

# The Life of Albert Francis Arthur Lofley Jones

John Toone

BAA VSS, York, June 2014



# Outline Facts

- 1 in 40 of all visual observations of variable stars has been generated by Albert Jones
- 1<sup>st</sup> observer to achieve 200,000, 300,000, 400,000 & 500,000 visual observations
- The only observer to have accrued over 400,000 observations
- Only 4 other observers have made half Albert Jones total (250,000)

# Ancestry

ALBERT FRANCIS ARTHUR LOFLEY JONES  
1920-2013

EDWARD LOFLEY JONES  
1876-

JOHN RICHMOND PRIMROSE HULL JONES  
1841-1928

JOHN JONES  
1808-

THOMAS JONES  
1786-

SARAH COULTAS  
1808-1882

MARY  
1785-

SARAH ANN LOFLEY  
1848-1923

ROBERT LOFLEY  
1794-

MICHAEL COULTAS  
1756-1943

M 1810

M 1869

M 1827

M 1802

CLARA MARTHA FISHER  
1881-1959

CHARLES WILLIAM FISHER

JAMES MITCHELL FISHER

CLARA COX

LOUISA ANN SMITH

M 1857

# Great Great Grandparents in 1841 UK Census

The image shows two pages of a 1841 UK census document for North Myton. The document is titled 'Great Great Grandparents in 1841 UK Census' and contains two pages of census data. The first page is numbered '1' and the second page is numbered '2'. Both pages list the names, ages, and professions of residents in North Myton, Yorkshire. The first page lists 18 households, and the second page lists 18 households. The total number of people on the first page is 117, and on the second page is 120.

PLACE	HOUSE NO.	NAME	AGE	PROFESSION, TRADE, EMPLOYMENT, or INDEPENDENT MEANS.	Where Born
North Myton	1	John White	10	Boysman	York
		Elizabeth	46		York
		Isaac	3		York
		Henry	8		York
	7	John Altham	64	Salesman	York
		Margaret	67		York
		John Pittman	14	Boysman	York
		Robert Jackson	44	Boysman	York
		Isaac Jackson	44		York
		Isaac	21		York
		Eliza Jackson	11	F. S.	York
	12	Thomas Jones	50	Ind.	York
		Mary	56		York
		John	24	Boysman	York
		Henry	24	Boysman	York
		Mary	22		York
		Elizabeth	19		York
		Elizabeth Thompson	21	F. S.	York
	Mary Jackson	10	F. S.	York	
18	William Jackson	50	Teacher	York	
	William Jackson	25	Boysman	York	
	Elizabeth	25		York	
	Maria	6		York	
	Martin	6		York	
	Mary	5		York	
TOTAL in 1841	117				

PLACE	HOUSE NO.	NAME	AGE	PROFESSION, TRADE, EMPLOYMENT, or INDEPENDENT MEANS.	Where Born
North Myton	1	Robert Jackson	21	Boysman	York
		George Jackson	10	Boysman	York
		Mary	10		York
		Eliza	22		York
		John	15	Boysman	York
		Thomas	16		York
		Elizabeth	15		York
		Mary	15		York
		William	14		York
		Richard	14		York
		Livingstone	14		York
	18	Henry Jackson	31	Teacher	York
		Ann	26		York
		Ann	19		York
		James	1		York
		Elizabeth	15		York
		Elizabeth	14		York
	18	Thomas Jackson	21	F. S.	York
	Elizabeth	21	F. S.	York	
	John	11		York	
	Ann	11		York	
	Robert	11		York	
	Robert	11		York	
	Robert	11		York	
TOTAL in 1841	120				

- Thomas & Mary Jones lived in North Myton, Kingston upon Hull, Yorkshire with 2 sons (John & Henry), 2 daughters (Mary & Hannah) & 2 female servants

# Marriage Certificate of Grandparents

Page 141

1869. Marriage solemnized at the Parish Church in the Parish of St Paul Sculcoates in the County of York.

No.	When Married.	Name and Surname.	Age.	Condition.	Rank or Profession.	Residence at the time of Marriage.	Father's Name and Surname.	Rank or Profession of Father.
281	Nov 1 <sup>st</sup>	Alfred Richmond Lenny Primrose	35 26	Bachelor Spinster	Quaker —	Richmond House —	Alfred Richmond Peter Primrose	Quaker Railway Clerk

Married in the Parish Church according to the Rites and Ceremonies of the Established Church, by \_\_\_\_\_ or after \_\_\_\_\_ by me,

This Marriage was solemnized between us, { Alfred Richmond } in the Presence of us, { Andrew Henry Chapman }  
{ Lenny Primrose } { Henry Chapman }

---

1869. Marriage solemnized at the Parish Church in the Parish of St Paul Sculcoates in the County of York.

No.	When Married.	Name and Surname.	Age.	Condition.	Rank or Profession.	Residence at the time of Marriage.	Father's Name and Surname.	Rank or Profession of Father.
282	Nov 6 <sup>th</sup>	John Richmond Primrose Hull Jones	29 21	Bachelor Spinster	Grinder —	Hull Street Hull Street	John Jones John Lofley	Traveller Traveller

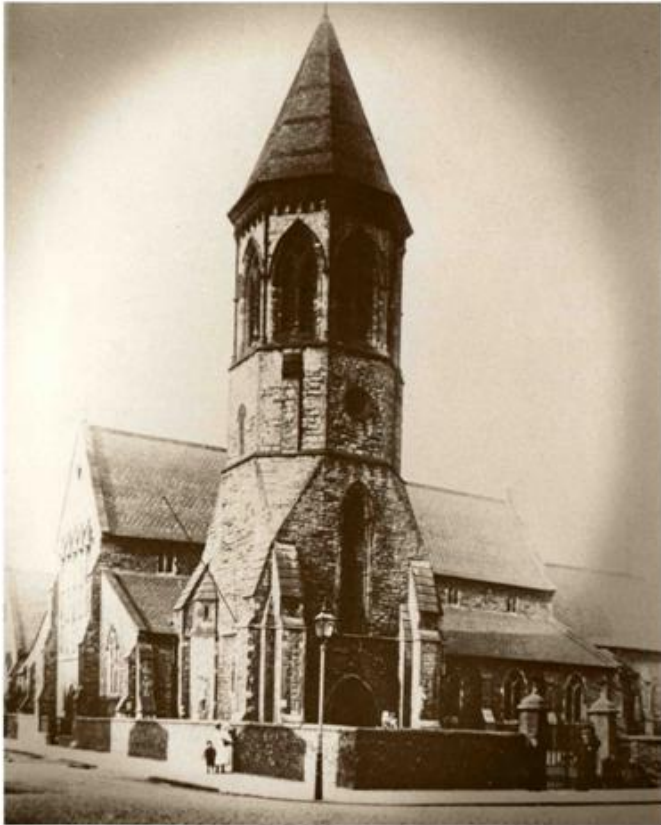
Married in the Parish Church according to the Rites and Ceremonies of the Established Church, by \_\_\_\_\_ or after \_\_\_\_\_ by me,

