J.P.V.MADSEN, PHILIPS AUSTRALIA (1948-1963), CSIRO (1927-1963).

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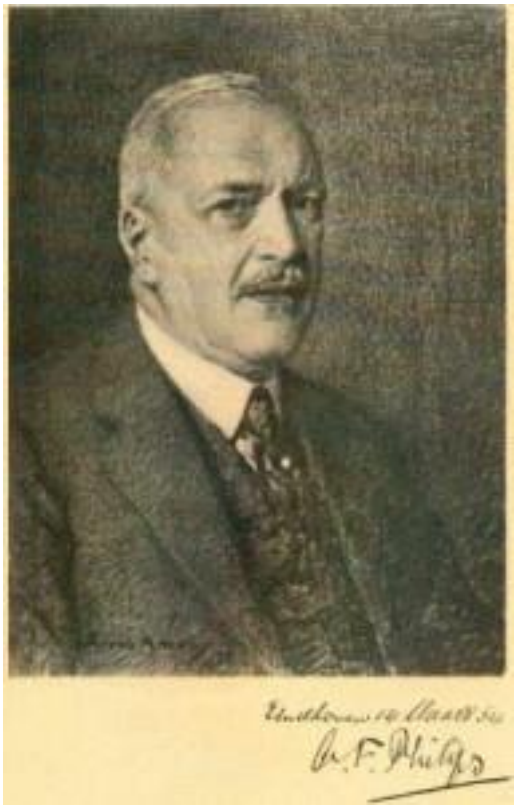
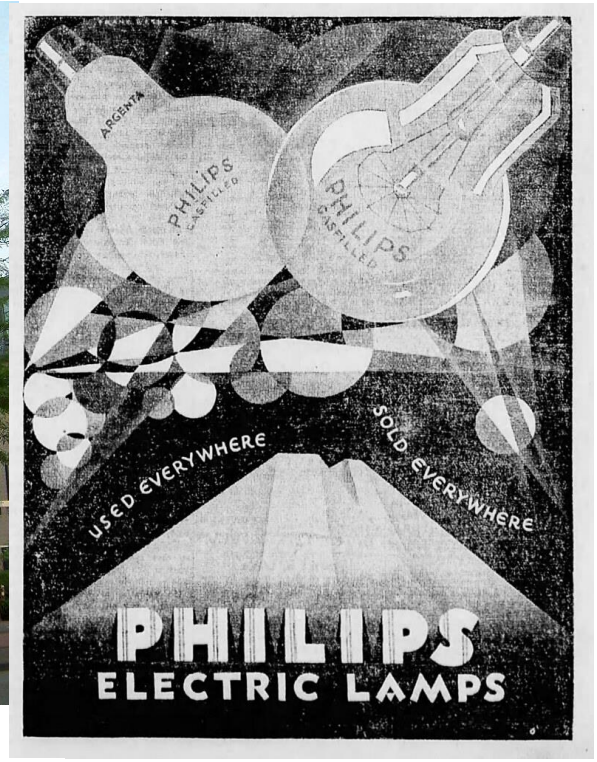
R.W.Madsen, November 2020.

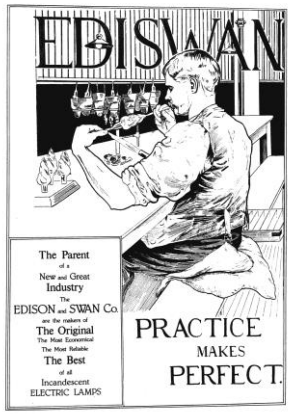
J.P.V.Madsen, Philips Australia (1948-1963), CSIRO (1927-1963).

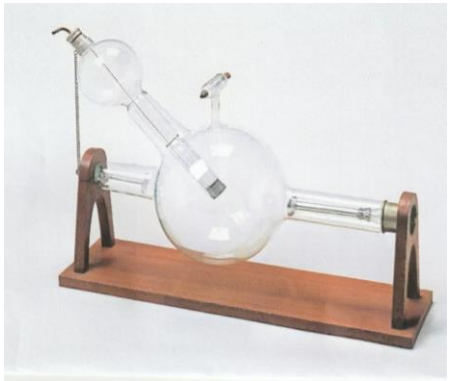
PHILIPS: Frederik (1830-1900), Gerard (1858-1942), Anton (1874-1951).

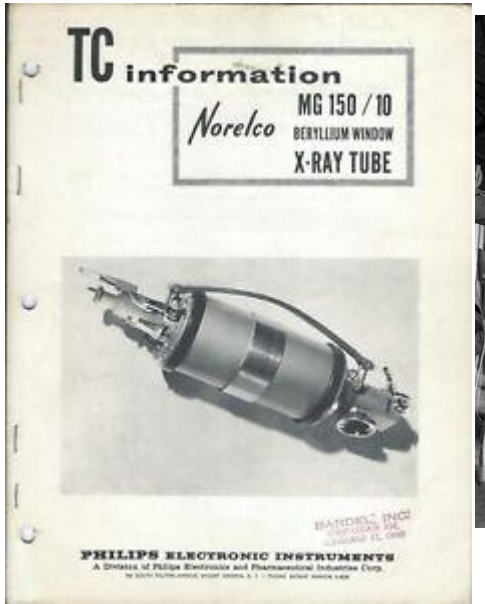


Eindhoven Light Factory







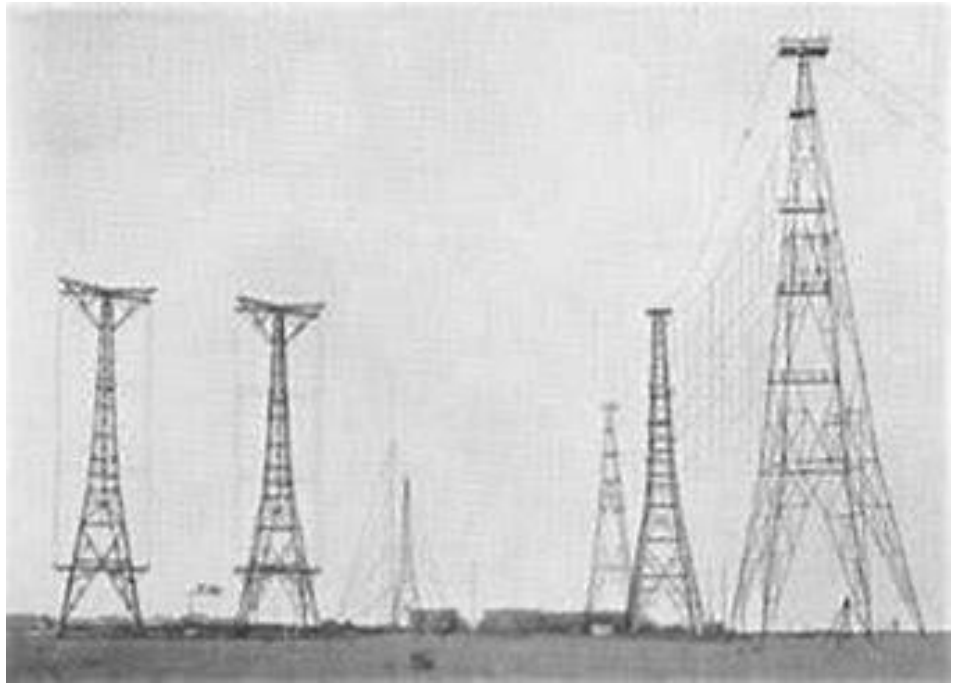


Physics Laboratory & Radio Valves.

November 10, 1928

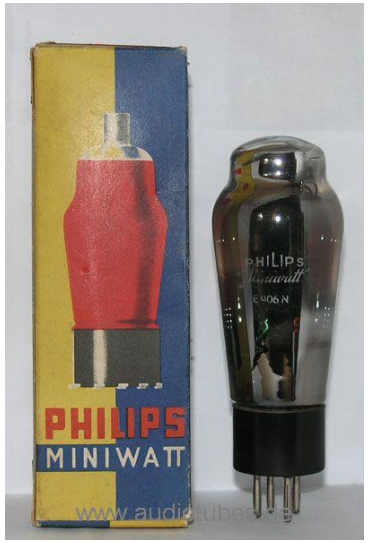
Tomania Radiocollection

Philips Shortwave PHOHI 1934. Radio Luxembourg Long Wave.



Technical Review 1936.

Hans Jonker (1901-1963)



VOL. 1 No. 7 JULY 1936

Philips Technical Review

DEALING WITH TECHNICAL PROBLEMS
RELATING TO THE PRODUCTS, PROCESSES AND INVESTIGATIONS OF
N.V. PHILIPS' GLOEILAMPENFABRIEKEN
EDITED BY THE RESEARCH LABORATORY OF N.V. PHILIPS' GLOEILAMPENFABRIEKEN, EINDHOVEN, HOLLAND

IRRADIATION OF PLANTS WITH NEON LIGHT

By J. W. M. ROODENBURG and G. ZECHER.

Summary. Owing to the want of light the growth and development of plants during the winter becomes considerably arrested. This check may be completely or partly counterbalanced by irradiating the plants with artificial light. Owing to its favourable spectral distribution neon light is particularly suitable for this purpose. The technical development of neon light sources for plant irradiation and the irradiation conditions laid down by Roodenburg on the basis of extensive experimental work now permit the commercial grower and the amateur horticulturist to promote the growth of their plants by irradiation.

After decades of abortive experiments in the Netherlands and elsewhere on the artificial irradiation of plants, an appreciable measure of success has recently been achieved in this direction. That light is one of the principal factors in the growth of plants has been realised for many years, and the idea has long been entertained of attempting to influence the growth and development of plants by irradiation with artificial light. But only with the technical development of the requisite sources of light has a fundamental investigation of this problem been made possible and enabled the market grower and amateur horticulturist to employ irradiation methods on a practical scale.

Composition of light for the irradiation of plants

The life and growth of plants are intimately connected with certain chemical processes. One of the chief of these is the assimilation of carbon dioxide, in the course of which the plants absorb carbon dioxide from the air and the carbohydrates from the water of which plants are principally built up. Carbon dioxide assimilation takes place only when a light stimulus is provided, the light being absorbed by the green colouring matter of the leaves, viz, chlorophyll. If the light available for the plant drops below a specific level, e.g. during the short days of winter, growth is practically static, even though all other conditions for their growth are adequately met, as for instance by placing in heated and moist greenhouses and by the addition of suitable fertilisers.

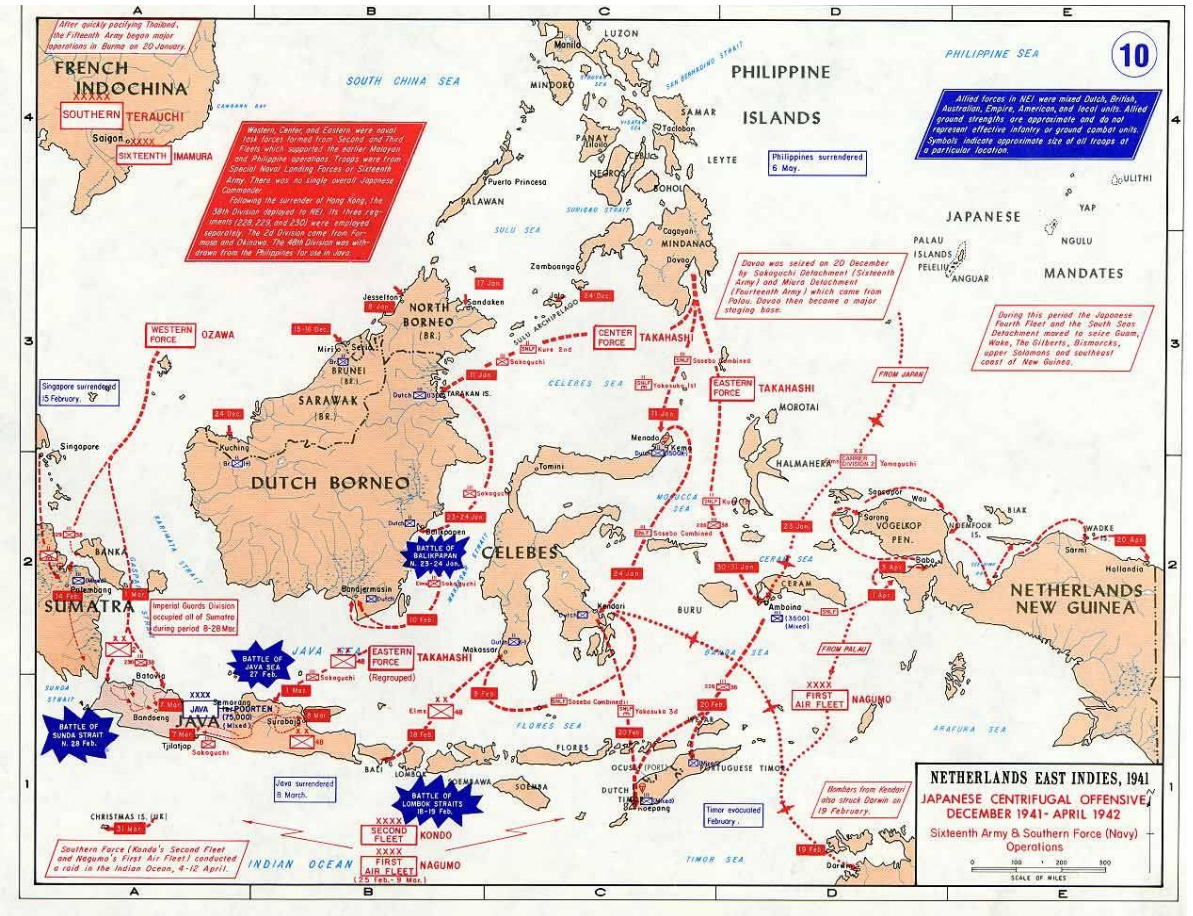
By augmenting the natural light with an auxiliary source of illumination, it has now been possible to promote the growth of plants even during the darkest winter months.

