THE WESTERN AUSTRALIAN ORCHID BULLETIN

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Due to the COVID-19 situation, general meetings of the Orchid Society of Western Australia (Inc.) are cancelled until further notice.

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THIS MONTH'S MEETING

MEETINGS CANCELLED

UNTIL FURTHER NOTICE

JUNE MEETING DATES

OSWA Committee:	7:30 pm Friday 5th
General Meeting:	-- cancelled ? --

INSIDE THIS ISSUE

We acknowledge assistance from Lotterywest for the printing of this Bulletin

Birthdays

May: 4th, Jacqui Bateman, 7th Dorothy Walton, 9th Ellen Dixon, 10th Colleen Cortenbach

June: 2nd Tom Seaman, 10th Val Dobrowolski, 17th Maggie Longmore

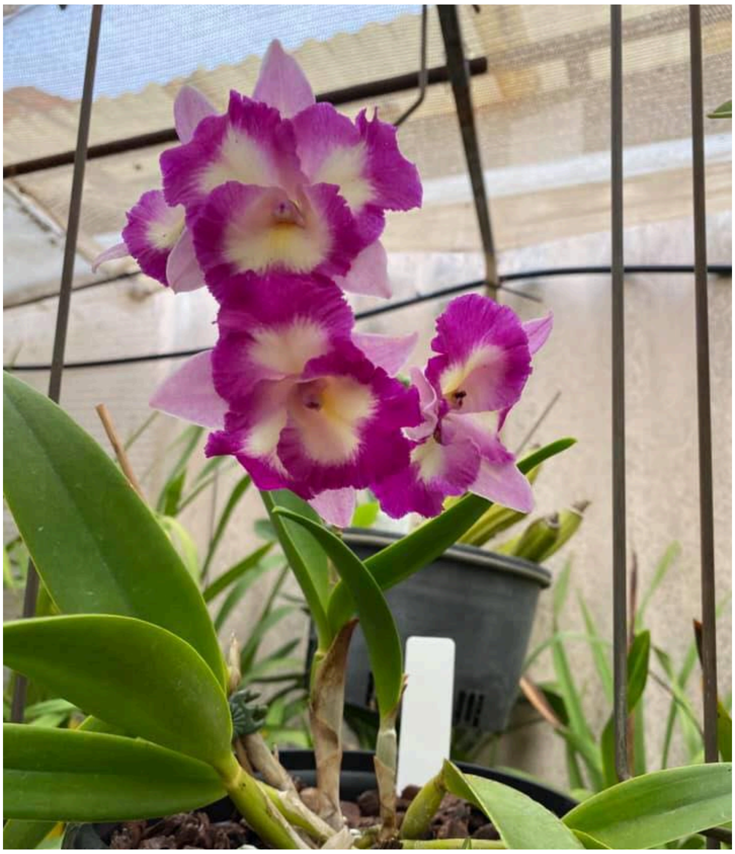
Best wishes to anyone else celebrating Birthdays or Anniversaries. To any member on the sick list we wish you a speedy recovery & may you soon be well.

Monthly "Virtual" Plant Competition

Photos of orchids in our May competition are online now. To vote for your favourite open entry, go to https://tinyurl.com/may-open and for your favourite novice entry go to https://tinyurl.com/maynovice.

To enter the Virtual Plant Competition, submit photos of your orchids in flower to oswa2020@iinet.net.au by the 3rd Friday of the month, and include your name in the email so we know who sent the photos. The photos will be posted on our Facebook page (www.facebook.com/orchidswa) before the end of the month. **'Like'** your favourite photo in the Open and Novice categories to cast your votes! Voting will be open until the first Friday of the next month. Winners will receive a coupon to exchange for a prize when general meetings resume.