This Marriage was solemnized between us, { John Richmond Primrose } in the Presence of us, { John Lofley }  
{ Hull Jones } { John Lofley }

- John Richmond Primrose Hull Jones married Sarah Ann Lofley at St Pauls church in South Sculcoates, Hull on 6<sup>th</sup> Nov 1869
- John R P H Jones is listed as a grinder and his father John Jones is listed as a traveller

# St Pauls Church, Sculcoates, Hull

- Constructed in 1844
- John Richmond Primrose Hull Jones married Sarah Ann Lofley on 6<sup>th</sup> Nov 1869
- Demolished in 1976



East Riding Archives and Local Studies  
EMALS reference number:  
PE103/1146  
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# J R P H Jones was a Brogden Navvie

[99-257-12]

## BROGDENS' NAVVIES

### A FINDING AID

Compiled by Rollo Arnold

### CONTENTS

Ships with Brogden Immigrants	1
Navvies and their families; an alphabetical list	6
BROGDENS' NAVVIES - Paper read to Landfall in Southern Seas, 8th Australasian Congress on Genealogy and Heraldry, Lincoln University, 8 February 1997.	40

SURNAME	Given names	Age	Occup	Where from	Ship
HUNT	Thomas	31	labourer	England	20
	Emma	29			
	Eliz.	6			
HUNT	R.				12
HURRELL	Richard	28	labourer	b. Devon	15
				engaged Plymouth	
HURRELL	William	32	labourer	b. Devon	15
HUSSEY	Thomas	23	navvy	England	20
	Mary	?			
[Marlb. Press 26/3/73. Mary involved in a brawl with Wm Philp at Tua Marina. Takes Philp to court, but without success.]					
IRELAND	Jos.	25	farm labourer	England	35
	Maria	22			
ISOM	William	26			10
JAMIESON	Chas	21	labourer	b. Isle of Wight	15
JEFFERY	Granville	24	labr	b. Cornwall	15
	or George?			engaged Falmouth	29
JEFFERY	Richard	12 [sic]	navvie		24
JEFFREYS	Henry	24		England	24
JEFFS	George				23
[Evidence to Commission on the voyage, to which he signed his name. Was engaged by Brogdens at Uxbridge. IM]					
JENKINS	Wm	26	labr	b. Cornwall	15
				engaged Falmouth	
	Mary	22			
	Ellen	2			
	Infant				
JESSOP	John	28	labr	b. Yorkshire	15
				engaged London	
JONES	Fredk.	22	navvie	England	24
JONES	George	29	labr	b. Cornwall	15
				engaged Falmouth	
	Lydia	30			
JONES	Geo.	27	navvie		39
JONES	J.	26	navvie		24
JONES	John H.	32			10
	Sarah	32			
	John	1			
JONES	Thomas	30	labr	b. Cornwall	15
				engaged Truro	
	Hannah	26			
	Elizth	6			
	Emma	4			
	Hannah	3			
	Thomas	inf.			
JONES	Wm				33
[IM - Surgeon's report - Convalescent from fever on arrival]					
JORDAN	Joseph				30
[Wellington Independent 28 Dec 1873. R.M. Court, Wgtn. 'One of Brogdens' new arrivals' on charge of drunkenness. Discharged with a caution.]					

# J R P H Jones & Family Emigrated to NZ in 1872

## SHIPS WITH BROGDEN IMMIGRANTS

10	Schiehallion	Sailed London	13 Apr 72
		Arrived Wellington	9 Jul 72
		Number for Brogdens	138
		Total Brogdens & Govt	138

BROGDENS' NAMES AVAILABLE? Full list, IM 5/4/4

ORIGINS C.R. Carter selected 12 at Leamington on 29 Mar, 60 at Falmouth on 1 Apr, a few at Plymouth, a few from London, about 12 from Staffordshire. Able-bodied men were engaged as follows: London 26, Ulverston 2, Leamington 13, Plymouth 13, Falmouth & Redruth 34, Burslem & Tipton 9 ( AJHR 1872, D-1B, pp. 11-12)  
[ AJHR 1873, D-2D, p. 19 has a list of wives and children of these men (28 souls) who came out on the *Forfarshire* - Ship 35]

“with but one exception they are Englishmen” - Featherston IM 5/4/4

DISPERSAL All sent to Picton on the coaster *Rangatira*, 13 July 1872. AJHR 1881, I-1A, p. 25, - Brogdens' agent states the 3/4 of them quickly left the railway job to work for farmers, go gold digging &c.

12	Halcione	Sailed London	20 Apr 72
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# Albert Jones Summary Movements

- 1920 August 9: Born at 623 Worcester Street, Linwood, Christchurch
- 1926 October: Moved to rented property in Craigie Avenue, Timaru
- 1927 January: Moved to 40 Trafalgar Street, Timaru
- 1964: Moved to Tahunanui, Nelson
- 1979: Moved to 31 Ranui Road, Stoke, Nelson
- 2010: Moved to Whareama, Stoke, Nelson
- 2013 September 11: Passed away at Nelson Hospital

# Albert Jones Family

- Father: Edward Lofley Jones
  - Mother: Clara Martha Fisher
  - Step Brother: Percy Edward Jones
  - Sister: Iris Clara Lofley Jones
  - Brother: Eric Ionic Lofley Jones
- 
- First Wife: Ann 1973-1979
  - Second Wife: Carolyn 1984-2013

# Education

- 1925-1926: North Linward Primary School, Christchurch
- 1927-1932: Waimataitai School, Timaru (passed Proficiency Exam)
- 1933-1936: Timaru Boys High School (passed Matriculation and School Certificate exams)
- Favourite Subject: Chemistry

# Professional Career

- 1937-1963: Miller at Timaru Milling Company
- 1940-1942: Home Guard then infantry, 2<sup>nd</sup> Battalion, Canterbury Regiment
- 1964-1985: Grocer for Levin & Co at Tahunanui, Nelson
  
- Declined site testing job on Mt John
- Declined Directorship of Carter Observatory

# First Steps in Astronomy

- 1938: Constructed first telescope from lens kit & paper wrapped round metal tube
- 1939: Saw aurora & sent report to newly established Carter Observatory
- 1941: Purchased 5" reflector & joined NZAS
- 1943: Observed Nova Pup 1942 (CP Pup) & sent magnitude estimates to Carter Observatory



# 5 inch F15 Calver Reflector

- Made first variable star observation on 18<sup>th</sup> Jan 1943
- Recovered Comet Kopff in 1945

# Early Associations

- 1941: Became a member of the NZAS
- 1944: Joined the VSS NZAS
- 1945: Became a member of the BAA
- 1946: Joined the Societe Belge D'Astronomie
- 1947: Elected a Fellow of the RAS
  
- 1963: Elected a Fellow of the RASNZ
- 1965: Became a member of the IAU

PETER FREDERICK SMITH, Lieut., R.N.V.R., H.M.S. *Trulove*, c/o G.P.O., London.