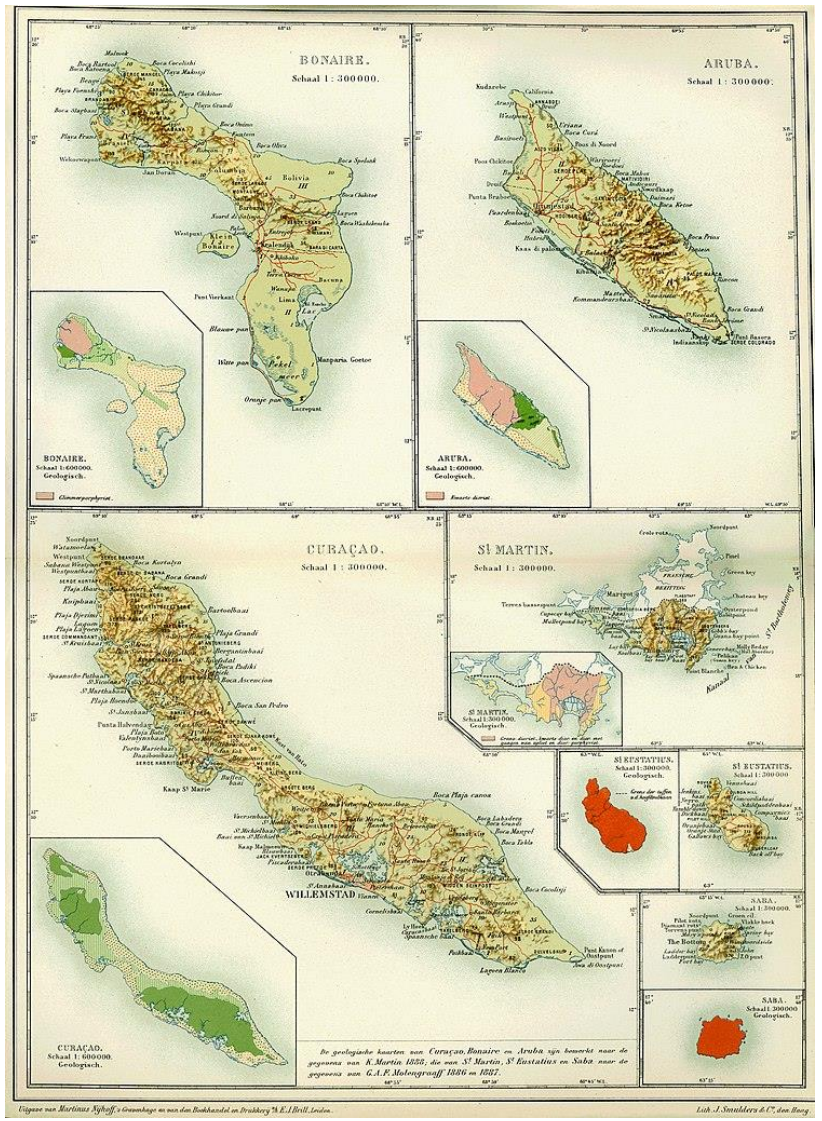
Carbon dioxide assimilation is most active in red light, which is absorbed to a high degree by chlorophyll. Hence, in providing auxiliary irradiation for plants, it is essential to utilise a source of light containing a sufficient concentration of red rays. At an early date it was therefore proposed to employ neon light for this purpose [1]). *Fig. 1* shows the spectrum of a neon light source and the assimilation curve, the latter indicating the amount of carbohydrate formed on irradiation with an equivalent light energy of each wavelength. Neon has the most intense lines just in that region in which the effect of light on carbon dioxide assimilation is greatest. The same figure also gives the spectrum for an ordinary glowlamp. The greater part of the radiation from the glowlamp consists of infra-red (invisible) rays and only 8 per cent of its radiation is situated in the visible spectrum, whilst about 20 per cent of the total energy radiated from the neon tube lies in this region. But since glowlamp light is much easier to generate and to manipulate than neon light, experiments have also been carried out on the irradiation of plants with glowlamp light. In the first place it is necessary to produce an adequate intensity of red

[1]) G. Höstermann: Experiments with neon light. Bericht Königl. Gärtnerlehranstalt Dahlem, 1916-17, p. 76.

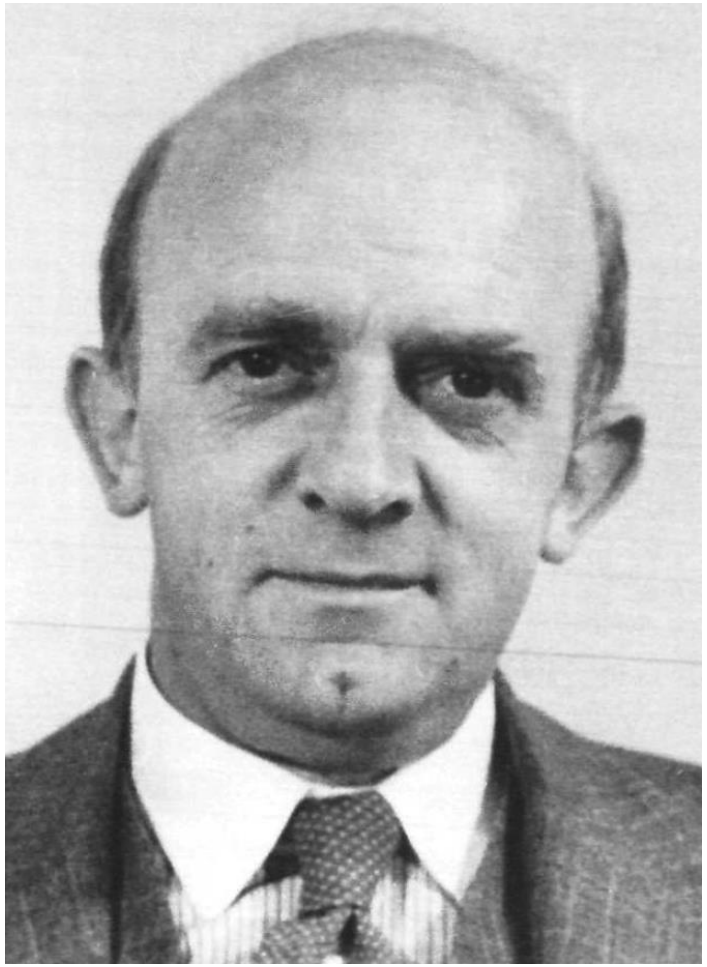
10-14 May 1940.

Netherlands DEI & Antilles.

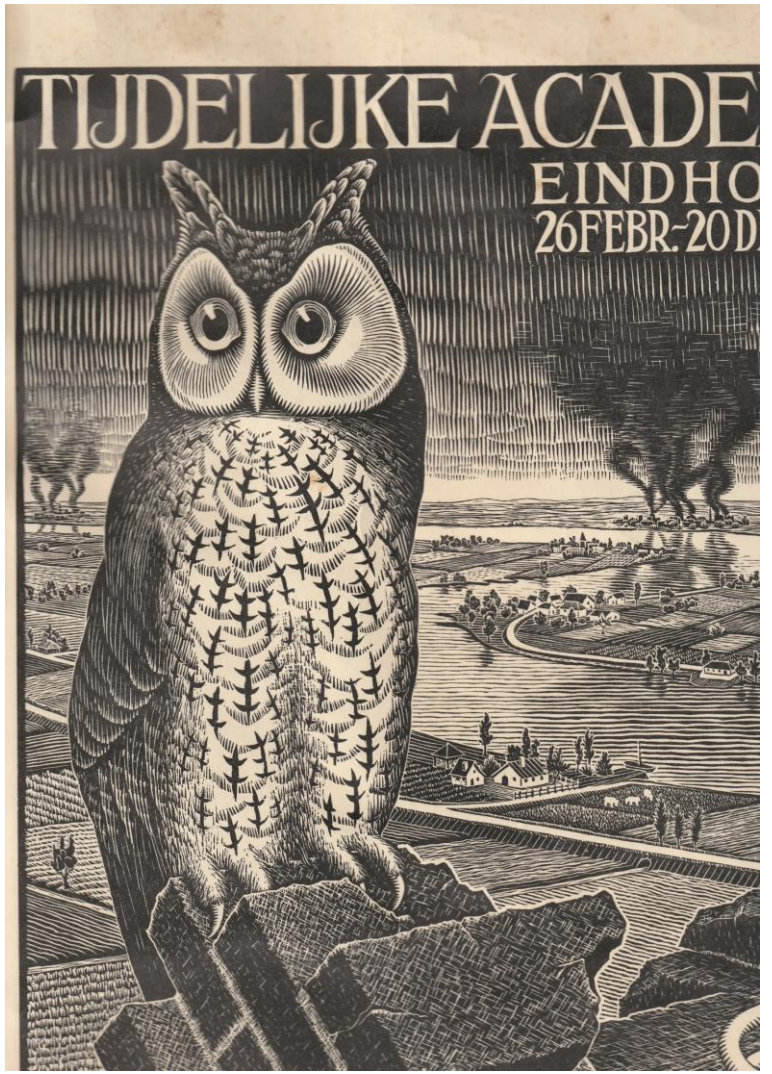




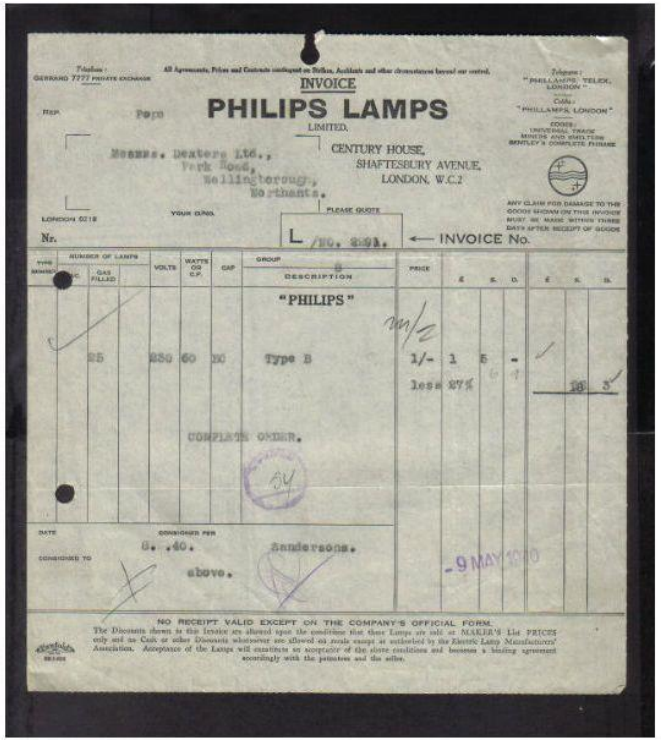
Frits Philips, Frans Otten, Othon Loupart



Eindhoven Bomb Damage 1942.



Century House, London. KPM Ships DEI.



INVOICE

PHILIPS LAMPS
LIMITED.

Messrs. Deakers Ltd.,
Park Road,
Rollingborough,
Northants.

CENTURY HOUSE,
SHAFTESBURY AVENUE,
LONDON, W.C.2

LONDON 6218

YOUR O/NO.

PLEASE QUOTE

Nr. L /20. 2.31. ← INVOICE No.

NUMBER OF LAMPS	VOLTS	WATTS OR C.P.	CAP	GROUP	DESCRIPTION	PRICE £ s. d.	£ s. d.
					"PHILIPS"		
25	250	60	BC	Type B		1/- 1 5 -	
					less 40%		18 9

COMPLETE ORDER.

DATE 6.40. CONSIGNED PER Sandersons.

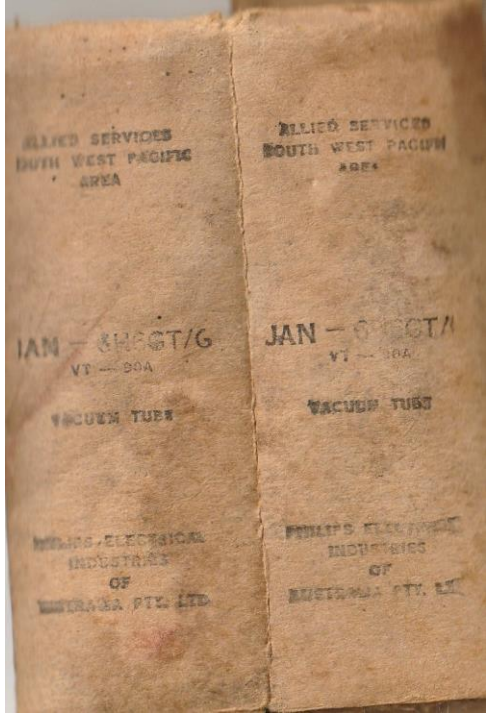
CONSIGNED TO above.