Winners for the for the April Virtual Plant Competition:



Open: *Cattleya* unknown, grown by Rosemary McGrath. This orchid is an example of a "splash-petal" cattleya, so named because of the splash of a different colour on the outer parts of the petals. The splash-petal trait comes from *Cattleya intermedia* var. *aquinii* (below). It is an example of a peloric mutation, where the petals take on characteristics of the labellum. The 18th century biologist Linnaeus coined the term 'peloric'. He derived the term from the Greek word for 'monster', because mutations could not be explained by the theories of genera and species that existed at that time.

Novice: *Cattlianthe* Portiata 'Mel', grown by Valerie Cooper. This orchid is a hybrid of *Cattleya labiata* and *Cattlianthe* Portia. *Cattlianthe* Portia is in turn a hybrid of *Cattleya labiata* and *Guarianthe bowringiana*. So, about 75% of *Cattlianthe* Portiata comes from the species *Cattleya labiata*. *Cattlianthe* Portiata used to be known as *Cattleya* Portiata, but, after studies of its DNA, orchid taxonomists moved it to the genus *Cattlianthe* a few years ago.

Monthly Meetings

The authorities are beginning to relax restrictions on public gatherings, so there is the prospect that we may be able to start having monthly meetings again soon. When the time comes:

Remember to sign in for insurance purposes. The sign-in book also helps with our attendance records, and of course helps with getting to know new members.

Contributions to the **Supper Table** are always appreciated, but we ask more members to contribute.

The Opportunity Table is a good way to share excess lemons, tomatoes and other fruit and vegetables, plants, cuttings, bulbs, clean pots... Please **donate a gold coin** if you take an item from the opportunity table.

CYMBIDIUM CULTURAL NOTES (MAY/JUNE 2020) based on notes from Roy Brown

During May some of the early flowering Cymbidiums will be in flower. Others will have flower buds showing through the protective sheaths on the stem. Once they reach the stage where flower buds are visible, it's time to move the plants out of the shade house and into the flowering house, where more protection can be given them. Heavy rain or hail can chip the soft buds and leave a permanent mark. Also strong winds can cause the leaves to rub on the flower and this too will cause a blemish. Cymbidiums like to grow in a position where there is plenty of free air movement, so don't completely enclose the flowering house like a glass house. This could be the reason for bud drop. Give them overhead protection from the heavy rain and also close off the sides that face the strongest winds. Don't overcrowd your plants, if possible give them plenty of room between each pot. By the end of May we can expect cold, wet wintery weather. Watering will depend on the weather but don't let the pots become dry, particularly those in spike and those under cover. Keep the shade house and flowering house well baited with Baysol pellets for slugs and snails, particularly now that flower buds are showing. If you are using Strike Back for Orchids pellets or liquid, continue your regular feeding program for your cymbidiums, but reduce the rate and frequency of application, because the plants are growing more slowly as the weather gets colder. If you have been using a high nitrogen fertiliser, you should now switch to a high potassium fertiliser (such as Strike Back for Orchids) to encourage strong flowering.

CATTLEYA CULTURAL NOTES (MAY/JUNE 2020) based on notes from Henry Eaton

Autumn weather has at last been established with cool nights and warm days. This has meant that plants that flower in the autumn have begun to do so with plenty of blooms. As always, culture of your plants will be dependent on the prevailing weather. Because of the cold there will be a slowing of activity in the plant, so watering needs will lessen and fertilising can be further reduced from last month. The Strike Back for Orchids fertilisers (pellets or liquid versions) are good choices because their high potassium content will encourage strong flowering.

This beautiful specimen of *Rhyncholaeliocattleya* Blanche Aisaka 'Yuki', grown by Leo Waters, flowered during May.

Now is not a good time for repotting unless the mix in the pot has deteriorated badly, or new roots are being formed over the edge of the pot. In the latter instance, an alternative is to place the whole plant in a larger pot without disturbing the mix, and fill the remaining space with moist, fresh mix. Repotting can then be completed in the spring. The other method is to place a pot full of mix beneath the roots spilling over so they can establish themselves and not be air pruned, as would otherwise occur. As the intensity of the sun now declines, all shading can be removed and the plants will benefit from the increased light and warmth. To protect the flowers from spotting with Botrytis, try and maintain a good flow of air around the plants by hanging them up or having a fan blowing gently over them. The flowers also need protection from snails and slugs by placing baits in the pots and near the flower sheath. Also keep water off the flowers by hand watering into the pot and growing the flowering plants where they are out of reach of the rain. After flowering, plants can be grown in an area where they can experience a rest period during which they receive little or no water, until they show signs of activity again with the appearance of new roots or a swelling of the bud at the base of the pseudo bulb.

