

SAMPLE

Introduction to Medicinal Herbs

Lesson Aim

Distinguish between all the main plant families in which important commercial medicinal herbs are found and determine reliable sources for information about medicinal herbs.

Many plants or plant combinations are poisonous. For this reason, it is essential that before using an herb, you are able to *positively* identify it.

It cannot be stressed enough - that care must be taken when using plants for food or medicine.

If you are unsure of what a plant is, ask your local nursery staff or herbalists knowledgeable in the field of herbs, or if you can, bring it to the school and one of the tutors will identify it, or take it to the herbarium. If you are not sure what a plant is, and whether or not it is poisonous, *do not* use it for medications. Before using herbs medicinally, learn as much as possible, from this course, and from books recommended in this course.

It takes years of study to become a doctor, or a naturopath, therefore this course is designed for those interested in learning a little about a very involved topic. As with any other course, you get as much out of it, as you put into it.

MEDICINAL USES

Medicinal herbs are plants which contain chemicals which have an effect upon the body (usually the human body, but sometimes animals as well). The effect of medicinal herbs may be mild or strong depending on a number of things including:

- The species and variety of plant - NB: there can be subtle but important differences between two plants which may appear to be identical. For example, many herbs now sold are cultivated varieties of the original species and may not have the chemical constituents of the species form.
- Species that have the same common name but are totally different and unrelated - one could be highly poisonous the other benign
- How it was grown i.e. herbs that are over fertilised and watered tend to have a lower concentration of the important chemical constituents.
- The part(s) of the plant used. (e.g. root, leaf, stem, flower, fruit, mature or new growth, etc).
- Harvest time – i.e. time of day, time of year, weather conditions at the time, etc.
- The preparation of the medicine (e.g. as an oil, tablet, tea, ointment etc).
- The storage of the medicine NB: some medicines store well, but generally fresh is best).
- How it is used - (e.g. some herbs may be safe to use externally, but the same herb may be a serious problem if taken internally. Some may be beneficial in a certain concentration, but dangerous in a different concentration).

BEING CAUTIOUS

Be careful about what you use and how you use it.

There are legal controls in most developed countries which apply to manufacture or prescription of medicines, and these regulations are usually relevant to herbal medicines. You cannot simply make and sell herbal medicines without satisfying legal requirements.

There is however a large and expanding market for people to grow medicinal herbs for legally operating manufacturers world-wide. These markets are also becoming more regulated by industry bodies. If you intend to grow for the medicinal market it is in your best interest to research the industry associations in your region. There are specific growing, harvesting and handling procedures that are becoming an industry standard. Herbs that are not grown to meet these standards may not find their way onto the market.

Ways of Using Herbs

You can safely use some medicinal herbs in your own home once you gain a better understanding of these plants.

There are many ways of using medicinal herbs, some include:

Herbal Medicine

This is a broad term which may incorporate other techniques as described below.

Herbal medicine tends to work with the body's natural processes to combat disease (in contrast with allopathic medicine practiced by doctors, which aims to combat disease by blocking the processes followed by nature). In extreme situations, herbal medicine may be inappropriate. You should always acknowledge that there is a place for doctors practicing allopathic medicine, just as much as there is a place for herbal medicine.

Naturopathy

This is based on helping the body heal itself by attending to the five "cornerstones" of good health (ie. good nutrition, a good (psychological) attitude, fresh air, exercise and sunshine. Disease is seen as a body reacting against a build up of toxins; where the body may be working to eliminate the undesirable levels of harmful chemicals. Herbs may be used to stimulate a faster elimination of these toxins.

Aromatherapy

This involves using scented oils (derived from herbs), to treat various ailments, from mild stress or headache, to more severe problems. (e.g. massage with scented oils, scented baths, scenting the air (e.g. candles, atomisers, potpourri), washes -soaps, baths, etc)

Homoeopathy

This is based on a principle that "like cures like" (similar to the concept of immunisation).

The body is seen to have a self-healing potential. By giving the patient a very dilute solution of something (normally derived from herbs), which will cause the same symptoms as an illness, the body is then stimulated to combat those symptoms, and in doing so, combat the illness.