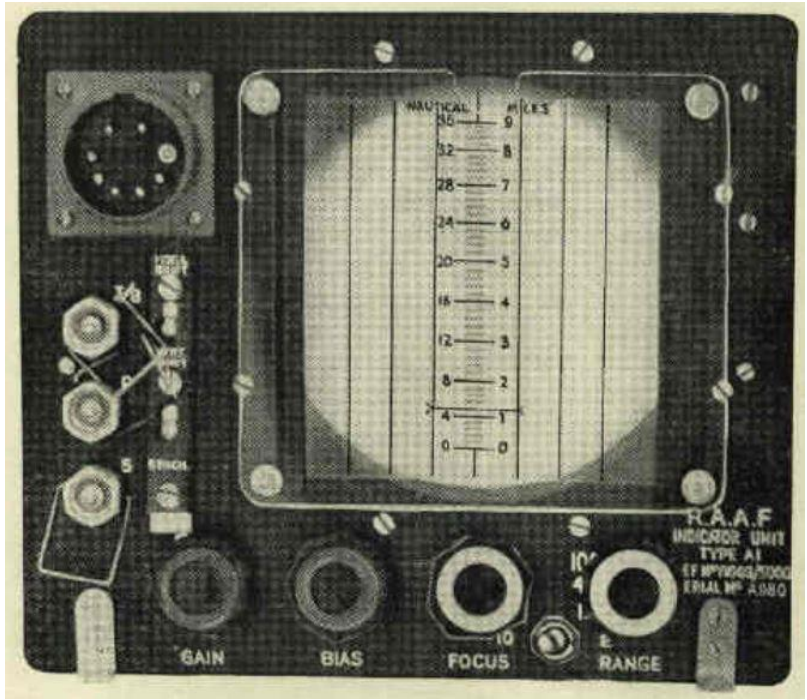
-9 MAY 1940

NO RECEIPT VALID EXCEPT ON THE COMPANY'S OFFICIAL FORM.
The Discounts shown in this Invoice are allowed upon the conditions that these Lamps are sold at MAKER'S List PRICES only and no Cash or other Discounts whatsoever are allowed on goods except as authorised by the Electric Lamp Manufacturers' Association. Acceptance of the Lamps will constitute an acceptance of the above conditions and becomes a binding agreement accordingly with the purchaser and the seller.

Philips Australia 1926-1939.

Philips Australia WW2.





J.P.V.Madsen joins Philips Australia Board 1948. Wandella Ave, Roseville.

PHILIPS ELECTRICAL INDUSTRIES OF AUSTRALIA PTY. LIMITED
PHILIPS HOUSE 69-73 CLARENCE STREET, SYDNEY
AND AT MELBOURNE - ADELAIDE - PERTH - BRISBANE

BX 1661
TELEPHONE: BW 21-24 (10 LINES)
TELEGRAMS: 'ARGENTA' SYDNEY

BOX 2703 C G.P.O.
SYDNEY

YOUR REF.

PLEASE QUOTE IN YOUR REPLY

5th April, 1948.

MANAGEMENT
AEP/MD/2742

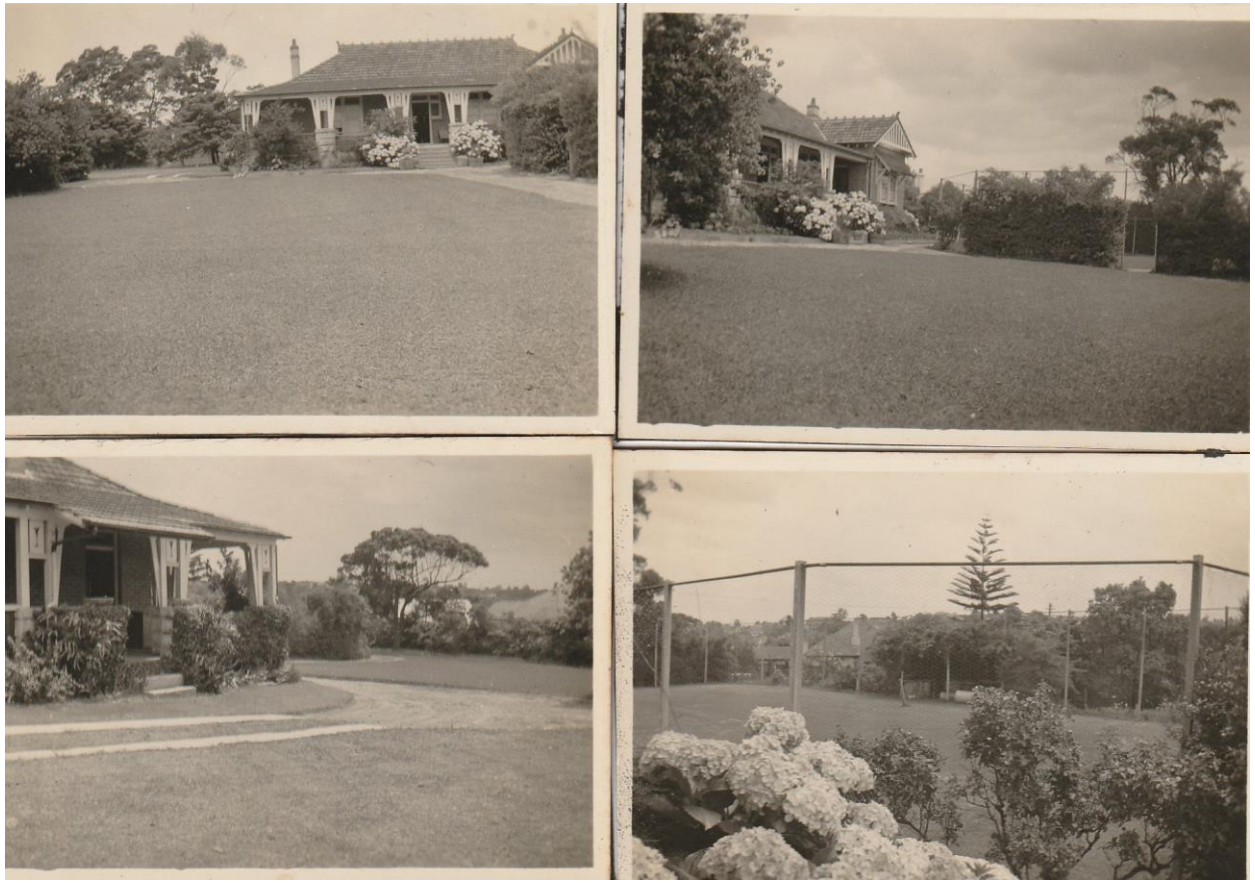
Sir John Madsen,
1 Wandella Avenue,
ROSEVILLE. N.S.W.

Dear Sir John,

Further to our conversation of to-day I have pleasure in confirming that the following telegram from Mr. Loupart arrived to-day:

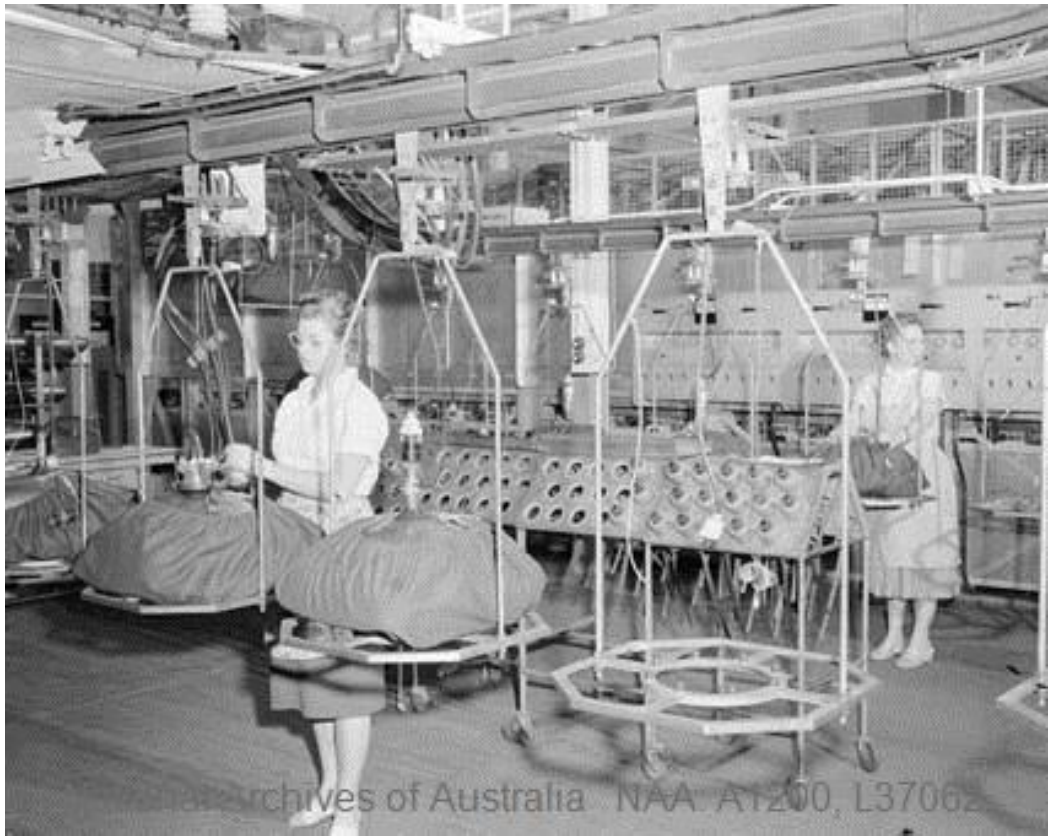
"DELIGHTED HEAR SIR JOHN MADSEN NOW ABLE AND READY JOIN BOARD YOUR COMPANY THUS FULFILLING LONGFELT MUTUAL DESIRE stop WE ALL FEEL THE PROPOSED CLOSE COOPERATION WITH EMINENT REPRESENTATIVE OF AUSTRALIAN SCIENCE WILL BE OF UTMOST IMPORTANCE FUTURE DEVELOPMENT INDUSTRIAL FIELD stop ON BEHALF OF ENTIRE BOARD OF MANAGEMENT I EXTEND HEARTIEST WELCOME TO SIR JOHN WE ARE LOOKING FORWARD TO LONG HAPPY ASSOCIATION stop PROFESSOR CASIMIR JOINS ME IN KINDEST PERSONAL REGARDS - LOUPART"

We of the local organisation are very happy to associate ourselves with the expressions of welcome so adequately expressed by

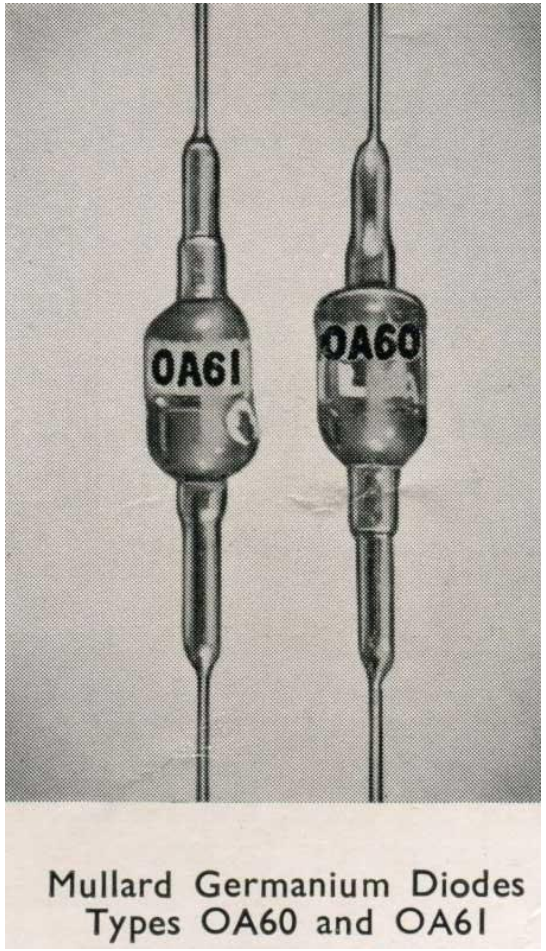


Philips Australia Electronics.

Frits Philips visit 1962. Hendon Factory Adelaide.



Menzies Research Laboratory, Hendon.1958.



Madsen Farewell at Hendon, 1963.

SIR JOHN MADSEN FAREWELLED AT PHILIPS, HENDON

Former Philips director Sir John Madsen was guest of honor recently at Philips Hendon works, when executives and directors presented him with a travelling rug on the eve of his retirement as technical consultant, an appointment he had held since retirement from the board in June 1962. Around the luncheon table (l. to r.): Hendon assistant general manager Arthur Treglown, Menzies Research Laboratory director Dr Angus Nicholson, Hendon works factory manager and director Bob Keukenmeester, Sir John Madsen, technical director Harold Brown, TCA chief engineer Bob Hill, Hendon area chief engineer John Bourne (partly hidden), chief engineer apparatus laboratories Gerry Mak, and TCA general manager Bill Griffiths.

