



# Andrew Ross

One of the best known microscope makers in London, Andrew Ross began business in 1830 and collaborated with J.J. Lister (1786-1869), inventor of a new design for achromatic lenses for the microscope. Both Ross and Lister were the founding members of the Microscopical Society of London (later the Royal Microscopical Society). Ross introduced a number of improvements to design of microscopes, and his last model won first place in the Great Exhibition of 1851. After his death, the firm he founded continued under the direction of his son Thomas (d. 1870).

Andrew Ross was born in 1798 and died on 8 September, 1859. He established his business in 1830 and became well known for his magnificent telescopes as well as his microscopes. This particular microscope was one of the firm's early examples and was patterned after Lister's design. The signature includes the "& Company," which indicates this stand was made at the time the firm was associated with Mr. Lister. This association lasted for only a few years (1837-1842). The absence of a serial number is also of interest as Ross **introduced the use of serial numbers in August of 1842**. According to Nuttall this practice began when he moved the factory to the new address at 21 Featherstone Buildings, Holborn (Quek, Vol.33, 1979). It was also at about this time that his business association with Lister seems to have ended. In 1839, Ross published an article in *The Penny Cyclopaedia* introducing this completely new form of microscope. Some have attributed the pattern to Jackson but, Jackson himself, said that it was all the work of others (Nelson, RMS, 1900). Turner refers to this design as the first really satisfactory microscope ever to be made (Turner, 1981). The limb was made in a single casting,

supporting the body and stage. It was attached to the pillar by means of a compass joint. The body was mounted to the limb by means of a carriage which was moved up and down on a rack that was cut into the back of the limb. This general design became known as the Lister-limb. The fine adjustment was provided by a short lever acting on a sprung nosepiece.

Date	Description	Amount
Feb 19	Camera Obscura with 1/2 achromatic lens and small telescope holding mechanism	7 10 0
Mar 20	Plate of glass slip 2 1/2 x 1 1/2	9 - -
30	Solar Microscope a Camera	4 5 0
	Single lens obj. slip 2 1/2 diam	9 6 -
Apr 23	Two Camera Obscures	2 0 0
July 8	Lens for Solar Microscope	2 6 -
	Camera with achromatic lens	1 5 -
	Plate slip 5 x 5	4 - -
		<b>15 4 -</b>

Andrew Ross & Co., Statement of Account for 1839.  
Shows Talbot purchased items on 20 and 30 March 1839.  
(By courtesy of the Talbot Museum, Lacock)



Andrew Ross (1798-1859) was a renowned and successful scientific instrument maker in the 19th century. He was apprenticed to John Corless in the Joiners' Company in 1813 and eventually became an optician, starting his own business in 1830. Ross had a strong personal interest in astronomy, however he quickly became well known for producing quality lenses and microscopes.

From 1837 until 1841, Ross collaborated with Joseph Lister and continued to develop and influence microscope design and function. Lister is one of the most renowned pioneers in the field of microscopy, and his work with Ross helped put a spotlight on microscopes as an invaluable scientific tool in medical diagnosis and biological research. Ross and Lister were founding members of the Microscopical Society of London, which went on to become the Royal Microscopy Society. During these years the company was renamed Andrew Ross & Co, until Lister left the business in 1841.

Andrew Ross received high acclaim and many awards for his ingenious work with scientific instruments. In 1830 he received the Gold Isis Medal from the Society of Arts for his improved dividing astronomical and mathematical instruments and for his circular dividing engine. He received the same medal in 1836 for his improvements in achromatic objectives of microscopes. In 1841 he received a silver medal from the Society for his invention of the spherometer. In 1851 Ross exhibited instruments in the Great Exhibition, winning a medal for his microscope and his large equatorial telescope, which was highly admired by visitors.

Ross was a highly esteemed member of the Photographic Society of London, who described him as a powerful genius and someone who excelled in perfection. The company was taken over by Thomas Ross, Andrew's son, in 1859, trading under the name Ross & Co.

Thomas was also a member of the Photographic Society of London. Thomas focused much of the business into photographic lenses and became highly successful. His lenses were so highly esteemed that they often fetched a higher price second hand than new. The Ross name also became well known for producing excellent quality binoculars, providing them to the British Military during World War One and World War Two.

In 1948 the Ross company joined forces with camera manufactures Barnet Ensign to become Ross-Ensign, which then changed its name in 1954 to Barnet Ensign Ross. The company ceased to trade under the Ross name in 1975 when it was taken over by the company Avimo, who was later taken over by Thales Optics.

