Unit name and Force: Abertay Computer Forensics Task Force

Case against: John Doe

Investigating Officers:

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1. Introduction

1.1. Investigators

A team of four investigators analysed the suspects hard drive and then collated their results to formulate the following report. The sections for which each investigator was responsible can be found below.

Jordan Gribben:
1. Introduction
4. Conclusion

Paul Crone:
2. Description of Crime
   Editor of Report

Caólán Keenan:
3.1 Description of investigation
3.3 Production List and Associated Description

Rory Leanord:
3.2 Analysis

1.2. Investigation Summary

The suspect under investigation, Mr John Doe, has had their computer along with all peripherals such as USB's and equipment such as cameras seized from their home following the police raid. All objects obtained from the police raid were taken to be forensically analysed at the request of Dr Ian Ferguson.

The forensic investigation conducted by the four examiners found that the suspect in question, Mr John Doe, had illicit and sensitive material within his possession. The images and documents found stored on the computer were obtained through various methods such as through email communications from multiple individuals, transferring from USB's, and downloading them off bookmarked websites.

Some of the illicit material found on the suspect's computer was hidden in locations on the drive that an average user would not be able to find, showing that the images must have been placed there by someone with computing knowledge.

All the evidence found along with the arguments to support these claims can be found in the document below.

2. Description of Crime

2.1. Images Captured on a Canon EOS-1DS Camera

1 illicit image was captured on a Canon EOS-1DS camera. This image file was discovered stored on the suspect's computer and can be found in Appendix A. The image was captured on the 29th of January 2003 at 16:14 GMT.

2.2. Images captured on Canon Powershot SD100

18 Illicit images were discovered in Documents and Settings and can be found in Appendix A. These image files were captured on a Canon Powershot SD100 between 13th June 2004 at 19:44 BST and the 27th June 2004 at 18:28 BST.

2.3. Edited and encrypted files containing images

A file called 'CrouchingKokako.dll' was found on the suspects computer. Whilst normally a library file, it was discovered after closer examination to have been a .zip file that has been edited in an attempt to hide the contents. When decompressed (or 'unzipped'), there were 7 images found. These can be located in Appendix B. There is no metadata to date these photos.

Another encrypted file called 'birdpics.gpg' was discovered in the suspect's My Documents folder. Upon decryption, another 5 images of birds were found. This is another clear attempt by the suspect to hide the illicit images on their computer. The images from this decrypted file can be located in Appendix J. There is no metadata available to date these photos.

2.4. Illicit files downloaded from the internet

An illicit image was found on the suspect's machine under the user account 'Bob'. Upon further inspection of the image, the image was found to have been downloaded by the suspect. This image was captured on 20th June 2004. It was then downloaded to the suspect's computer on the 3rd February 2005. It was last accessed on 3rd February 2005 at 15:06:42.

After inspection of the suspect's browser history and download history, it was found that the suspect had accessed websites containing bird and bird-related images. It was also discovered that the suspect had downloaded images, a .wav file (a type of audio file) of birds, a web page, and a .zip file containing more images. These incidents took between 2nd February 2005 and 9th February 2005 and can be located in Appendices C through E. The audio file can be found at Appendix N.

Illicit websites were also saved within the suspect's browser bookmarks. These can be seen in Appendix P.

2.5. Illicit images sent and received via email

Various emails have been recovered that were sent and received by the suspect to an individual called ‘Bob Forbes’ (ben@example.com). It has also been found that the suspect received images via email. These emails take place between 16th October 2004 – 9th February 2005 and can be viewed in Appendix G alongside images sent and received.

There is also evidence the suspect subscribed to a bird mailing list. This can also be seen in Appendix G.

2.6. Birdwatching trip hidden in unallocated space on disk

Over twenty bird images, as well as some guides on bird watching, were found in an unallocated space of the recovered disk. From the evidence found, as well as the attempts to hide it within unallocated space, it is reasonable for us to assume that a birdwatching trip did take place. This took place between the 3rd February 2005 to the 9th February 2005. The images captured and the guide can be found in Appendices K.

2.7. Illicit material stored on computer

There is a file ‘nestboxtips.txt under the My Documents folder for the ‘johndoe’ user account. This file contains information on birdwatching and on the construction of birdboxes. This file was created and viewed on 2nd February 2005 and can be seen in Appendix F.

In the program files, there were images of people dressing up as birds. These can be seen in Appendix L. There were also a further 7 illicit images of birds found in the suspects My Pictures folder alongside two book and DVD covers. These can be viewed at Appendix M.

3. Description of Investigation

3.1. Analysis Methodology

This section of the report describes the steps performed to obtain evidence from the suspect's drive, referring to the commands, tools, software, and programs used in the imaging process to seize each piece of evidence.

3.1.1. Preservation of Data

The first step in preserving the johnDoe.dd drive is to create an exact duplicate of the original suspect drive, which will henceforth be referred to as the cloned drive. A SATA cable is attached to the suspect's original drive, followed by a power cable. With the power turned on, it is connected to the machine used to make the copy. In a terminal, the **dmesg** command is used to retrieve the device name assigned to the suspect's drive, ensuring the contents are copied successfully. Following this, the **dcfldd** command is used to copy the drive to a desktop file named *jd*. This will allow for an investigation into the drive without tampering with the original. This is to ensure the files are not compromised, which is paramount in keeping all evidence usable in court.

Alongside these commands, an **MD5 hash** of the original data is recovered. After calculating the md5sum of the cloned drive, it can be compared to the **MD5** generated of the original. If the hashes match, it means the copy is accurate and can be used in evidence gathering.

Subsequently, the **chmod** command is used to prevent the alterations being made to data on the drive. This is achieved by changing the file permissions of the drive to read-only. This means that when conducting the analysis the data remains untampered with. Further commands such as **fdisk** and **mmls** can be carried out on the disk image of the drive to perform a disk audit to gather information such as partitions and unallocated space. This helps to reach a conclusion of where important evidence could be located, such as images carved from partitions.

3.1.2. Physical Search

The next step is to search through the contents of the disk image. The commands **foremost** and **metacam** are used in file-carving to obtain metadata on the cloned drive’s files. foremost will search for file types whilst Metacam is used to retrieve data such as timestamps.

3.1.3. Whitelisting

This step is taken once the disk image has gone through the loopback mounting technique to make disk image files available. The md5deep command is then used to compose a list of MD5 hashes for every file on the drive. This is an important step as the whitelisting technique is used to dismiss files included in typical drives and OS. This is accomplished by comparing the captured hashes against hashes of a clean copy of the WinXP OS used by the suspect.

Hashes found in both the clean copy and suspect copy are considered unsuspicious and insignificant, they are put to the side in a separate .txt file. The remaining files are added to a blacklist for further inspection using Autopsy.

3.1.4. Browser Examination

When the disk image is mounted, an examination into the suspect's browser use begins. Cache files are located for Internet Explorer and the **pasco** command is then used to explore its content. The suspect's Internet Explorer history is located using this command. **Galleta** is used to find the suspect's cookie file for analysis. Furthermore, the **find** command is used to locate other index.dat files providing potential evidence such as typed URLs and bookmarks.

3.1.5. Further Analysis Using Autopsy

With the use of Autopsy and The Sleuth Kit, a variety of evidence can be collected to develop a case against the suspect. A new case is created, and pertinent evidence is imported into it. Keywords linking to the suspected crime(s) can be used in searches to extract relevant content. This is in the form of folders or file content/metadata. The blacklist created earlier is also imported to autopsy for more extensive examination. The files on this list are inspected further to ensure as much content is covered, and no potential evidence is left unseen. This tool is also used to inspect browser viewing history to ascertain whether the suspect has been visiting sites containing illicit content.

3.2. Analysis

Within this section, there is analysis of the evidence that was uncovered throughout the earlier stages of the investigation, following the mentioned methodologies.

3.2.1. Preservation of Data

To ensure that the data is the same on both the working drive and the suspects drive, an MD5 hash was taken of John Doe's computer drive. This was then compared to a MD5 hash that was taken of the drive image. These are taken to ensure that the drive and cloned image are identical and that the integrity of the investigation is upheld. If these hashes didn't match, then the drives weren't the same and the evidence uncovered would no longer be valid. The hashes are displayed below;

John Does Drive: d63dd1b8917ca28bac7c955fc3b6cd25
Suspect Drive Clone: d63dd1b8917ca28bac7c955fc3b6cd25

After John Doe's drive was imaged, fdisk and mmls were both used to uncover the partitions that exist on the drive, as well as the capacity and unallocated space. These commands revealed that the drive had been partitioned into 2 parts. The first partitioned was an allocated space of 2.9gb, this contained windows XP. The second partition was unallocated space, with a capacity 2.4gb. Both portions brought the drive capacity to 5.4gb, matching the drive. The output of these commands can be found in Appendix W.

3.2.2. Physical Search

Once the previous stage was completed, the investigation moved onto physically searching the drive. This was done on the cloned image, so that evidence couldn't be tampered with or removed. It was discovered that there were 21 illicit and incriminating images that were taken on a Canon PowerShot SD100. As well as this there was 2 illicit images that was taken on a Canon EOS-1DS, and 1 illicit image taken on a Sony Cybershot. Other images were found that were taken on a Canon PowerShot SD100, however these images weren't illicit nor incrementation and have thus been redacted. All illicit images can be found in Appendix A.

3.2.3. Whitelisting

To ensure that there was no malware on the system, investigators ran a malware scan on the cloned drive. This scan uncovered a trojan virus on the system. After a further investigation, a file titled *pagefile.sys* called functions with the title of "keylogger" and "DDOS" for the trojan.

3.2.4. Browser Examination

On analysis of the both browsers found on the suspect drive, a file called downloads.rdf was discovered. This is a file that the Mozilla Firefox browser creates and holds data about all the files downloaded from within Mozilla Firefox, this can be found in Appendix C. Within this file, it is revealed that a zip file was downloaded, titled *Birds.zip*. As well as this there are 7

illicit images, an audio file containing suspicious audio and a downloaded webpage about group breeding. The audio file can be found in Appendix N.
Alongside uncovering the download history, the tool pasco was used to uncover the cookies and history from within the browsers. Within the history, illicit images were accessed on several occasions. This can be found in Appendix O**.** Alongside this there are multiple cached webpage, were the suspect is browsing for illicit material. This can be found in Appendices Q, D-F.

3.2.5. Autopsy

The majority of this investigation was done using a program called Autopsy. Autopsy is piece of software that specialises in digital forensics and is a graphical interface for the sleuth kit set of digital forensics tools, as well as other tool sets. Autopsy allows for pre-created whitelists and blacklists to be imported into the investigation, as well has having a robust searching function, which includes keywords and file types.

When the initial data source is imported into the autopsy investigation, it is ingested and analysed, extracting and labelling files of interest. These files can be file type mismatch, emails, images, suspicious configuration files.

3.2.5.1. Users Account

Through Autopsy, the suspects user account details were able to be uncovered. The suspect had a cartoon illicit image as his user account image. As well as an illicit image set as his desktop background. These images can be found in Appendices H and I.

It was also discovered that the user account *Bob* had an illicit image, which was found within the ‘My Music’ file. However, upon further analysis, this file looks to have been downloaded by the suspects user account. This image can be found within Appendix R.

3.2.5.2. File type mismatch

Upon analysis of the file type mismatches, it was discovered that a file titled CrouchingKokak.dll, was a .zip file, which contained 7 illicit images. As well as this another mismatch was uncovered, an executable file called *FantailFrontVeiw.exe* contained an illicit image. These images can be found in Appendix B.

It was also discovered that there were 3 illicit images hidden within the *Program Files* folder. These images were titled *.exe* files, meaning that the computer wouldn’t open them. To view the images *.jpg* was added to the file name, allowing it to be opened. These files can be seen in Appendix L.

3.2.5.3. Files Recovered

While in autopsy, multiple files were uncovered from the suspects drives. These files were 3 illicit PDFs files, these can be found in Appendix V. Found alongside the 3 PDFs was a word document describing bird watching, this can be found in Appendix S.

3.2.5.4. Email Analysis

The analysis of the emails found on the suspects drive shows that they received emails from 2 separate accounts. The suspect received 4 emails from the email address **ben@example.org** and 1 email from the account **mailinglist@birds.example.com.** These emails contained illicit attachments, with the emails from **ben@example.org** containing 8 illicit images and the email from **mailinglist@birds.example.com** contained information on how to identify certain types of bird. This information can be found in Appendix G.