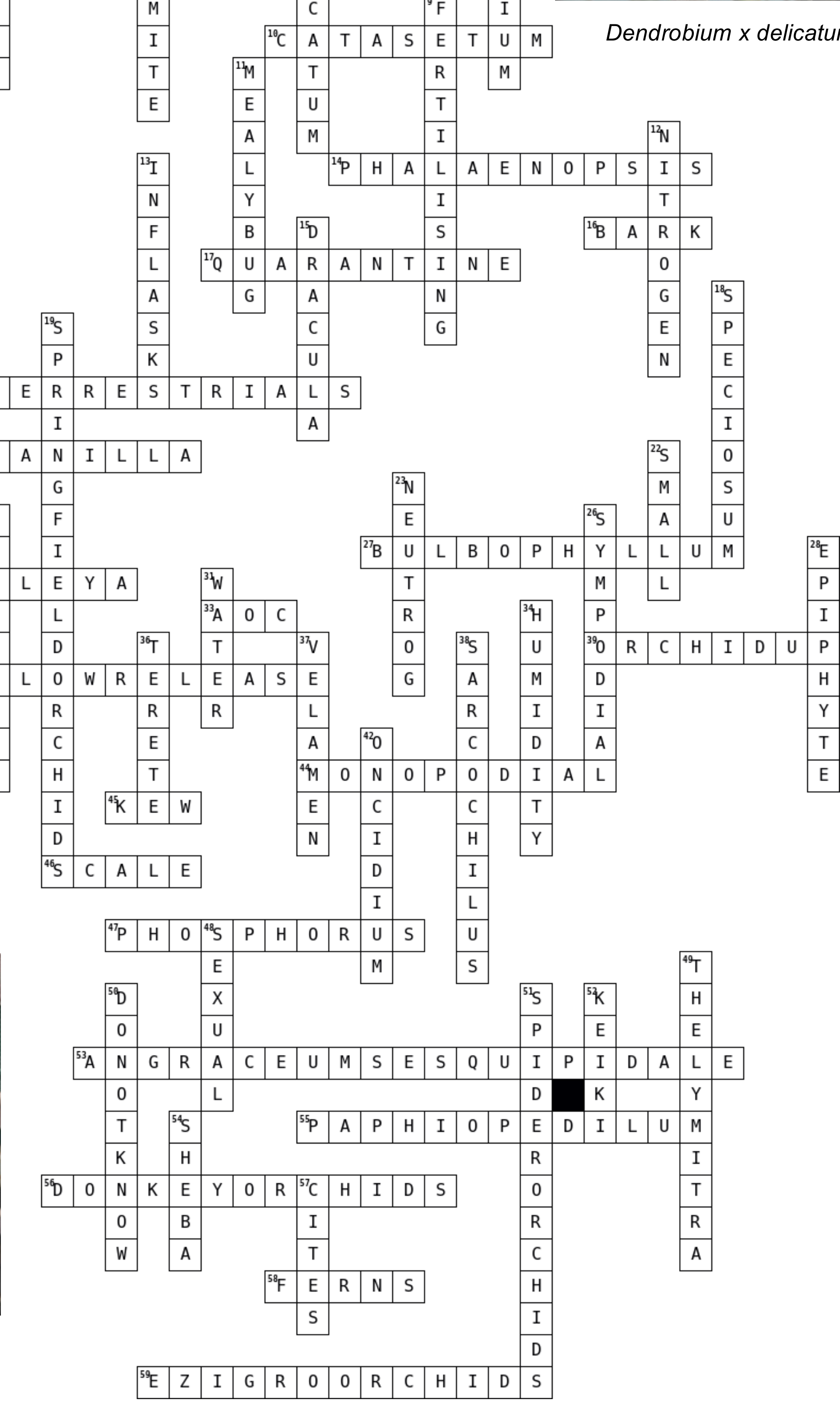
PAPHIOPEDILUM CULTURAL NOTES (MAY/JUNE 2020) by Trevor Burnett