GROWING AND KNOWING MEDICINAL HERBS

Horticulture deals with living things and as such is somewhat unpredictable and variable. The ways you treat a plant is different from place to place, time to time and according to what you are trying to get from the plant. When referring to a book or magazine article, always look at where it was written and who it was written by

(e.g. a gardening writer from Sydney will usually talk about gardening in Sydney. If you are from London or Auckland, these recommendations on Sydney gardening may be quite misleading for you!). There can be great variations over relatively small distances in such things as rainfall, wind and soil type. A certain type of tree might very well grow twice as tall in one area as in another. In horticulture, there are different ways of tackling any job - often each one just as correct as the other. Never consider that a particular technique is the only way of doing something! You should try to be aware of the advantages and disadvantages of all of the alternatives. They all have their pros and cons, and it is up to your own preferences as to which way you choose to do something.

The horticultural aspects of this subject have been written to teach growing and identifying medicinal herbs in a way which will be relevant to anywhere in the world. It puts aside regional techniques and tries to teach you principles and concepts that can be applied to anywhere. Keep this in mind as you study try to see the principles, not just black and white facts.

THE PLANT NAMING SYSTEM

Plants are given two different types of names:

1. Common Names - these are English language names usually given to plants by amateur gardeners as a descriptive, easy to remember tag. Many plants have more than one common name, and sometimes the same common name can be given to several quite different plants. This along with the fact that there is no real control over common names makes them inaccurate and unreliable for plant identification.

2. Scientific Names - based on Latin language, these names often seem more complex than common names at first glance; however they have a system to them which can make plant identification much easier. The system of scientific naming is strictly controlled and coordinated by botanists throughout the world. Scientific names should always be used in preference to common names.

In the scientific system, plants are classified by dividing them into groups that have similar characteristics. These groups are then divided into smaller groups with similar characteristics. These are divided again and so the division of group to sub group and sub group to further sub groups goes on - until you finally have only one type of plant in each group.

There are many different levels of division, although the main ones that we use are just a couple at the bottom end of the scale.

The plant names which you see in books or on plant labels in a nursery will usually consist of two words:

- The first word is the "genus" name of the plant
- The second word is the "species" name of the plant

The main levels of division are as follows:

- All plants are divided into *phyla*
- *Phyla* are divided into *classes*
- *Classes* are divided into *orders*
- *Orders* are divided into *families*
- *Families* are divided into *genera* (the singular of genera is genus)
- *Genera* are divided into *species*
- *Species* are sometimes divided into *varieties*

The main plant phyla we are concerned with in horticulture are:

- Anthophyta - (i.e. angiosperms) this group includes all of the plants which produce flowers (e.g. eucalypts, roses, lettuce, grasses etc.)

- Coniferophyta - (i.e. conifers - this includes all plants which produce cones (i.e. pines, cypress etc.)
- Pterophyta - (i.e. ferns)
- Other phyla - (include such things as mosses, fungi, bacteria and algae).

Anthophyta is divided into two classes:

1. Dicotyledonae - in these plants the first leaves to appear from a germinating seed are in a pair (two leaves appear at once). The veins in the leaves are not parallel in these plants (e.g. mint, parsley etc.)
2. Monocotyledonae - in these plants, the first leaf to appear when a seed germinates is a single leaf. Veins in the leaves are parallel to each other (e.g. lemon grass, garlic, chives etc)

It can be seen above that you can distinguish between dicotyledons and monocotyledons by a couple of very simple characteristics. In the same way, we can usually distinguish which family a plant belongs to by a few basic characteristics:

Examples:

- Lamiaceae family - foliage is perfumed and flowers have two distinct lips
- Araceae family leaves are usually heart shaped (e.g. Philodendron) and plants are commonly tropical/indoor plants.
- Asteraceae - have daisy type flowers.
- Apiaceae - flowers occur in an umbrella like head on a single stalk.

You should be able to tell a family name from other types of names by the fact that it will end with "aceae". Students have sometimes called the family name a genus. Note that a genus name virtually never ends in the letters "aceae".

e.g. *Lavandula angustifolia*

Lavandula is the genus

angustifolia is the species

The genus name begins with a capital letter. The species name is usually written beginning with a small letter. When writing scientific names they should be either in italics e.g. *Acer palmatum*. Or if the name is written by hand it is meant to be underlined.

Sometimes a third word (and perhaps a fourth) is added to follow the species. These words would refer to the variety of that particular species. Cultivar (cultivated variety) names are enclosed in quotation marks.

