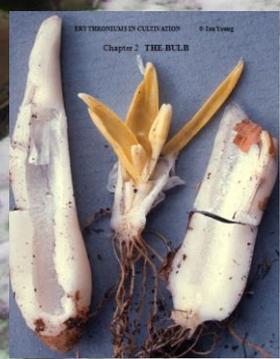




BULB LOG 05.....4<sup>th</sup> February 2015



Includes Chapter 2 of Erythroniums in Cultivation

As you can see from this week's cover picture it is snowing so I cannot get out to take too many pictures. Also I have been away in England for four days speaking to the Western Counties Hardy Plant Society including a visit to John Massey of the famous Ashwood Nurseries. Below are some of the images I made during my visit to John's wonderful garden.



John Massey guides visitors through his garden





The second chapter of my book on Erythroniums in Cultivation completes this week's Bulb Log and follows below – I hope you enjoy it.....

Chapter 2 THE BULB



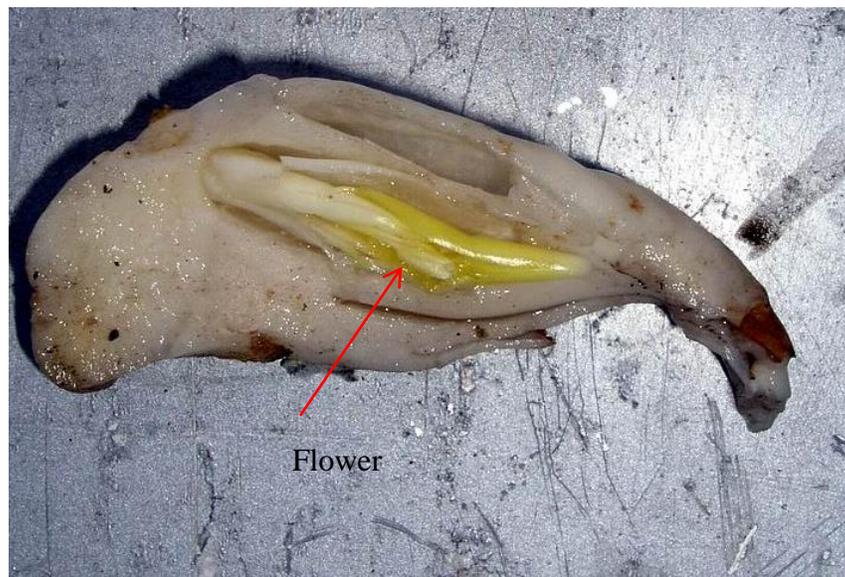
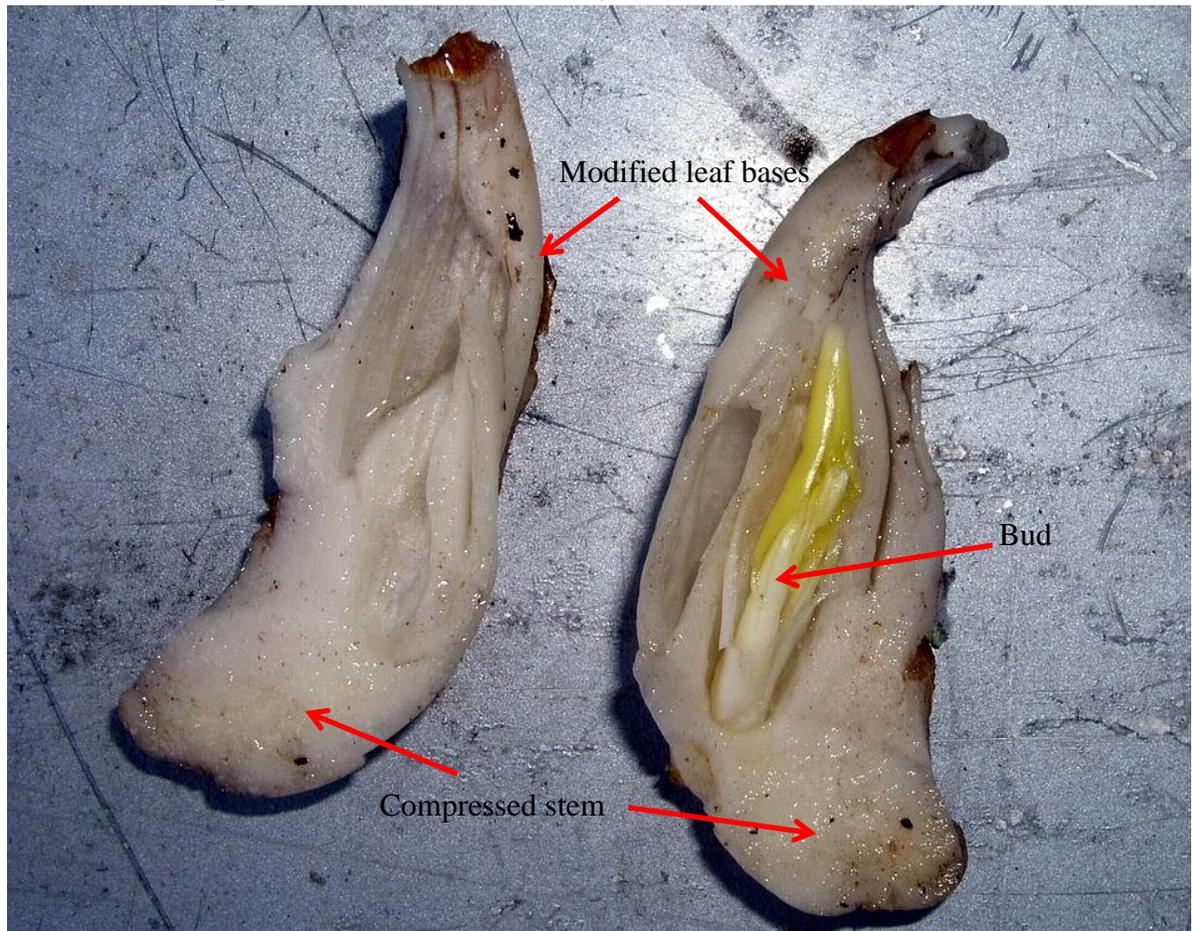
People tend to want to categorise bulbs into one of the botanically defined structures of being either a Bulb, a Corm or a Tuber. Erythronium are considered to be a Bulb however I believe they are fascinating structures that defy the simple term of being just a Bulb. To fully understand the structure of the Erythronium bulb it is necessary to dissect it to reveal the true nature of the different parts. This bulb was cut in July while it was in its summer state, or aestivation.