The growing conditions this month are similar to last month, and as the conditions cool, reduced watering will be necessary. I personally reduce my watering further to once every 10 days, but am always mindful that we could still get some of those unexpected hot days, when watering may have to be adjusted. We would need to get 3-4 hot days in a row before I would adjust my watering programme. We should be seeing a good proportion of our plants now producing spikes. The early flowering types will be well advanced and should be staked to prevent twisting and breakage, as the spikes will be soft and not fully set to support the flower. The plant’s growth will have started to slow considerably on the flowering plants, as all the effort is now being channelled into supporting the flowers. If you have been using a high nitrogen fertiliser to encourage plant growth, you will need to switch to a fertiliser with less nitrogen and more phosphorus and potassium, to improve the strength and quality of the flowers. If you routinely use Strike Back for Orchids (pellets or liquid), just keep fertilising as you did last month, since Strike Back has a relatively high levels of phosphorus and potassium. The smaller, un-flowered plants will still require a fertiliser at one quarter or half strength, on a fortnightly or monthly basis, to keep the growth moving forward. With more buds appearing weekly, continue staking plants using meat skewers, wire stakes or thin bamboo canes. If you decide to use wire, ensure the top is turned over to help protect your eyes from getting poked when working with the plants. If you are moving plants to a different area to flower, ensure they are returned to the same orientation to the light source as in the original location. Turning plants can cause flower stems to become twisted, spoiling the effect if you wish to enter them in the various shows. My tip for the month is: if you are growing the plants without heat during the winter (as I do), keep the plants drier than usual, as wet, cold conditions are often fatal to roots.

Rhyncholaeliocattleya Jim Baylis 5D, flowered by Jim and Kaye Baylis. This plant was named in Jim's honour and presented to Jim to acknowledge and celebrate his five decades of membership and contributions to OSWA.

Gomesa Kulnura Radiance ‘Fred’, grown by Robin Dalziell. If you are thinking "but, but, that's an *Oncidium!*", well, you are correct, sort of, because this orchid used to be known as *Oncidium* Kulnura Radiance. Back in about 2014, after much DNA testing and debate by orchid taxonomists, many orchids were moved from the genus *Oncidium* to the genus *Gomesa*. The genus *Gomesa* was named in 1815 by the Scottish botanist Robert Brown (who discovered Brownian motion and the nucleus of the cell, and accompanied Sir Joseph Banks on an expedition to Australia). The genus was named after Doctor Bernardinus Antonius Gomez, a Portuguese physician and botanist.

~~ Solution to the Orchid Crossword ~~



Dendrobium x delicatum

Dendrobium speciosum

Dendrobium kingianum

Humidity, Part 2. Electronic Humidity Gauges

(For "Humidity, Part 1. Mechanical Humidity Gauges" see the April 2017 issue of the Bulletin. It's anyone's guess when Part 3 will be ready.)

Humidity is measured using a device known as a hygrometer ("humidity gauge"). Mechanical hygrometers have been around for more than a century. They have a dial and a needle to indicate the relative humidity. More sophisticated versions have a two needles, one for humidity and one for temperature. Mechanical hygrometers are simple and easy to read. In the shadehouse, they can provide service for many years with little or no maintenance. If you are interested in a simple humidity gauge to tell you the relative humidity (and maybe temperature), and nothing more, then a mechanical hygrometer may be for you. The picture to the right shows a mechanical thermometer/hygrometer available at Bunnings for $33.39 (photo from http://www.bunnings.com.au/holman-thermometer-and-hygrometer_p3130792). A mechanical hygrometer contains a piece of a material that can absorb moisture from the atmosphere as humidity increases, and lose moisture to the atmosphere as humidity decreases. Such a material is called a *hygroscopic* material. In a mechanical hygrometer the hygroscopic material changes size and shape as it absorbs moisture. The changes in size and shape cause some mechanical device like a spring or coil to move a needle around a dial, and so the relative humidity is measured. Of course, these days, simple mechanical devices are being replaced by newfangled, complicated, electronic devices, and hygrometers are no exception in this regard.