For example: *Acer palmatum* 'Dissectum Atropurpureum'

Acer is the genus

palmatum is the species

Dissectum tells us that this is a variety of *Acer palmatum* which has dissected leaves.

Atropurpureum tells us that this variety of *Acer palmatum* has purple foliage.

Hybrids, Varieties and Cultivars

You may occasionally be confused by the difference between hybrids, varieties and cultivars.

A **hybrid** plant is one which has resulted from two different species cross breeding. The hybrid is a combination of characteristics from two different species; something bred or selected out of nature by man. Example: *Eucalyptus* 'Torwood'. This is a cross between *Eucalyptus torquata* and *Eucalyptus woodwardii*. Sometimes the two plants which have been cross bred are both mentioned, and a "x" is placed between them, e.g. *Eucalyptus*

torquata x *woodwardii*. Some plants hybridise naturally, but many, many hybrids are produced by man for horticulture and agriculture. There are also a number of hybrids that are produced by crossing two different plant genera. In this case, the "x" is listed before the genus name. For example, x *Cupressocyparis leylandii* is a cross between *Chamaecyparis nootkatensis* x *Cupressus macrocarpa*.

A **variety** is just a particular type of plant in one species. A variety does not have parents from two different species, but a hybrid does. When a plant group within one species is so different to the rest of the population, it is called a variety.

The word **cultivar** is derived from the words *cultivated variety*. The accepted meaning of the word cultivar varies somewhat. In general, a cultivar is a group of cultivated plants that are clearly distinguishable from others by a certain characteristic (for example, variegated leaves). This characteristic must be passed on to the offspring (whether produced sexually or asexually) of the plant for it to be a true cultivar. In some countries, the word cultivar means the same thing as a variety.

Many valuable agricultural plants are cultivars, and they need to be reproduced with little or no variation between parent and offspring. There are two main categories of cultivars: clones and lines. Clones are produced by asexual means from parent plants. Lines are produced by sexual means (seed) from parent plant. This can be a difficult task, and cultivars may not remain "true to type" when produced under incorrect conditions.

To write a cultivar name, one needs to write the genus and species name followed by the cultivar name (which starts with a capital letter). The cultivar name should be either preceded by the letters cv. or it should be inside quotation marks as follows. For example: *Macaranga tanariensis* cv. *Smithordii* or *Macaranga tanariensis* 'Smithordii'.

To learn more about the plant naming system, watch our Plant Identification video at <https://vimeo.com/album/5919034/video/318368425>

How Does the Plant Naming System Apply to Medicinal Herbs?

Other than the fact that they have medicinal properties - medicinal herbs are like any other plant and are therefore not included in any one specific family. For example, *Borago officinalis* (borage) is a member of the Boraginaceae family, whereas *Salvia officinalis* (sage) is a member of the Lamiaceae family. There are many other families in which medicinal herbs are included.

Throughout this course you should always use scientific names – common names are optional (but useful).

WHAT IS PLANT KNOWLEDGE?

If you have good plant knowledge you should be able to do the following:

1. Identify a wide range of different plants. The ability to identify several hundred plants is a start; average professional horticulturists would be able to identify several thousand plants; top horticulturists could identify over 5000 plants.
2. Identify the family a plant belongs to, even if you can't identify the actual plant.
3. Describe how the plant you identify grows – its size, shape, soil and water requirements, time of flowering time, flower shape and colour, etc.
4. Explain how to propagate plants shown to you, whether you can identify them or not.
5. Suggest the likely pest and disease problems which might cause problems on the plant shown to you, whether or not you can name the actual plant.

How Do You Acquire Plant Knowledge?

Most people develop their plant knowledge by a combination of two things:

1. Reading or hearing about plants: through studies, looking through books and magazines, going to lectures, watching TV shows, talking to gardeners and nursery staff.
2. Handling plants - picking them up, holding them, planting, feeding, watering and pruning them, and perhaps propagating them.

Do not expect to acquire good knowledge of plants overnight! Plant knowledge normally develops over a period of time.

Even people who enrol in diplomas and degrees courses in horticulture frequently become disillusioned, thinking that they will never remember "all of those plant names". Often it is not until they are half way through their course that students suddenly realise they are beginning to remember some of these names. Also often it isn't until this stage that they find they are beginning to be able to pronounce plant names.