10 Mingay's ELECTRICAL WEEKLY, July 12, 1963

EVOLUON

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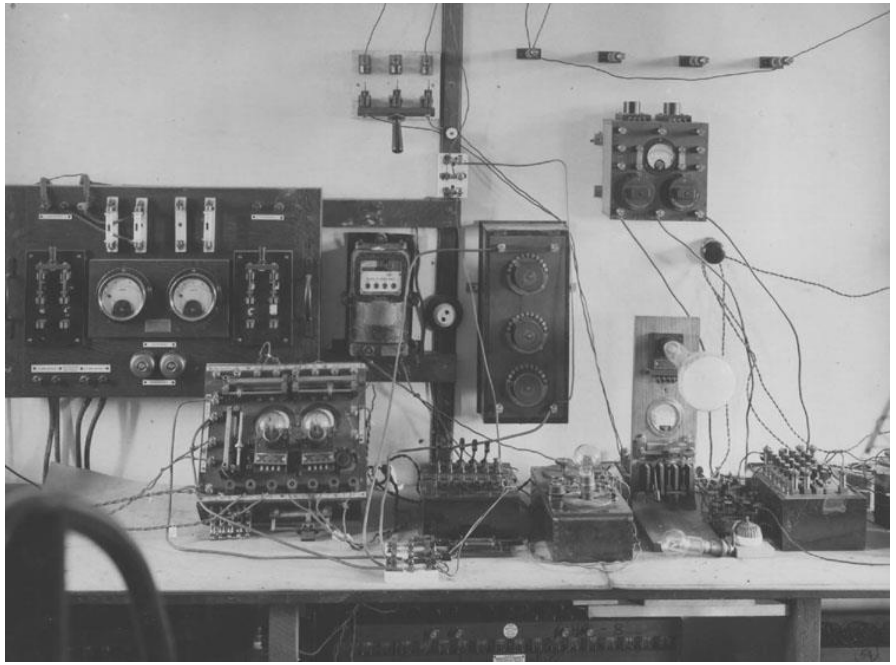
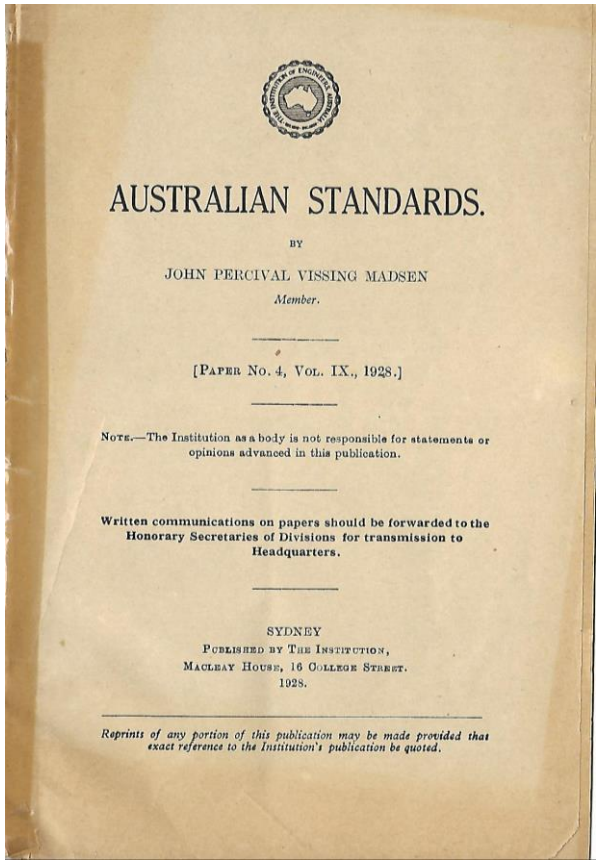
CSIR Radio Research 1927. Atmospherics & Ionosphere.



CSIR National Standards Committee 1927.



AUSTRALIAN STANDARDS.

BY

JOHN PERCIVAL VISSING MADSEN

Member.

[PAPER NO. 4, VOL. IX., 1928.]

NOTE.—The Institution as a body is not responsible for statements or opinions advanced in this publication.

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SYDNEY

PUBLISHED BY THE INSTITUTION,

MACLEAY HOUSE, 16 COLLEGE STREET.

1928.

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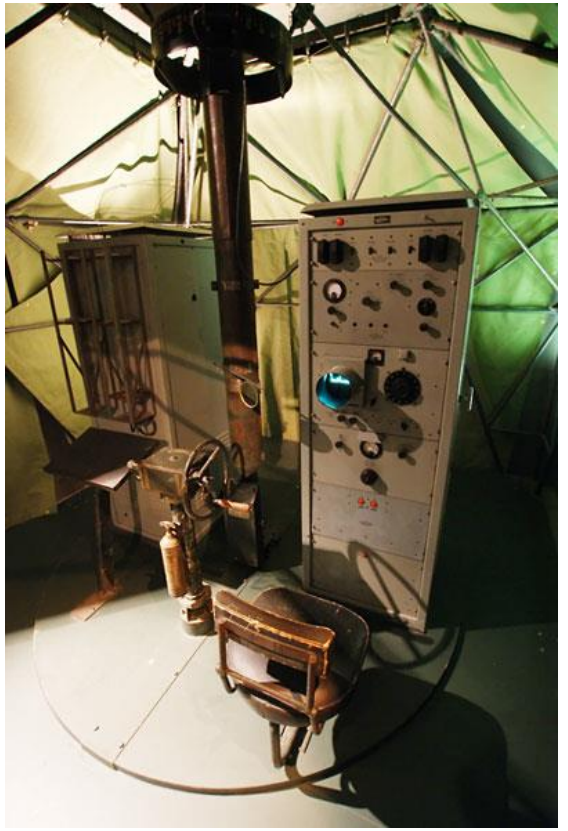
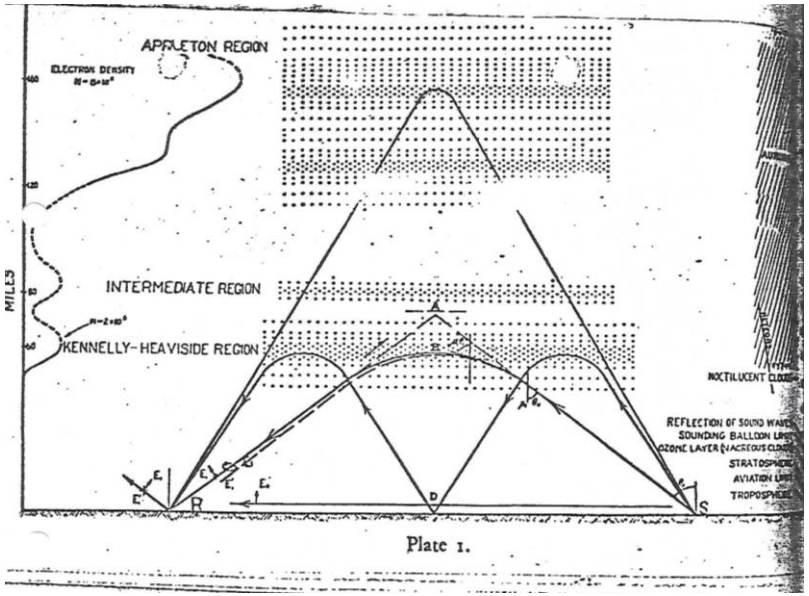
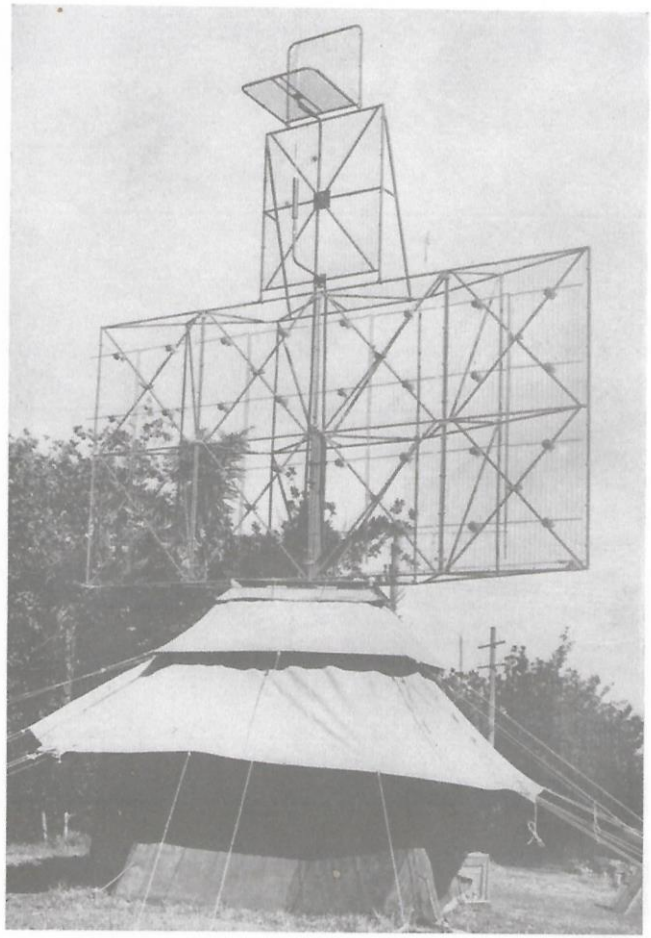


Radio Research Board up to 1939.



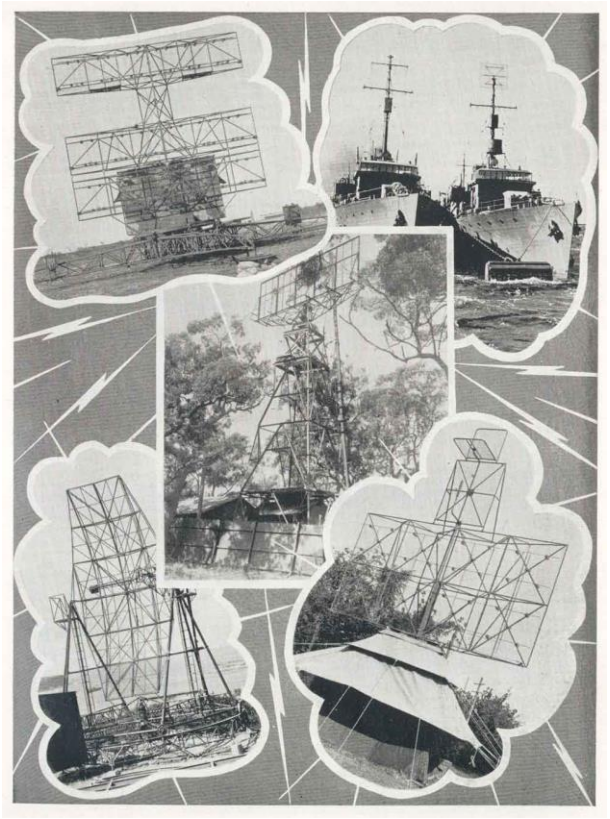
NSL, Radiophysics & Radio Research Board 1939-1945.