The following is a list of dates and corresponding workshop addresses, found inscribed on Ross instruments in museum collections. (please note this list may not be totally accurate but can be used as a rough guide):

Andrew Ross:	1830-1839	15 St Johns Square, London.
		1837 – 1941 'Andw Ross & Co (with J.J. Lister)
	1839-1843	33 Regent St, Piccadilly.
	1843-1847	21 Featherstone Buildings, Clerkenwell, London
	1848-1856	2 Featherstone Buildings, Clerkenwell, London
Ross & Co:	1859-onwards	London
	1880 – 1893	112 New Bond Street





Courtesy of Molecular Expressions  
Simple and compound

1831

Andrew Ross fashioned the convertible, simple-compound microscope as a portable companion instrument to a full-sized brass compound microscope. Both were designed and commissioned in 1831 by William Valentine, a noted botanist from Nottingham, England.

The inspiration for the Valentine design may have come from Charles Gould, a British instrument maker who had designed a pocket version of the microscope that was portable enough for both the laboratory and routine botanical fieldwork. In fact, many nineteenth-century craftsmen imitated the original concept that Gould described in an 1827 publication. Nevertheless, the convertible simple-compound microscope is an early example of the fine craftsmanship of Ross, who created the instrument only a year after he established his telescope and microscope workshop in London.

Illustrated above in its simple form, the Ross instrument features a lens holder that may carry either a single lens or a Wollaston doublet. When the holder is removed, however, a compound body tube fits the single pillar stand. The instrument also consists of a substage condenser tube that includes an adjustment for the condenser lens and a large, concave mirror mounted on a brass gimbal that is attached to one leg of the Y-shaped microscope foot. A massive mechanical stage is fixed to the pillar stand and is capable of moving at right angles through the use of a pair of direct-acting screws. Later known as the Turrell mechanical stage, as a result of its description by William Turrell in an 1832 publication, the innovative design for controlling x-y translational motion with one knob is the basis for the modern mechanical stage. Flexible, but plagued with certain design flaws, several years later Ross created an improved version of the convertible instrument intended for use during dissections.

1831

William Valentine, a plant anatomist in Nottingham, England, designed this microscope and commissioned it to be build by Andrew Ross in 1831. This is one of the earliest instruments build by Ross, who established his business the previous year, 1830.

An unusual feature of this microscope is the fine focus knob, that can be clearly seen under the base of the microscope. The knob connects to a threaded rod that traverses the pillar or "foot" of the microscope and connects to the stage to effect motion. This focusing technique is similar to that seen in two of George Adams' microscopes, the Universal Single and Universal Double microscopes, both of which were built almost 75 years earlier in 1746.

Another interesting feature of this microscope is the rather long condenser tube that holds the substage condenser lens. A concave reflector mirror is positioned at the bottom of this tube in order to direct light onto the specimen. Because the microscope was not fitted with an inclination mechanism, it was very uncomfortable to use for extended periods of time.



Courtesy of Molecular Expressions



Courtesy of The Science Museum - London  
Inventory No.: 1921-217  
Valentine type

1832

Ross described a very similar instrument in 1831 (see A Ross - Trans.Soc.Arts, 48,413), made in March of that year for Mr Valentine of Nottingham. The present example would have been made soon afterwards, and differs in a few particulars. This one has a heavy flat tripod foot, engraved with the signature, which does not fold. One arm carries the gimbal of the double-sided mirror, while at the centre is a pillar. The pillar contains both coarse and fine adjustments. The fine adjustment has a screw with fifty threads to the inch operating in a sprung bearing direct on the sprung nut at the bottom of the triangular housing of the sprung coarse-focus triangular bar. This copious springing prevented lost motion in the adjustments - and still works very satisfactorily to this day. The head of the fine screw was large, set at the bottom of the pillar under the foot, and divided into 100 parts, thus allowing the height adjustments to be measured to 1/5000". This may be the first use of a divided fine adjustment head for micrometry.

Coarse focussing was carried out by a small milled head working a pinion in a rack set into the rear of the inner triangular bar; this also is still perfectly smooth and positive in operation.

The stage is plain, and supported by two long brackets. The top plate is moved by two screws at right angles, and has a small Varley multiple-plate insert operated by a long lever with ivory handle below stage to give further mechanical motion of a very smooth and rapidly altered kind. Below stage screw one or other illumination apparatus, both designed by Wollaston. One incorporates a mirror at the bottom of a long tube surmounted by a focussing condenser, the other uses a similar condenser in a shorter tube which uses the main mirror.

