Military Survey for both officers on Army Survey Courses and soldiers on Trade and Technician Courses certainly at Hermitage from 1949 and possibly also earlier at Longleat until 1949.

The maintenance of manuals in the Military Engineering Volume XIII series, and their publication by H.M.S.O., was slow and the necessity to condense a subject into a book of manageable size meant that they may have been less detailed than some of the précis which may have covered specific subjects in greater detail. By the 1960's some of the précis were very comprehensive and it is probably true to say that they were the first point of reference by most students in preference to the manuals. In the 1970's the first electronic typewriters were introduced in the Unit Production Section resulting in good quality précis on heavyweight paper, occasionally with colour-printed diagrams.

At some time the burden of maintaining both systems of teaching aid or reference manual was eased by the introduction of loose-leaf Manuals the component parts or sections of which were in some cases probably based on the SMS précis or vice versa. Ultimately however, probably in the late 1970's, a decision was made that all survey soldiers' examinations were to be based on the multi-choice system based on the content of the Manuals and the emphasis on the use of Précis probably declined as a result.

Précis must have remained in use however since a catalogue of SMS Précis dated 1989 exists. In this catalogue, in addition to the traditional subjects of Computations, Field, Air, Photo, Carto Litho, and Storeman Svy etc., there were also included General, Land Navigation, Military Survey Operations and Visual Aids categories of précis.

Furthermore, the use of the SMS Précis did not die out. Ref E defined interim measures for the design and production of "the new series of SMS précis" Ref F laid down the production procedures for the new set of précis.

However, many of the traditional subjects covered by the précis were soon overtaken by the introduction of computer based digital technology which led to a decline in the teaching of traditional skills covered by the précis as the range of technician courses was condensed. Many of the précis thus effectively became obsolete. The same obsolescence applied to the Manuals of Military Engineering covering survey subjects.

By 2008 only one relevant volume of the Manual of Military Engineering is in use, **Military Engineering Volume 24 Field Geographic Support**, although a range of **Technical Doctrine Notes** are under development, the first covering Geospatial Data and Information Management being published on 1 May 08.

The SMS Précis and the relevant volumes of the Manual of Military Engineering represent a rich source of reference material for anyone interested in researching the conventional methods and techniques of Military Survey in the mid to late twentieth century prior to the advent of digital technology.

An appeal to retired military surveyors for copies of old précis resulted in the receipt of a good collection of 1960's and earlier précis to supplement the remaining holdings in the library of the Royal School of Military Survey. A list of the presently known SMS Précis is at Annex A.

In mid 2008 a master set of précis was passed to Cambridge University Library Map Room to be held as an entity alongside, but not part of, the Charles Close Society's archival material. A less complete set was passed to the Map Room of the Bodleian Library, Oxford.

Enquiries about access to these archived sets should be addressed to the Map Librarians at those universities.

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