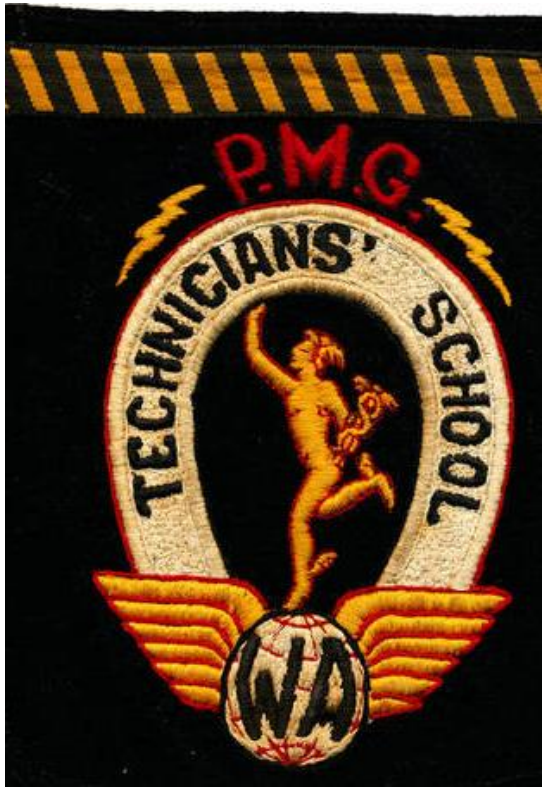


Light-weight air-warning equipment. (Radiophysics Laboratory)

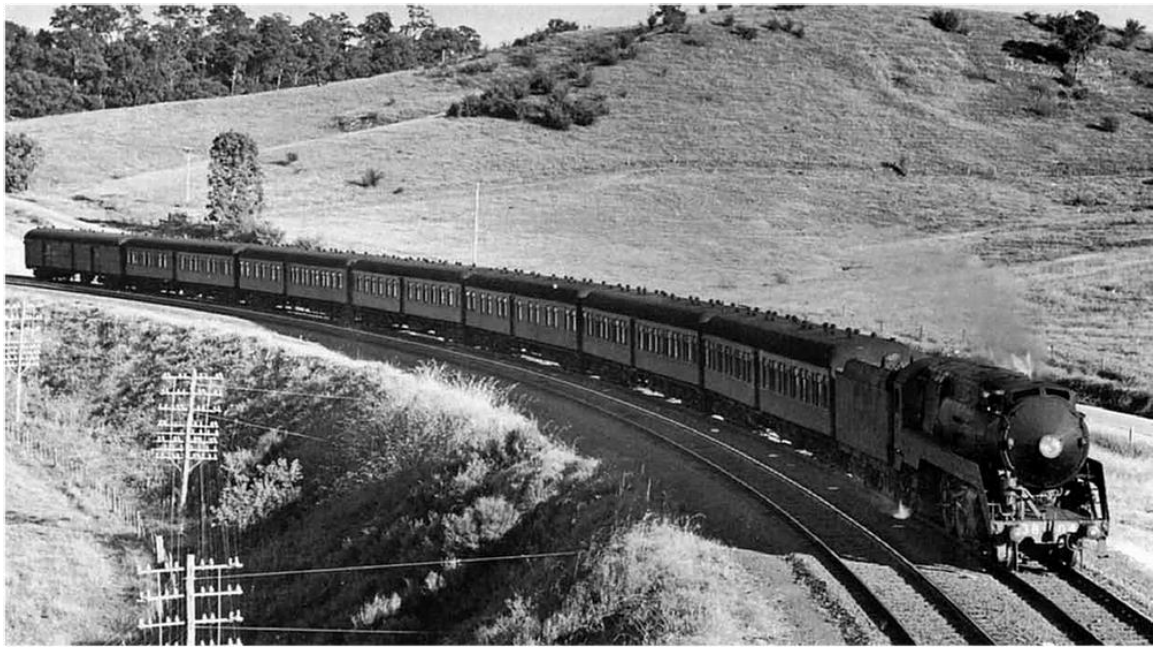
LW/AW & IFF.

Radar Manufacturing Concerns Used by CSIR.

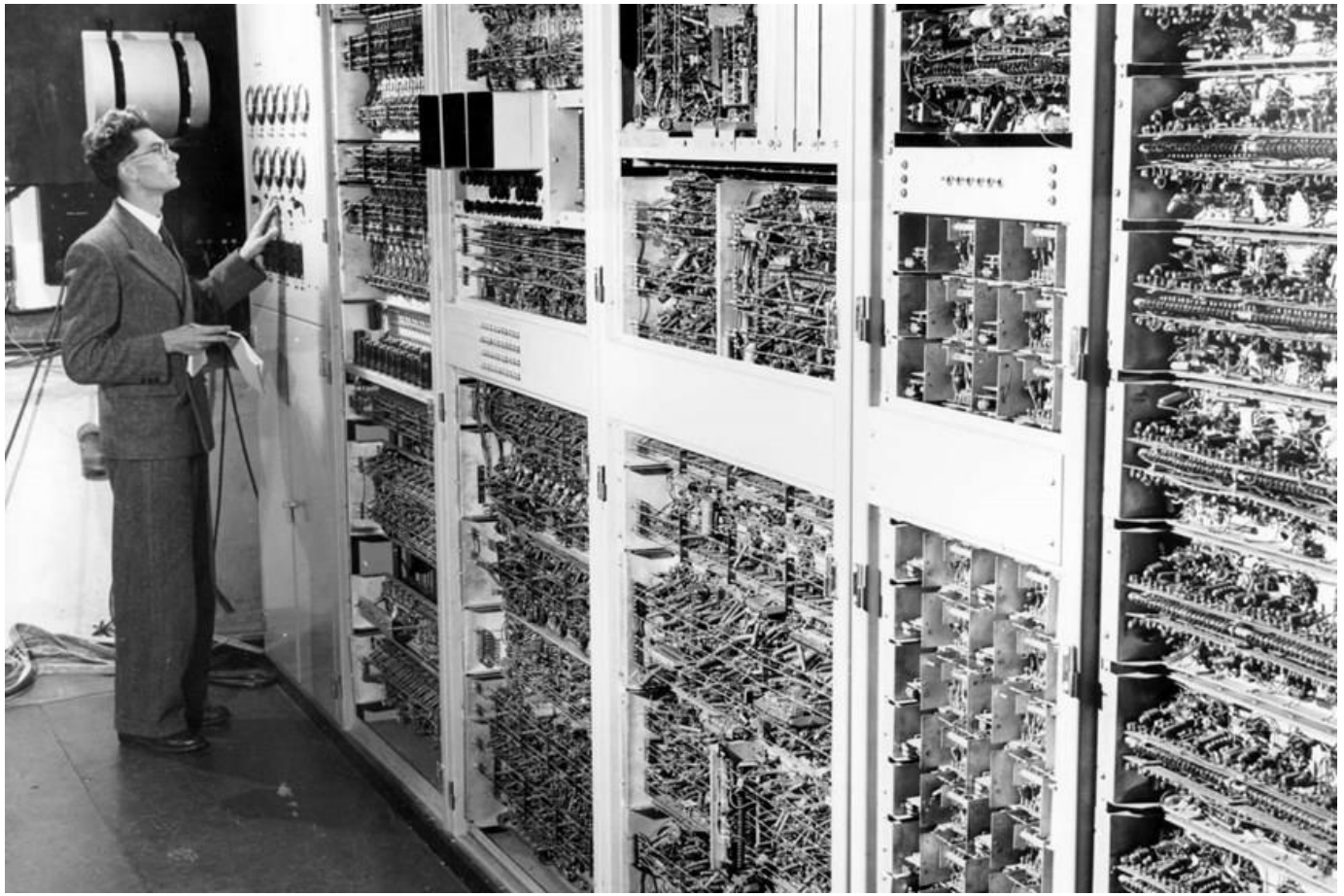




CSIR Meetings in Melbourne by train then air.

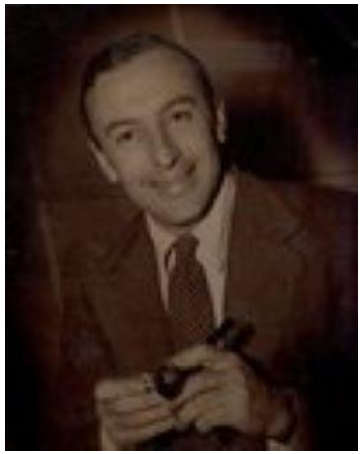


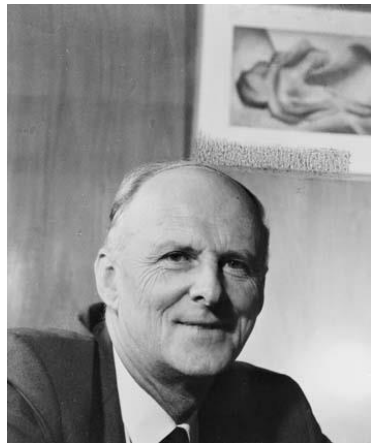
CSIRAC & Computer Conference Sydney 1951.

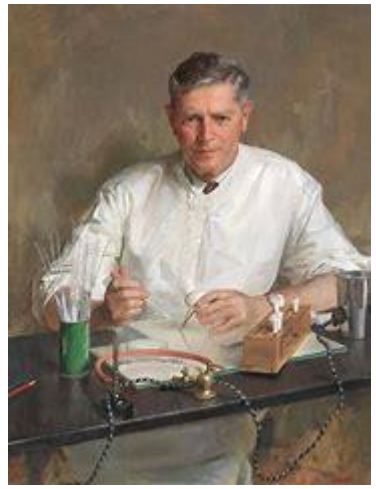


URSI August 1952 Sydney.

CSIRO Advisory Council 1949-1955.





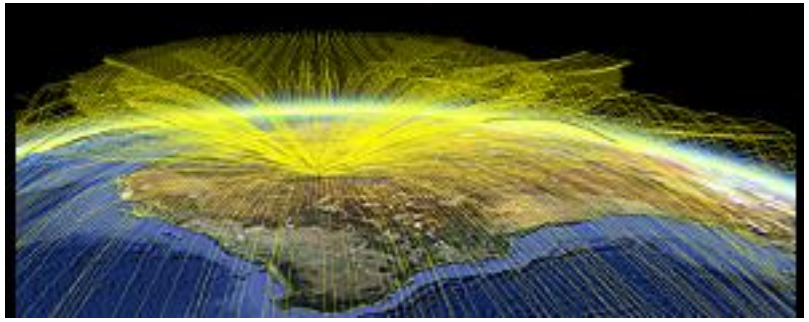


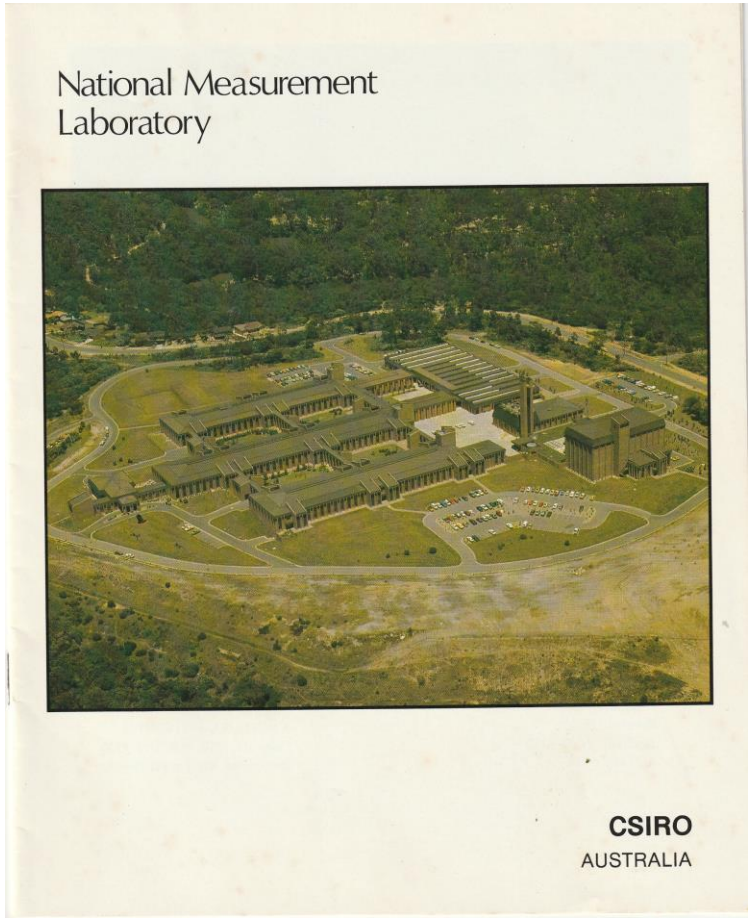
Indian Science Delegation 1949.
Roger “Joe”Madsen, Wagga, 1957 Wheat Research.

our Indian scientists arrived in Sydney yesterday on a six-weeks' tour of universities, search laboratories, and industrial plants in all States. The picture shows (from left) John Madsen, a member of the N.S.W. State Committee of the C.S.I.R., welcoming S. Krishna, leader of the Indian party, *Lieutenant-Colonel* M. L. Ahuja, Dr. B. P. Pal, and Mr. V. P. Sondhi.

NSL Fundamental Research. Ohm & Volt.

NML, CSIRO & IPS legacy.





Philips Business System 2020.

3.2 How we create value

Based on the International Integrated Reporting Council framework, and with the renewed Philips Business System at the heart of our endeavors, we use six forms of capital to create value for our stakeholders in the short, medium and long term.