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An Unusual Andrew Ross Brass Compound Monocular Microscope, English, mid 19th century, signed A Ross London, the tube supported by a raked column, focusing by knurled screw, on universal joint above column on tripod base, in mahogany case with two objectives and bench condenser, 32cm.(12 1/2in) high



Sold for 1.675 £ inclusive of Buyer's Premium  
Date: october 2004



Courtesy of Bonhams  
A.Ross, London



Courtesy of The Science Museum - London  
Inventory No.: 1913-293

### 1835

A very different instrument from other Ross microscopes of its period. The heavy tripod foot, engraved with the signature as above, has a clamping telescopic pillar at its centre, with a clamping ball and socket joint on top. To this is attached a collar, part of the main stage plate. From this descends a tube which carries a small sliding collar for the gimbal of the small double-sided mirror. Above this is a stay for the pinion, and then another collar for an arm to take accessories, and then the pinion housing itself, with large knobs on each side. Above this is the stage; below are large-headed screws holding an extension plate on each side, and a plain substage sleeve. The top plate is worked by two small rack and pinion heads set below the stage; it has a rotating sliding bar.

At the top of the main collar a square-section bar rises, worked by the rack and pinion heads below stage level. At the top of the bar is an extraordinary device, designed to allow the body-tube arm to rotate through a clampable 90° while acting as a fine adjustment by raising and lowering the arm itself. This was done by a screw acting against a circular rod passing through the bar, pressed upwards by a strong spiral spring at its lower end. This mechanism is now a little shaky, and it could never have been entirely satisfactory. The arm is short, and carries the body-tube which has sprung nosepiece (to absorb shocks to the objective while focusing), no drawtube, a Huygenian eyepiece, and an uncorrected objective.

### 1835

This compound monocular microscope is the earliest Ross instrument in the collection, and may be one of the four known to have survived. The limb, which supports the body-tube and stage, is attached to the pillar by a ball-and-socket joint. The stage carries a tubular column on its under surface, and the pillar sits on a flat tripod base. About 1835. Signed: **Ross, London**.



Courtesy of University of Texas  
Medical Branch



Courtesy of Sotheby's  
Ross / london

### 1832 ?



Sold for 7.800 £ inclusive of Buyer's Premium  
Date: December 2004

Signed Ross London, with flat tripod base with sculpted end supporting a fixed pillar with rectangular clamping knob and ball-and-socket-joint to the end, right angled arm supporting the optical tube, black anodized brass square stage with mechanical stage knob below, Wollaston condenser, contained within a mahogany case with accessories contained within a red leather case including lieberkuhn, stage forceps, condenser lens, live box and a stage magnifier, and two eyepieces with covers and two objectives, also with two simple lenses for use as a simple microscope.

The unusual ball-and-socket-joint at the top of the pillar, enabled the microscope to be tilted and manoeuvred to almost any direction. It is believed that this type of ball-and-socket-joint derived from a design by

Pritchard's Ball and Socket Microscope. This particular microscope by Ross is extremely uncommon so-much-so that its existence was initially overlooked by Edward Nelson in his account of Ross microscopes. Its discovery was made in 1982 by A. Morrison-Low and R.H.Nuttall who identified three examples: one in the Science Museum London, one in the University of Edinburgh and one in the Moody Medical Library, Texas. Since then two others have emerged, one in a private collection and the example offered here. Nuttall has concluded that probably ten examples were made in total.

### 1835

A turned pillar stands on a flat base with three fold-out feet. The stage is attached to the top of the pillar by a compass joint. The stage plate rotates and a bracket to support specimens is held on the plate by spring clips. The cylindrical limb passes through the stage. Two steadying struts attach the stage to the lower end of the limb where a socket holds the plano-concave mirror. Two milled heads at the rear of the limb raise a triangular sectioned bar that holds a vertical arm supporting the body tube. The wooden case also contains four eyepieces, two objectives in cans, and a stage bracket on pins.



Courtesy of Museum History of Science -  
Oxford  
Inventory n°: 24183

1837

Andrew Ross & Co.



Courtesy of The Science Museum - London  
Inventory No.: 1919-469  
Andw. Ross & Co.,/Opticians/33 Regent St.,/Piccadilly

1838

This instrument is very similar to that described by Ross in his article 'Microscope' in the Penny Cyclopaedia in 1839, but without the mechanical stage. The foot is flat and trilobular, engraved with the signature, and supporting a central pillar carrying a compass joint. This supports a Lister limb, with the stage attached to its bottom end. From the stage a tube descends, carrying the semi-gimbal of the double-sided mirror, and above it a nest of three turn-out stops. The base of the stage has a hole into which is fitted a sleeve carrying a small stage insert with double clip. The limb carries a cradle to support the body, a device original to Ross (see Q.J.M.S., 1, 219 (1853)). The cradle is worked by a pinion on its housing, into a rack attached to the rear of the limb. The body-tube is plain, without drawtube, and is engraved: To William Wright, from the Head Masters of University College School/T.H.K. & H.M./1838. A Huygenian eyepiece is fitted; there is no fine adjustment. Two achromatic objectives are included, both in boxes engraved: *Andw. Ross & Co.,/Opticians/33 Regent St.,/Piccadilly*. The one is a 1", the other 1/4". An alternative top plate, with sliding bar, is to hand for the stage.

like the Penny Cyclopaedia model and therefore is easily dated to that period.