At the base is a compressed stem with the main bud, which will be next season's growth, sitting on top of it. This bud is surrounded and protected by a sheath of modified leaf bases.

Bulbs have evolved to respond very quickly to a short favourable growing season, usually in spring, followed by a long dry summer when conditions are not favourable to above ground growth, with growth in the form of the roots coinciding with the return of the rains in autumn.

In the spring

Erythroniums rush into growth producing leaves, flowers and seeds, in a relatively short period before retreating back under ground for the summer.



That is what we see above ground but growth is also happening below.

As the spring flowering period peaks the new bulb is forming underground and will be fully formed before the plants become dormant. Fertilised plants, which are forming seeds, will grow on for longer than non fertilised ones. As the season progresses next spring's plant is formed in miniature, complete in every detail, within the bulb before the plant enters its summer rest. During aestivation the shoot grows very slowly, sustained and protected by the bulb, for up to ten months until favourable growing conditions return.

We often call this the dormant period but growth of the tiny new plant within the bulb continues very slowly through the summer - in

late summer and autumn new roots will emerge responding to availability of moisture.



Erythronium bulbs replace themselves every year - the stem grows through the top of the bulb, left, then during the course of the growing season the current bulb shrinks away using most of its reserves, while a new bulb forms at the base of the stem. During this season most of the bulb's food store will be used up or passed on to the new growth except for that part of



the bulb formed from compressed stem, which persists to varying degrees attached to the base of the new bulb. The annual roots can be seen attached to the base of what remains of the old bulb.



Bulbs start taking themselves down into the ground starting in the first year of germination. The bulb (bottom left) is a first year *Erythronium sibiricum* bulb and you can see the depth it has gone to from the colour of the leaf. The white parts were underground and away from the light: the young

bulb forms at the base of the radicle stem, note also the root emerges separately. Above that is a second year bulb showing how it continues its progress down into the ground by again pushing a stem down below the root base.



Nonflowering bulbs grow in the same way with just a single leaf growing from the top of the bulb - when the bulb is mature two leaves and a flower will appear. It is only when a bulb produces two leaves that you will get a flower: single leaved plants never flower.