*Proposer*: Eric V. Pinck

*Seconder*: Ralph I. Smith

WILFRED GEORGE WADDICOR, 222 Spork Road, Royal Oak Estate, Northenden, Manchester.

*Proposer*: G. Waddicot

*Seconder*: Thomas Parton

### New Members elected by N.S.W. Branch

THOMAS ROSEBY ASHLEY, B.E., 4 Fernhurst Avenue, Cremorne, Sydney.

WILLIAM JAMES BELSHAW, 50 Boyce Road, Marcubra, Sydney.

L. L. BRENNAN, c/o Duke and Albany Street, Gosford.

S. J. ELWIN, 27 Cotswold Street, Strathfield, Sydney.

TOM ENTWISTLE, Orange Grove Road, Liverpool, Sydney.

WILLIAM PANDELIS GEORGANS, 112 Anzac Parade, Parramatta, Sydney.

MISS SYLVIA E. GREEN, 10 Victoria Avenue, Woolshra, Sydney.

WILLIAM GEORGE HANSON, 92 Marsden Street, Parramatta, Sydney.

HAROLD LESLIE HUMPHRIES, 46 Captain Pipers Road, Vaucluse, Sydney.

ALBERT FRANCIS LOFTLEY JONES, 40 Trafalgar Street, Timaru, New Zealand.

JOHN LESLIE JONES, 21 Eddystone Road, Bexley.

ALAN ROBERT JORDAN, 59 Grand Parade, Brighton-le-Sands, Sydney.

RODERICK WILLIAM KARE, 16 Fenton Avenue, Newcastle.

WILLIAM JOHN KIDO, 19 Crinan Street, Hurlstone Park, Sydney.

JOHN LAWSON, 61 Roe Street, Mayfield, Newcastle.

BASIL LERTZER, Flat 6, The Carlton, 13 Cross Street, Waverley, Sydney.

ALYN MORRIS MARLAND, 3 Courallie Road, Northbridge, Sydney.

WILLIAM KEMP ROBERTSON, 15 Ruse Street, Harris Park, Sydney.

JOSEPH RUDDOCK, Tally Ho, Sharland Avenue, Chatswood, Sydney.

JOHN B. SELLS, 23 Kenneth Street, Longueville, Sydney.

LAURENCE GEORGE THOMAS, 20 Hutchinson Street, Granville, Sydney.

### Instruments Available for Loan

1. Rowland Speculum Grating, 20 × 28 mm., 14,438 lines to the inch.
22. Transit Theodolite.
59. 3.5-inch Portrait Lens and Camera attachment.
79. Miscellaneous Instruments presented by the executors of the late Major A. E. Levin.
  - (a) Scales and small weights. (h) Wet and Dry Bulb Thermometer. (i) Case of drawing instruments. (j) Spirit Level.
83. 9½-inch Reflector, "With" Mirror on Berthon Equatorial, clock driven with circles, etc., and carrying 4½-inch Grubb doublet cameras.
84. 6-inch Photographic Telescope, 52-inch focus, takes plates 6 × 6 inches, on clock-driven equatorial mounting; also 3½-inch guider telescope—all by Dallmeyer.
93. 12½-inch Reflector, clock-driven equatorial, clamps, slow motions, circles, etc. Tube does not rotate.
94. 3-inch Refractor without mounting.

Applications for the loan of instruments will be considered by the Council. They should be sent to the Curator of Instruments, J. H. J. Burt, 6 Elmbourne Road, London, S.W. 17. Applicants are invited to state the kind of observational work they intend to undertake, when they will be advised as to which of the available instruments will be most suitable for that work. Applications by members of less than two years' standing will ordinarily be required to be supported in writing by a member of at least five years' standing. The larger telescopes will be reserved for loan to those who are prepared to take a part in the work of the Observing Sections.

### Increased Price of Publications

Owing to the rapid growth of membership and consequent demands upon our stock of back