1839

Some have attributed the pattern of this model to Jackson but, Jackson himself, said that it was all the work of others (Nelson, RMS, 1900). Turner refers to this design as the first really satisfactory microscope ever to be made (Turner, 1981). The limb was made in a single casting, supporting the body and stage. It was attached to the pillar by means of a compass joint. The body was mounted to the limb by means of a carriage which was moved up and down on a rack that was cut into the back of the limb. This general design became known as the Lister-limb. The fine adjustment was provided by a short lever acting on a sprung nosepiece. Our present microscope is very much



Courtesy of The Lundy Antique  
Microscope Collection  
Original Lister type



Courtesy of Museum History of Science - Oxford  
Inventory n°: 42439  
ANDRW. ROSS & CO OPTICIANS, 33 Regent St. Piccadilly

1838 - 1839

"ANDRW. ROSS & CO OPTICIANS, 33 Regent St. Piccadilly".  
Tube: "REGISTERED No. 4380 JUNE 27th 1861"

Originally a monocular microscope, the binocular body with a symmetrical, achromatic prism was a later addition. This brass instrument is supported by a cylindrical pillar on a flat tripod foot. The maker's name and address are inscribed on the foot. A compass joint at the top of the pillar carries the shaped limb. The upper part of the limb has a triangular cross section and rackwork on the rear face. The body tubes are held by brackets on a sleeve that can be racked up and down on the limb. The eyepieces have two lenses and push into the top of the tubes. The interocular distance is adjusted by a bar with milled knob at each end that extends the eyepiece fittings from the body. Fine focusing is adjusted by a mill-edged screw on the front of the lower part of the body. An internal thread on the nose takes an objective. The mechanical stage has a plate mounted on a cylinder that fits the stage hole and allows the plate to rotate. A sliding bracket to support specimens has two pinholes and dovetails onto the stage plate. A post below the stage carries the plano-concave mirror in a horseshoe mount on a sliding sleeve.

The accessories with this microscope are a bull's-eye lens on a stand, a spring state for glass phials, a condensing lens on a steel pin, stage forceps, four eyepieces and five objectives in cans, one with a Lieberkuhn. Only one of the objectives fits the microscope.



Courtesy of Museum History of Science - Oxford  
Inventory n°: 55549  
ANDRW. ROSS & CO OPTICIANS, 33 Regent St. Piccadilly

1838

This brass instrument is supported by a cylindrical pillar on a flat tripod foot. The maker's name and address are inscribed on the foot. A compass joint at the top of the pillar carries the shaped limb. The upper part of the limb has a triangular cross section and rackwork on the rear face. The body tube is held on brackets on a sleeve that can be racked up and down on the limb. The eyepiece has two lenses and pushes into the top of the body. Fine focusing is achieved by a telescoping nosepiece. A mill-edged screw on the lower, front of the body pushes on a bracket that is hinged at the rear. This draws the nose from the body. A spring retracts the nose as the screw is released. An external thread on the nose takes an objective. The mechanical stage has a plate mounted on a cylinder that fits the stage hole and allows the plate to rotate. A sliding bracket to support specimens has two pinholes and dovetails onto the stage plate. A post below the stage carries the plano-concave mirror in a horseshoe mount on a sliding sleeve.



Courtesy of The Science Museum - London  
Inventory No.: 1921-213

1840

A large stand on a flat splayed horseshoe foot, engraved with the signature, with a central pillar surmounted by a compass joint. The joint is attached to a small box, from which descends a tube carrying the sleeve of the stalked gimbal of the double-sided mirror. Above this is a further sleeve, carrying an arm with bush to take accessories. The thick stage is attached to the box, with a substantial bracket below, with a dovetail slide for substage fittings in front. Within the stage is a fine focus adjustment, operated by a milled head on each side of it. These rotate a brass ring with serrated rim, which pushes against brass rods attached to the underside of the upper stage plate held in contact by springs; rotation in one direction raises the stage, and vice versa. This is a rather complicated device for fine focussing used also by Powell at about the same time; needless to say, it was not long-lasting in application, although it works well enough. There are rack and pinion movements to the upper plate, which has two holes for accessories. From out of the box winds a square-section bar controlled by a large knob; the rack is cut into the back of the bar itself. At the top of the bar is a socket for the pin of the body-tube arm, which can rotate through 90°. The arm rises to a long sleeve in which the body-tube can move for focussing; it is comparatively very narrow in diameter, lacks a drawtube, and has a Huygenian eyepiece. The objective is a 1/8" achromat (two doublets close together and one lens in front in a sliding correction collar) as introduced by Ross about 1838.

signed Ross London, substage accessories, bulls-eye condensot, fishplate; in wooden box with brass corners and fittings. 18 1/4 x 8 3/4 x 6 1/4 in. (46 x 22.5 x 15cm.) The signature and street address give dates of 1837-41, the interior fittings of the case suggest some alterations.