3.2.5.5. General Browsing

While browsing the suspects drive through autopsy, multiple folders were found to contain illicit images. Within the *My Pictures* file 9 illicit images were discovered, these can be found in Appendix M.

Within the unallocated space on the suspects drive, 20 illicit images were found, alongside a text document detailing a bird watching trip. These can be found in Appendix K.

While going through the drive, an encrypted *.gpg* file was uncovered. These files are opened with a ***.s*** file which, upon further analysis, was found within the drive. The contents of this file were a base64 encoded string. Once decoded the string read "*arran"* which when entered, was the passcode. When the file was unencrypted, it revealed a *.zip* file, which contained 5 illicit images. These can be found in Appendix J.

Within the RECYCLER folder another illicit image of a bird was uncovered. This can be viewed in Appendix U.

Within the recently deleted folder 11 illicit images were found. These were discovered due to how computers delete files. The data for these files is still there, the computer just doesn't display them. These images can be found in Appendix V.

3.3. Production List and Associated Description

johnDoe-002.dd – This is a clone of the evidence drive belonging to the suspect, analysed during the investigation to build a case against John Doe. This copy was loaded into both Linux and Windows and evidence was gathered using various tools such as Autopsy.

Ubuntu Linux – used to safely make a copy of the original drive
Kali Linux VM & USB Boot – used to analysed the drive with forensics package installed

Digital Forensics Technical Report – A report has been created to be provided as evidence against the suspect. It contains a detailed account of evidence gathered on the suspects drive.

4. Conclusions

Throughout this report multiple incidents containing illicit material are shown to have taken place on the suspect's seized computer.

Numerous attempts by the suspect to hide the illicit material have also taken place. The first attempt to hide the illicit material can be seen within the unallocated third partition on drive.

The second time this is seen is with the illicit image within the 'Bob' user account within the suspects machine at first this may look like the other user is responsible for that content however upon further investigation it is clear that this image was downloaded by the suspect's user account and placed there. Another example of illicit content being hidden is with the encrypted .gpg file that, when decrypted, revealed 5 more illicit images. Finally, some files have had their file type changed in order to hide the images inside, this can be seen twice - once with the CrouchingKokako.dll which was originally a .zip file which, when uncompressed, contains 7 illicit images and again with 4 images having their file type changed to .exe so the image could not be viewed without changing the file type. The actions taken towards hiding the illicit material require above average computer literacy to complete and could not have been done accidently.

Despite attempts by the suspect to delete a number of illicit materials from the machine, all the affected files were able to be recovered by the investigators.

The suspect can also be seen to have created multiple illicit images using various cameras> By using the metadata found within these images we can see the camera model used and when they were created. One of the Cameras appears to show several people birdwatching.

The suspect has been in clear communication with others via email where the discussion and sharing of illicit materials has taken place.

Illicit material has been viewed and downloaded online on the suspects machine, this has occurred on numerus occasion as seen within the suspect download and internet history.

Beyond reasonable doubt the suspect in question has viewed, obtained and created various illicit material using their seized devices. There have been multiple attempts to hide this content as well as attempts to delete files containing the illicit materials. The suspect has also been found to be in communication with other individuals about images and other material relating to birds.

5. Appendices

5.1. Appendix A - Cameras

Canon EOS-1DS	
File name	Image
32065-BellbirdJumpingOffBranch.jpg	

Canon PowerShot SD100	
File name	Image
1179-ready2fledge.jpg	
2508-birdtrans2.jpg	
3229-chicks2.jpg	

3245-newbies2.jpg	
36287-f0415008.jpg	
36290-f0416072.jpg	
36327-f0438640.jpg	
36329-f0439400.jpg	

36336-f0441536.jpg	
36343-f0443520.jpg	
36371-f0464568.jpg	
36483-f0526960.jpg	
36604-f0592136.jpg	

36853-f0544152.jpg	
36857-f0545184.jpg	
f0345656.jpg	
f0360392.jpg	
f0382464.jpg	

Sony Cybershot	
File name	Image
32677-BC7 feeding the birds.jpg	

5.2. Appendix B - CrouchingKokako.dll

File name	Image
brd_WoodDuck.jpg	
Brolga.jpg	
BrushTurkeyPerching.jpg	

BrushTurkeyPerching.jpg	
CanadaGooseWashing.jpg	
ChestnutMandibledToucan.jpg	
CrouchingKokako.jpg	

5.3. Appendix C - Downloads.rdf

downloads.rdf <?xml version="1.0"?>
<RDF:RDF xmlns:NC="http://home.netscape.com/NC-rdf#"
xmlns:RDF="http://www.w3.org/1999/02/22-rdf-syntax-ns#">
<RDF:Description RDF:about="C:\Documents and Settings\johndoe\My Documents\birds.zip"
NC:Name="birds.zip"
NC:Transferred="1028kB of 1028kB">
<NC:URL RDF:resource="http://www.traveltex.com/downloads/screensavers/birds.zip"/>
<NC:File RDF:resource="C:\Documents and Settings\johndoe\My Documents\birds.zip"/>
<NC:DateStarted NC:parseType="Date">Wed Feb 09 11:28:00 GMT Standard Time 2005 +345172</NC:DateStarted>
<NC:DateEnded NC:parseType="Date">Wed Feb 09 11:28:00 GMT Standard Time 2005 +415273</NC:DateEnded>

```
    <NC:DownloadState NC:parseType="Integer">1</NC:DownloadState>
    <NC:ProgressPercent NC:parseType="Integer">100</NC:ProgressPercent>
  </RDF:Description>
  <RDF:Description RDF:about="C:\Documents and Settings\johndoe\My Documents\My
Pictures\babyscot_2weeks1.jpg"
                   NC:Name="babyscot_2weeks1.jpg"
                   NC:Transferred="33kB of 33kB">
    <NC:URL
RDF:resource="http://freespace.virgin.net/cobber.budgies/images/babyscot_2weeks1.jpg"/>
    <NC:File RDF:resource="C:\Documents and Settings\johndoe\My Documents\My
Pictures\babyscot_2weeks1.jpg"/>
    <NC:DateStarted NC:parseType="Date">Thu Feb 03 15:00:27 GMT Standard Time 2005
+761262</NC:DateStarted>
    <NC:DateEnded NC:parseType="Date">Thu Feb 03 15:00:27 GMT Standard Time 2005
+811334</NC:DateEnded>
    <NC:DownloadState NC:parseType="Integer">1</NC:DownloadState>
    <NC:ProgressPercent NC:parseType="Integer">100</NC:ProgressPercent>
  </RDF:Description>
  <RDF:Description RDF:about="C:\Documents and Settings\bob\My Documents\My
Music\ready2fledge.jpg"
                   NC:Name="ready2fledge.jpg"
                   NC:Transferred="77kB of 77kB">
    <NC:URL RDF:resource="http://people.cornell.edu/pages/sah67/ready2fledge.jpg"/>
    <NC:File RDF:resource="C:\Documents and Settings\bob\My Documents\My
Music\ready2fledge.jpg"/>
    <NC:DateStarted NC:parseType="Date">Thu Feb 03 15:06:42 GMT Standard Time 2005
+379937</NC:DateStarted>
    <NC:DateEnded NC:parseType="Date">Thu Feb 03 15:06:42 GMT Standard Time 2005
+440024</NC:DateEnded>
    <NC:DownloadState NC:parseType="Integer">1</NC:DownloadState>
    <NC:ProgressPercent NC:parseType="Integer">100</NC:ProgressPercent>
  </RDF:Description>
  <RDF:Seq RDF:about="NC:DownloadsRoot">
    <RDF:li RDF:resource="C:\Documents and Settings\johndoe\My Documents\birds.zip"/>
    <RDF:li RDF:resource="C:\Documents and Settings\bob\My Documents\My
Music\ready2fledge.jpg"/>
    <RDF:li RDF:resource="C:\Documents and Settings\johndoe\My
Documents\newbies2.jpg"/>
    <RDF:li RDF:resource="C:\Documents and Settings\johndoe\My Documents\My
Pictures\chicks2.jpg"/>
    <RDF:li RDF:resource="C:\Documents and Settings\johndoe\Desktop\birdtrans2.jpg"/>
    <RDF:li RDF:resource="C:\Documents and Settings\johndoe\My
Documents\ostbk2b2.htm"/>
    <RDF:li RDF:resource="C:\Documents and Settings\johndoe\My Documents\My
Pictures\177.jpg"/>
    <RDF:li RDF:resource="C:\Documents and Settings\johndoe\My Documents\My
Pictures\babyscot_2weeks1.jpg"/>
    <RDF:li RDF:resource="C:\Documents and Settings\johndoe\My Documents\My
Pictures\babyscot_vyoung.jpg"/>
    <RDF:li RDF:resource="E:\birds\audio\aggressive_song.wav"/>
```

<RDF:li RDF:resource="C:\Documents and Settings\johndoe\Desktop\AdbeRdr70_enu_full.exe"/>
<RDF:li RDF:resource="C:\DOCUME~1\JOHNDOE\LOCALS~1\TEMP\dawn.ram"/>
</RDF:Seq>
<RDF:Description RDF:about="C:\Documents and Settings\johndoe\Desktop\birdtrans2.jpg"
NC:Name="birdtrans2.jpg"
NC:Transferred="58kB of 58kB">
<NC:URL RDF:resource="http://people.cornell.edu/pages/sah67/birdtrans2.jpg"/>
<NC:File RDF:resource="C:\Documents and Settings\johndoe\Desktop\birdtrans2.jpg"/>
<NC:DateStarted NC:parseType="Date">Thu Feb 03 15:04:48 GMT Standard Time 2005 +235806</NC:DateStarted>
<NC:DateEnded NC:parseType="Date">Thu Feb 03 15:04:48 GMT Standard Time 2005 +285878</NC:DateEnded>
<NC:DownloadState NC:parseType="Integer">1</NC:DownloadState>
<NC:ProgressPercent NC:parseType="Integer">100</NC:ProgressPercent>
</RDF:Description>
<RDF:Description RDF:about="C:\Documents and Settings\johndoe\My Documents\My Pictures\177.jpg"
NC:Name="177.jpg"
NC:Transferred="9kB of 9kB">
<NC:URL RDF:resource="http://www.insaneanimals.com/items/177.jpg"/>
<NC:File RDF:resource="C:\Documents and Settings\johndoe\My Documents\My Pictures\177.jpg"/>
<NC:DateStarted NC:parseType="Date">Thu Feb 03 15:01:38 GMT Standard Time 2005 +983675</NC:DateStarted>
<NC:DateEnded NC:parseType="Date">Thu Feb 03 15:01:39 GMT Standard Time 2005 +033747</NC:DateEnded>
<NC:DownloadState NC:parseType="Integer">1</NC:DownloadState>
<NC:ProgressPercent NC:parseType="Integer">100</NC:ProgressPercent>
</RDF:Description>
<RDF:Description RDF:about="C:\DOCUME~1\JOHNDOE\LOCALS~1\TEMP\dawn.ram"
NC:Name="dawn.ram"
NC:Transferred="1kB of 1kB">
<NC:URL RDF:resource="http://www.pbs.org/lifeofbirds/songs/dawn.ram"/>
<NC:File RDF:resource="C:\DOCUME~1\JOHNDOE\LOCALS~1\TEMP\dawn.ram"/>
<NC:DateStarted NC:parseType="Date">Wed Feb 02 15:12:09 GMT Standard Time 2005 +573635</NC:DateStarted>
<NC:DateEnded NC:parseType="Date">Wed Feb 02 15:12:09 GMT Standard Time 2005 +593664</NC:DateEnded>
<NC:DownloadState NC:parseType="Integer">1</NC:DownloadState>
<NC:ProgressPercent NC:parseType="Integer">100</NC:ProgressPercent>
</RDF:Description>
<RDF:Description RDF:about="C:\Documents and Settings\johndoe\Desktop\AdbeRdr70_enu_full.exe"
NC:Name="AdbeRdr70_enu_full.exe"
NC:Transferred="20311kB of 20311kB">

<NC:URL
RDF:resource="http://ardownload.adobe.com/pub/adobe/reader/win/7x/7.0/enu/AdbeRdr70_enu_full.exe"/>
<NC:File RDF:resource="C:\Documents and Settings\johndoe\Desktop\AdbeRdr70_enu_full.exe"/>
<NC:DateStarted NC:parseType="Date">Wed Feb 02 16:53:20 GMT Standard Time 2005 +553275</NC:DateStarted>
<NC:DateEnded NC:parseType="Date">Wed Feb 02 16:54:42 GMT Standard Time 2005 +150606</NC:DateEnded>
<NC:DownloadState NC:parseType="Integer">1</NC:DownloadState>
<NC:ProgressPercent NC:parseType="Integer">100</NC:ProgressPercent>
</RDF:Description>
<RDF:Description RDF:about="C:\Documents and Settings\johndoe\My Documents\My Pictures\babyscot_vyoung.jpg"
NC:Name="babyscot_vyoung.jpg"
NC:Transferred="38kB of 38kB">
<NC:URL
RDF:resource="http://freespace.virgin.net/cobber.budgies/images/babyscot_vyoung.jpg"/>
<NC:File RDF:resource="C:\Documents and Settings\johndoe\My Documents\My Pictures\babyscot_vyoung.jpg"/>
<NC:DateStarted NC:parseType="Date">Thu Feb 03 15:00:19 GMT Standard Time 2005 +779785</NC:DateStarted>
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5.4. Appendix D - WebPage Download - ostbk2b2.htm

FACILITIES
CHICKS

Young chicks can be maintained in a variety of suitable facilities. A small portable pen, 12 feet long, 4 feet wide and 2 foot high can be adequate for a number of chicks. The pen is placed on short cut grass and moved daily. Chicks are brought out to the pen after the temperature reaches above 60 F and the sun is shining. Birds can be maintained in this type of facility until the temperature drops or until weather is prohibitive. Include some type of shade and wind break as young birds are sensitive to extreme sun and wind. Young birds should be brought indoors in the evening and maintained in a heated
environment until at least 2 to 3 months of age. Temperature in indoor shelters should be maintained at least 65 F and enough room to allow the birds to exercise should be provided.