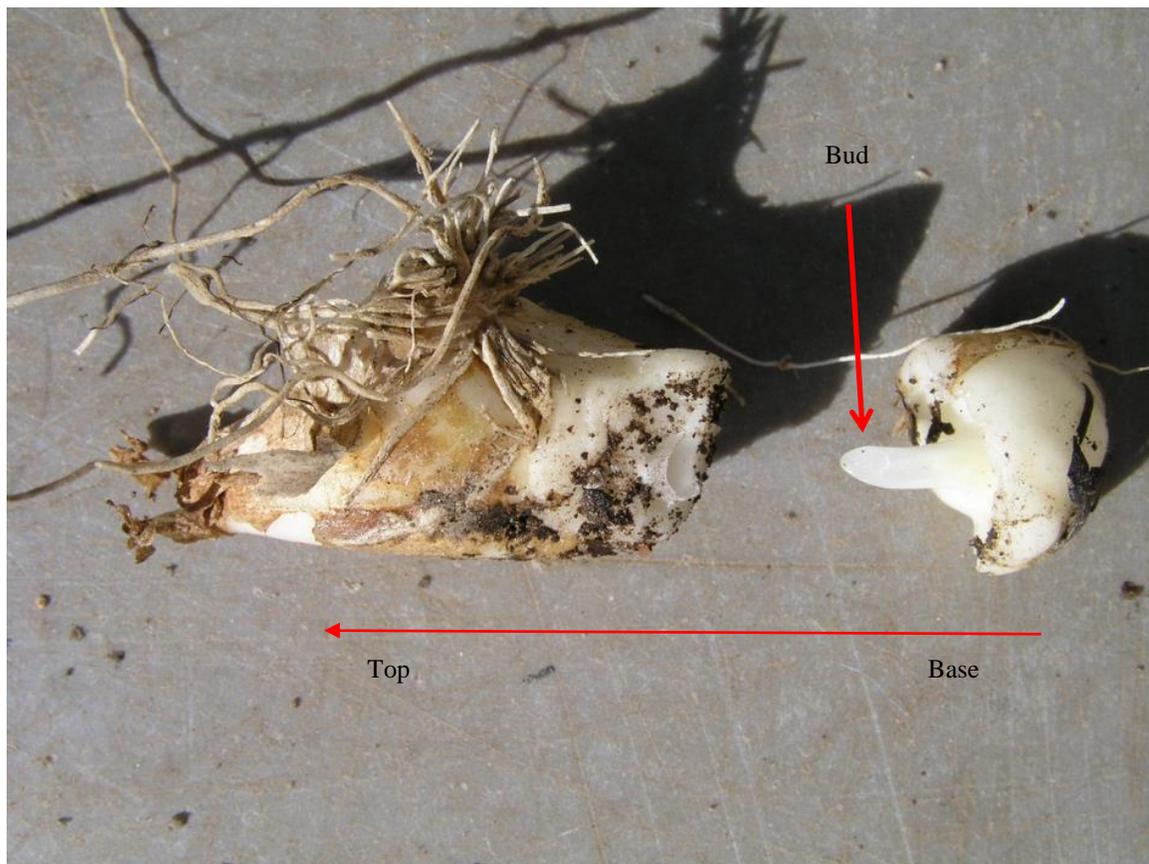
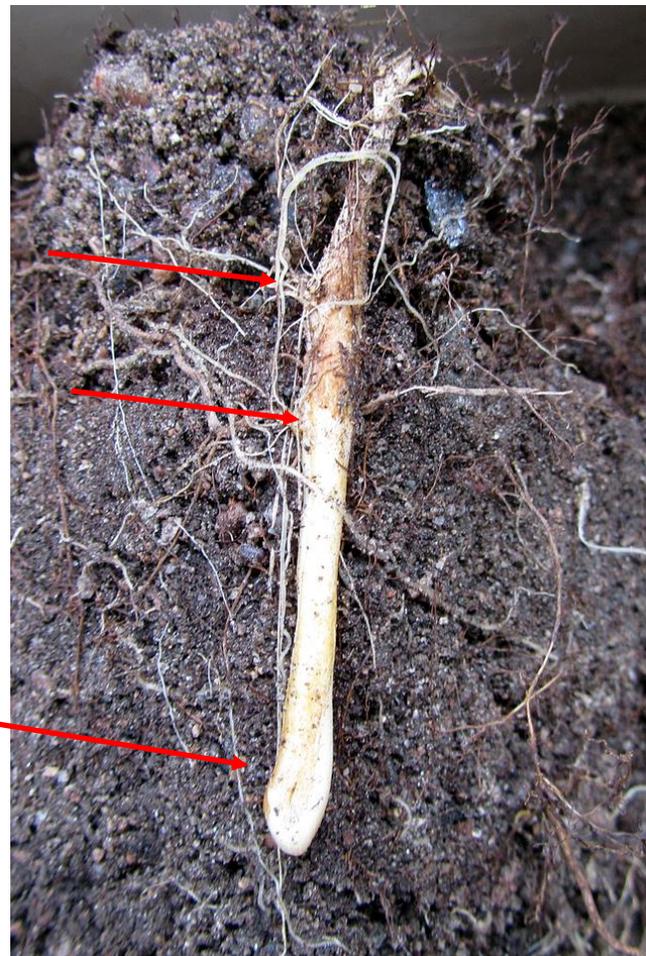
We can learn so much by observing bulbs whenever we get the opportunity to handle them. The smaller of these two bulbs is one year younger and we can tell from the white pointed end that projects below the