1840

AN ENGLISH MONOCULAR MICROSCOPE ANDREW ROSS & CO, circa 1840 signed on the tripod foot ANDW ROSS & CO OPTICIANS, 33 Regent St. Piccadilly; the main body and accessories ?nickle-plated, 5 laquered brass objectives in ?nickle-plated canisters, one later In. objective



Courtesy of Christie's  
ANDW ROSS & CO OPTICIANS, 33 Regent St. Piccadilly

Sold for 8.125 £ inclusive of Buyer's Premium  
Date: October 2009



Courtesy of The Science Museum - London  
Inventory No.: 1913-293

1840

The low mahogany case is fitted, and has stoppings lined with blue plush. It contains an instrument resembling the Jones "Most Improved" type of forty years before - quite a surprise for this maker at this time of his partnership with J J Lister! The three folding feet, one engraved with the signature, make a flat tripod, which supports at its centre an elegantly tapered pillar terminating in a compass joint. To this is attached the square-section limb with a rack inserted into its front. Low down this slides the collar of the stalked gimbal of the double-sided mirror, while along it runs the stage bracket driven by a pinion in its housing. The stage is a simple rectangle, with two lateral extensions drilled for accessories, and a sprung double clip.

At the top of the limb is attached in a slot the sliding body-tube arm. The tube screws into this; it has a drawtube and carries a two-lens eyepiece. There are four simple objectives, and another in a lieberkuhn. In addition there are a hand forceps, stage forceps with extension arm, plane and dished glass discs for the stage aperture, livebox, and superstage condenser. A set of four four-place mica-covered bone sliders and two four-place opaque sliders completes the outfit.

This large instrument has a number of unusual features, not least **the signatures of two makers: Ross and James Smith**. The splayed-V foot is heavy and thick, and has a short pillar topped by a compass joint with wing-nut clamp. This carries a bracket with fine adjustment screw on its top, attached also to the tubular limb. From this descends a tube carrying the sliding collar for the double-sided mirror gimbal, and strong double brackets for the stage. This is mechanical, with dovetailed plates worked by a vertical lever in a ball and socket, as publicised by White in 1844; there is a sliding rotating top plate. Below the stage is a screw-on rack and pinion focussing centring achromatic condenser, the size of an objective, in a long tube with diaphragm opening at the bottom. The prismatic focussing bar has a rack attached to its rear, and wide knobs to control. The fine adjustment already mentioned is a screw which operates on a lever to raise and lower the entire coarse-focussing bar in its tube, quite an heroic idea. The bar has a high-rise body-tube arm at its top, interchangeable with another arm to carry simple lenses. The arm carries a sleeve in which the body-tube slides. There is a drawtube graduated to 6", and a Huygenian eyepiece. No objectives remain.

1840



Courtesy of The Science Museum - London  
Inventory No.: 1928-863  
A Ross & Smith



Courtesy of The Billings Microscope Collections  
Inventory No.: 49091 – 60 – 4713 - 203  
Andw. Ross & Co / Opticians/33 Regent St.,/Piccadilly.No 50

**1840**

Simple and compound microscope. The Y-Shaped tripod foot of this instrument is 10 inches long and 8 inches wide at the front; the heel is hinged at 2 inches. The circular pillar is 4 inches high and 1-1/2 inches in diameter; it has compass joint with a clamp at the top. In this joint is a short, heavy arm, that carries the 8-inch circular limb, with an inner triangular bar. The stage plate is 5-1/4 x 4-3/4 inches with a mechanical stage above that has rectangular motions controlled by two racks and pinions. Both pinions are fixed in a frame below the stage and are not parallel. A revolving disc of diaphragms fits beneath the stage with a short cylindrical tube. There is a double mirror, 2-3/4 inches in diameter at the lower end of the limb on a sliding sleeve, and immediately above is another sleeve with an angle arm for a screw-in condenser, polarizer or dark well.. For use as a simple microscope, the entire arm may be removed and another substituted.

**1841**

This rather elegant instrument is a development of the 1839 design (see 1919-469) with its cradle for the body-tube; the cradle has been abandoned and the rack is now attached to the body, albeit on short brackets.

The circular base is weighted with lead, and supports a short rotatable pillar topped by a compass joint. To this is attached the Jackson-type limb, clamped for inclination by a large knob. The bottom of the limb carries the stage, below which is a thick rod with a tube sliding on it; this carries the gimbal of the double-sided

mirror. The stage is quite plain, with sleeves above and below; that above carries a rotatable and sliding top plate equipped with two clips. This is a very workable stage, allowing smooth positioning of a slide.