In areas where weather is more severe, this period may need to be extended. Do not provide feed at night but available water is acceptable. Feed the young birds as outlined in CARE OF YOUNG BIRDS section, prior to turning them out in the morning.

JUVENILES

Juvenile birds between 3 and 10 months of age can be maintained in a similar, but larger facility as young birds. For convenience, access to the indoor facility should be available directly from the outdoor pens. However, shelter is not needed except in extremely cold areas. The amount of space per bird, for both indoor and outdoor facilities should be increased for this age bird as compared to that available for younger chicks. Outdoor pens can be of any type of substrate but ground cover such as grass, clover, or alfalfa is ideal. Grass should be kept at a closely mowed level, especially when grass begins to dry out or turn to seed, as impactions are more common at this time. Daily mowing may be necessary during some periods of the year.

ADULTS Pens and facilities for adults vary considerably. Most ranchers maintain adult pairs or trios in facilities that range from five thousand square feet to an acre or more. In general, the more room that can be provided, the better the situation. Common fences and line of sight access to neighboring pairs is often desirable but may not be practicable with overly aggressive males. Housing or shade is usually provided although not always utilized. If birds are accustomed to being fed and watered in a shed they will be more easily confined when necessary and may build the nest and lay indoors. Alley-ways for movement of birds from pen to pen, access for haling, and provisions for confinement for veterinary care should be considered at the time of construction. Although suprising, most ratites do not require indoor shelter once over 6 months of age and often refuse to use such structures, independent of weather.

Fencing is dependent on personal preference and economics. Chain link is good but may result in problems related to leg and foot injures and is not easily climbed if escape from the pen by egg gatherers is necessary. Tubular "cattle" type fence is suitable and offer some benefits and others types of woven wire fencing are routinely used. Many ranchers are now utilizing group pens consisting of several males and numerous females in larger acreage. This appears to provide some benefits and is more nearly similar to a natural situation. Early results indicate that increased fertility, more egg numbers, and extended laying periods can be expected in this type of set up. Several acres of enclosed pasture are needed for this type of operation. Difficulties with a group breeding situation include the inability to determine exactly the resultant chicks parentage. Ostrich Book

5.5. Appendix E - Birding_p_js.txt


```
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href="'+u+'">'+t+'</a></td></tr>')}function zIobj(a,h,s,c){var j=0,l=a.length,i=1;w('<table
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class="tl">'+a[0]+'</td></tr>');while(j++<h){zIod(a[i++],'http://clk.about.com/?zi='+c+'&zu
='+a[i++],s);j=(i==l)?h:j;}w('</table>')}
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Birds','http://birding.about.com/library/blalphatypeofbird.htm','Specs for Building Birdhouses
and for use in Bird House Plans','http://birding.about.com/library/blhousespecs.htm','FREE
Holiday Bird Clipart - Valentine\'s Day Index','http://birding.about.com/library/blclip-direct-
```

val.htm','Butterfly and Bee Free Clipart Index','http://birding.about.com/library/blclip-butterflies.htm','Free Bird Clipart Index - Eagles','http://birding.about.com/library/blclip-type-eagles.htm','Christines Free Bird Bee Butterfly Clipart','http://birding.about.com/library/blclip-direct.htm','Birding and Birdwatching - Build a Bluebird Nest Box for Wild Birds','http://birding.about.com/library/weekly/aa010703a.htm','Wild Bird Photography Library','http://birding.about.com/library/weekly/aa020100a.htm','Cooking FOR the Birds - Recipe Collection - Attracting Bird and Butterflies with a Garden Habitat - Butterfly and Bird Garden','http://birding.about.com/library/weekly/aa031300a.htm','Wild Bird Photography Library Arranged by Species','http://birding.about.com/library/blphotobird.htm');

5.6. Appendix F - Nestboxtips.txt

Tips for Nest Boxes this spring/summer

If you have old boxes in your garden, clean out any of last years nesting material or any old bits of food that may have been stored in there.

If you are putting up new nest boxes make sure that they are out of the reach of cats and Squirrels.

Check that the box isn't in full sun otherwise young birds may literally bake in the heat.

Experiment with different kinds of bird boxes – the open-fronted "Robin" boxes may even attract Spotted Flycatchers.

Make sure any boxes are at least 15mm in thickness.

Face boxes away from prevailing winds.

Don't put nest boxes to close together in a small area as this will only lead to territorial fights.

Always make sure that there is enough food and fresh water made available close by.

Do not but bird boxes with perches attached – the birds do not need them and it may only invite predators.

Never buy a bird table with a nest box built in, as nesting birds will only come into conflict with feeding ones.

5.7. Appendix G - Emails

Email data	Email text	Attached files
-----HEADERS----- X-Account-Key: account2 X-UIDL: mI9vNXPVmE7PpsleLfhS X-Mozilla-Status: 0001 X-Mozilla-Status2: 00000000	A young woman was walking past a pet shop and saw an exotic, white cockatoo for	

Message-Id: <FcJJpiktBLDJDt7QctR1@fakepop.invalid> Date: Wed, 09 Feb 2005 11:08:01 +0000 X-UIDL: mI9vNXPVmE7PpsleLfhS X-fakepop-version: 7 X-fakepop-build: Dec 4 2004 17:08:02 X-fakepop-url: http://vztech.com.br/software/fakepop/ X-Message-Flag: message delivered by fakepop - http://vztech.com.br/software/fakepop/ Envelope-to: jdoe@example.com Delivery-date: Wed, 17 Nov 2004 19:51:39 +0100 Received: from example.org ([192.168.231.26] helo=example.org) by mail.example.com with esmtp (Exim 4.34) id 1CIWEs-0005v3-7o for jdoe@example.com; Fri, 15 Oct 2004 18:51:39 +0100 Received: (qmail 23682 invoked from network); 15 Oct 2004 07:08:32 -0000 Date: Wed, 17 Nov 2004 19:20:15 +0200 From: Ben Forbes <ben@example.org> To: jdoe@example.com Subject: expensive birds ---END HEADERS--	sale. The price was $6000. She entered the store and asked the clerk why the bird was so expensive. The clerk told her that the bird spoke 6 different languages. "Does it speak English?" asked the woman. "Of course it does!" said the clerk. The woman thought about her mother who was multi-lingual, a bit of a recluse and lived all alone. She decided to purchase the bird and send it to her mother as a companion. She paid for the bird and made arrangements for it to be delivered. The following day, the woman telephoned her mother. "Mama, did	

	you like the cockatoo that I sent you?" "Oh it was delicious!" she replied." "Mama, what do you mean delicious?" "I made soup out of it." "But mama, that bird spoke six different languages!" "Oh dear! Why didn't it say something?"	
From: Ben Forbes <ben@example.org> To: jdoe@example.com Subject: Good Pics 11:08:01GMT 2005-02-09 -----HEADERS----- Content-Type: text/plain; charset="utf-8" Content-Transfer-Encoding: 7bit Content-Disposition: inline ---END HEADERS--	Hi thought you'd like these enjoy	 32563-7EYBTELF1KAN.jpg 32565-IMG_3937_filtered

		 32568-cute_penguin.jpg
From: Ben Forbes <ben@example.org> To: jdoe@example.com Subject: Some more good ones 11:08:01GMT 2005-02-09 -----HEADERS----- Content-Type: text/plain; charset="utf-8" Content-Transfer-Encoding: 7bit Content-Disposition: inline ---END HEADERS--		 *Nesting red-winged blackbird/* *Carouge à épaulettes en cours de nidification* *Mike Hopiak / Cornell Lab of Ornithology* 32578-glfs-storm-birds.jpg 32584-gawall8.jpg

		32576-BC7 feeding the birds.jpg 32580-colorful-birds.jpg 32565-IMG_3937_filtered.jpg
-----HEADERS----- X-Account-Key: account2 X-UIDL: vmyLTMZm6jBNjghPvFqQ X-Mozilla-Status: 0001 X-Mozilla-Status2: 00000000 Message-Id: <WnifxlWJ4fCUPH80kr3g@fakepop.invalid> Date: Wed, 09 Feb 2005 11:08:01 +0000 X-UIDL: vmyLTMZm6jBNjghPvFqQ X-fakepop-version: 7 X-fakepop-build: Dec 4 2004 17:08:02 X-fakepop-url: http://vztech.com.br/software/fakepop/ X-Message-Flag: message delivered by fakepop - http://vztech.com.br/software/fakepop/ Envelope-to: jdoe@example.com Delivery-date: Sat, 16 Oct 2004 18:51:39 +0100 Received: from outgoing.birds.com ([192.168.231.26] helo=outgoing2.birds.example.com) by mail.example.com with esmtp (Exim 4.34) id 1CIWEs-0005v3-7o for jdoe@example.com; Sat, 16 Oct 2004 18:51:39 +0100	How to Identify Birds Are you amazed at how quickly birders can identify birds? Actually, it's just like getting to know your human neighbors. When you move into a new neighborhood everyone is a stranger, but soon you learn to tell people apart as you unconsciously catalog their	

Received: (qmail 23682 invoked from network); 16 Oct 2004 07:08:32 -0000 Date: Sat, 16 Oct 2004 15:20:15 +0200 From: Bird Fanciers <mailinglist@birds.example.com> To: jdoe@example.com Subject: How to Identify Birds ---END HEADERS--	characteristics. Their habits, shape, styles of walking, and "habitats" become familiar enough that you can recognize each neighbor immediately, even at a distance. Paying attention to individual differences can help you identify birds, too. You can recognize many birds simply by noting their shapes, even if seen only in silhouette. Other useful characteristics are a bird's posture, size (easiest to judge if you use familiar birds as a size reference), flight pattern and/or head-on flight profile, and the kind of habitat in which the bird was seen.	

	Start by learning to identify general groups of birds- warblers, flycatchers, hawks, owls, wrens- whose members all share certain similarities. As your observation skills improve, familiarize yourself with the field marks- colored or patterned areas on the bird's body, head, and wings- that help distinguish species.	