Capital input

The six forms of capital (resources and relationships) that Philips draws upon for its business activities; all data refer to 2019

Human
- Employees 80,495, 120 nationalities, 38% female
- Philips University 5,324 courses, 966,813 hours, 683,336 training completions
- 32,650 employees in growth geographies
- Focus on Inclusion & Diversity

Intellectual
- Invested in R&D EUR 1.88 billion (Green Innovation EUR 235 million)
- Employees in R&D 12,287 across the globe including growth geographies

Financial
- Equity EUR 12.6 billion
- Net debt*) EUR 4.0 billion

Manufacturing
- Employees in production 35,640
- Manufacturing sites 35, cost of materials used EUR 5.3 billion
- Total assets EUR 27.0 billion
- Capital expenditure EUR 518 million

Natural
- Energy used in manufacturing 1,400 terajoules
- Water used 890,000 m^3
- Recycled plastics in our products 1,904 tonnes
- Pledge to take back all medical equipment by 2025

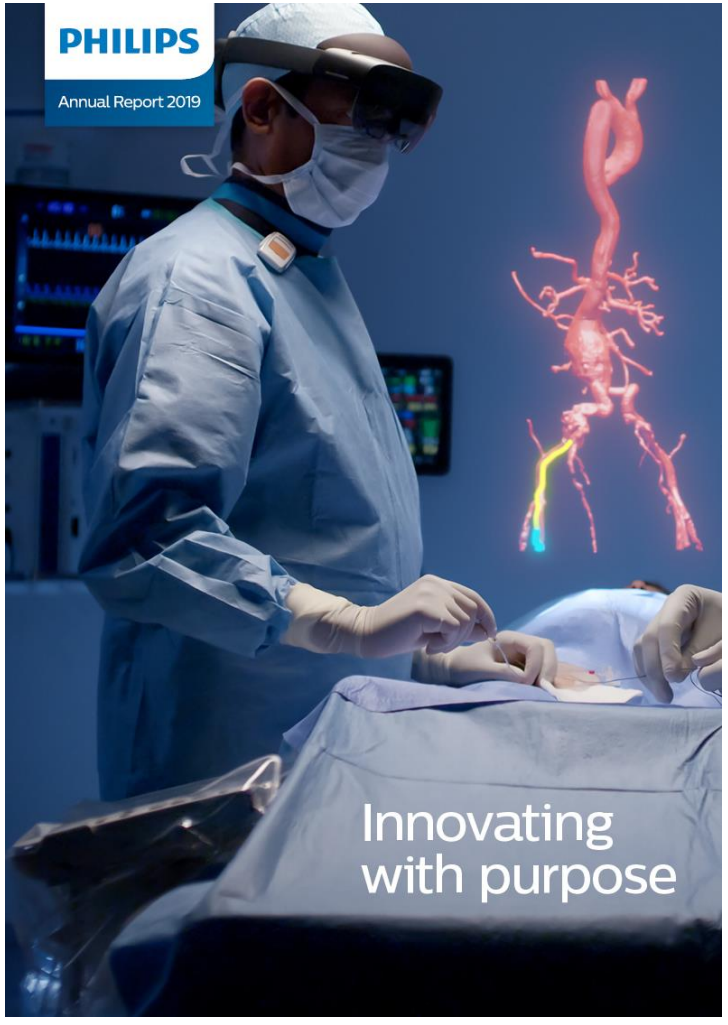
Social
- Philips Foundation
- Stakeholder engagement
- Volunteering policy

Philips Business System

- In 2019 we updated our operating model, the Philips Business System (PBS). With its six interconnected elements, the PBS defines how we work together effectively to achieve our company objectives.

- Our **strategy** defines our path to sustainable value creation for customers and shareholders.
- Clear **governance**, roles and responsibilities empower people to collaborate and act fast.
- Standard **processes**, systems and practices enable lean and agile ways of working.
- We value and develop **people** and teams, rewarding them for sustainable results.
- We live the Philips **culture**, which sets standards on behaviors, quality and integrity.
- Through disciplined **performance** management and continuous improvement we achieve our goals.

And this is where the wheel gets going. The better we perform, the more we grow, the more we can re-invest in new business opportunities, and the more value we deliver to our customers, shareholders, and other stakeholders.



J.P.V.Madsen, Philips Australia (1948-1963), CSIRO (1927-1963).

Prepared by: R.W.Madsen, November 2020.

Introduction.

Philips in Australia started its operations in 1927 at the same time that J.P.V.Madsen (1879-1969) commenced his Australian Radio Research Board & National Standards Committee with CSIRO whilst he was Professor of Electrical Engineering at Sydney University. Over the next 20 years through the 1930's, the Second World War & the start of the post war boom in electronics, Philips Australia manufacturing grew & became consolidated in a single factory in Hendon, Adelaide whilst the National Standards Laboratory & Radiophysics Divisions of CSIRO which JPVM had done so much to get up and running were located in the NSL Building (now the Madsen Building) at Sydney University.

Philips Australia, under the leadership of Dutchman Frank Leddy (1903-1964) from 1942 to 1962, was keen to "Australianise" the local Board & in 1948 JPVM agreed to become a Director & he was in that role for the next 15 years. CSIRO in 1949 had an executive reorganization & JPVM became an initial member of the CSIRO Advisory Council for a 6 year term which was in addition to his roles as Chairman of the Radio Research Board (1927-1958) & Electrical Research Board (1946-1963) & as a member of the NSW Committee up to 1963. (JPVM was also a member of the CSIRO Radio Research Consultative Committee).

In 1891 Gerard Philips (1858-1942) started a family business in Eindhoven, Netherlands making incandescent lamps. Gerard had prepared himself thoroughly for this enterprise with the help of capital from his merchant banker father Frederik (1830-1900); he had graduated in 1883 from the Delft University of Technology in Mechanical Engineering, gained ship building experience in the Netherlands & Glasgow where he enrolled for a short time in William Thomson's (Lord Kelvin:1824-1907) electrical research team, obtained a silver medal for passing the City & Guilds prize in electric lighting & transmission then managed projects in the UK & on the continent for the Anglo American Brush Electric Light Corporation which was established in 1880 to commercialise the patents of Charles Francis Brush (1849-1929) of Ohio who in 1877 patented an improved dynamo which by 1882, with his lamps, were installed in major cities in America & Europe & the company became part of GE a few years later.

JPVM also had prepared himself thoroughly some 20 years later for a career in the rapidly emerging electrical industry by undertaking a study tour over 4 months in 1902-1903 to the UK & US looking into the teaching of Electrical Engineering at the main universities & higher technical colleges as well as the significant manufacturing businesses prior to advancing to the new position of Lecturer in Electrical Engineering at the University of Adelaide under Professor of Physics, W H Bragg.(1862-1942). [JPVM had graduated with degrees in Science & Mechanical Engineering at Sydney University in 1899-1900 & had been able to become familiar with the installation of a new power station in Adelaide in 1901.]

In 1895 Gerard's younger brother by 16 years, Anton (1874-1951) also an engineer, joined the business at a difficult time as a sales representative & over the next 19 years the business grew in profitability by Gerard using his knowledge of manufacturing processes to steadily improve his product & reduce cost in a cut throat industry while Anton developed markets & made valuable suggestions for product development. 1914 was a significant date for Philips in having become a company with outside investor capital & employing Dr. Gilles Holst (1886-1968) as the first Director of the Physics Laboratory to carry out fundamental research work for new products such as X ray

tubes & radio valves. In 1946 Dr Holst was joined by Dr H Casimir (1909-2000) as co Director of the Physics Research Laboratory.

JPVM carried out fundamental research in collaboration with W H Bragg in the period 1905-1911 leading to Ernest Rutherford's (1871-1937) model of the nuclear atom in 1911 & it was not until 1927 that he returned to fundamental research with the Australian Radio Research Board along similar lines to the British Radio Research Board. Whilst with Philips Australia JPVM encouraged the setting up of a Research Laboratory at Hendon in 1958 (Menzies Research Laboratory-[R G Menzies: 1894-1978]) to include fundamental work however the significant changes to Australian manufacturing operations due to the sudden Australian tariff reductions in 1975 spelt the end of product development in Australia & about 30 years later even Philips Research in Eindhoven on fundamental research for consumer electronics was cut back. The whole Philips organization needed to get back into profitability & gradually evolved into a healthcare products business-even the lighting business which had started over 100 years earlier was spun off from Philips in 2018. Prof. Casimir in Eindhoven did not agree with fundamental research being done at Hendon.

An evolution process was also taking place by 2000 in the CSIRO Radiophysics Division into the ATNF (Australia Telescope National Facility) & although the National Measurement Laboratory (NML) became a part of the National Measurement Institute (responsible for biological, chemical, legal & physical measurements) it still carries on its Standards role at the Lindfield Laboratory.

When Frits Philips (1905-2005), who was Anton's son, came to Australia in 1962 as Chairman of Philips he referred to JPVM as "Uncle John" which may have been closer to the truth than he realized.

<u>Slide 1.</u> J P V Madsen, Philips Australia (1948-1963), CSIRO (1927-1963).

The only 2 Philips logos since 1938 have kept the style & character of the company which does not like to experiment with its identity.

<u>Slide 2.</u> Philips: Frederik (1830-1900), Gerard (1858-1942), Anton (1874-1951).

The hometown for Frederik & his family was Zaltbommel in the heart of the Netherlands & 55 Kms north of Eindhoven & 88 Kms east of Delft which is located between Rotterdam & the Hague. Delft University of Technology was founded in 1842 by William II of the Netherlands (1792-1849) as the Royal Academy to train civil servants going to the DEI (Dutch East Indies) & elsewhere. Gerard's mother, Maria (1836-1921) was 22 when Gerard was born in Zaltbommel & the other child was Anton (1874-1951) born 16 years later. Gerard had no children & Anton's only son was Frits (1905-2005) who went to Delft University like his uncle as an engineer. Frans Otten (1895-1969) who became the CEO of Philips 1939-1961 was the son in law of Anton & was married to Anna Philips (1899-1996).

<u>Slide 3.</u> Eindhoven Light Factory.

It is quite likely that Gerard & his father visited the First International Exposition of Electricity held in Paris in the autumn of 1881 where 2500 incandescent lamps from Thomas Edison, Joseph Swan & 2 others were compared, with the Edison high resistance lamp being judged the most efficient. Also in 1882 an International Exposition of Electricity was held at Crystal Palace with displays of electricity generation & lighting. In 1885 in the US an estimated 300,000 general lighting lamps (all carbon filament) were sold & by 1914 an estimated 88.5 mil lamps (85.5% tungsten) were sold. Although Philips were late comers to the lamp market they were able to quickly establish themselves on quality & reliability & overtook most rivals.

Apparently Frederik provided the capital for Gerard to buy & equip an old factory in Eindhoven to produce incandescent lamps. The patent law in the Netherlands between 1869-1910 had been revoked & this may have helped Gerard. Eindhoven was to become a Philips company town with its HQ located there with the factories until the HQ moved to Amsterdam in 2001. The main competition from England was the Ediswan joint venture between the US Edison interests & the UK Swan technology but held back by craft methods & not quickly pursuing mass production methods at a lower cost. In Germany the Siemens interest used the Osram (Osmium & Wolfram ie. Tungsten) brand from 1905. The Edison interests became part of GE (General Electric) & in the decade from 1910 Philips & GE co-operated with technical cross licensing & GE took a 20% interest in Philips. When WW1 started & Germany was cut off, Philips was asked to repair X ray tubes in the Research Lab & this led in 1918 to Philips own first X ray tube which is shown, with a later Philips-Norelco X ray tube for the US market. Glass blowing was a significant part of the manufacturing process requiring a great deal of energy & skill on the part of workers (a 1931 You Tube of the Eindhoven factory clearly shows the bellows like cheeks of some worker glass blowers).

Slide 4. Physics Laboratory & Radio Valves.

Gilles Holst (1886-1968) in 1904 went to Zurich to do Engineering but switched to Maths & Physics which he completed in 1908 & after returning to the Netherlands obtained his PhD in Zurich on "Thermal properties of ammonia & methyl chloride" in 1914 when he then joined Philips to start the Physics Laboratory working on X ray tubes then radio valves as an extension of lamp manufacture. In 1919 Philips were making a copy of a Telefunken radio valve until 1926 when Holst made a significant breakthrough with his power pentode. With this valve Philips could see that they could make a good profit on making radios & produced the model 2501 which quickly sold in very large numbers (the speaker was separate) up to 1930 & then in 1931-32 Philips had the Type 930 A "Cathedral"radio with a built in speaker & a cabinet made of "Arbolite" (layers of paper, cellulose & phenol resin fused under high pressure & finished with a wood imitation print).The 2501 had 3 wave bands (200-400 mtrs, 300-600 mtrs & 1,000-2,000 mtrs) & the Type 930 A also (200-450 mtrs, 400-950 mtrs, 900-2100 mtrs).

Slide 5. Philips Shortwave PHOHI 1934. Radio Luxembourg Long Wave.

In 1927 engineers at Philips Labs created a signal strong enough to reach all the way to the Dutch colonies. A transmitter tower was built at Huizen, a village in north Holland, 12,000 kms to the DEI. It was restarted in 1934 & appears to have used the 19.71 mtr & 31.28 mtr short wave lengths. The name PHOHI comes from Philips Omroep Holland-Indie (Philips Holland-India Broadcasting Station) & in the DEI from 1934 -1939 some 27 shortwave transmitters were operating from Batavia & Surabaya in which PHOHI Philips had a stake in NIROM (Dutch East Indies Broadcasting Corp.) In the 1930's Luxembourg was a rogue state from the point of view of radio broadcasting & was making commercial transmissions on long wave 1,293 mtrs (& other wave lengths) to the UK in competition with the BBC & to the world in general. The work of the RRB on atmospherics had reported on the better performance of long waves but the advent of the tuned quarter wavelength transmitting mast which favoured ground waves at the expense of sky waves, had increased coverage & reduced fading & solved the problem of interference from atmospherics.

Slide 6. Technical Review 1936.

In 1921 Dr Holst hired Dr Balthasar van der Pol (1889-1959) to be in charge of radio valve development & he was soon noted for work on filament coatings with barium & thorium leading to the Philips trade name "Miniwatt". He remained with Philips Labs until 1949 doing important

fundamental work & in 1952 attended URSI in Sydney & was very interested in the 21 cm hydrogen line work.

In 1936 Philips Labs commenced publication of the Philips Technical Review which built on the international reputation of the Lab. The format of "summary" & detailed discussion continued for some 50 years dealing with fundamental & applied product matters such as this very early one on the "Irradiation of plants with Neon light".