Above stage level the limb curves below a long upright with attached sprung angles to contain the sliding bar fitted with a rack; the pinion works in an attached housing. The body-tube, engraved with the signature, has a nosepiece fine adjustment, but no drawtube.

Four Huygenian eyepieces are to hand. One is plain and of lower power, the others are all of power B, and contain various devices. The one has two curved pointers, one worked by a small lever, the other by a screw to provide precise positioning; this is an original Mathew caliper eyepiece. A second has two straight pointers worked by external sectors. The third has four internal straight leaves worked by external sectors, so as to allow any part of the field to be shown with the rest blackened.

The objective is in a box signed: 1/4in/Andw.Ross & Co.,/Opticians/33 Regent St.,/Piccadilly.



Courtesy of The Science Museum - London  
Inventory No.: 1921-216  
Andw.Ross & Co.,/Opticians/33 Regent St.,/Piccadilly.No 50



Courtesy of National Museums Scotland  
Andw. Rofs / 33 Regent St. / Piccadilly / No 30

**1841**

The microscope has a circular weighted base, a short pillar with rotating bearing, and a Lister-limb with mechanical stage with rotating upper plate and substage wheel of three stops. There are two contemporary objectives, and three eyepieces. Accessories include a lieberkuhn, bull's eye condenser and stage forceps. It came in a fitted mahogany case (not shown). It is signed on the body tube: 'Andw. Rofs / 33 Regent St. / Piccadilly / No 30.'

Andrew Ross's partnership ceased at some point in 1841. Subsequently, he began numbering his instruments: no 33 is in the collection of the Royal Microscopical Society, and is very similar to this example. It is also similar to the design illustrated by Ross in the article

he wrote on the microscope for the Penny Cyclopaedia in 1839. In 1843, he introduced a Y-shaped foot, with bar-limb, which subsequently became known as the 'Ross model' microscope.

**1841**

The circular base is lead weighted for stability, and the short pillar ends with a bearing that allows rotation so as to place the weight in the best position according to the inclination of the limb. The limb is held by a compass joint with a clamping screw. Rackwork moves a dovetailed slide to which the body-tube is fixed by two cradles. Fine focusing is by a short lever on the nosepiece. The stage is a mechanical one, with an upper plate that rotates and slides. Below is a three-aperture rotating disc. The mirror is plano-concave, and is fixed to the lower part of the limb. The eyepiece is Huygenian, and the unsigned objective is in a can engraved: 1/4 In. The lid of the can is signed in the same way as the microscope.

This microscope was described briefly and illustrated in JRMS [1899] 214 15. It is similar in many ways to the one illustrated by Ross in the article he wrote on the microscope for the Penny Cyclopaedia (1839). Ross introduced the Y-shaped foot for which he is famous in 1843, the Society acquiring one of the first. This was exchanged for an up-to-date model by Thomas Ross in 1861.

The microscope with serial No 73 is in the Wellcome Museum at the Science Museum, London and this is signed: ANDW ROSS LONDON



Courtesy of Royal Microscopical Society  
Andw Ross, Optician / 33 Regent St  
Piccadilly. /Nº 33



Courtesy of Christie's  
Andw Ross & Co Opticians 33 Regent St  
Piccadilly / N° 41

A mid 19th-Century brass compound monocular microscope, signed on the barrel Andw Ross Optician London No41, with rack and pinion focusing and micrometer fine adjustment to the nosepiece, attached via a curved limb to the mechanical stage with substage aperture disc and plano-concave mirror, the limb tilting on a compass joint from a short brass column and circular leaded base, with two eyepieces and two objectives, one with lieberkuhn sleeve in a canister marked 1/2In. Andw Ross & Co Opticians 33 Regent St Piccadilly, associated stage-mounted bull's-eye condenser, sprung stage attachment, two live boxes and the stand for a table bull's-eye condenser (no lens), in a fitted mahogany carrying case with string handle -- 43.7cm. (17 1/4in.) high



Sold for **2.032 £** inclusive of Buyer's Premium  
Date: june 2004

**1842**

The absence of a serial number is also of interest as **Ross introduced the use of serial numbers in August of 1842**. According to Nuttall this practice began when he moved the factory to the new address at 21 Featherstone Buildings, Holborn (Quek, Vol.33, 1979). It was also at about this time that his business association with Lister seems to have ended. (*Lundy Antique Microscope Collection*)



Courtesy of Lundy Antique Microscope  
Collection  
A Ross No 54



Courtesy of The Science Museum - London  
Inventory No.: A4869  
ANDw ROSS/LONDON / 73

**1843**

The upright mahogany case takes the stand without body-tube arm and tube; these are kept in the lower drawer, which has space for a number of accessories. The flat splayed horseshoe foot, engraved with the signature, supports two vertical plates between which a bracket attached to the stage and on to the box-form limb is slung. The stage has heavy brackets below, and between them a tube carrying the pin of the gimbal of the double-sided mirror. The bottom plate of the stage has rear dovetails and front pinhole accepting either of two slides. The one has a circle of three apertures, the other a low-power paraboloid. To the side of the main plate is attached the mechanical movement heads and gears, with rather awkwardly-placed horizontal knurled knobs in a double bracket below the stage, and with bolted-on steady-bar; it all looks poorly designed. The top plate carries a sliding and rotating plate with sliding sprung bar.