5.8. Appendix H - John Doe user picture

File name	Image
Johndoe.bmp	

5.9. Appendix I - John Doe's Wallpaper

File name	Image
Firefox Wallpaper.bmp	

5.10. Appendix J - Gpg files

File Name	Image
WhiteFacedHeronFlying.jpg	
WhiteFrontedParrot.jpg	
WhiteThroatedSparrowInTree.jpg	

WhoopingCranes.jpg	
yellow-wag-cover-nb.jpg	

5.11. Appendix K - Partition 3 carved files

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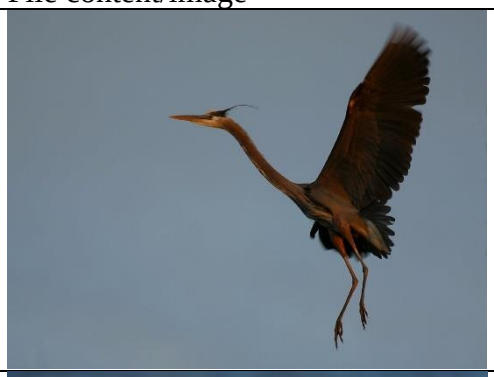
37100-f0000536.jpg	
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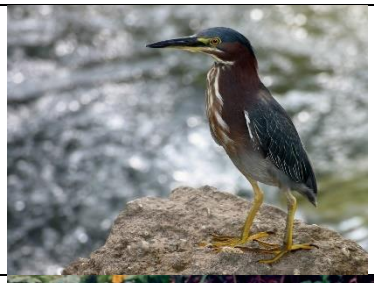
37115-f0007896.jpg	
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f0005504.doc	An Insider's Guide to Enjoying Your First Birding Field Trip by Pete Dunne

	Field trips are a lot like going to a dance, and there are two schools of thought. You can just waltz onto the dance floor and let the other person lead or you can learn a few basic dance steps beforehand. Here, for those who want to get a jump on etiquette, are some of the basic rules of the birding field trip. Learn them, and you'll spend more time birding and less time tripping over your feet. • Rule 1 - Never miss an opportunity to use a restroom. Your capacity for birding may be limitless but your bladder is not. Some leaders are generous with their planned rest stops; some are miserly. Whenever the group arrives at a planned rest stop, take full advantage {and mind your coffee consumption between stops). • Rule 2 - Familiarize yourself with whatever pre-trip information is sent. Most organized field trips come with instructions. In the pre-trip material, you will almost certainly find the answers to your most pressing questions: dress, equipment needs, time commitment, lunch plans. Being prepared is the first step toward having a great time. Re: Clothing. Rule of thumb: In winter, if in doubt, just bring it. In hot weather, cover up for sun protection-this means hat, long-sleeved cotton shirt, long pants. At any time of year, avoid bright colors, particularly white. In the universal language of wild creatures, white means "Danger! Watch Out! Hide ! It's not the message you want to send. • Rule 3 - Don't be late. When you join a group, you sacrifice a measure of self-determination. One of the quickest ways to annoy the group leader and everyone else, is to arrive late and delay the group's departure. • Rule 4 - Don't wander off.

	The second quickest way to annoy the group leader is to wander off. You don't want to be left behind and you don't want to be the focus of an unnecessary search. If you plan to leave the group, for a short time or for the balance of the day, be certain you inform the leader. It is in your interest to stay close to the leader and the more experienced members of the group so that you can rely on their knowledge and bird-finding skills. Staying close applies to car caravanning, too. The rule of thumb is one car length back for every ten miles per hour of velocity. Thirty miles per hour; three car lengths behind the bumper ahead of you. Sixty miles per hour; six lengths. Don't trust yourself to keep the pace? Don't drive. Car-pool with someone else. • Rule 5 - Come prepared. If the trip involves driving, make sure you have enough fuel to see you through. If the instructions state "bring lunch," don't assume that you'll be able to stop at a convenience store to pick up a sandwich. Do that, and you'll likely be eating alone. • Rule 6 - Check out your equipment before the trip. The single greatest frustration first-time trip goers face in not inexperience, but rather the lousy or malfunctioning equipment - usually optics. If your binoculars aren't working, ask whether a loaner is available. It you don't own binoculars, do not rush out to the nearest discount store and buy some for the trip. People who do this usually end up with instruments they soon replace. Borrow binoculars for the trip. Use your field trip experience to see what instruments experienced birders are using in order to make an educated purchase later. • Rule 7 - Speak Softly.

	Human voices put wildlife on alert. Talking may also prevent a leader from hearing songs or calls and keep you from hearing instructions. Field trips are social and conversation is part of the field trip experience. If you want to converse, do so in whispers or stand away from the group. • Rule 8 - Keep motion to a minimum. More than sound, birds react to motion. In close proximity to birds, don't move quickly and above all do not advance until the leader gives the word. Want to draw the ire of a group? Walk toward "the bird of the day" and scare it away. • Rule 9 - Don't monopolize the leader. Sure you have questions. Sure you want to get to know the leader, and you want them to come to recognize your wonderful qualities, too. One of those qualities should be deference, because everyone in the group shares your ambition. Deference extends to use of the spotting scopes, too. When the leader trains his scope on an interesting bird, and you were first to get a glimpse last time, defer to others the next several times. No matter what your place in line, first looks through a scope are quick looks. After you get an identifying glimpse, step quickly aside for the next person. If the bird is moving, reposition the scope so the next user won't have to pan back and forth. After everyone has had their glimpse, more leisurely viewing is possible. • Rule 10 - Do ask questions. Leaders want to share their knowledge, and questions are the catalyst that unlocks it. Don't be intimidated by what you don't know or what you presume that others know. Chances are your question is shared by others in the group. You may not be the leader, but if you trigger the answer to a question that some other member of the group was too shy to utter, you'll be their hero. That's it. All you need to know to get the most out of your first field trip experience. If it seems like too much

	to remember, just remember Rule #1. At any other time, there will be someone else around to ask for assistance. This guide has been reproduced with the permission of Pete Dunne. Minor editing by Ron Bourque. ----------METADATA---------- Application-Name: Microsoft Word 9.0 Author: Paul Teddy Character Count: 4545 Comments: Company: Dreamagine Content-Type: application/msword Creation-Date: 2002-09-15T20:09:00Z Edit-Time: 1200000000 Keywords: Last-Author: Paul Teddy Last-Modified: 2002-09-15T20:17:00Z Last-Save-Date: 2002-09-15T20:17:00Z Page-Count: 1 Revision-Number: 3 Template: Normal Word-Count: 797 X-Parsed-By: org.apache.tika.parser.DefaultParser X-TIKA:origResourceName: C:\WINDOWS\Desktop\paul teddy\web sites\nycas\enjoytrip\printerfriendly\guide.doc comment: cp:revision: 3 cp:subject: creator: Paul Teddy date: 2002-09-15T20:17:00Z dc:creator: Paul Teddy dc:subject: dc:title: An Insiders Guide to Enjoying Your First Birding Field Trip dcterms:created: 2002-09-15T20:09:00Z dcterms:modified: 2002-09-15T20:17:00Z extended-properties:Application: Microsoft Word 9.0 extended-properties:Company: Dreamagine extended-properties:Template: Normal meta:author: Paul Teddy

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5.12. Appendix L - Program files folder

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5274-frankbeecostume_1827_84985892	

5276-frankbeecostume_1827_96360352	

5.13. Appendix M - John Doe's My Pictures Folder

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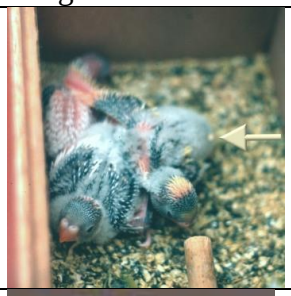
3225-babyscot_2weeks1.jpg	
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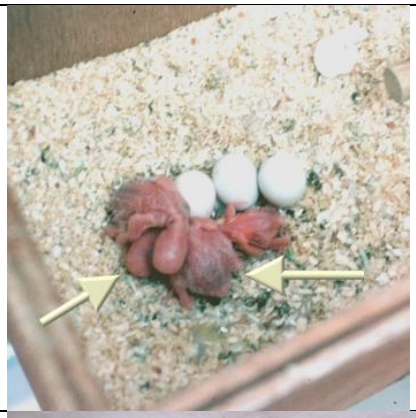
3239-tn_duck_3.jpg	
3234-snow_geese.jpg	

3227-babyscot_vyoung.jpg	
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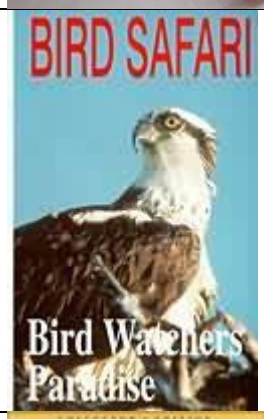
3223-7107298.jpg	
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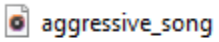
5.14. Appendix N - Audio files