Elected to  
BAA (NSW  
Branch) on  
27<sup>th</sup> June  
1945

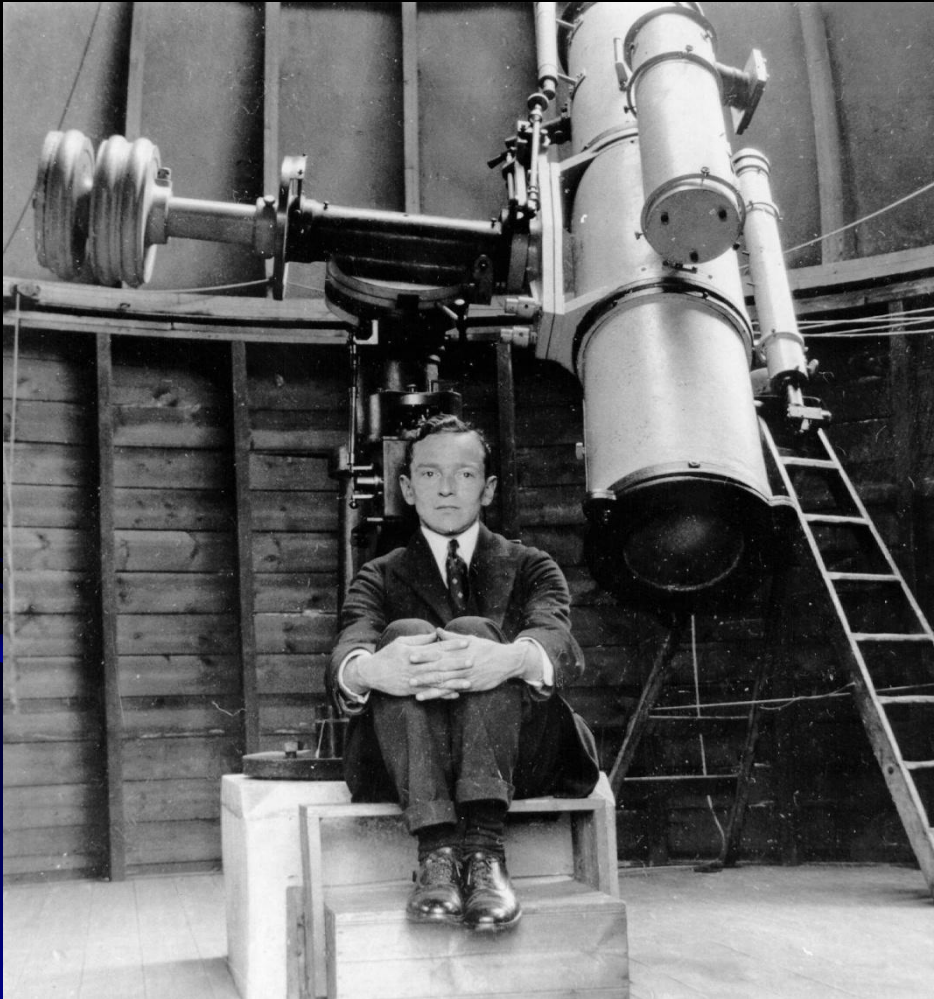


# 5.3 inch Refractor in 1947

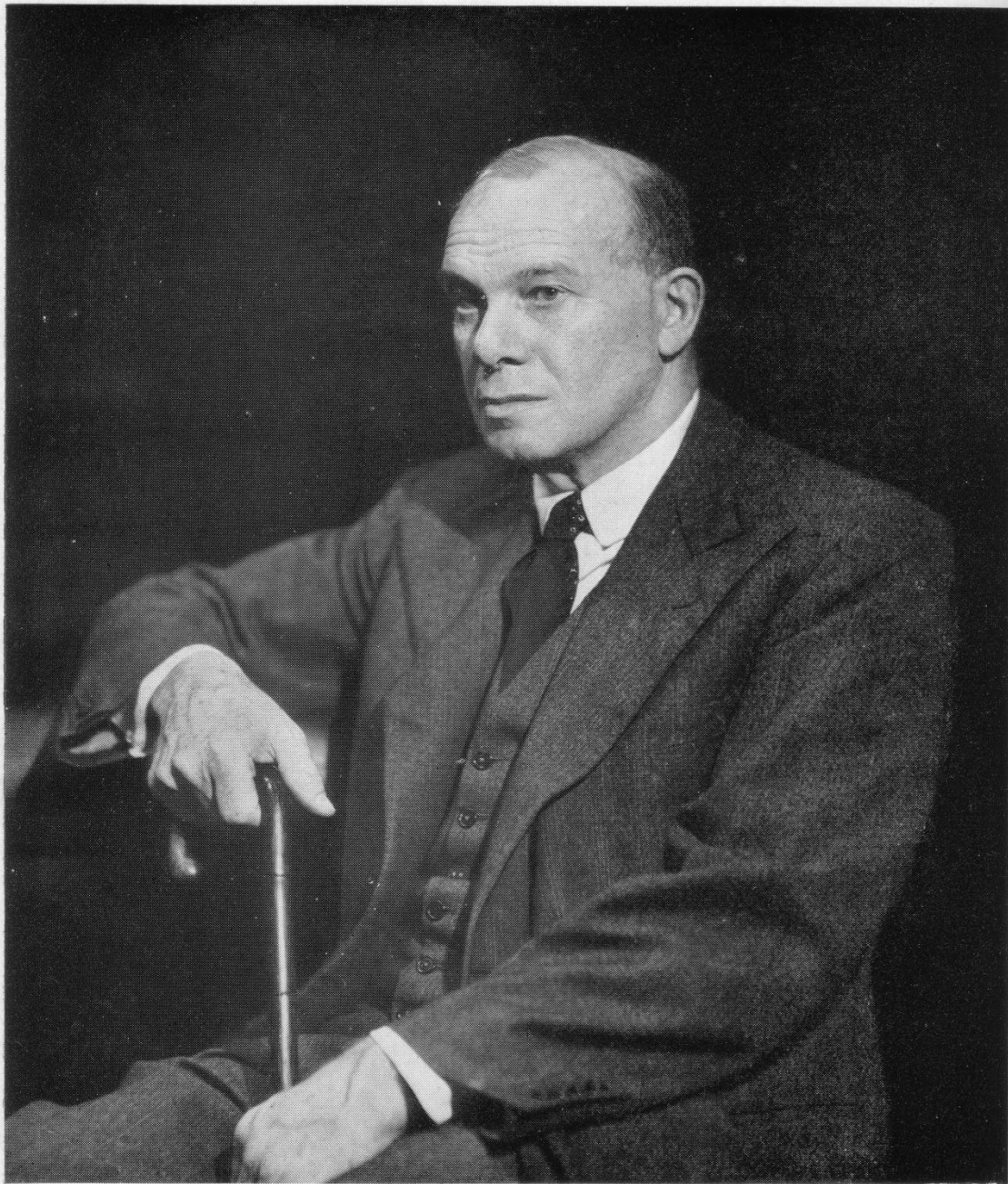


- In use from 1945 until LESBET was constructed in early 1948
- Discovered Comet 1946h whilst star hopping to U Pup

# Frederick James Hargreaves 1891-1970 (if your work interferes with your hobby, give up your work)



- Director of BAA Photographic Section 1926-1937
- Jackson-Gwilt Medal from the RAS 1938
- BAA President 1942-1944
- RAS Vice-President 1943-1945
- Formed Cox, Hargreaves & Thomas Ltd in 1947



*Walter Stoneman, F.R.P.S.*

*LESLIE JOHN COMRIE, M.A., Ph.D., F.R.S.*

# Leslie John Comrie 1893-1950

- Great War Veteran
- Director of BAA Computing Section 1919-1922
- Superintendant at HM Nautical Almanac Office 1926-1936
- Arranged manufacture & transport of 12.5 inch mirror from UK to NZ

# LESBET pictured in 1949



- 12.5 inch F5 mirror configured from Hysil glass
- Mirror cost £75 paid to Leslie Comrie who later sent food parcels to UK
- Constructed by Albert Jones during 1948 and christened LESBET

# LESBET pictured in 1987



- Used from February 1948 to May 2010
- Equatorial mounting but used as altazimuth
- 45mm & 78mm finder scopes

# AAVSO meeting in October 1957



# First Observers to 100K Milestone

Year	Observer	Country
1939	Charles Butterworth	UK
1957	Albert Jones	NZ
1958	Reginald de Kock	SA
1960	Cyrus Fernald	USA
1962	Leslie Peltier	USA

# The estimated total of 515,000 visual observations is based on the following:

1. **100,000** observations were made between 1943 and 1957 according to Frank Bateson's statement at the October 1957 AAVSO meeting.
2. Frank Bateson in December 1958 wrote that his annual average output was then at 10,000 therefore it is reasonable to assume that he made **50,000** observations in the years 1958-1962.
3. **365,000** observations are in the AAVSO database for the period 1963-2011.