Behind the stage, on a further heavy bracket, is attached the box-limb. From this winds a prismatic bar with rackwork cut into its front; it continues below the box as a thick rod, providing a steady. The body-tube arm attaches by a wide milled nut; two distance pieces can be used to increase the stage to objective distance for longer focus lenses. The arm contains a long lever nosepiece fine adjustment, with graduated milled head. The body-tube has no drawtube, but a Huygenian eyepiece is in place, although there is no objective.

**ANDw ROSS - LONDON No.73**

1843



**This microscope is unique in that it bears the signatures** of two of the premier English manufacturers of the Victorian era, **Andrew Ross and Powell & Lealand**. The microscope incorporates design features found in microscopes made by both firms. In 1843, Andrew Ross published a description of his new microscope design (*The London Physiological Journal*, 1843). The microscope incorporated a bar-limb construction where the tube was supported by a box-like limb housing a long-lever fine adjustment mechanism designed to move the nosepiece. The microscope is supported on a Y shaped base having two flat uprights terminating at the pivot point, above which is the coarse adjustment consisting of a triangular shaft with rack that slides in a brass block. Movement is by a double-knobbed pinion. This design became quite famous and was used by Ross, with some modifications, for over 30 years. Numerous other manufacturers both in England and America based some of their own products on this design. The microscope presented here is an example from the first or second year of production and is signed on the base **Ross, London, No. 88**.

Ross microscopes No 84 and No. 86, the latter located in the Whipple collection (see: *The Whipple Museum of the History of Science, Catalogue 7, Microscopes*, cat. No. 203), do not have these struts and each has the Ross mechanical stage, but are otherwise similar to the microscope presented here.

A Ross microscope with a dual signature has precedence. In the Science Museum is a microscope dated 1840-1844 that bears the signatures of both Andrew Ross and James Smith (See the reference in 1840)).

**1843**



Courtesy of Bonhams  
Adrw. Ross, London, No.110

Signed Adrw. Ross, London, No.110, with rack and pinion and leaver and screw focusing, mechanical stage with plano-concave reflector, in mahogany case with several drawers of specimen slides (as listed in accompanying note book) and accessories including bench condenser, Ross 1, 1/6, 1/8 and 1/2in objectives, ocular, 18in (46cm) high



Sold for **£1020** inclusive of Buyer's Premium  
Date: 30 September 2009



Sold for **1.800 €** inclusive of Buyer's Premium  
Date: 20 June 2006



Courtesy of Auction Team Breker  
ANDw ROSS / LONDON / 119

**1843**



Courtesy of Fleaglass  
ANDw ROSS / LONDON / 169

Offered is a unique microscope outfit by Andrew Ross contained within an unusual rosewood Cabinet. The microscope case may have been for an exhibition or a special one off commission. It's a very rare occurrence for microscope cabinets to be made of rosewood especially one of this size. The microscope is an early version of the then new model of 'bar limb' type microscopes being produced by the firm of Andrew Ross and is numbered 169. The instrument sports a number of earlier features including the unusual mechanical stage operated via two knurled nuts below the stage as found on the earlier Ross microscopes (see no " in Le Turners 'Great age of the microscope'). Another feature soon phased out is the steadying bar under the main body of the microscope which is exposed. In later instruments this is covered with the mirror support column. The microscope uses the early Ross pre-RMS objective thread.

The microscope is held on its dark purple coloured rosewood base via 4 wooden catches. At the front of the wooden base is a turned hole to accept the bulls-eye stand base. The base is of the typical Y shaped form with the back engraved.

**ANDw ROSS - LONDON No.169**

The main body is supported on two trunnions at the top of the two side plates. At the bottom of the body is the steadying column. In front of this is the mirror column with the plano-concave mirror held at the base in a gimble. At the front of the body is the mechanical stage secured with 4 brass bolts. The underside is designed to accept the substage accessories on an interchangeable dovetailed slot arrangement. The stage is an interesting example of the early mechanical Ross stage with X and Y adjustment via the two knurled nuts on the underside. The topside of the stage

can be rotated around the optical axis and the slide holder can be slid up and down. At the back of the stage are two holes for accepting the parabolic side reflector and the stage forceps. At the back of the body are the two large course focus wheels acting on rackwork cut into the back of the triangular column. An unusual arrangement for applying force to the rack is employed via a sprung collar at the top of the body. The bar limb is fixed at the back via a nut in front of which is found the fine focussing knob. Fine focussing is via a lever acting on the nosepiece.