roots that it is still making its way down into the ground while the larger bulb, with a more rounded base, has achieved a suitable depth. It is not an **ultimate depth** that the bulbs are seeking but a suitable environment probably related to moisture and temperature so depth can vary from garden to garden.



Sometimes the bulbs become extremely long and thin as they push down into the ground. You can clearly see the remains of previous years root bases along the length of these bulbs.

The next season's roots will emerge towards the base.



If you should accidentally break an Erythronium bulb do not worry as not all is lost. Provided the growing conditions are good the part with the bud will grow and could still flower. The other part or parts of the broken bulb may also produce growths from dormant buds. Under normal growing conditions these additional buds are suppressed but with the removal of the dominant bud these additional buds may now grow.

Erythronium bulbs only have a thin partial skin, remnants of last season's leaf bases, which offers little protection to the drying out of the bulb – this is why the bulbs should not be out of the ground for any length of time and, if they are, they should be stored in moist sand, moss, or similar medium. The persistent stem bases can be seen forming chains at the base of these bulbs.



#### **Erythronium revolutum bulbs**

The dried remains of the roots may also persist for a few years but are completely dead. Some bulbs will produce secondary shoots from the base stem base adjacent to the chains.



Some bulbs take many years before even a tiny extra bud appears while others readily produce offsets (left) these are the forms (such as Erythronium 'White Beauty') that will quickly clump up making them excellent garden cultivars.

Even within a species you will find some clones that increase while others do not.



**Bulb in autumn with new roots emerging.**

In addition to the secondary growth buds at the base of the stem some forms may go on to produce extra growth buds higher up the stem. The picture, above left, shows an additional growth, complete with its own roots, still attached towards the top of the new bulb; on the right this secondary growth has now become independent and is held in place only by the remains of the old bulb.

### **Erythronium dens canis bulbs**

When the old bulbs do not die away completely they remain as an attachment at the base of the bulb forming a chain, much like a creeping Rhizome.



**Bulb in late spring roots dying back.**





Looking at the chains in more detail we will see the individual growths formed each year form the links in the chain. While the roots die after a year the links formed from the stem bases survive but will remain dormant as long as the dominant growth, the new bulb, remains attached. If we consider a normal plant stem, such as a Chrysanthemum, the terminal shoot/bud, is always dominant often suppressing the side buds further down the stem from growing - removal of the main shoot will allow the secondary buds to develop and it is just the same with these Erythronium chains.



These perennial stem bases that form the chains are more prominent in some species than others and even within those species the size of the chains can vary considerably.

**Erythronium montanum** bulbs



**Erythronium dens canis**

**Erythronium montanum**



I have experimented over many years, when repotting bulbs in the summer, by removing these chains then splitting them down into individual links - which is easy to do as they are only loosely joined together. These individual links are then potted up and grown on the same way as the other Erythronium bulbs. These chains are covered in dormant buds which will now burst into growth, sometimes one bud per link sometimes more - in some cases small leaves will appear above ground during the first year after splitting other times no growth appears above ground until the second year however underground there are new bulbs forming.



**New *Erythronium dens canis* bulbs formed on chin links**

Through the course of the year the old chain links will shrivel away as their reserves pass on to and support the formation of a new bulb. If these new bulbs are grown well they will reach flowering size in about three more years.

Breaking up a bulb can also result in dormant buds coming into growth. I originally discovered this when accidentally breaking a fragile young bulb when repotting. Always replant all the parts and some if not all of them will grow on.