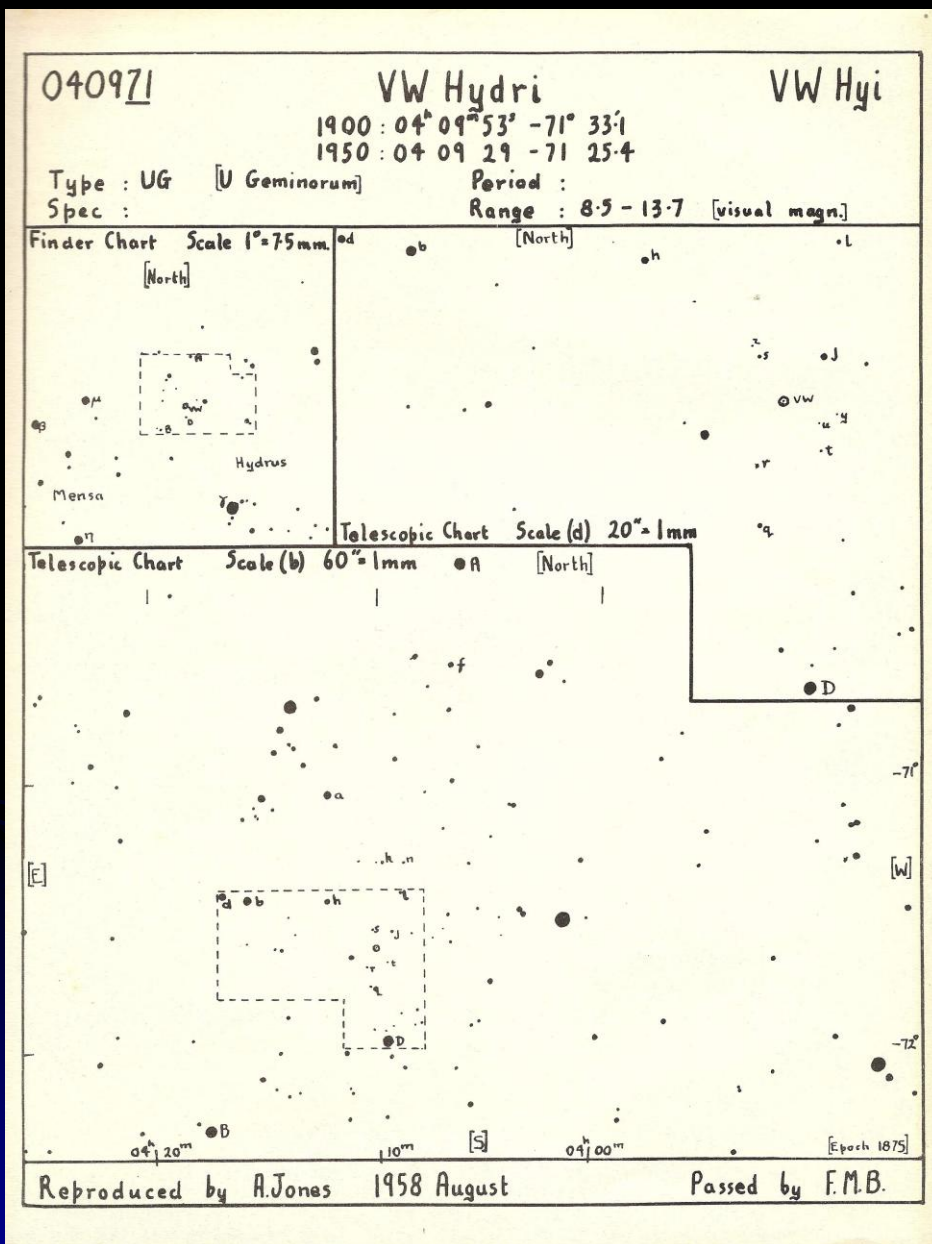


# Leading Visual Observers

Quantity	Observer	Country
515,000	Albert Jones	NZ
347,000	Hiroaki Narumi	Japan
317,000	Taichi Kato	Japan
287,000	Danie Overbeek	SA
265,000	Gary Poyner	UK

# Systematic Monitoring of Southern Dwarf Novae

- 1953 August 6: Caught VW Hyi in outburst
- 1954 July 25: Caught S4893 (Z Cha) in outburst after 20 negative observations
- 1954 Oct 17: Caught S5005 (EK TrA) in outburst after 15 negative observations
- 1958: Provided input on southern dwarf novae for Brun & Petit “Atlas of U Geminorum Stars”



# VW Hyi Chart from 1958

- Plotted from Cape Photographic Durchmusterung
- Position of VW Hyi confirmed when it faded from outburst in 1953

# RASNZ VSS Circular 72 (1956)

NOV 20 1956

ROYAL ASTRONOMICAL SOCIETY OF NEW ZEALAND.

CIRCULAR NO. 72 (cont).

- 4 -

VARIABLE STAR SECTION.

CIRCULAR NO. 72.

"THE U GEMINORUM TYPE VARIABLE WV HYDR1"

by  
F.M. BATESON, F.R.A.S.  
and  
A.F. JONES, F.R.A.S.

SUMMARY. Observations of 040971 Wv Hydr1 from J.D. 2,434,596 to 2,435,349 are presented in Table 1. Observed dates of maxima are listed in Table 3 and data on comparison stars together with a chart are given.

From a discussion of the observations Wv Hydr1 is found to be a U Geminorum type variable with an average interval between maxima of 32.6 days. Maxima are shown to be of two types and the visual range 8.4 to 13.6.

1. INTRODUCTION.

040971 Wv Hydr1 is listed in The General Catalogue (1) at:-

R.A. 04h 09m 53s )  
Dec. -73° 36.6' ) Epoch 1900

Other details give the range as 8.5 to 13.4, photographic with a mean value of its cycle as 35 days. Type U Geminorum.

Apart from the discovery announcement (2) and an article by A. Jones (3) this star does not appear to have attracted a great deal of attention. Yet it proves to be one of the most interesting variables of its type in the Southern hemisphere.