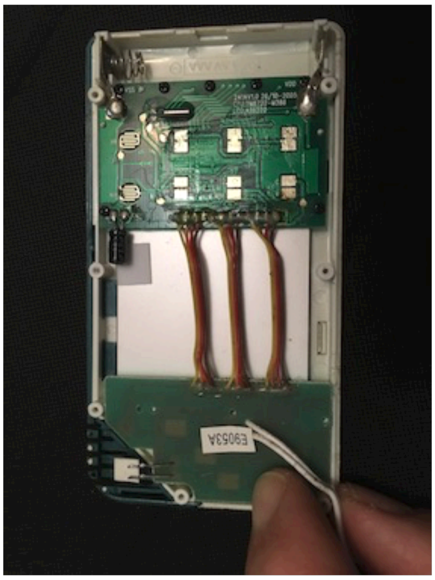
There are various types of electronic hygrometer. Like a mechanical hygrometer, an electronic hygrometer has at its heart a hygroscopic material. Electrical properties of this material, such as capacitance or resistivity, change as the material absorbs or loses moisture. Electrical circuitry measures that change, and uses the result of that measurement to calculate the relative humidity, then displays the relative humidity on a digital readout.

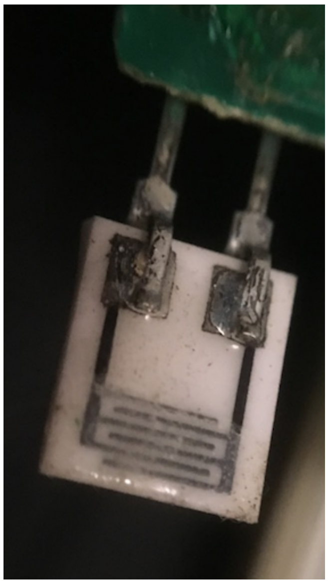
The simplest type of electronic hygrometer is the *resistive hygrometer*. In resistive hygrometers, interdigitated wire shapes (like two "E" shapes locked together but not touching) are embedded in the hygroscopic material. Electrical current can flow from one wire E shape through the hygroscopic material to the other wire E shape, but the material does not allow the current to flow freely -- the material has a property called *resistivity*. If humidity increases, the hygroscopic material absorbs moisture, and the resistivity of the material decreases, so the current flow between the interdigitated wire E shapes increases. This increase in current flow is interpreted as an increase in relative humidity. Conversely, if humidity decreases, the hygroscopic material dries out a bit and its resistivity increases, so current flow between the interdigitated wire E shapes decreases.

Because electronic hygrometers have electrical circuitry, they cannot be allowed to get wet and they need electrical power to function. For the orchid hobbyist, devices that obtain power from a small built-in solar panel or batteries are most practical. The photo to the left shows a solar-powered thermometer/hygrometer -- the dark square is the solar panel. Electronic components can be made very small (temperature + humidity sensors that are about 1 cm x 1.2 cm x 0.5 cm can be purchased for about $6.50 online) and so electronic hygrometers can be very compact. It turns out that most of the size of electronic hygrometers is devoted to displays and buttons that need to be large enough for humans to be able to use, and to accommodate batteries or a solar panel. The electronic hygrometers in the price range likely to interest hobbyists work reasonably well for relative humidity in the range of 20% - 80%.