5.15. Appendix O - John Doe web history

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Visited: johndoe@file:///C:/Documents%20and%20Settings/johndoe/Desktop/birdtrans2.jpg	02/03/2005 15:04:48	02/03/2005 15:04:48
Visited: johndoe@file:///C:/birdwatching.doc	02/03/2005 15:49:39	02/03/2005 15:49:39
Visited: johndoe@http://www.mozilla.org/products	01/24/2005 16:23:15	01/24/2005 16:23:15
Visited: johndoe@http://v5.windowsupdate.microsoft.com/v5consumer/default.aspx	01/24/2005 16:40:02	01/24/2005 16:40:02
Visited: johndoe@file:///C:/Program%20Files/Real/RealPlayer/Firstrun/context.htm	02/02/2005 15:04:48	02/02/2005 15:04:48
Visited: johndoe@http://download.mozilla.org/?product=firefox&os=win&lang=en-GB	01/24/2005 16:21:43	01/24/2005 16:21:43
Visited: johndoe@file:///C:/Documents%20and%20Settings/johndoe/My%20Documents/aa010703a.htm	02/02/2005 14:25:59	02/02/2005 14:25:59
Visited: johndoe@http://office.microsoft.com/en-gb/officeupdate/default.aspx	01/25/2005 11:16:45	01/25/2005 11:16:45
Visited: johndoe@file:///C:/Documents%20and%20Settings/johndoe/My%20Documents/My%20Pictures/babyscot_vyoung.jpg	02/03/2005 15:00:19	02/03/2005 15:00:19
Visited: johndoe@file:///E:/birds/Killdeer.jpg	02/03/2005 14:49:29	02/03/2005 14:49:29
Visited: johndoe@file:///C:/Documents%20and%20Settings/johndoe/My%20Documents/My%20Pictures/177.jpg	02/03/2005 15:01:38	02/03/2005 15:01:38
Visited: johndoe@file:///C:/Program%20Files/Real/RealPlayer/Firstrun/1.htm	02/02/2005 15:04:47	02/02/2005 15:04:47
Visited: johndoe@file:///C:/Documents%20and%20Settings/johndoe/My%20Documents/ostbk2b2.htm	02/03/2005 15:02:45	02/03/2005 15:02:45
Visited: johndoe@file:///D:/Prac5/Q3%20Thread%20(Statechart).gif	02/02/2005 15:10:48	02/02/2005 15:10:48
Visited: johndoe@res://C:\Program%20Files\Real\RealPlayer\rpplugins\rpmn3260.dll/black.html	02/02/2005 15:04:43	02/02/2005 15:04:43
Visited: johndoe@javascript:parent.fnScan()		01/24/2005 16:40:26
Visited: johndoe@file:///C:/Documents%20and%20Settings/johndoe/My%20Documents/My%20Pictures/snow_geese.jpg	02/02/2005 14:18:53	02/02/2005 14:18:53
Visited: johndoe@file:///C:/Documents%20and%20Settings/johndoe/Application%20Data/Mozilla/Firefox/Profiles/w4nf3obl.default/bookmarks.html	02/03/2005 12:20:20	02/03/2005 12:20:20
Visited: johndoe@res://C:\WINDOWS\system32\shdoclc.dll/dnserror.htm	01/24/2005 16:13:02	01/24/2005 16:13:02
Visited: johndoe@http://v5.windowsupdate.microsoft.com/v5consumer/resultslist.aspx?ln=en-us&id=0	01/24/2005 16:40:43	01/24/2005 16:40:43
Visited: johndoe@file:///E:/birds/non%20images/BirdingGuide.pdf	02/03/2005 15:52:01	02/03/2005 15:52:01
Visited: johndoe@file:///C:/Documents%20and%20Settings/johndoe/My%20Documents/newbies2.jpg	02/03/2005 15:05:44	02/03/2005 15:05:44
Visited: johndoe@http://office.microsoft.com/en-gb/FX010354621033.aspx	01/25/2005 11:33:46	01/25/2005 11:33:46
Visited: johndoe@javascript:catchEvent('continue')		02/02/2005 15:04:34
Visited: johndoe@http://v5.windowsupdate.microsoft.com/v5consumer/resultslist.aspx?ln=en-us&id=6	01/24/2005 16:16:10	01/24/2005 16:16:10
Visited: johndoe@http://www.mozilla.org/products/thunderbird	01/24/2005 16:23:25	01/24/2005 16:23:25
Visited: johndoe@http://office.microsoft.com/search/redir.aspx?AssetID=ES790020331033&Origin=HH010704921033&CTT=5	01/25/2005 11:16:47	01/25/2005 11:16:47
Visited: johndoe@file:///D:/Prac4/Prac4.gif	02/02/2005 15:10:16	02/02/2005 15:10:16
Visited: johndoe@file:///C:/Documents%20and%20Settings/johndoe/My%20Documents/My%20Pictures/7107298.jpg	02/02/2005 14:20:33	02/02/2005 14:20:33
Visited: johndoe@file:///C:/Documents%20and%20Settings/johndoe/My%20Documents/My%20Pictures/wbpremium_s.jpg	02/02/2005 14:28:19	02/02/2005 14:28:19
Visited: johndoe@file:///C:/Documents%20and%20Settings/johndoe/My%20Documents/birds.zip	02/09/2005 11:28:00	02/09/2005 11:28:00
Visited: johndoe@http://office.microsoft.com/en-gb/FX010329501033.aspx	01/25/2005 11:16:56	01/25/2005 11:16:56
Visited: johndoe@http://office.microsoft.com/search/redir.aspx?AssetID=ES790020331033&CTT=5&Origin=HA010492041033	01/25/2005 11:26:00	01/25/2005 11:26:00
Visited: johndoe@javascript:parent.fnExpressScan()		01/24/2005 16:15:54
Visited: johndoe@http://www.mozilla.org/products/firefox	01/24/2005 16:21:42	01/24/2005 16:21:42
Visited: johndoe@file:///C:/Documents%20and%20Settings/bob/My%20Documents/My%20Music/ready2fledge.jpg	02/03/2005 15:06:42	02/03/2005 15:06:42
Visited: johndoe@file:///C:/Documents%20and%20Settings/johndoe/My%20Documents/stuf.doc	02/09/2005 16:57:49	02/09/2005 16:57:49
Visited: johndoe@file:///C:/Documents%20and%20Settings/johndoe/My%20Documents/My%20Pictures/tn_duck_3.jpg	02/02/2005 14:18:13	02/02/2005 14:18:13
Visited: johndoe@http://64.12.168.243/pub/mozilla.org/thunderbird/releases/1.0/win32/en-US/Thunderbird%20Setup%201.0.exe	01/24/2005 16:24:56	01/24/2005 16:24:56
Visited: johndoe@http://v5.windowsupdate.microsoft.com/v5consumer/resultslist.aspx?ln=en-us&id=1&LinkId=SOFTWARE&TocIndex=	01/24/2005 16:41:10	01/24/2005 16:41:10
Visited: johndoe@http://office.microsoft.com/en-gb/FX010355751033.aspx	01/25/2005 11:25:56	01/25/2005 11:25:56
Visited: johndoe@file:///C:/Program%20Files/Real/RealPlayer/DataCache/Login/index.html	02/02/2005 14:57:13	02/02/2005 14:57:13
Visited: johndoe@file:///E:/birds/audio/aggressive_song.wav	02/03/2005 12:22:51	02/03/2005 12:22:51
Visited: johndoe@file:///F:/AlmondMarshGreatBlueHeronStalling.jpg	02/09/2005 17:06:28	02/09/2005 17:06:28
Visited: johndoe@about:blank	01/25/2005 11:16:36	01/25/2005 11:16:36
Visited: johndoe@file:///C:/WINDOWS/ODBC.INI	02/03/2005 15:54:06	02/03/2005 15:54:06
Visited: johndoe@file:///C:/Program%20Files/MSN/aggressive_song.wav	02/09/2005 17:00:50	02/09/2005 17:00:50
Visited: johndoe@file:///C:/WINDOWS/system32/oobe/actshell.htm	01/24/2005 16:13:56	01/24/2005 16:13:56
Visited: johndoe@https://account.real.com/acct/intro/msg.html?msg=frweur	02/02/2005 15:04:34	02/02/2005 15:04:34
Visited: johndoe@file:///C:/EvanstonWoodpecker.jpg	02/03/2005 14:14:59	02/03/2005 14:14:59
Visited: johndoe@file:///E:/birds/non%20images/BookList.doc	02/03/2005 15:51:54	02/03/2005 15:51:54
Visited: johndoe@file:///C:/Documents%20and%20Settings/johndoe/My%20Documents/nestboxtips.txt	02/02/2005 14:29:30	02/02/2005 14:29:30
Visited: johndoe@http://v5.windowsupdate.microsoft.com/v5consumer/default.aspx?ln=en-us	01/24/2005 16:40:12	01/24/2005 16:40:12
Visited: johndoe@http://download.mozilla.org/?product=thunderbird&os=win&lang=en-US	01/24/2005 16:23:26	01/24/2005 16:23:26
Visited: johndoe@http://www.real.com/intro/index_upsell_manager.html?DC=NSP01D&optin=true&country=gb&language=en-gb&icon=tiscali&LI=en&PBR=10485	02/02/2005 15:04:28	02/02/2005 15:04:28
Visited: johndoe@file:///C:/Documents%20and%20Settings/johndoe/My%20Documents/My%20Pictures/babyscot_2weeks1.jpg	02/03/2005 15:00:27	02/03/2005 15:00:27
Visited: johndoe@file:///C:/Documents%20and%20Settings/johndoe/My%20Documents/kakapo.ram	02/02/2005 15:11:51	02/02/2005 15:11:51
Visited: johndoe@file:///C:/Documents%20and%20Settings/johndoe/Application%20Data/Mozilla/Firefox/Profiles/w4nf3obl.default/cookies.txt	02/03/2005 12:19:07	02/03/2005 12:19:07
Visited: johndoe@file:///C:/Documents%20and%20Settings/johndoe/My%20Documents/My%20Pictures/chicks2.jpg	02/03/2005 15:05:03	02/03/2005 15:05:03
Visited: johndoe@file:///C:/Documents%20and%20Settings/johndoe/My%20Documents/My%20Pictures/40m.jpg	02/02/2005 14:43:36	02/02/2005 14:43:36
Visited: johndoe@file:///C:/Program%20Files/Adobe/Acrobat%207.0/Reader/Legal/Adobe%20Reader/7.0.0/en_US/license.html	02/02/2005 17:03:40	02/02/2005 17:03:40
Visited: johndoe@http://windowsupdate.microsoft.com	01/24/2005 16:39:59	01/24/2005 16:39:59
Visited: johndoe@http://www.linorg.usp.br/mozilla//firefox/releases/1.0/win32/en-GB/Firefox%20Setup%201.0.exe	01/24/2005 16:20:34	01/24/2005 16:20:34
Visited: johndoe@http://mozilla.mirrors.tds.net/pub/mozilla.org/firefox/releases/1.0/win32/en-GB/Firefox%20Setup%201.0.exe	01/24/2005 16:22:25	01/24/2005 16:22:25
Visited: johndoe@file:///C:/Documents%20and%20Settings/All%20Users/Documents/My%20Music/Sample%20Music/Doc1.doc	02/03/2005 14:17:48	02/03/2005 14:17:48

5.16. Appendix P - John Doe Bookmarks

<!DOCTYPE NETSCAPE-Bookmark-file-1>
<!-- This is an automatically generated file.
    It will be read
and overwritten.
DO NOT EDIT! -
->
<META HTTP-EQUIV="Content-Type" CONTENT="text/html; charset=UTF-8">
<TITLE>Bookmarks</TITLE>
<H1 LAST_MODIFIED="1107439776">Bookmarks</H1>

<DL><p>

<DT><H3 PERSONAL_TOOLBAR_FOLDER="true" ID="rdf:#$FvPhC3">Bookmarks Toolbar Folder</H3>
<DD>Add bookmarks to this folder to see them displayed on the Bookmarks Toolbar
<DL><p>
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BBgAMJ5THwGvJLAAAAABJRU5ErkJggg==" LAST_CHARSET="ISO-8859-1" ID="rdf:#$GvPhC3">Getting Started</A>
<DT><A HREF="http://fxfeeds.mozillazine.org/" LAST_MODIFIED="1107966483" FEEDURL="http://fxfeeds.mozillazine.org/rss20.xml" ID="rdf:#$HvPhC3">Latest Headlines</A>
</DL><p>
<HR>
<DT><H3 ID="rdf:#$6wPhC3">Quick Searches</H3>
<DD>Handy searches that can be performed in the addressbar
<DL><p>
<DT><A HREF="http://www.google.co.uk/search?q=%s" SHORTCUTURL="google" ICON="
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/8/wD9/P8A+vz/
AP/7/wD/+v8A/vr/APz6/wD4+v8A+/n/APP5/wD/+P8A+vj/AO/4/wDm+P8A2fj/AP/3/wD/9v
8A9vb/AP/1/wD
69f8A9PT/AO30/wD/8/8A//L/APnx/wD28P8A///+APj//gD2/P//gA4P/+AOP//gD/f4A6f/9AP///
AD2//wA8//8APf
9/AD///sA/v/7AOD/+wD/vsA9/X7APr/+gDv/voA///5AP/9+QD/+/kA+e35AP//+ADm//gA4f
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AAAAAAAAAA
AAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAA="
LAST_CHARSET="UTF-8"
ID="rdf:#$7wPhC3">Google Quicksearch</A>
<DD>Type "google <search terms>" in the location bar to perform a Google search
<DT><A HREF="http://dictionary.reference.com/search?q=%s"
SHORTCUTURL="dict" ID="rdf:#$8wPhC3">Dictionary.com Quicksearch</A>
<DD>Type "dict <word>" in the location bar to perform a dictionary look-up
<DT><A HREF="http://www.google.co.uk/search?q=%s" SHORTCUTURL="quote"
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<DD>Type "quote <symbol>" in the location bar to perform a stock symbol look-up
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SHORTCUTURL="wp" ID="rdf:#$awPhC3">Wikipedia Quicksearch</A>
<DD>Type "wp <something>" in the location bar to look up something in Wikipedia, a free online encyclopedia.
<DT><A HREF="http://www.urbandictionary.com/define.php?term=%s"
SHORTCUTURL="slang" ID="rdf:#$bwPhC3">Urban Dictionary</A>
<DD>Type "slang <word>" in the location bar to look up something in the people's slang dictionary
</DL><p>
<DT><H3 ID="rdf:#$ZvPhC3">Firefox and Mozilla Links</H3>
<DL><p>
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GCCAGCnNzgA
BBgAMJ5THwGvJLAAAAABJRU5ErkJggg==" LAST_CHARSET="ISO-8859-1"
ID="rdf:#$.vPhC3">Firefox Start Page</A>
<DT><A HREF="http://www.mozilla.org/products/firefox/central.html"
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5.17. Appendix Q - FantailFrontView.jpg

5.18. Appendix R - User Bob MyMusic

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5.19. Appendix S - Birdwatching.doc

BIRDWATCHING IN THAILAND
Feathered Magic from Mangroves to Mountaintops by Antony Lynam
One of the great attractions for nature tourists visiting Thailand is the diversity of environments extending across mountain peaks, lowland rainforests, mangroves, coral reefs, farmland and urban jungles. Within a day, or even a few hours travel, one can easily make the transition between these places and witness natural marvels large and small.
For wildlife enthusiasts no group maintains interest and pleasure more than birds. While special efforts are required to see in the wild charismatic species such as elephants and primates, birds are found across the entire spectrum of environments from pristine to severely degraded areas.
Part of the attraction for birds lies in their diversity. Nine hundred and seventy eight bird species have been recorded in Thailand, approximately 10% of the

world's total. At the Isthmus of Kra between latitudes 11° and 13°N, a major biogeographic transition between Indochinese and Sundaic forests produces a special diversity of birds with a total of 152 species of birds reaching the northern or southern range limits of their geographic ranges.
Two-thirds of Thai birds are residents, the remainder are seasonal visitors. Locations where migrants congregate, often in large numbers, are highly accessible making Thailand a special destination for birdwatchers.
Many birds are susceptible to human disturbance because they have small geographic ranges, a result of specific habitat requirements. For example, Deignan's babbler - a non-descript forest bird is found on Doi Chiang Dao and nowhere else in the world. Gurney's pitta are only found in lowland rainforests. Fewer than 30 birds remain in the last known population in Thailand at Khao Nor Chuchi, Krabi. Efforts by local and international conservation agencies strive to increase protection efforts and reafforest areas encroached by rubber farmers, though time is running out. With approximately 20% of the birds found in Thailand being globally or regionally endangered species, this makes the country a birdwatching haven for bird enthusiasts.
IDENTIFYING BIRDS
Birds are distinguished first by their size and shape. They range from diminutive flowerpeckers, sunbirds and white-eyes, about the size of your index finger, to lanky storks and egrets that stand almost a metre tall, and Green peafowl with its spectacular 2m tail. The form of the beak offers vital clues about the bird's diet. For example a thin curved tube for sipping nectar or a sharp hook for tearing flesh. The pattern and colour of plumage can tell apart the sexes as in pheasants where males are bright and striking, and females are drab and dowdy. By far the most useful character for identification is a bird's voice. This is especially true in forests where on average 90% of birds are hidden from view. The most experienced birdwatchers in the tropics know their songs and calls.
BEST TIMES TO SEE BIRDS
The nesting season is a good time to be watching birds. During this most active time in a bird's life a variety of vocalizations and behaviours are exhibited. In Thailand, as in other tropical countries, the nesting season coincides with the period when food is in abundant supply. A bird expends much energy in courting, mating, incubating eggs, defending a nest and feeding offspring. Most birds nest during the transition between dry and wet seasons when new leaves and grass

shoots sprout. This occurs from February to June. Certain birds depend on the availability of water and nest throughout the rainy season.
Migrants are best observed during their passage into or out of the country, or as they pass through on their way to other places. Most conspicuously, half a million ducks spend their winter in Thailand, feeding and resting in watery roosts from Chiang Saen to Thale Noi. Thousands of garganey and Lesser treeduck flock during January and February.
Shorebirds like sandpipers, stints and plovers migrate long-distances between nesting grounds in Eurasia and tropical Asia and wintering grounds in Australasia. They stop to feed in Thailand's mudflats and mangroves during September to May where they stock up on invertebrates and crustaceans. During October, the southward migration of hawks over peninsular Thailand is an avian spectacle. Chinese goshawks, Japanese sparrowhawks, crested honey buzzards, black bazas, and others are seen coasting on thermals in their thousands daily. Less

conspicuous is the blue-winged pitta, a ground dwelling bird that arrives with the rains to nest in deciduous and bamboo forests, and escapes the hot season for the wetter forests of Malaysia and Sumatra.