In accordance with its policy of extending observations to all southern variables of this type, the V.S.S. of the Royal Astronomical Society, added the variable to its working list in 1953 August. Since then it has been well observed.

11. OBSERVATIONS.

The star has been observed since 1953 August 6. Observations from that date to 1955 August 31 are listed in Table 1, in the usual form. Details of observers, instruments and locations are given in Circular 69 (4). All observations were visual.

111. COMPARISON STARS.

Table 2 gives the comparison stars used. A chart of the region, based on the C.P.D. for Epoch 1875.0, is reproduced in Figure 1.

In Table 2 the columns give respectively the following details:-

- (1). Designation on Chart reproduced as Figure 1.
- (2). C.P.D. No. when star is listed in that publication.
- (3). H.D. No. when available.
- (4). H.D. visual magnitude.
- (5). H.D. photographic magnitude.
- (6). Spectrum.
- (7). Adopted visual magnitude determined from Jones' observations by Bateson.

TABLE 1. ---- OBSERVATIONS.

2434000 +					
596.83 9.9 Jo	692.11 9.5 Jo	786.90(12.7 Jo	863.92(11.5 Pl	929.25 13.5 Jo	
597.82 10.5 Jo	.96 10.7 Jo	787.09(13.2 Jo	864.81 13.4 Jo	.84(12.7 Jo	
598.83 11.7 Jo	693.12 11.1 Jo	792.02(12.5 Jo	866.90 13.1 Jo	931.27 13.1 Jo	
599.93 13.5 Jo	.90 12.0 Jo	.89(12.5 Jo	869.79(12.1 Jo	.80(12.7 Jo	
604.80(12.1 Jo	694.90(12.7 Jo	793.39 11.0 Jo	871.92(12.7 Jo	932.81(12.1 Jo	
605.85(13.2 Jo	.91(11.5 Pl	794.17 9.3 Jo	873.21 11.6 Jo	933.25(12.7 Jo	
608.26 13.7?Jo	695.15(12.7 Jo	796.96 12.3 Jo	.27 11.5 Jo	934.28(13.2 Jo	
609.20 13.5 Jo	697.89(12.1 Jo	797.98 13.2 Jo	.78 9.9 Jo	.79(12.7 Jo	
611.26 13.2 Jo	700.13(13.2 Jo	799.95 13.5 Jo	874.22 10.4 Jo	935.26(13.2 Jo	
612.24 13.1 Jo	703.00(11.6 Jo	800.95(13.2 Jo	.80 11.0 Jo	936.90(10.9 Jo	
618.82 13.4 Jo	705.01(12.7 Jo	806.88(12.7 Jo	875.24 11.7 Jo	937.29(13.2 Jo	
619.89(12.7 Jo	707.90 12.6 Jo	811.23(10.9 Jo	876.80(12.5 Jo	945.00(13.2 Jo	
620.83(12.7 Jo	.97 12.6 Jo	812.89(12.7 Jo	877.19 13.1 Jo	.89(12.7 Jo	
621.25(12.7 Jo	708.04 12.6 Jo	813.87(12.7 Jo	.26 13.1 Jo	946.00(13.2 Jo	
624.25 9.8 Jo	.91 9.2 Jo	815.05 12.9 Jo	878.26 13.1 Jo	.95 9.5 Jo	
624.84 11.4 Jo	.95 9.4 Jo	817.21(12.7 Jo	879.79(11.6 Jo	.98 9.5 Jo	
625.94 12.7 Jo	710.93 11.2 Jo	.91(12.7 Jo	883.80(12.1 Jo	947.07 9.3 Jo	
628.25(12.1 Jo	711.03 11.1 Jo	818.19(12.5 Jo	884.79 13.4 Jo	.26 9.1 Jo	
628.95(13.2 Jo	.13 11.4 Jo	.89(12.1 Jo	885.87(12.7 Jo	.27 9.0 Jo	
630.87(12.7 Jo	.93 12.6 Jo	819.19 12.7?Jo	887.79 13.5 Jo	.79 9.0 Jo	
631.22 13.0 Jo	.99 12.6 Jo	820.88(12.1 Jo	888.79 13.4 Jo	.92 9.5 Jo	
632.98(12.7 Jo	721.13 9.7 Jo	821.22(12.1 Jo	889.78(12.7 Jo	.98 9.7 Jo	
633.99 13.1 Jo	723.93 11.0 Jo	823.01(12.1 Jo	890.25 13.5 Jo	949.80 12.0 Jo	
634.20 13.1 Jo	724.13 11.4 Jo	824.84(13.2 Jo	.80 13.3 Jo	950.28 12.9 Jo	
634.85(12.7 Jo	727.08 13.6 Jo	825.84 13.6 Jo	891.26 13.4 Jo	.99(13.2 Jo	
635.20 13.2 Jo	728.93(12.1 Jo	827.88(12.7 Jo	.78 13.3 Jo	951.24 13.4 Jo	
636.20 13.1 Jo	730.15(11.6 Jo	829.24(12.1 Jo	893.79 13.4 Jo	.80(12.7 Jo	
637.83(12.1 Jo	735.93 9.8 Jo	831.21(13.2 Jo	894.26(12.7 Jo	952.87(12.7 Jo	
638.19 13.1 Jo	736.94 11.0 Jo	.87(13.2 Jo	895.82(12.7 Jo	954.28(12.7 Jo	
.88(12.7 Jo	739.01 13.5 Jo	832.23(12.7 Jo	898.31 13.5 Jo	955.25(13.2 Jo	
639.18 13.1 Jo	.91(12.7 Jo	.83(12.7 Jo	903.83(12.7 Jo	956.80(12.7 Jo	
640.22 13.1 Jo	742.99 13.1 Jo	.99(13.2 Jo	904.22 13.5 Jo	957.24 13.4 Jo	
641.22(12.7 Jo	744.94 13.1 Jo	833.21(12.7 Jo	.78(12.7 Jo	960.04(12.7 Jo	
644.84(12.1 Jo	746.14(12.7 Jo	834.98(13.2 Jo	905.22 10.3 Jo	.27(12.7 Jo	
645.88(12.7 Jo	.91(12.7 Jo	835.82(12.7 Jo	.25 9.9 Jo	962.18 13.5 Jo	
646.96(12.7 Jo	747.13(12.7 Jo	838.00(12.7 Jo	906.20 9.9 Jo	963.21 13.4 Jo	
650.97(12.7 Jo	748.13 13.5 Jo	.23(12.7 Jo	.27 9.9 Jo	.85(12.5 Jo	
652.92 10.0 Jo	750.00 13.2 Jo	.82(12.7 Jo	907.93 12.4 Jo	964.24 13.4 Jo	
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689.11(13.2 Jo	778.91 13.5 Jo	855.93 9.5 Jo	.81 13.5 Jo	.98(13.2 Jo	
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## The light curve of the dwarf nova, VW Hydr