**1845**

This type of instrument was described for the first time in 1843, and is an entirely new design from earlier Ross microscopes. It was to be made in very similar form for many years, and be extensively copied by other makers. A very thick baseplate in the form of a flat splayed tripod, engraved with the signature, supports two vertical plates strengthened by right-angle brackets, to make a totally rigid support for the box-limb slung between them in massive gunmetal trunnions. Below the stage, which is attached to both trunnions and front of the box-limb, descends a tube on which slide two sleeves. The lower one carries the gimbal of the large double-sided mirror, the upper one a bush for accessories. Below the box-limb descends a further tube, containing the stem of the lower part of the focusing bar. The stage is built up on a thick baseplate, below which is a sleeve taking a circle of three apertures and a horizontal bush for accessories. Below also is bracketed a rod and the rest of the y-axis mechanical movement, worked by a horizontal knob below the stage. This movement operates on a plate which carries the x-axis movements, and this in turn carries the top plate, which rotates and has a sliding bar. The whole stage is totally rigid but still smooth in its motion. From out of the box rises a gunmetal prismatic bar with rackwork cut into its rear, worked by a pinion attached to two very large knobs. To the top of the bar is attached the body-tube arm, by a large knob. It contains the second-order lever nosepiece fine adjustment, worked by a large graduated horizontal knob below the arm. The motion is slow, smooth and free from backlash. The rather narrow body-tube is attached to the arm and supported by an elegant triangular-section bracket; there is no drawtube, and only one Huygenian eyepiece.



**1845**

This is an early example of the new design by Ross introducing the Y-shaped of foot that became popular in England. Side plates hold trunnions that support the limb. A triangular sectioned bar can be racked up from within the limb and the monocular body tube is carried on an arm attached to the top of the bar. A conical nose, with an external thread for objectives, screws into the underside of the bar. The stage has a collar on which a plate with a sliding rest for specimens is mounted. A rotating disk with three apertures is attached to the underside of the stage. The plano-concave mirror is set on a post below the stage. The instrument stands on a board that slides into a fitted mahogany case with two hinged doors. Two eyepieces and an objective in a can are present.

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Price 4.095 €

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**1845**

A 19th-Century lacquered-brass Ross No. 1 stand compound monocular microscope, signed on the foot AND.W ROSS. LONDON. N.o 190, uncased.  
The body-tube is held at the objective end on a short limb from the main pillar and is focused via rack and pinion and micrometer fine adjustment. The complex mechanical stage incorporates a substage aperture disc, with a plano-concave mirror is mounted beneath. The main pillar is on an axis over the No. 1 stand with a Y-shaped foot. There are two eyepieces and 1/8, 1/4 and 1/10in. signed Ross objectives in canisters, two with fitted lieberkuhn.



Sold for **£ 705** inclusive of Buyer's Premium  
Date: july 2003



**1845**

**Ross, London, No. 201**, with tri-foot base marked A. Ross, London No. 201 on rear leg, bar limb construction, dual-sided mirror, coarse rack focus on pillar, rectangular stage with two-direction adjustment by knurled thumbscrews, binocular tube engraved on brass collar Wenham's Binocular, by Ross, London, and interocular separation by rack and pinion, ht. 19 1/4 in.



Sold for **1.800 €** inclusive of Buyer's Premium  
Date: May 2006



**1845**

The mahogany case has six drawers fitted for accessories, and contains the Ross N°2 medium-sized model. The base is the splayed horseshoe, of thinner plates than the larger model, with the same uprights and brackets, and box-limb between them. From this descends a tube on which slides a gunmetal sleeve for the gimbal of the double-sided mirror. The stage is attached to the side of the box, and below is bracketed the substage slide. This contains a second, gunmetal, dovetail, and is worked by a pinion. This second dovetail contains a rotating centring substage sleeve, each movement worked by fine screws. There is a Gillett achromatic condenser in place. The stage itself has a baseplate supported by thick brackets; this plate carries two others in dovetails, each worked by a vertical knob at the right. The top plate rotates and has a sliding bar. Below the bottom plate is a dovetail slide; into this go a three-opening rotating diaphragm (the largest opening threaded for the Nicol polarizer present), and a focussing substage tube. This is a very satisfactory stage in use. At the top of the box is a pinion worked by two large knobs, driving a gunmetal prismatic bar with rackwork cut into its rear. The body-tube arm is attached by a screw, and contains a second-order lever nosepiece fine adjustment. The tube has no drawtube.

**ANDw ROSS - LONDON No.216**



Price **6.500 \$**  
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