WHERE TO FIND BIRDS

Given that many birds are denizens of certain times, places, habitats or seasons, the amateur naturalist can remember them by association.

PARKS, TEMPLES AND GARDENS

Some species like barn swallows, magpie robins, mynas and starlings can be found around Bangkok and environs. Lumphini Park, a heavily-used green area in the city centre supports a variety of birds with over 90 species having been recorded there. Temples near Bangkok and Ayutthaya preserve pockets of the natural landscape including birds such as black kites, parakeets and woodland birds that are characteristic of the habitats.

RICE PADDIES, MARSHES AND PONDS

Rice paddies, marshes and ponds away from built-up areas support breeding populations of Asian openbill stork and many other waterbirds.

Key sites: Suphan Buri-Ayutthaya and Beung Boraphet.

PEAT SWAMP FORESTS

Almost the last vestige of Thailand's peat swamp forest at Phru To Daeng or Chalerm Phrakiat Wildlife Sanctuary in Narathiwat supports Lesser adjutants, a kind of stork, along with several birds characteristic of Sundaic forests.

LAKES, RIVER SANDBANKS AND REEDBEDS

Lakes, river sandbanks and reedbeds preserve unique assemblages of wintering waterfowl and perching birds.

Key sites: Chiang Saen, Fang Hot Springs, and Thaton.

AGRICULTURAL LANDSCAPES

Agricultural landscapes across the country support species that tolerate human presence and include kites, rollers, bee-eaters, coucals, weavers and bulbuls.

SANDY BEACHES, MANGROVE AND TIDAL FLATS

Sandy beaches are attractive to tourists but are barren habitats for birds, while little-visited mangroves and tidal flats that are rich in nutrients and microorganisms, are favoured feeding haunts for migrant waders. Some birds like

the Brown-winged kingfisher and Mangrove pitta, are entirely restricted to mangroves while Mangrove whistlers and flyeaters rarely leave the area.

Key sites: Samut Sakhon, Ban Laem in Petchburi, and Krabi.

OFFSHORE ISLANDS

Offshore islands such as Phi Phi, Libong, Surin and the Similans support fewer species than similar sized mainland habitats but some such as Nicobar and Pied Imperial pigeon are entirely restricted to these refuges.

SEASCAPES

While there are fewer seabirds in the warm Thai waters compared with those in the northern and southern hemispheres, frigate birds, skuas, boobies, and terns are among the rewards for marine birders.

FORESTS

Most resident Thai birds depend upon forests for their survival. Rainforests in the extreme south support the greatest avian diversity, while seasonally dry dipterocarp, mixed deciduous and evergreen forests in the centre and north.

Key sites: Khao Yai National Park, Kaeng Krachan National Park, Khao Soi Dao, Nam Nao National Park, Khao Nor Chuchi, Ban Nai Chong, and Hala Bala Wildlife

Sanctuary.
MOUNTAINS
Sibias, minlas, and laughing thrushes are relatives of species found in the Himalayas and southern China, and can only be found in mountain forests. Following surveys of high mountain peaks in the last decade, at least 20 new species or 2% of the total have been added to the lists for Thailand.
Key sites: Doi Pha Hom Pok, Doi Chiang Dao, Doi Inthanon, Doi Ang Khang, and Doi Suthep.
By visiting these enchanting destinations, travellers can appreciate the avian wonders that Thailand offers and better understand the importance of the wild and not so wild areas that preserve them.
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69/12 Soi Ramindra 24, Joorakaebau, Ladprao, Bangkok 10230, Thailand
Email: bcst@box1.a-net.net.th
Tel: 66-(0)-2943-5965
Web sites:
www.bcst.org/index_ebird.html
www.thai.net/bcst
* The Bird Conservation Society of Thailand (BCST) is a BirdLife Partner
Oriental Bird Club (OBC)
c/o Uthai Treesucon, 723/1 Mu 2 Soi Ram Intra, Joorakhaebua, Bangkok 10230.
E-mail:
utree@loxinfo.co.th
mail@orientalbirdclub.org
Web site: www.orientalbirdclub.org
Wildlife Conservation Society - Thailand Programme
P.O. Box 170, Laksi, Bangkok 10210
Tel: +662-503 4478, +662-503 4479
Fax: +662-503 4096
Email: thailand@wcs.org

Reference information:
Field guide
Robson, C. 2002.
A field guide to the birds of Thailand.
Asia Books, Bangkok. 272pp.
TAT PUBLICATIONS ON NATURE TOURISM
For more information on birdwatching in Thailand, please refer to the following nature tourism guide books in the "National Park" series published by the Tourism
Authority of Thailand as part of the Tourism and Employment Creation Plan implemented under the Social Investment Project.
 KHAO YAI: DONG PHAYA YEN FOREST RANGE
ISBN 974-8252-70-1
 KAENG KRACHAN:
Amazing Forest of Phetchburi River
ISBN 974-8252-72-8
 KHAO SOK
Fascinating Limestone Mountains Amid The Verdant Forest of Surat Thani,

Thailand
ISBN 974-679-099-4
 DOI INTHANON - DOI SUTHEP
The Himalayan Springs of Thailand
SBN 974-8252-67-1
 PHU LUANG
The Kingdom of Plants
ISBN 974-8252-73-6
BIRDWATCHING TIPS
 Consult field guides, checklists, and maps prior to arriving at the birdwatching destination.
 Dress in colours that blend in with the surroundings.
 Bring appropriate equipment such as telescope, bird guide, and a notebook.
 Plan to arrive at the destination at sunrise when birds are first out in search for food and are most active.
 Walk slowly stopping at intervals to listen for calling birds.
 Look for the birds in thickets, on the branches of trees, and on the ground.
 Avoid talking, smoking, or walking on dry leaves, all of which will scare birds away.
CONSERVING BIRD DIVERSITY
Across the world, humans coexist with birds but human activities often affect the survival prospects for birds. Forty-eight species of birds found in Thailand (5% of the total) are globally threatened by the loss or disturbance of their habitats, food resources, and breeding areas, and by other human actions, and so require special conservation attention. A further 97 species (10%) are potentially threatened if current trends persist.
In Thailand, 101 species (10% of the total) are hunted as pests, for food or for the pet trade and are directly threatened by humans. The list of hunted species includes waterbirds, birds of prey, pheasants, parakeets, pigeons, hornbills, pittas weavers, bulbuls, and other forest birds. Worldwide the trade in birds includes 2,600 species and several million birds each year. Ten percent of threatened birds worldwide are affected by the bird trade.

There are a number of ways in which the numbers and distribution of threatened birds are being restored. Habitat conservation programmes are an important mechanism. Feeding habitats for seasonal migrants are being preserved by incorporating mangroves and coastal tidal areas in marine protected areas. Lowland forests that support Gurney's pitta and other diversity are being protected and a reafforestation programme planned. Preventing encroachment around the edges of parks maintains the integrity of forest blocks used by the majority of native birds, including migrant raptors and songbirds.
In most cases, preserving and protecting natural habitats can bring back even highly endangered populations of rare birds. These measures are relatively cost effective to implement. As an example, a 3-year Khao Yai Conservation Project preserved over 2,000 sq km of wildlife habitat, discouraged poaching, and provided employment alternatives for local forest resource users, at an annual cost of 7 million baht (US$171,000).
For critically endangered species, whose populations are extremely small, and whose survival in the wild is uncertain due to factors that simply cannot be controlled, other more costly measures such as captive breeding, are being

considered. Captive breeding is risky because birds need to be recovered from the wild to establish breeding populations, and injury is possible. Some species do not breed well in captivity because their natural courting and nesting behaviours are no longer possible. Strict controls on who is allowed to breed endangered species, registration of individuals, and enforcement of laws so that commercial sale is not possible, need to be adopted. Without these controls, captive breeding programmes cannot succeed.

HOW YOU CAN HELP IN THE CONSERVATION OF BIRDS

Visitors to Thailand can assist efforts to preserve and maintain the diversity of birds and their habitats simply by visiting national parks and other wilderness areas. Bird enthusiasts can report the species they observe to authorities. Checklists are now available at many popular national parks. Tourists can report evidence of suspicious activity that might lead to the arrest of unscrupulous individuals trapping or hunting birds and can also participate as volunteers in habitat conservation programmes. In these ways, tourists can help reduce the threats to birds, and at the same time enjoy Thailand's birdwatching paradise.

Contact information:

TO REPORT BIRD SPECIES OBSERVED

 TO REPORT BIRD SPECIES OBSERVED

Please contact the Park Visitor Centre of the National Park

or

Bird Conservation Society of Thailand (BCST)*
69/12 Soi Ramindra 24, Joorakaebau, Ladprao, Bangkok 10230, Thailand
Email: bcst@box1.a-net.net.th
Tel: 66-(0)-2943-5965
Web sites:
www.bcst.org/index_ebird.html
www.thai.net/bcst

* The Bird Conservation Society of Thailand (BCST) is a BirdLife Partner

 TO REPORT EVIDENCE OF SUSPICIOUS ACTIVITY

Please contact

Willdife Protection and Suppression Office
Department of National Parks, Wildlife, and Plant Conservation
61 Paholyothin Road, Chatuchak, Bangkok 10900
Tel: 66-(0)-2579-5266

 HABITAT CONSERVATION VOLUNTEER PROGRAMMES

Please contact
Wildlife Conservation Society - Thailand Programme
P.O. Box 170, Laksi, Bangkok 10210
Tel: +662-503 4478, +662-503 4479
Fax: +662-503 4096
Email: thailand@wcs.org

FAMILIES OF BIRDS IN THAILAND UNDER THREAT

The following bird species are under threat because there is a high demand for them and they are hunted for the local, regional and global bird trade. To help preserve the species, please refrain from purchasing any of the following birds as pets, and if you happen to witness any of the following birds being sold or traded, or note any suspicious activities involving them, please contact:

The Willdife Protection and Suppression Office
Department of National Parks, Wildlife, and Plant Conservation
61 Paholyothin Road, Chatuchak, Bangkok 10900
Tel: 66-(0)-2579-5266
1. Phasianidae (wood partridges and pheasants) - 4 species
2. Anatidae (White-winged duck) - 1 species
3. Picidae (woodpeckers and barbets) - 3 species
4. Bucerotidae (hornbills) - 7 species
5. Upupidae (Common hoopoe) - 1 species
6. Cuculidae (Coral-billed ground cuckoo) - 1 species
7. Psittacidae (parrots and parakeets) - 4 species
8. Columbidae (pigeons) - 12 species
9. Accipitridae (birds of prey) - 9 species
10. Threskiornithidae (White-shouldered ibis) - 1 species
11. Ciconiidae (Lesser adjutant) - 1 species
12. Pittidae (pittas) - 3 species
13. Irenidae (Asian fairy bluebird and leafbirds) - 6 species
14. Corvidae (jays, crows, magpies, orioles and minivets) - 14 species
15. Muscicapidae (thrushes, robins, and sharmas) - 3 species
16. Sturnidae (starlings and mynas) - 3 species
17. Paridae (Yellow-cheeked tit) - 1 species
18. Pycnonotidae (bulbuls) - 7 species
19. Zosteropidae (Japanese white-eye) - 1 species
20. Sylvidae (laughing thrushes, mesias, minlas and sibias) - 8 species
21. Nectariniidae (Scarlet-backed flowerpecker) - 1 species
22. Passeridae (weavers and munias) - 7 species
23. Fringillidae (grosbeaks and buntings) - 3 species
About The Author
ANTONY LYNAM
Antony Lynam (Ph.D.), Wildlife Conservation Society (WCS)- Thailand Programme Director and conservation scientist, works with the Thailand Department of National Parks, Wildlife and Plants to develop programmes for the conservation of the country's endangered species, park resources management, and the design and conduct of training curriculum for park rangers.