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Visual observations are presented covering the interval J.D. 2,434,604 to 2,442,600. A mean interval of 27.33 days was found between successive maxima. These are of two main types: supermaxima, with a mean magnitude of 8.64<sub>v</sub>, when the variable remains above magnitude 9.5<sub>v</sub> for longer than 6 days; and normal maxima, with a mean magnitude of 9.45<sub>v</sub>, when the star is brighter than 10.5<sub>v</sub> for 3 days at the most, and usually for under 2 days. Supermaxima are grouped into 8 classes and normal maxima into 5, according to the rate of rise per 0.1 of a day. Outbursts observed totalled 292 of which 44 were supermaxima, which had a mean interval of 179.35 ± 12.1 days between successive outbursts of this type. It is concluded that supermaxima and normal maxima originate from the same energy source, and that supermaxima trigger subsequent normal maxima. The observations are consistent with the theory that the outbursts originate in the primary, causing a thermal pulse running through its outer layers and passing through the disk. Humps observed during minimum brightness have a period consistent with the orbital period whereas humps during supermaxima have a longer period.

### INTRODUCTION

The variability of VW Hyi was discovered photographically by Luyten (1932), and reobserved by Luyten (1938). He designated it as 11.1932, assigning a range of 9 to 14 ptg. Boyce (1943) recorded the star as HV 8028, of the SS Cyg class, range 8.5 to 13.4 ptg. She found 113 maxima on Harvard plates taken over a period of 50 years. The duration of these maxima was from 8 to 10 days, and the intervals between successive maxima showed a wide spread in values, quite unlike the situation for SS Cyg. The distribution of these intervals was probably distorted because of the spread in dates on which the plates were taken.

After these investigations, apparently, VW Hyi was not observed until A. F. Jones commenced observations in August 1953.

### Charts and sequences

Charts have been published by Jones (1954), Bateson & Jones (1956), Hoffmeister (1957), Brun & Petit (1957), and Bateson (1958). The last mentioned reproduced Jones' chart with a provisional visual sequence based on step estimates. The zero point adopted for this sequence was CPD -70°276 (HD 26492) with *m<sub>v</sub>* 7.6. This chart and sequence were used by southern observers for intensive observation of VW Hyi.

Marino & Walker, Auckland Observatory, determined a photoelectric sequence which provided reliable magnitudes for the comparison stars. This

was published with Chart 350 by Bateson *et al.* (1976).

### Observations

The first visual observations were reported by Jones (1954), Jones (1955), and Bateson & Jones (1956). Subsequent observations by members of the Variable Star Section, Royal Astronomical Society of New Zealand, have appeared in numerous Circulars of the Section. All these were preliminary estimates based on the provisional sequence. Bateson & Jones (1956), Bateson (1957), and Bateson (1965) found the mean interval between successive maxima was 28.72 days, with 2 distinctive types of maxima.

There are available approximately 21 000 visual observations by members of the Variable Star Section, Royal Astronomical Society of New Zealand, covering the interval J.D. 2,434,604 to 2,442,600.

### METHODS AND RESULTS

The V magnitudes for the comparison stars, as determined by Marino & Walker, were used to correct all estimates to a reliable system. Daily Means were then derived from the observations. These were plotted on an extended scale in order that the light curve could be studied in detail. This enabled the times of maxima to be determined with considerable accuracy, except when the star was poorly observed.

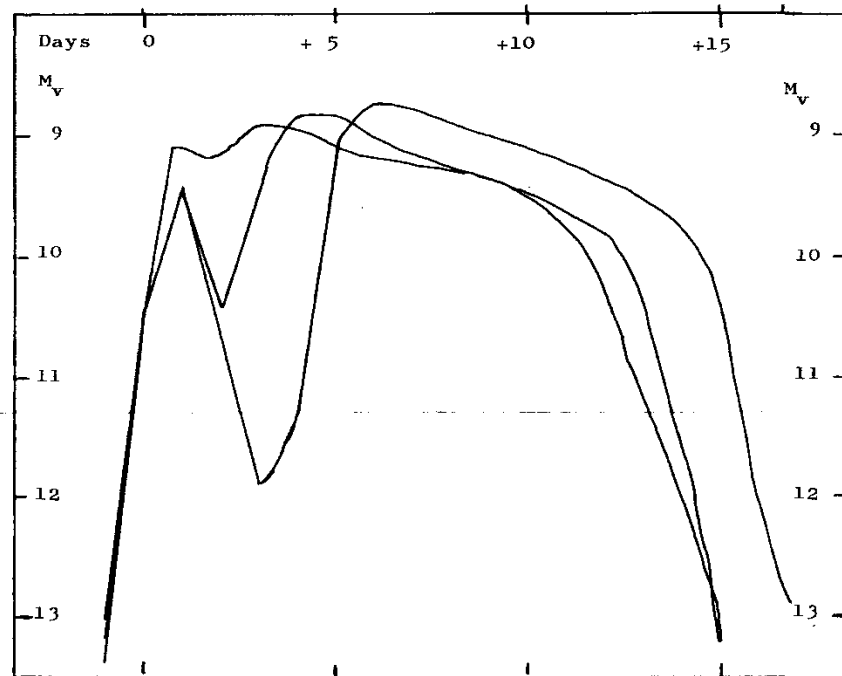


Fig. 7 VW Hyi smoothed light curves, supermaxima types S6 to S8

Type	M <sub>v</sub>	from 12 maxima
A	0.74	37
B	0.44	48
C	0.32	26
D	0.24	13
E	0.18	

Mean magnitude at maximum and width of maximum were used to subdivide each type. Successive numbers in each class denote generally brighter mean magnitudes at maxima and increasing widths. Thus for type A: A1 is fainter and narrower than A2, which is fainter than A3 or A4.

Normal maxima differ from supermaxima in mean brightness and width. They also do not remain at a maximum, but immediately start decline once that point is reached. Marked fluctuations are absent on the decline. They resemble supermaxima

in often having a marked dip in minimum magnitude immediately before an outburst. Fifty-nine instances of this occur amongst the 136 well observed normal maxima. It is probable that this effect is usual.