PRONUNCIATION OF PLANT NAMES

Plant names are based on the ancient Latin language, and as such, they should (strictly speaking) be pronounced using the rules of Latin. In practice however, plant names are pronounced differently from place to place, even within the same country. One expert horticulturist may pronounce a plant name one way, while another may use a completely different pronunciation. Both may be equally respected in the profession.

The Important thing is that they both spell the name in exactly the same way – if this is done then they can communicate information effectively even if the pronunciation differs a little.

The usual way to learn pronunciation is to learn to identify and spell plant names first, then as time goes by, and as you mix with other horticulturists, you will pick up the way they pronounce names which you have learnt.

If you want to learn 100% accurate pronunciation of plant names, you can use a Latin language text book, or a book such as "Plant Names Simplified" (published by Landsman's Bookshop, U.K.), Dictionary of Plant Names by Coomes or similar text.

You are usually better advised to not worry about pronunciation too much when you first start studying horticulture. Concentrate on learning to identify and spell the names for at least 12 months before you start giving any significant attention to pronunciation.

When you have got to the point of having a reasonable grasp of plant identification (ie. when you can identify and spell at least 200 or so plants), you should then, start to pay a little more attention to pronunciation. The best way to polish your pronunciation at that point would be to mix with people who are fluent in their identification and pronunciation of plant names. Ideally, get a part time job in a nursery. If this is not possible, join a garden club. Generally the specialist societies are better than the local clubs (ie. The Rose Society; The Fern Society; The Herb Society etc.). These specialist societies tend to be patronized by at least a few experts. The local clubs are often (but not always), made up of amateurs who have little more experience than yourself.

Guidelines to Pronouncing Scientific Plant Names

Pronunciation of scientific plant names should ideally follow the rules that apply to the classic Greek and Latin languages, from which most of these names are originally derived. In the Latin language letters or diphthongs are pronounced as shown below:

"a" A short "a" as in fat or that

"ae" As the "y" sounds in why; or as the "i" sounds in mite

"au" As "ou" sounds in out or ouch

"c" A hard c or k as "c" sounds in cool or "k" sounds in keep

"e" As "e" sounds in bet, set or pet - or as "a" sounds in hate

"ei" As "a" sounds in gate

"ew" As "ew" sounds in few, or "ough" sounds in through

"ow" As "ow" sounds in how

"oi" As "oy" sounds in toy

"o" can be as "o" sounds in cob, or as it sounds in note

"g" A hard "g" as in get, gone or good

"i" Can be as the "i" sounds in bin, pip, or fit - or as "ee" sounds in been

"j" As "y" sounds in yet yellow

"s" As "s" sounds in sit or ask - not as "s" sounds in as or those

"u" Can sound as "u" does in bull or as it sounds in shute - but never like it does in rub

"v" Pronounced like "w" in win or wheel

"y" Pronounced like the French pronounce "u"

Examples of Pronunciation

Callistemon

pronounce as follows - Kal - list - tee - mon

Lagerstroemia

pronounce as follows - ag - er - strow - me - a

Kniphofia

pronounce as follows - nif - off - ee - a

Pyrethrum

pronounce as follows - Pie - reeth - rum

RESOURCES

The following contact points and references are only meant as a start to help you find information about the group of plants you are studying:

1. Reference Books

- Hortus Third: an American Book, with comprehensive listings on over 30,000 different plants, commonly in cultivation; generally referred to as an ultimate authority in the industry. You should find copies of Hortus in major city public libraries, in the libraries of capital city herbariums, and in libraries at horticultural schools and colleges.
- Encyclopaedia of Medicinal Herbs by J.M. Kadana
- The RHS Encyclopaedia of Herbs by Deni Bown
- The Herbalist by Meyer
- The Old Herb Doctor by Meyer

Visit a bookshop, and see what books you can find on the group of plants you are studying.

2. Organizations

- *Herbariums* - a Herbarium is a place where collections of pressed plants are kept. Most botanic gardens in capital cities maintain herbariums and libraries (within the herbarium building). These collections of plants and books, along with the people who work at the herbarium, are an invaluable source of detailed information on most types of plants.
- *Government Departments* - some state and national government departments specialise in certain groups of plants - departments of Agriculture have information on 'Crop Plants' such as fruit, vegetables, nuts, berries, grain, cut flowers and sometimes nursery plants. Health Departments may have information on medicines.
- *Professional Associations*
- *Health Professionals*

3. Magazines and Journals

Many general gardening magazines are sold in news outlets or book shops. Others are available by subscription or through news outlets.