An Australian citizen, he has authored a number of technical papers and popular articles concerning conservation issues in Australia, North America, and Thailand, and was a contributor to the seminal volume on habitat fragmentation "Tropical Forest Remnants: Ecology, Conservation and Management". He writes frequently on natural history for magazines, journals and newspapers including Wildlife Conservation, The Nation, The Bangkok Post, and The Natural History Bulletin of The Siam Society.

5.20. Appendix T - Deleted files

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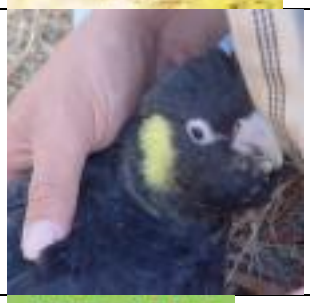
36053-f0056944.jpg	
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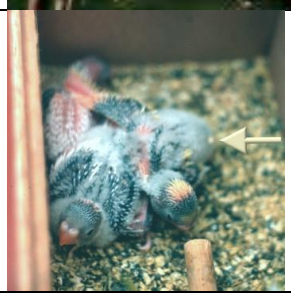
1238C212d01.jpg	

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5.22. Appendix V - PDF's

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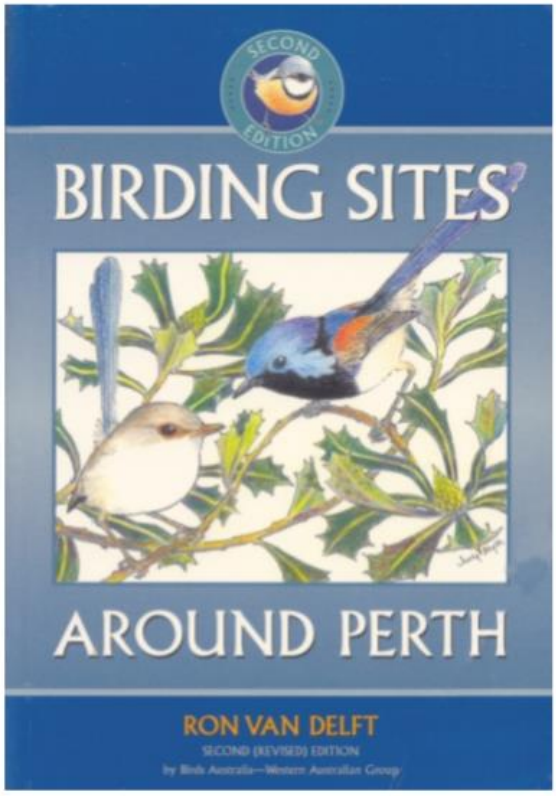


Number 57ab in a series of Bird Guides of Western Australia

Birding Sites Around Perth is a comprehensive guide to Perth's best bird watching sites, including Kings Park, John Forrest National Park and Rottnest Island.

This revised and enlarged edition describes forty-six sites within a 60 kilometre radius of the city, with excellent location maps, lists of birds regularly seen, and notes on species of special interest. Also provided are suggested bird watching tours for local enthusiasts and visitors, and a wealth of information on endemic species. Over 200 birds are featured in 165 pages.

Illustrated throughout with colour photographs and pencil drawings, *Birding Sites Around Perth* is an excellent introduction to bird watching and to Perth's wildlife heritage.

Copies of the book are available for purchase from the Birds Australia office during office hours or available by post.

WHAT IS BIRDS AUSTRALIA?

Birds Australia is a non-profit national organisation working for the enjoyment, study and conservation of Australia's birds. The WA group of Birds Australia has members statewide and offers a variety of activities for members, including conservation and research projects.

Activities and services include excursions, camp-outs, bird surveys and social activities. We also have a library, books for sale and information about birds.

To view our full range of bird guides and bird lists, visit our web site.

INTERESTED?

Contact us at:
Birds Australia Western Australia Inc.
71 Oceanic Drive
Floreat WA 6014 Weekdays 9.30 - 12.30 pm

Phone: (08) 9383 7749
Fax: (08) 9387 8412
Email: birdswa@iinet.net.au
Web: birdswa.iinet.net.au

Birds Australia

B. f0273688

UNIVERSITY of CALIFORNIA
BOTANICAL GARDEN
NEWSLETTER

Volume 26, Number 2 Published by the UNIVERSITY OF CALIFORNIA BOTANICAL GARDEN at Berkeley, California Spring 2001

Birds at the UCBG

"It's a hummingbird! But is it Anna's, Allen's or Rufous?"

Academic interest in the Garden's bird life over the last few years has primarily been associated with undergraduates studying the territorial behavior of hummingbirds. Any regular Garden visitor can tell you however, that you've never really experienced the Garden until you have taken the time to sit and just watch the birds, listen to their songs and enjoy the way in which they use the Garden! Encouraged by the vast plant variety and habitat diversity, there are around seventy-six bird species regularly sighted here over the course of an average year. The hope of spotting one of the more rarely sighted birds, such as the Western Kingbird or the White-throated Swift, keeps our endless parade of avoid birdwatchers in thrall.

Our resident birds, however, whether it's an audacious jay, a noisy woodpecker or a colorful finch, provide plenty of ongoing interest for the Garden community.

Aloes in the Southern African Area attract hummingbirds and demonstrate how birds at the Garden enjoy the diversity of plants in this collection.

The diverse collections of the Garden support an equally diverse population of birds, as is apparent in the list from the recent Christmas Bird Count. In addition to providing general shelter for both resident and migrant species, our collection provides food and nesting sites for many different taxa. The Garden environment offers a range of habitats that are rather different from the native chaparral of the canyon. Some visitors to the Japanese Pool, such as belted kingfishers and green and blue herons, might not otherwise stop in Strawberry Canyon. Native chaparral species are found in parts of the Garden that more closely approximate their preferred habitat. Wren tits, California thrashers, and spotted towhees are most commonly found in the scrubby areas of the South American and Australasian sections. Similarly, native riparian species are found in the trees along Strawberry Creek, such as Wilson's and orange crowned warblers.

Many birds have identified new food sources among the many non-native plants in our collections. This is particularly obvious when watching hummingbirds feed on both native salvias and penstemons, and also on bird-pollinated plants from other parts of the world. Aloes in the Southern African Area are pollinated by sun birds in their native habitat. These small colorful nectivores perch on the rigid blossom stalks of the aloes. This is a distinct contrast to the hovering feeding habit of the hummingbirds, which as a group are restricted to North and South America. Nonetheless, as a walk through this area at this time of the year demonstrates, hummingbirds utilize aloes extensively and assertively defend their feeding resources against other intruding hummers.

—Chris Carmichael

Photo by Jack Kilian

When not watching birds from the Elizabeth Hammond Interpretive Center, where he is pictured here, noted local ornithologist Dennis Wolff regularly teaches popular birdwatching classes in the Garden.

From Killing to Counting

Before 1900, Americans engaged in a holiday tradition known as the Christmas "Side Hunt". People would choose sides and go afield with their guns; whoever brought in the biggest pile of feathered quarry won. On Christmas Day 1900, ornithologist Frank Chapman, an early officer in the Audubon Society, called for an end to the slaughter. Rather than shooting birds, he suggested counting them. From Toronto to Pacific Grove, California, the Christmas Bird Count began. In its first year, 27 people participated, counting 18,500 individual birds of ninety species.

On Christmas Day 2000, 52,000 people participated in 1800 counts in the United States and Canada. They sighted 78,636,382 individual birds of 676 species! A century of bird counts has amassed a wealth of data which scientists use to monitor the health of bird species, pinpoint and explain trends, and detect the rise of environmental threats.

Along with three other members of the Audubon Society, I came to the rich and varied habitats of the UC Botanical Garden for this annual count. We found a total of 226 individual birds of 38 species, including such rarities as hermit and black-throated warblers.

—Dennis Wolff

AUDUBON CHRISTMAS COUNT DECEMBER 17, 2000	
American Robin	30
Anna's Hummingbird	25
Steller's Jay	21
Bushtit	16
Golden-Crowned Kinglet	14
Ruby-Crowned Kinglet	12
Yellow-Rumped Warbler	10
Townsend's Warbler	9
Western Scrub-Jay	9
Chestnut-Backed Chickadee	7
Hutton's Vireo	7
Song Sparrow	6
California Towhee	5
Golden-crowned Sparrow	5
Bewick's Wren	4
Fox Sparrow	4
Dark-eyed Junco	4
Turkey Vulture	3
Hermit Thrush	3
Allen/Rufous Hummingbird	3
Common Raven	3
Band-Tailed Pigeon	2
Northern Flicker	2
Black Phoebe	2
Red-breasted Nuthatch	2
Brown Creeper	2
California Thrasher	2
Spotted Towhee	2
White-crowned Sparrow	2
Cooper's Hawk	1
Sharp-shinned Hawk	1
Red-breasted Sapsucker	1
Nuttall's Woodpecker	1
Hairy Woodpecker	1
Wrentit	1
Black-throated Gray Warbler	1
Hermit Warbler	1

Dr. Chris Carmichael, UCBG Manager of Collections and Horticulture, is one of our noteworthy birders, a group which also includes Dr. Jennifer White, Associate Director for Education, and Curator Holly Forbes. Chris' academic background in vertebrate zoology equips him to effortlessly make the connections between the birds here in the Garden and their relationships to the plants.

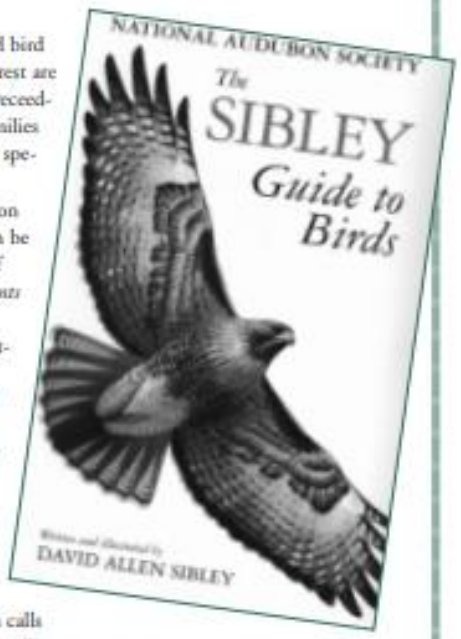
SIBLEY'S GUIDE TO BIRDS

National Audubon Society: The Sibley Guide to Birds, written and illustrated by David Allen Sibley; A Chanticleer Press Edition, Alfred A. Knopf, NY, ©2000; 544pp. Flexible Binding. $35.00.

Most visitors to the Garden come to see and study our special plants, but a surprising number also come to see the animals and birds which feed and take shelter in the hospitable environment. We have newts which breed yearly in our Japanese Pool and monarch butterflies visiting our milkweed plants. Now and again we are surprised to learn that we are on the Audubon Society's Hotline, as we were several years ago when dozens of visitors came to see a rare bird sighted in the southwest corner of the Garden.

In past years, the Roger Tory Peterson *Field Guide to Western Birds*, or the National Geographic Society's *Field Guide to Birds of North America*, were seen tucked under the arms of our 'Garden Birders'. Now there is a new, up-to-date field guide these birders will want to own, although its size and weight make it awkward to carry in the field.

The Sibley Guide to Birds is a great user-friendly guide containing over 6600 wonderfully detailed watercolor paintings of 810 species and 350 populations of North American birds. Descriptions and remarks accompany the illustrations, removing the need to flip back and forth between text and pictures. The birds are shown in similar poses to make comparisons between species easy. All important plumages are depicted and range maps show migration routes, summer, winter, and breeding locations, and bird distribution. Of particular interest are the good introductory pages preceding each family or group of families showing bird classification and speciation at a glance.