There has been a great deal of interest in the RAF WW II story of the Philips/Mullard EF50 pentode used in the CH (Chain Home) & airborne (AI-Interception) radars, in particular how a large quantity of the glass base & completed valves were hurriedly produced over 2 months before May 10 1940 when the Germans invaded Holland & Philips were just able to ship the glass, valves & manufacturing equipment to Mullard at Blackburn so that production could continue. Development of the EF 50 began in 1934-35 at Eindhoven by Hans Jonker (1901-63) & production of this all glass valve (the 1st of its type) was used by Pye in England for TV chassis which led to "Taffy" Bowen (1900-1983) becoming aware of its importance for radar & it was Watson-Watt who negotiated with Dr Tromp the head of valves at Eindhoven who came to London at Philips Century House in early 1940 to negotiate the urgent request for bases, valves & equipment. The EF 50 had a detection range of 50 miles, 5 times greater detection range than comparable valves & was to be cheap & mass produced. The EF 50 only had a short life & was required in great numbers.

The EF 50 was copied & produced in the US for military use by Sylvania which had similar developments in all glass tubes pre-war as Philips had.

In Australia no AI radar was built during the war (instead LW/GCI -Ground Control Intercept was used in the cloudy environs of New Guinea) & it appears that the ASV Mk II did not use the EF 50 so local production during the war was not required .It was found at Blackburn that it was not possible to push the performance of the all glass EF 50 envelope into the 200-300 MHz range.

Slide 7. 10-14 May 1940.

In the late 1930's after the Depression what Defence expenditure could be found by the Netherlands seems largely to involve the construction of battlecruisers in the DEI. At the start of WW II in September 1939 the Dutch declared neutrality which they hoped the Germans would respect & not invade, but Queen Wilhemina (1880-1968) [Queen 1890-1948] was not prepared to declare herself a German ally. On January 10, 1940 both Belgium & the Netherlands learned of German plans from a crashed German plane in Belgium that Germany intended attacking the Low countries. It took only from 10-14 May for the Germans to force a Dutch surrender however with the aid of 2 RN destroyers which came separately to the Hook of Holland area (Walcheren) to evacuate the Royal family, the Dutch Government in Exile, Anton Philips & Frans Otten with the company's capital succeeded in escaping to England. Gold & crates of diamonds were transferred to HMS Hereward & HMS Codrington the 2 RN destroyers involved.

Unlike the Vichy French Government which gave up French Indo China to the Japanese, Queen Wilhemina was able to keep an Allied Dutch Government in Exile in London & the BBC allocated her time to broadcast as Radio Orange to the Netherlands during the war. If the Dutch Govt. had been sufficiently pro-German to allow the DEI to fall into Japanese hands in 1940 the course of the war in the Pacific may well have been quite different.

Slide 8. Netherlands DEI & Antilles.

The Dutch East India Company (VOC logo -Veerinigde Oost-Indische Compagnie) operated the spice trade in present day Indonesia from 1602-1800 & then the territories became nationalized colonies of the Dutch Government. Shell had oil refineries in both the DEI & Antilles (Aruba) & Philips promoted its radio sales through broadcast short wave services. It was found with Australian radar, which had to be tropic proofed, that the only documented experience of this came from Philips in its DEI business (special varnishes & cements with waxing were required & for resistors & for condensors not to touch metal surfaces). King William II of the Netherlands created his Delft Royal Academy in 1842 to train civil servants for the DEI on the same lines that England trained civil servants for India.

Philips as a precaution of war arranged for its legal HQ to be moved according to Dutch legislation to the Antilles which became a US-UK protectorate in 1942. The Dutch West India Company from 1634 colonised the 6 Dutch islands including Curacao & Aruba.

Slide 9. Frits Philips, Frans Otten & Othon Loupart.

On May 13. 1940 Othon Loupart (1891-1962) left for the US with Frans Otten (1895-1969) & with Anton, to run Philips from there whilst Frits (1905-2005) stayed in Eindhoven to lead the wartime factory which produced at only a tiny fraction of its capacity making only basic lighting & radio products. Frits is well known for his saving of 382 Jews during the Nazi occupation by saying they were essential workers. Frans Otten graduated in 1923 from Delft University & joined Philips the following year & from 1931 for 8 years was Finance & Admin Director before coming CEO in 1939 until 1962 when Frits took up the position. Othon Loupart joined Philips in 1916 & later became known as a strategic thinker of the integration of sales & factories in national organisations spread around the world. Loupart sent the telegram from Eindhoven in 1948 acknowledging JPVM's appointment as a director in Australia.

Slide 10. Eindhoven Bomb Damage 1942.

Eindhoven was bombed by RAF Mosquitoes on several occasions during the war including December 6, 1942 & whilst there were casualties of workers they apparently were not too severe. The wise owl poster from JPVM's papers reads: "TIJDELIJKE ACADEMY EINDHOVEN 26 Feb-20 December 1945" translated as: Temporary University Awarded to Eindhoven 26 Feb-20 Dec. 1945.

Slide 11. Century House London. KPM Ships DEI.

At the start of the war in both the UK & Australia there was concern by authorities that some Philips employees had German relatives who could receive wartime secrets. In the UK by 1938 Mullard (a wholly owned Philips company from 1927) had a new valve factory at Blackburn in Lancashire & Philips Radio was co-siting with a Mullard Laboratory at Mitcham in Surrey with the HQ for Philips Lamps in Century House Shaftesbury Ave. To allay fears Philips staff were not allowed into Blackburn which became a very large producer of valves for the UK services even though Mullard did have some Dutch employees. In Australia before 1942 when Frank Leddy (1904-1963) was brought in after he had a very good experience with Australian forces in the Middle East, anonymous suspicions had arisen that the Managing Director was a German spy however after investigation the intelligence agencies agreed that the national need (for valves) appears to outweigh any unsubstantiated suspicion that defence related work was being jeopardized. In February 1942 Philips instructed the valve factory to sell exclusively to producers for defence purposes.

A further Dutch contribution to Australian defences were 21 vessels of KPM (Royal Dutch Navigation Company) which fled from the DEI & came under SWPA US command in March 1942 under gross

charter as part of a fleet of 43 ships to operate in New Guinea waters. 2 Dutch flagged ships were converted to Hospital Ships for NG. ("Maetsuycker" shown).

Slide 12. Philips Australia 1926-1939.

Philips Australia was established in 1926 to sell imported Philips products. In 1929 the Australian Govt. raised import tariffs to make domestic lamp & radio production viable. The ELMA (Electric Lamp Manufacturers Association- Philips, Siemens & General Electric) started at Newcastle in 1931 selling identical product as Osram, Philips, Royal Ediswan, Mazda Pearl & Condor. A large factory was in operation at Camperdown (NSW) & radio sets production started in 1933 however radio & x-ray losses in 1934-36 resulted in the appointment of a new MD (A. Giberius an assistant of O.Loupart Commercial Head of Radio) to turn the situation around. In 1936 R G Menzies visited Eindhoven to notify a change in government trade policy to encourage local production of valves. It was about Giberius that an anonymous tip off in 1939 to NSW Police was made, as he had employed a number of refugee workers from Nazi Europe/Germany.

Slide 13. Philips Australia WW 2.

Philips, STC & AWA were the main suppliers of valves for radar & radio equipment in Australia in WW 2. The standard valve packing carton for Allied Services SWPA is shown with a vacuum tube VT-90 A made by Philips Electrical Industries of Australia Pty Ltd. After the war in 1948 Frank Leddy (MD 1942-1962) moved all the Philips factories in Sydney to Hendon in Adelaide where a large munitions factory had become available very cheaply. The ASV Mk II set shown is an original English set with the RAAF ASV Mk II (Aust) also shown (Transmitter by Radio Corp.- Melbourne, Receiver by AWA, Viewing Units by Gramophone Co- Sydney, Alternator by Joseph Lucas). [The ASV Mk II was a very good airborne set widely produced by Allies & was developed at RAE Farnborough by members of Taffy Bowens original air borne group as a properly engineered a reliable piece of equipment using the VT90 triode (STC) at 176 mc/s. Philco in the US made some 7,000 sets for the Army & Navy].

Frank Leddy worked for Philips in Cairo from 1938 where he established a workshop employing Arab boys & wounded Australian servicemen who were trained to make direction finding loops for soldiers to use & the loops were made using scrap metal from aircraft shot down near Tobruk.

Slide 14. J P V Madsen joins Philips Australia Board 1948. Wandella Ave Roseville.

Othon Loupart sent a telegram to JPVM welcoming JPVM to the Philips Aust. Board & also the regards of Prof. Henk Casimir FRS (1909-2000) the co-Director of the Physics Lab who had joined Philips in 1942 & retired from the Philips Board in 1972 [Casimir had obtained his PhD from Leiden University in 1931 & had spent time with Niels Bohr in Copenhagen]. JPVM visited Eindhoven & Century House in London in 1950 & returned to Sydney on the 1 Class "Orantes". In London JPVM met with Tom Goldup a senior Director of Mullard.

The photos of No 1 Wandella Ave including the tennis court probably dates from the 1930's.

Slide 15. Philips Australia Electronics.

The 3 Philips Australia products that JPVM had personally, were the Radiogram (used by his daughter Phyllis for classical music), Philishave & Monochrome TV with a corded remote control.

Slide 16. Frits Philips visit 1962. Hendon Factory Adelaide.

Soon after becoming CEO, Frits Philips (1905-2005) came to Australia to arrange for the new MD (P. Vink-[1920-2006] an avid fly fisherman !) to take over from Frank Leddy who was going to Italy as MD. The Board meeting at this time (L to R) includes Sir Frank Meere (1895-1985), JPVM, P. Vink, Frits Philips, Frank Leddy, [Coy Secy], Walter Forsyth, Geoff Bottril & Denzil Macarthur Onslow. P.Vink was MD Australia for 6 years before going to North America as MD for many years.

TV production was a major part of Hendon work at this time. TV production also was done by the Kreisler subsidiary in Sydney at Newtown (1950-1960), at Alexandria for 2 years after a fire at Newtown then at Caringbah (1962-1982), the company being noted for its very high employee morale.

Slide 17. Menzies Research Lab. Hendon 1958.

One thing JPVM did at Philips was encourage the setting up of a Research Lab (Menzies Research Lab) in 1958 to include fundamental research as well as applied product development research. (H. Casimir shown, was however not in favour of fundamental research being done in Australia). At this time a lot of work had been done at CSIRO Radiophysics (initially in 1953 with assistance from Bell Research Labs) & at AWA on transistor development as well as Philips which had a considerable bearing on company profitability from the Miniwatt valve market. It is not clear how long the Menzies Lab continued for but one possible legacy may be in Integrated Circuit developments today operating as a business, Hendon Semiconductors.

Slide 18. Madsen Farewell at Hendon 1963.

The first idea Philips had for JPVM was to get into radar at Hendon but this was never on the scale of CSIRO -RPL. Harold Brown was a student of JPVM's who became the Technical Director & is shown in this farewell group. In 2015 the laser read Compact Disc first put on display by Philips in March 1979 was judged the most valued Philips innovation. Sony became a joint developer of CDs. In 1966 the Philips Evoluon Exhibition Building was opened in the shape of a flying saucer at Eindhoven.

Slide 19. CSIR Radio Research 1927. Atmospherics & Ionosphere.

When JPVM started the Australian Radio Research Board it was to follow initially a similar programme to that of the British Radio Research Board which he had obtained on a trip to the UK & US looking into radio research & standards. Watson-Watt equipment for determining atmospheric wave forms is shown in 1926 & also pulse equipment of Breit & Tuve in 1924 at the Dept. of Terrestial Magnetism -Carnegie Institute which were the 2 areas the RRB was to follow with the very valuable support for many years of Sir Harry Brown (shown speaking at a conference) in charge of the PMG who was responsible for radio broadcasting in Australia in the 1930's & set radio station broadcasting frequencies & ongoing regulations.

Slide 20. CSIR National Standards Committee 1927.

In the 1st CSIR Annual Report for 1927 JPVM is also recorded as the Chairman of the National Standards Committee & on return from his trip to the US, UK & on to the Continent, he reported his findings to the Institution of Engineers. The position of Australian standards did not change until the mid 1930's when the Japanese threat was heading to Australia & aircraft especially were anticipated to be needed & in fact would need to be produced in Australia. In 1939 JPVM was given special authority by the CSIR Council to acquire a site, to supervise the construction of a building & the allocation of the work by the different sections as they formed. The site JPVM arranged was at the University of Sydney & was built with the Radiophysics extension in late 1939-early 1940 in line with plans from the NPL Teddington London where training of staff (including David Myers [1911-]) was

given. During the war the Electrical Section worked on ShD (Shore Defence) radar & Metrology produced gauges such as the slip gauge used in the manufacturing of aircraft & other engines. After the war the NSL was able to staff & equip itself for the traditional role of Standards Measurement at the Sydney Uni site until it moved to a much bigger, specially air conditioned site at Lindfield in 1977. The cost of running the NSL after the war was substantially more than for the RPL which had moved to a new site at Marsfield some 10 years earlier. The NSL building was renamed the "Madsen Building" by the University & is currently occupied by GeoScience.