The three photos on the top of the next page are of a thermometer/hygrometer that I purchased for about $20 about 17 years ago. The left-most photo shows the front of the device and its nice clear display showing time, temperature and humidity. The humidity is shown as "LO%" because this device only reliably measures humidity within the range 20%-80%, and at the time the photo was taken the air was very dry (humidity less than 20%). This thermometer/hygrometer contains a temperature and humidity sensors inside its plastic case, and an external temperature sensor at the end of a metre-long wire. Because this device has internal and external temperature sensors, I can use it to measure the temperature inside and outside my hothouse at the same time. The middle photo is the same thermometer/hygrometer, now with its back cover removed, to reveal some of the circuitry. Most of the circuitry is related to switches and buttons that allow the device to be operated. The humidity-sensing component is the small white feature (4 mm x 5 mm) at the lower left part of the thermometer/hygrometer. The right-most photo is a close up of the humidity-sensing component, showing the interdigitated E-shaped wires embedded in a transparent, resistive hygroscopic material. The white material is just a piece of plastic that supports the active components.

This thermometer/hygrometer still records temperature reliably. Although the hygrometer responds to changes in humidity, it appears to significantly under-estimate the humidity. This problem might be due to fouling of the hygroscopic sensor material by contaminants such as the dirt visible in the photo. Over the years this instrument has been splashed with fertiliser solution and tap water a few times, and no doubt it has gathered a lot of dust.





The beauty of electronic hygrometers arises from their complexity. They can measure relative humidity using electronic circuitry and a hygroscopic material, but they can also measure temperature, using more circuitry and a temperature-sensitive material (presumably a thermocouple). "Big deal" I hear you say, "the mechanical hygrometer from Bunnings can measure temperature and humidity, and it doesn't need batteries!" True, but the big advantage of electronic hygrometers comes about because of other things the circuitry can do. Circuitry can include components for keeping track of time, so an electronic hygrometer might also be able to show you the date and time (in case you forget to take your watch to the shadehouse, which I do frequently). Simple mechanical hygrometers can't tell you the time. Circuitry can include memory chips, so an electronic hygrometer might be able to store information. Devices that can show you the current temperature and humidity, but also keep a record of the lowest and highest values measured previously, are common, inexpensive, and very useful. You can, for example, find out how cold your shadehouse got overnight, or how hot and dry the air was over a hot long weekend, without having to keep checking your hygrometer during the night and day. I reckon that an electronic hygrometer with this sort of capability represents the optimal level of simplicity, functionality, and cost for most orchid hobbyists. The one pictured above has these capabilities, and it only cost twenty bucks.

More elaborate instruments, like the one pictured at left, have remote sensing capabilities. These sorts of instruments come with a boring-looking box (in this photo, it's the gadget on the left) that contains the humidity- and temperature-sensing components, and this box is placed in the shadehouse (or wherever you want to measure humidity and temperature). This box has little or no display, maybe just a small light that flashes occasionally to tell you that it is working, but it transmits a wireless signal. At some convenient location (in my case, on my bedside table) there is a larger device that serves as a base station (the round gadget in this photo). The base station receives the wireless signal from the sensor. So, without getting out of bed, I can see the current temperature and humidity in the hothouse, as well as historical maxima and minima, the time, date, and day of the week. Several sensors can be linked to a single base station, so I could monitor conditions in several hothouses, without getting out of bed. Sadly, if the humidity in the hothouse is too low, I have to get out of bed to do something about it.

For real data freaks, there are inexpensive electronic thermometer/hygrometers that are also data loggers; they can record temperature and humidity at different times, store the data, and then download it to a computer via a USB cable. These sorts of devices can record immense amounts of data -- the one I have will store over 20,000 readings of time, temperature and relative humidity, which means I can record conditions once a minute for two weeks, or once an hour for a whole year. You can see from the photo below that the device is very compact. It cost about $50 from Jaycar in O'Connor in 2018. The first time I used it, I recorded temperature and humidity every 5 minutes for a week. The device accumulated so much data that I could barely load it into Excel. For practical purposes, taking measurements every half hour or so for a week or two provides more than enough data to construct nice graphs that show how humidity and temperature vary during days and nights.