Examples

- Herb Grower Organic Herb Growers of Australia Inc.
- International Herb Growers IHGMA and Marketers Assoc. Newsletter
- The Herb Companion

You should find more by searching for "Publications Herbs" on the internet.

4. Nurseries

There are specialist nurseries in all different types of plants.

You may find nurseries specialising in the group of plants you are studying by looking in:

- Magazine Advertisements (see magazines listed above)
- Telephone book (look under both nurseries-wholesale, and nurseries-retail, under 'N' in the yellow pages).
- Internet searches

5. Seed Suppliers

Look over the following list of seed suppliers.

Herb companies supplying seed and plants in the USA: Web Site: <http://www.hort.purdue.edu/newcrop/med-aro/seedsources.html>

Rainbow Seeds
PO Box 5895
Wellesley Street
Auckland 1001 New Zealand

Richter's Herb Specialists
Highway 47, Goodwood
Ontario L0C 1A0 Canada
Telephone: 1 905 640 6677
Facsimile: 1 905 640 6641
Email for orders: orderdesk@richters.com
Email for inquiries: inquiry@richters.com

Email for customer service: custserv@richters.com

Web Site: <http://www.richters.com>

Cyberseeds

PO Box 171102 Ref# OL100

San Antonio

Texas 78217-1102 USA

Facsimile: 1 888 466 3320

Web Site: <http://cyberseeds.com/htm/seeds/HE.htm>

Overseas Ordering Instructions: http://cyberseeds.com/seeds_o.htm

Abundant Life Seed Foundation

930 Lawrence Street

PO Box 772

Port Townsend

Washington 98368 USA

Telephone: 1 360 385 5660

E-mail: abundant@olyphen.com

Newsletter: <http://csf.colorado.edu/perma/abundant/letters.html>

Nichols Garden Nursery

1190 North Pacific Highway

Albany

Oregon 97321-4580 USA

Telephone: 1 541 928 9280

Facsimile: 1 541 967 8406

Email: nichols@gardennursery.com

Web Site: <http://www.gardennursery.com/>

Elixir Farm Botanicals Limited Liability Company

Brixey

Missouri 65618 USA

Telephone: 1 877 315 SEED

Facsimile: 1 417 261 2355

Email: efb@aristotle.net

Web Site: <http://www.elixirfarm.com/>

Order Form and Seed List: <http://www.elixirfarm.com/eforder.htm>

Chinese Herbs: <http://www.elixirfarm.com/chiherb.htm>

Indigenous and Medicinal Herbs: <http://www.elixirfarm.com/indign.htm>

JL Hudson Seedsman

PO Box 1058

Redwood City

California 94064 USA

Taylor's Herb Garden

1535 Lone Oak Road

Vista California 92084 USA

Gardens of the Blue Ridge

PO Box 10

Pineola

North Carolina 28662 USA

Midwest Wildflowers

Box 64, Rockton

Illinois 61072 USA

Suffolk Herbs
Sawyers Farm
Little Conrad
Sudbury Suffolk CO1 0NY UK

Medigran
Holenweg 41
1623 PA Hoorn - Holland
www.medigran.nl

Kieft Bloemzaden BV
PO Box 1000
1695 ZG Blokker Holland
PO Box 63
1606 Zh Venhuizen Holland

A general list of seed suppliers, predominantly flowers:
<http://www.goldsmithseeds.com/customer.htm>

6. Videos

For the exceptionally keen student, it may be worthwhile spending time watching videos.

There are a lot of free videos on medicinal herbs to be found and watched on the internet. Be careful about the credibility of what you are watching though. You will see some come from very credible people or organisations (eg. universities or qualified professionals); while others may not present the credentials of the video at all. Don't believe it just because it is on the internet.

You might start by searching for "Medicinal Herbs Videos". Then try other search terms (eg. You Tube Herbal Medicine).

Plant Review Worksheets

With each assignment, you will be required to prepare plant reviews. Each plant should be named, described and illustrated. Each plant collection should include two trees, two shrubs, one native plant, one non-native, one climber and one indoor plant.