The inside of a LW/AW radar with separate transmitter & receiver with hand wheel rotation of a circular platform comes from the AWM display. In addition to the Australian & US forces which had a large number of LW/AW in the SWPA, 12 sets were sent to the RAF Far East Command (Imphal area) for the Burma campaign where the Japanese Army Air Division was in retreat by mid 1943.

Slide 21. Radio Research Board up to 1939.

Probably the greatest achievement of the Australian RRB up to 1939 was in undertaking fundamental research by a substantial group of experienced researchers as well as Ph D level students undertaking investigations who were gathered back together to work on radar at the CSIR Radiophysics Lab in 1940. & also to work on Ionospheric Prediction, which became established in the RRB at Sydney University.

The pulsed investigations of the ionosphere were in direct line of development for radar & the same situation happened when war broke out in the UK when scientific staff at universities quickly transferred to RDF work with very good result.

Prof Tom Laby of Melbourne University completed his atmospheric work with RRB in 1939 when the PMG settled on medium wavelength for radio stations in Australia as illustrated by the AWA mast in Sydney.

Slide 22. NSL, Radiophysics & Radio Research Board 1939-45.

JPVM ran the NSL & Radiophysics Laboratories as sister bodies but the connecting doorways & access doors were secure & all staff had identity passes. The RRB work on Ionospheric Prediction was carried out in JPVM's Electrical Engineering Dept. JPVM was Chairman of the Radiophysics Advisory Board (Aug. 1939-Aug. 1942) & whilst remaining as a member of the Board until 1945 he relinquished the Chairman's position as he realized someone better suited for production was required rather than his expertise in research.

In 1941 JPVM was pleased to find that the UK services were going to standardize in 2 wavelengths for radar viz. 1.5 mtr & 10 cm based on the VT90 transmitting triode & the cavity magnetron both of which RPL were using or had under development & had been arranging local production with STC. The VT90 prototype was designed by the GEC Transmitting Valve Group (W.Aldous & J.Bell) in 1939 as the W 1046, shown (& produced in America by RCA as the 8011). The 10 cm magnetron taken to the US & Canada in the Tizard Mission of August 1940 is shown.

The LW/AW radar used the VT 90 at 1.5 mtrs & was designed based on ASV experience & the lightweight aerial system known as the "Worledge" was designed by the NSWGR engineer, Mr J.G Worledge, in charge of radar aerial production.

The set of slip gauges shown are similar to those made at the NSL by the Metrology section ladies & which were unobtainable from overseas due to wartime demands & had to be made locally.

In 1941 with impetus from the UK & Australia it was agreed in Washington that 3 centres (USA, England & Aust,) be set up for ionospheric prediction work to assist Allied communications & which involved ionosphere recorders (ie. Pulsed transmitters sweeping through a 1 Mc/s to 15 Mc/s range in a few minutes). Receivers follow automatically & make records of the reflected echoes & the changes in the virtual height of reflection. The first fully automatic equipment in Australia was designed by H B Wood of the RRB & with further work by A J Higgs at Mt Stromlo. This vital service allowed radio communication by Allied services over short & long distances throughout the full 24 hour day at frequencies most suitable.

Slide 23. Radar Manufacturing Concerns used by CSIR.

The RPL was responsible for designing radars to the prototype stage & then pass them mainly to the PMG for production arrangements with manufacturers. There were times such as December 1941 when the RPL workshops themselves made 4 or 5 sets for Air Warning, as a small production run. The company logos of the main organisations used by CSIR are shown : STC for VT90 & Magnetron transmitting valves, the NSWGR for aerial systems made at Eveleigh workshops, the Gramophone Company-Sydney,PMG, Radio Corp (Astor)-Melbourne, AWA -Sydney & Joseph Lucas, plus sub contractors were used.

Slide 24. CSIR/CSIRO Meetings in Melbourne by train then air.

The Head Office of CSIR from 1927 was in Melbourne & on the occasions when JPVM attended CSIR related meetings there it appears that he would have caught the NSWGR Melbourne Limited Express to Albury & then the Spirit of Progress (from 1937) to Spencer St arriving at 11.35. The Spirit of Progress departed Spencer St at 18.30 & arrived at Albury at 22.20. The Melbourne Limited was a sleeper to Albury & would have arrived before the 7.55 departure of the Spirit of Progress for Spencer St.

It is not known when JPVM started flying to Melbourne but by 1946 TAA was flying a Skymaster service operated by the Commonwealth. JPVM was keen to include Melbourne in his plans & I would imagine his trips to Melbourne would have been 2-3 times a year.

Slide 25. CSIRAC & the Computer Conference At Sydney University in August 1951.

The CSIRAC automatic digital computer (the 5th in the world of its type) was put on operational display at Sydney University Electrical Engineering in August 1951 as part of a Computing Conference, also involving analogue computing presented by David Myers (1911-)Prof. Elec Eng Sydney University. JPVM chaired the Conference & in his welcoming address eloquently described the situation: “Computing has traditionally occupied an intermediate position between theory & practice, and being neither fish nor fowl, has been looked at rather askance in the past by both species. But modern science and technology, with their rapid expansion accelerated by the demands of two world wars, have placed a correspondingly increasing requirement on the computer; consequently both the producer and the user of mathematical theory have closed their ranks in stimulating the progress of computing methods & techniques”.

In 1946 Trevor Pearcey (1919-1998) at RPL proposed to Taffy Bowen the logic for a paper tape fed digital computer & in 1947 he was joined by Maston Beard working on the electronic engineering components (M. Beard graduated in 1939 from Sydney Uni Elec Eng & joined RPL on radar transmitter design. T. Pearcey had joined RPL in 1945 from England but had seen an early computer at Harvard & reasoned he could do something better.) . JPVM has been noted as supporting the

funding of the project which by 1949 was able to test its operations. In 1965 Trevor Pearcey on a CSIROPEDIA video explains the 3 design principles he used & also the paper tape input & output for printing results. The unusual 5 ft. tubes filled with mercury with memory for 756 words are also shown with comprehensive indicator displays. There are some 2,000 valves in CSIRAC & Raytheon appears to have had a leading role.

In the US, Bell Labs built the 1st transisterised digital computer (TRADIC-Transisterised Digital Computer) in 1954 for the US Airforce which was much more reliable than vacuum tubes but only processed around the same speed at that time.

At the conclusion of the Conference JPVM indicated that both the digital & analogue computing would both continue to undergo further development in their applications. (During the 1950's RPL did work on the interchange between digital to analogue & analogue to digital data). The comprehensive book on the Proceedings of the Conference is regarded as the birth certificate of Australian Computing.

Slide 26. URSI August 1952, Sydney.

URSI (International Union of Radio Science) 1952 was held in Sydney where JPVM was President for Australia. Sir Edward Appleton FRS (1892-1965) had been the International President of URSI for many years & stated that the reason that URSI had come to Australia (the first time outside Europe & North America) was in recognition of the outstanding radio work done in Australia over the previous 25 years. Sir Frederick White (1905-1994) explains that "the curiosity of Dr J L Pawsey (1908-1962) in 1945 about extra-terrestial radio noise took a major group of his colleagues into the new science of radio-astronomy. By 1952 when URSI met in Australia, no laboratory in the world could claim to have played a greater part in this new science".

"Chris Christiansen" at Potts Hill who had helped confirm the 21 cm Hydrogen Line in 1951 is with Edward Appleton, Fred White & Balthasar van de Pol, retired from Philips. In the dinner presentation JPVM is with Edward Appleton & Fred White. The 16 ft X 18Ft telescope at Potts Hill was used in a great many experiments in different ways.

Slide 27. CSIRO Advisory Council 1949-1955.

JPVM had been a co-opted member of the CSIR Council since 1943 & with the reorganization into CSIRO in 1949 Advisory Council Members were appointed for a term of 6 years. Some of the Advisory Council Members during JPVM's term were : David Myers, Sir David Rivett (1885-1961), Philip Baxter (1905-1989) a Chemical Engineer & Vice Chancellor UNSW, Sir Macfarlane Burnet (1899-1985) FRS, 1960 Nobel Prize winner in immunology, Sir Mark Oliphant (1901-2000) well known during the war at Birmingham University being involved in his department with the 10 cm magnetron (Randall & Boot) & the atomic bomb proposal (Frisch & Peierls).

It appears that the Advisory Council met twice a year in May & November.

Slide 28. Indian Science Delegation 1949. Roger "Joe" Madsen, Wagga 1957, Wheat Research.

In Jan-Feb 1948 JPVM led an Australian Goodwill Scientific Delegation to India. The delegation included Sir Kerr Grant (1878-1967) Professor of Physics Uni. Adelaide, J A Prescott (Waite Research Institute), R G Thomas (CSIR Industrial Chemistry) & G B Gresford (Secy. CSIR). The delegation attended the Indian Science Congress Association meeting held in Patna & visits were made to a large number of research institutions & business concerns. A short visit was also made to Pakistan.

In early 1949 an Indian Science Delegation visited Australia (Adelaide, Melbourne, Sydney & Brisbane) & were welcomed by JPVM in Sydney, but none of the delegates was expert in Standards.

In 1957 CSIRO in conjunction with the NSW Dept of Agriculture commenced joint wheat research at the Wheat Research Institute at Wagga Ag. College & my father, Roger "Joe"Madsen (1916-2002) as Regional Director of the Dept. of Ag. is with Sir Ian Clunies Ross (1899-1959) (Chairman of CSIRO) & Fred White the CEO of CSIRO.

Slide 29. NSL Fundamental Research. OHM & VOLT.

As early as April 1903 in his "Report on a Recent Tour through England & America" to Adelaide University on taking up the new position of Lecturer in Electrical Engineering JPVM called attention to the necessity of having a Standardising Section in the Laboratory to allow Universities in the colonies to undertake such work. This was further highlighted in 1914 in JPVM's Presidential Address to the NSW Electrical Association by which time he had a great deal of experience in fundamental research in physics & so it would have been of great interest to him to know of the work of the NSL/NML in determining the absolute values of the Ohm & Volt.

The work of Doug Lampard (1927-1994) [Lampard Capacitance Theorem-1957] at NSL allowed the standard Ohm to be redefined & resulted in a standard SI unit of resistance for many decades. Lampard's theorem was based on an extremely useful experiment where the calculated capacitance per unit length of a number of different cross section gave the same answer independent of size & shape.(Doug Lampard did Engineering & Science at Sydney University 1945-51. & worked with "Mel"Thompson (1917-2009) in 1956 on the new theorem).

In 1990 a revised definition of the fundamental constants (e=electronic charge & n=Planck's constant) led to an internationally adopted standard of the volt & confirmed Australian Metrology at that time as amongst the top 2 or 3 electrical standards laboratories in the world. Work on super conductivity possibly stemming from 1946 cryogenics expertise at the NSL contributed to this outcome. John Macfarlane, Ian Harvey & Robert Frenkel of NSL are shown ready to move volt testing equipment to the NML in 1977.

From 1954-1957 RPL was working on semi conductor /transistor research by doping germanium & silicon with minute quantities of impurities. The RPL photo shows a germanium ingot being prepared. After AWA set up a Semi Conductor Lab in 1957, RPL discontinued this area of work.

Slide 30. NML, CSIRO & IPS Legacy.

The legacy of JPVM's involvement with CSIRO dating from over 90 years ago is really quite profound. The Standards Laboratory has now been at Lindfield as the NML longer than it was at Sydney University as the NSL, & right from the outset it worked closely with similar Laboratories in the UK & US & after the war as part of an international network of standards & testing organisations. The original Radio Research Board (& later renamed as ATERB- Australian Telecommunications & Electronic Research Board) was substantially funded by PMG & with its research & university grants format it continued for some 50 year until funding cuts ended its outstanding legacy. (The Electrical Research Board also probably ended around the same time).

The RPL which had grown out of the RRB to undertake the wartime radar work & had continued (unlike similar overseas radar laboratories) after the war particularly with radio astronomy, no longer exists as such but is currently represented by the ATNF (Australia Telescope National Facility) & also by the CSIRO run Tidbinbilla Deep Space Communication Station. (In 1956, as soon as the

Russian Sputnik had been launched, JPVM was encouraging research into satellite communication through RRB grants).

The Scientific Liaison function in Washington established by JPVM in May 1941 still continues to the present day with a very useful role. The very valuable wartime RRB work on Ionosphere Prediction was transferred by JPVM after the war to what is now the IPS in the Dept. of Meteorology. In 1955 the RRB obtained a new field station, "Harben Vale" at Camden where a lab, workshops, office & living quarters for permanent staff was provided. For the 1958 IGY (International Geophysical Year) 2 pieces of equipment on loan from the US were installed at Camden for recording atmospheric & ionospheric data.

Slide 31. Philips Business System 2020.

It is remarkable that the name of a family business which was first used 129 years ago is still proudly carried on as a global enterprise which is reliant on innovation & research for the products it produces. The identity & business system which the company strives to maintain owes a great deal to the experience in lighting, radio & X-ray the company experienced in the first 4 decades of its operations. The company's evolution away from consumer electronic products in the early 2000's to healthcare places, it quite high in the various peer groups by which it now measures itself (Quantum, TSR, Labour Market, International & Environmental).

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