Electronic devices can show you results in nice, sharp numbers on a digital display, and so they might give us the notion that they are accurate, but that is not always the case. In practice, inexpensive temperature sensors can be very reliable, but hygrometers can have problems. If the electronic circuitry is poorly calibrated (a common problem with cheap hygrometers), the electrical properties of the hygroscopic material will be incorrectly analysed, leading to an incorrect measurement of humidity. I have seen different hygrometers (both electronic and mechanical), which, when positioned side-by-side, show humidity values that differ by more than 20%. This variability is not a necessarily a problem if you stick to one hygrometer. For example, if you find that your orchids grow well under conditions where your hygrometer says the humidity is 60%, you would aim to keep your humidity so that your hygrometer kept reading 60%. In this way you are using your hygrometer to help you keep the humidity stable at a level acceptable to the orchids. It would not matter if the true humidity was actually 70% or 50%, as long as it was stable.

A more serious problem is that the accuracy of electronic hygrometers can change with time. The hygroscopic material can absorb moisture, but it can also absorb other stuff, and this other stuff can contaminate the sensor and make measurements inaccurate. In the shadehouse, care needs to be taken to protect the hygrometer from splashes of water or fertiliser solutions or fungicide sprays. (These considerations apply to mechanical hygrometers as well, but since mechanical hygrometers don't have nice digital outputs, they are unlikely to trick us into believing they are highly accurate.) In my experience, electronic hygrometers underestimate humidity as they get older, for example one might tell me the humidity is 25% when it is really 40%, and the older the device, the greater the error.

If you want to *really* know the relative humidity, you need to calibrate your hygrometer. Calibration of a *thermometer* is easy. We know that the temperature of ice-water is about 0 °C and the temperature of boiling water is about 100 °C, so we can stick a thermometer into one or both of these and check that it reads the temperature correctly. Temperature is easy to measure though, and electronic thermometer/hygrometers measure temperature accurately enough for most purposes, so nobody ever calibrates their thermometers. Unfortunately, calibration of a *hygrometer* is not as easy as for a thermometer.

Probably the simplest way to calibrate a hygrometer is to put your hygrometer into a container that contains air of a known relative humidity. Chemists (real ones, not pharmacists) have compiled tables of relative humidity above saturated solutions at various temperatures. What does this mean? Here's an example. If you take sodium chloride (table salt) and keep pouring it into pure water until no more dissolves in the water, and then add a bit more sodium chloride so that there is some solid sitting in the bottom of the solution, you now have a saturated solution of sodium chloride. You then put some of that solution (with some of the undissolved sodium chloride too) into a large plastic ice cream container, put the lid on, and leave it for a few hours. During those hours, you look up one of the chemists' tables on relative humidity, and you will find that at 25 °C, the relative humidity inside that container will be 75.3%. To calibrate your hygrometer, you need to put it in the ice cream container (balancing it on some sort of platform so that it doesn't fall into the saturated solution) and then put the lid back on and leave the ice cream container to stand for a few more hours at 25 °C, then see what the hygrometer thinks the humidity is. If the hygrometer tells you the humidity is 75.3% (and the temperature is 25 °C), perfect! If the temperature is 25 °C but the hygrometer thinks the humidity is 65%, then you need to add 10.3% to your hygrometer's reading to get to the correct humidity. If your hygrometer thinks the relative humidity is 65% but the temperature is 18 °C, you need to go to consult the humidity tables and figure out what the humidity *should* be at 18 °C, and then think about what to do next. If this sounds tedious, that's because it is tedious: you need pure water and pure sodium chloride (tap water and table salt from a supermarket are not pure enough for accurate calibration); you need an air-tight container that is transparent (so you can read the hygrometer while it is in the container experiencing the 75.3% relative humidity); and so on and so on. I don't know of anyone who has calibrated a hygrometer. I started to do it one day, but after futzing about for an hour or so I decided my time could be better spent doing other things.