***Erythronium albidum* bulb**

The eastern North American *Erythronium* bulbs differ slightly in that their shape tends towards a more classical bulb shape rather than the elongated shapes of the other species; some are also known to produce stolons.

**Erythronium americanum bulbs**

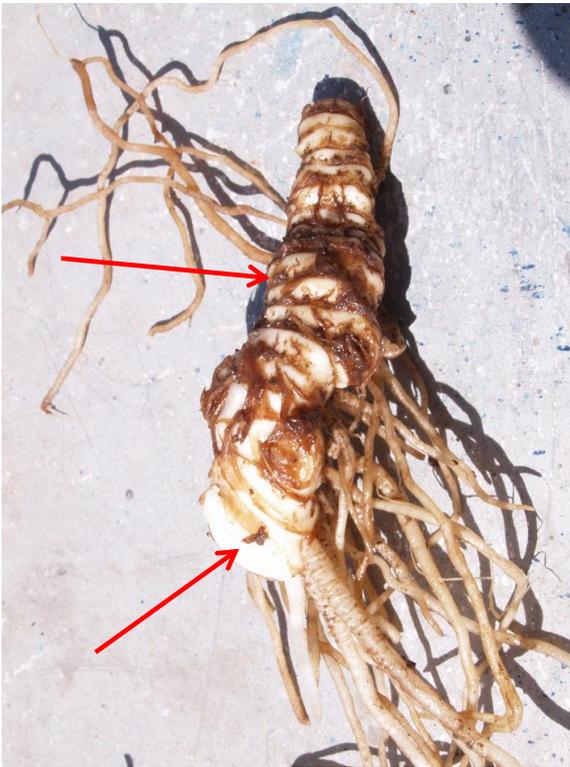
Perhaps the most commonly grown form of *Erythronium americanum* has a habit of sending out stolons, often a number from a single bulb, which results in a lot of small bulbs that never mature enough to produce a flower. In turn these small bulbs send out more stolons and so this cycle continues with lots of leaves and few flowers.



**Erythronium americanum bulbs with stolons**

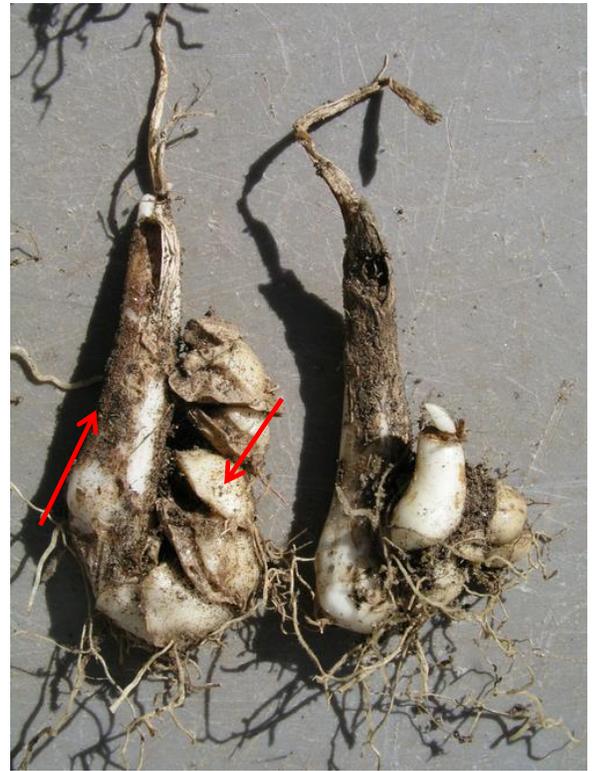
There are many stories of how to encourage the stoloniferous forms of *Erythronium americanum* to flower; most are myths but some forms will form mature bulbs and flower most years.

**Mature flowering sized bulbs of *Erythronium americanum*.**



Studying the bulbs carefully we can see that rather than being a simple structure Erythronium combine elements of a bulb, a corm and a creeping rhizome.

If we compare Erythronium to Trillium rivale, (left) we can see there are similarities both having the main bud at the front with the remains of previous years growths attached. The previous growths in the Trillium are



formed into a single structure, the annual links marked only by a slight scar on the rhizome, unlike the chains on the Erythronium which are minimally attached together –also the Trillium roots remain active for more than one year.



As well as being botanically fascinating they can also be very attractive - this Erythronium tuloumense bulb grew down until it hit the bottom of the pot turned sideways and ended up looking reminiscent of a reclining figure sculpture by the late Henry Moore.