A standstill at an intermediate magnitude appears to be present on both the rise and fall. Standstills on the rising branch have an average duration of 2 hours 22 minutes at a mean magnitude of 11.8 from 11 observed. On the descending branch, standstills average 2 hours 30 minutes at a mean magnitude of 11.2 from 16 observed.

A common feature of normal maxima is a tendency to decrease at the bottom of the descending branch and then immediately increase half a magnitude, giving the curve at this point a V shape.

Mean light curves derived for each subdivision are given in Table 4 for half-day intervals. The zero point of reference was taken as magnitude 10.5 on

# Kepler Mission Light Curves

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## The Cause of the Superoutburst in SU UMa Stars is Finally Revealed by Kepler Light Curve of V1504 Cygni

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### Abstract

We have studied the short cadence Kepler light curve of an SU UMa star, V1504 Cyg, which covers a period of  $\sim 630$  d. All superoutbursts in V1504 Cyg have turned out to be of precursor-main types, and the superhump first appears near the maximum of the precursor. The superhumps grow smoothly from the precursor to the main superoutburst, showing that the superoutburst was initiated by a tidal instability (as evidenced by the growing superhump) as envisioned in the thermal-tidal instability (TTI) model proposed by Osaki (1989, PASJ, 41, 1005). We performed a power spectral analysis of the light curve of V1504 Cyg. One of the outstanding features is the appearance of a negative superhump extending over around 300 d, well over a supercycle. We found that the appearance of the negative superhump tends to decrease the frequency of occurrence of normal outbursts. Two types of supercycles are recognized in V1504 Cyg, which are similar to those of the Type L and Type S supercycles in the light curve of VW Hya, a prototype SU UMa star, introduced by Smak (1985, Acta Astron., 35, 357). It is found that the Type L supercycle is the one accompanied by the negative superhump, and Type S is that without the negative superhump. If we adopt a tilted disk as an origin of the negative superhump, two types of the supercycles are understood to be due to a difference in the outburst interval, which is in turn caused by a difference in mass supply from the secondary to different parts of the disk. The frequency of the negative superhump varies systematically during a supercycle in V1504 Cyg. This variation can be used as an indicator of the disk-radius variation, and we have found that the observed disk-radius variation in V1504 Cyg fits very well with a prediction of the TTI model.

**Key words:** accretion, accretion disks — stars: dwarf novae — stars: individual (V1504 Cygni) — stars: novae, cataclysmic variables

### 1. Introduction

The SU UMa stars are in short orbital periods that show two distinct types of outbursts: a short normal outburst with a duration of a few days, and a long superoutburst with a duration of typically two weeks (see, Warner (1995) and Hellier (2001a) for dwarf novae in general and for SU UMa stars in particular). In ordinary SU UMa stars, several short normal outbursts are sandwiched between two long superoutbursts, and a cycle from one superoutburst to the next is called a supercycle. Normal outbursts are believed to be essentially the same as those outbursts observed in ordinary dwarf novae with a longer orbital period, such as U Gem and SS Cyg stars; they are now well understood by considering the thermal limit-cycle instability in the accretion disk (see, e.g., Cannizzo 1993; Lasota 2001). During the superoutburst, periodic humps, called the superhumps, always appear with a period slightly longer than the orbital period by a few percent. The superhump phenomenon is now well understood by considering the tidal instability

(Whitehurst 1988; Hirose, Osaki 1990; Lubow 1991); superhumps are produced by a periodic tidal stressing of the eccentric precessing accretion disk, which is in turn produced by the tidal 3:1 resonance instability between the accretion-disk flow and the orbiting secondary star.

As to the superoutburst and supercycle of SU UMa stars, three different models have so far been proposed: the thermal-tidal instability model advocated by Osaki, the enhanced mass-transfer model advocated by Smak, and the pure thermal instability model by Cannizzo. No consensus has yet been reached about the cause of the superoutburst.

Besides the original planet hunting mission, NASA's Kepler observations (Koch et al. 2010) with high-accuracy photometry give an unprecedented opportunity to investigate variable stars. Two SU UMa stars, V344 Lyr and V1504 Cyg, in the Kepler field have been observed with the short cadence (SC) mode, and some of their light curves are now available to the public. In this paper, we consider the cause of the superoutburst in SU UMa stars using the Kepler light curve of one of them, V1504 Cyg,

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Cause of the Superoutburst in SU UMa Stars

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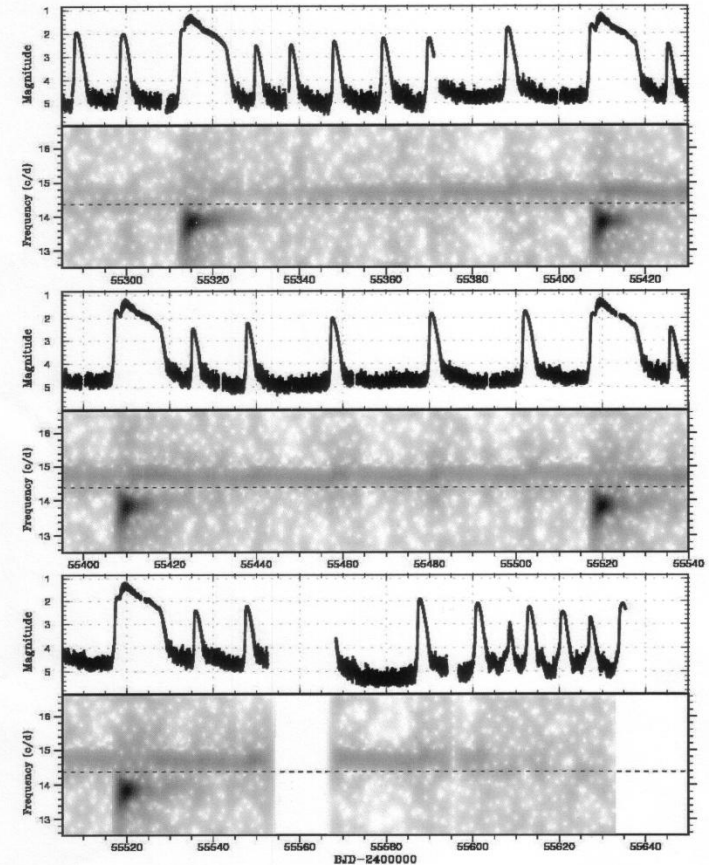


Fig. 3. (continued)

# Recurrent Novae & Supernovae Outburst Detections

- 1966: T Pyx
- 1973: V1017 Sgr
- 1987: SN1987A in LMC
- 1990: V3890 Sgr

# Normal Appearance of LMC





# SN1987A & Tarantula Nebula