As part of each assignment for this course you will be required to prepare EIGHT different specimen reviews (per assignment).

A TOTAL OF 56 DIFFERENT SPECIMEN REVIEWS WILL BE SUBMITTED OVER THE WHOLE CORE UNITS.

A sample worksheet is included in the following pages (each worksheet holds two plants).

Why Review Plants?

- To build gradually knowledge that is useful when working in any sector of the horticulture industry.
- To improve your ability to identify plants and understand the cultural requirements of a range of plant species.
- Plant Reviews should take no longer than 3- 4 hours per lesson (about 1/3rd the total lesson time). If you take longer you may be including too much detail.

How much to include?

The amount of effort and detail you put into your plant reviews is entirely up to you. Some students put in a lot of detail so they can refer to it later as a resource others. Others just put in simple short sentences under each heading.

If you want to simplify your reviews the most useful headings would be:

Plant family

Genus name

Species name

Common name(s)

Brief description (height, shape, leaves, flowers)

Cultural requirements (soil type, acid/alkaline, sun/shade, water/fertiliser)

Propagation (seed, cuttings or grafting)

Pests and diseases

Hints

The sample review sheet provided is an example only– change it to suit your needs; the guide above shows minimum expectations.

Photos are not mandatory but helpful to you as a later reference.

There is no penalty for producing short concise plant reviews.

Some students take too long doing their plant reviews because they can't find the right information. No single book or website will tell you all – use several sources.

When looking for information online type in the name of the plant then add what you are looking for e.g. English lavender botanical name; English lavender pests and diseases etc.

Additional Helpful Information

Naming the plant

Include the common name, scientific name; and the plant family name if possible.

If you cannot provide one of these, write a note to the tutor explaining that you attempted to find the information and why you could not.

Your tutor will often be able to help at least partly identify the odd unidentified plant; if you submit an illustration and good description (ideally presenting not only a leaf, but also a flower, fruit or seed head).

Describing the Plant

You should record any information that might be important to selecting and using this plant for a landscape design:

Height: How high can it grow in your locality?

Width: How wide can it grow in your locality?

Flower: What colour and when does it flower?

Leaf colour, shape, texture: What colour are the leaves when and mature? Are the leaves round, feathery, lobed, spiky? Are the leaves fine or coarse textured?

Scent: Are the flowers scented?

Hardiness: Is it frost tender? How does the wind affect it?

Culture: Are there any special things the plant requires? How hard should it be pruned and how often? Does it need good drainage? How often should it be fertilised?

Pests and Diseases: List any pests and diseases that are particularly bad for this plant.

Maintenance: Are there any maintenance requirements for the plant, such as pruning or raking fallen leaves in winter?

As a guide: include up to half a page of information for each plant.

Illustrating the Plant

This may be done any of the following ways:

Submit a photograph or drawing of parts of the plant

Send a scan of a photograph or drawing (Do not send large graphics files over the internet. Consult your student manual for details)

Refer to a web site page location where you have found the plant illustrated on the internet.

Submit a photograph of a pressed specimen (Note: Do not send pressed specimens across state or national borders. To do so may be illegal and in breach of Quarantine Regulations).

The following **Plant Identification Worksheet** is a sample only - change it as needed to suit your needs.

EXAMPLE OF A PLANT IDENTIFICATION WORKSHEET

Plant No. 1.

Plant Family.....	Sketch Or Photo
Genus.....	
Species.....	
Common Name.....	
How & Where to Plant it.....	
Height..... Spacing.....	
Hardiness	
Appearance	
Uses	
Culture	
Pest & Disease	
Harvest & Post Harvest	

Plant No. 2.

Plant Family.....	Sketch Or Photo
Genus.....	
Species.....	
Common Name.....	
How & Where to Plant it.....	
Height..... Spacing.....	
Hardiness	
Appearance	
Uses	
Culture	
Pest & Disease	
Harvest & Post Harvest	

SET TASK

Using the leads given on the last pages, contact as many resources as you can and begin to get a feel for the resources. Start compiling your resource file on Medicinal Herbs; list books, people, businesses, organization etc, which you might refer to for information later on. Collect any catalogues/leaflets/recipes, etc which might be useful in learning more about medicinal herbs. Spend up to 2 hours on this task.