In many ways the publication of *The Sibley Guide to Birds* can be compared to the publication of *The Jepson Manual: Higher Plants of California* a few years ago. Both were preceeded by respected long-used references. It is likely that the *Sibley Guide* will become the current authority for birds, as the *Jepson Manual* has become for plants. But keep your worn, well-loved field guides handy. For this reader, at least, it is hard to think that the beloved California Quail in the Garden calls "put-way-do" rather than the familiar "chi-ca-go" of old, which we teach the touring school children.

The Garden Shop also carries the following books related to the above review:

■ *Birds of Northern California* by David Fix and Andy Bezener; range maps by Don Roberson and David Fix; Lone Pine Pub., Renton, WA,©2000; 384pp. Paper. $19.95.

■ *Birds of San Francisco and the Bay Area*, by Chris C. Fisher and Joseph Morlan; Lone Pine Pub., Renton, WA, ©1996; 159pp. Paper. $9.95.

■ *Common Dragonflies of California, A Beginner's Pocket Guide*, by Kathy Biggs; Azalea Creek Pub., Sebastopol, CA, ©2000. 96pp. Paper. $9.95.

■ *Newts and Salamanders, Everything about Selection, Care, Nutrition, Diseases, Breeding, and Behavior*, by Frank Indiviglio; with photos by Richard D. Bartlett; illus. by Michele Earl-Bridges; Barron's, Hauppauge, NY, ©1997; 128pp. Paper. $6.95.

Brochures:

■ *Birds of the UC Botanical Garden*, UC Botanical Garden Staff. $1.00.

■ *Butterflies of the San Francisco Bay Region, A County Species List*, 5th ed., by John Steiner; San Francisco Bay Wildlife Soc, 1988. $1.00.

—Elly Bade

DIRECTOR'S COLUMN

Celebrating the Garden

Spring is here again! The hills are green and spangled with flowers. The wind is whipping across the coastal bluffs, and anyone with even the slightest inclination toward gardening has their hands in the soil. As I watch the seasons march across the landscape and think back to the past year, I'm amazed at the amount of progress we have to celebrate here at the Garden.

The living collection is in superior condition. Over the years, the horticultural staff has done an inspired job of maintaining and building the collection. However, with leadership by Manager of Collections and Horticulture, Chris Carmichael, and better access to materials and supplies, they have added new shine to the Garden. I invite you to push past the construction sites in the entrance to get a better look!

Ah, yes, those construction sites. We were so excited when they started. Now, we look forward eagerly to their completion. The Garden has not been a peaceful place to work or visit this year. Staff and volunteers have been wonderful, carrying out their work over the din of jackhammers, dump trucks, cement mixers, and more. From all this dust, mud, and upset, the Garden is gaining many physical improvements. Some, like the utility upgrades, make our jobs easier but are invisible to visitors. Others, such as renovated bathrooms and FEMA restoration of pathways in the Mexican and Central American area, are essential but not sensational. Many projects, though, are downright sensational!

Master rock garden creator, Phil Johnson, has just completed a spectacular hardscape in the Southern African section, and horticulturist Lawrence Lee will soon begin planting it with material obtained during his collecting trips to South Africa. This garden will feature the natural beauty of bulbs and succulents from the winter rainfall areas of the Karoo and Fynbos semi-arid and desert habitats. It also provides an opportunity to inform visitors about the precarious situation of these habitats in the face of regional development and global climate change.

Our new Arid House is also nearing completion. The name has recently been changed to Arid House from Desert Greenhouse — Arid House being more appropriate for that collection, though we are still making the name transition. This structure will house a substantial number of the most biologically and scientifically valuable plants in our collection, including many living "type" specimens. Type specimens are the exemplar individuals a taxonomist uses to describe a new species. Other specimens belong to species that are now extinct in the wild, and are therefore irreplaceable. The new house provides the public with excellent visual access to the exciting and unusual plant forms in this collection while ensuring their security.

UC researchers are anxiously awaiting opening of the Center for the Study of Plant Conservation (CSPC) at the Garden. Although the lab is not yet finished, scientists associated with this center are already exploring a diversity of questions related to plant conservation. Richard Shefferson, a graduate student at the Center, writes in this issue about his research devoted to discovering the types of fungi that sustain terrestrial orchids. Another graduate student, Jessica Riquetti, recently established a major field experiment to determine whether soil-borne organisms can limit the spread of European beach grass, an invasive species that reduces native plant diversity in sand dunes along the Pacific coast of North America. Work by these students and other scholars will be greatly facilitated by the new Center.

In preparation for our next round of construction, we have just begun design of the Jane Gray Research Greenhouse, which will be an important adjunct of Garden research in plant conservation and ethnobotany. This house will be erected in the place currently occupied by the temporary arid house and will serve researchers from both the CSPC and elsewhere on the Cal campus.

Although construction is the most visible sign of progress that visitors can see, the Garden has many other achievements to celebrate as well. Our educational outreach programs are receiving national recognition. Many partners are joining our Math in the Garden initiative. Beginning this spring staff at the UC Davis Arboretum, Brooklyn Botanic Garden, Missouri Botanical Garden, Morris Arboretum, and Atlanta Botanical Garden become active partners in the development process of the 'Math in the Garden' project as they try out the activities in their own programs. San Francisco Girl Scout Council troops and 4-H programs across California are also partners in this effort. Over the next year their evaluations of the effectiveness of the project's activities will provide crucial information to ensure that the final published materials will fit into different informal settings and programs and work in gardens throughout the country. Collaborations with these, and other partners, provide audiences diverse program opportunities that strengthen this and other aspects of the Garden's Education Programs.

Cactus drawings by UCBG horticulturist, Judith Finn. Above: Gymnocalycium saglione and at right: Euphorbia cf. leuconeura.

Our collaboration with East Bay Munipal Utility District, which resulted in our spectacular and innovative contribution to last year's San Francisco Flower and Garden Show, is now producing exciting new Garden interpretation materials. Garden staff and dedicated volunteers worked with EBMUD staff to develop an extensive and well-received tour of Plants for Water-wise Gardening. (See the Education Director's column for more information about this tour.) The tour takes advantage of our diverse and outstanding collection to illustrate landscape uses of water-conserving plants. Most species highlighted in the tour are available in the horticultural trade, but some are not, which puts the tour on the leading edge of horticultural innovation.

Through all of these changes, the Garden continues to expand its primary mission of support for botanical research. New molecular tools are allowing exciting discoveries in evolutionary biology and plant systematics. These tools work best on DNA extracted from live tissues, which makes living collections such as ours ever more important scientifically. Important new studies that have used UC Botanical Garden specimens are finding exciting and sometimes disturbing results. For example, Olmstead, DePamphilis, Young, and colleagues report this spring in the *American Journal of Botany* (Vol. 88: 348-361, 2001) that the snapdragon family (Scrophulariaceae) is not a natural evolutionary grouping. In their new interpretation, which was based in part on samples from the UC Botanical Garden, the only member of this family in the California flora that will remain in the Scrophulariaceae is the eponymous *Scrophularia californica*. Even the snapdragons *(Antirrhinum)* will no longer be in the "snapdragon" family.

Although living tissue is the *sine qua non* for molecular phylogenetics, it is still essential that every plant used in such research be vouchered. Vouchering, which involves removing a sample of the plant to produce a herbarium specimen, creates a permanent record that persists after death of the plant itself. It is essential that Garden material be vouchered so that future scientists can examine the specimens that today's botanists are using to classify plants and understand their evolutionary relationships. Thus, an important goal of the Garden is to voucher all accessioned plants in our collection. This academic year, our graduate student assistant, Rich Shefferson, has helped to voucher 274 plants in our collection.

With all this happening this year, one might ask whether Garden staff has had time to plan very far into the future. In fact, we have embarked on the early stages of strategic planning and, as the first round of construction nears completion, we will continue to move forward on this very important project.

—Ellen Simms

Garden Visitors

(left to right): Horticulturist Elaine Sedlack accompanied Mark Flanagan, "Keeper of the Gardens" at Windsor Great Park, and William McNamara, director of Quarryhill Botanical Garden in Glen Ellen, CA, during their visit on April 16th. Mr. Flanagan was the April speaker for the California Horticultural Society meeting.

Gardening Tips

■ The larvae of the diamond back moth can be a serious pest for members of the cabbage family, including cabbage, broccoli, collards, kale and others. The insects are becoming resistant to Bt, which has been used widely to control the insect. A researcher in Florida found that the larvae of the moths prefer feeding on highly fertilized collards more than on any other members of the family. Fields of crucifers to be protected are surrounded by a crop of specially treated collards, resulting in a reduction of sprays from 75 to 100%. In addition, a naturally occuring parasitic insect of diamond backs built up in the collards, and this helped control them in the desired crop. *Agricultural Research* 47 (3): 26.

■ The old world fern, (*Lygodium microphyllum*), introduced into Florida in 1950, now covers over 40,000 acres. In the last 6 years, there has been a 100 fold increase. A single leaf can be 100 feet long. Fortunately, it is believed that the plant will not move farther north than central Florida. *American Nurseryman* 191 (3): 10.

■ *Euphorbia esula*, an introduced species in the northern midwestern states, has colonized vast areas of marginal and non-agricultural land, displacing many beneficial plant species. In addition, it is toxic to sheep, cattle and horses. Recently, a gall midge was released which produced galls on the stem tips resulting in their destruction, thus preventing flowering and seed production. The insect may produce 3 or 4 generations in a season though the first generation produces the largest number of adults. It is these that can be harvested and used for new releases. *Biological Control* 16(2): 128-132.

—Robert D. Raabe

The Overlooked Equation

When I was an undergraduate living in Chicago, I volunteered at local county nature preserves to help restore Illinois' endangered prairies, savannas, and wetlands. Very often, my work involved monitoring the endangered plants that grew in the area, especially the imperiled populations of native, wild lady's slippers.

The lady's slippers we all know and love *(Paphiopedilum spp.)* are tropical, and have been propagated and hybridized for many years. Should you ever see a lady's slipper of the genus *Cypripedium* on display at a nursery, be warned – it was most likely stolen from the wild. Cypripedioid lady's slippers grow on the wild lands of North and Central America, Europe, and Asia, and have not been propagated successfully at all. Yet, as we have seen in other endangered plants, propagation is very often integral to successful restoration.

Why has propagation been so unsuccessful? The biology of orchids, especially the rare terrestrial orchids that evolved in the temperate regions of the world, is very complex. In fruiting structures known as pods, they produce thousands to millions of seeds no longer than a single millimeter, and half that in width. These seeds very rarely survive to produce a mature plant, and this seems to be why they have evolved to produce so many seeds all at once. The seeds scatter in the wind and find a new place to settle in the soil. Once the winter snows and rains are over, they imbibe water, and then they just sit. Why? Because they cannot progress any further

This Cypripedium californicum *in the Garden was collected by Garden horticulturist, Roger Raiche.*

in their development without the aid of a soil-inhabiting fungus. The orchid family is one of the few plant families that depends completely on soil fungi for germination. This kind of interaction is called "mycorrhizal," and requires some more explanation.

A mycorrhiza is an interface of two organisms – a plant and a fungus. The fungus, which can be one of many different species, grows through the soil as a mass of tiny filaments known individually as hyphae, forming a hyphal network called a mycelium. The fungus grows outward, looking

GARDEN NOTES

SUDDEN OAK DEATH…Horticulturists **Judith Finn** and **Jerry Parsons** attended an all day symposium, "Combating the Sudden Oak Death *Phytopthora*: a new disease", in Marin County, hosted by UC Cooperative Extension on March 9th.

CHANNEL ISLAND VISIT…Horticulturist **Nathan Smith** accompanied **Steven Junak**, of the Santa Barbara Botanic Garden, on a three-day visit to San Nicolas Island in late March. This island is part of the southern group of Channel Islands off the coast of southern California. They were conducting plant surveys and removing exotic plants. Nathan was able to collect several plants for the Garden's Californian Area.

GARDEN SHARING…Curator **Holly Forbes**, distributed duplicates of the Garden's epiphytic cactus collection to the Huntington Botanical Gardens in San Marino and to Ganna Walska Lotusland in Santa Barbara. It is common practice among gardens to share duplicates of collections, providing some protection against loss in any one location. **John Trager**, Curator of Desert Collections at the Huntington, donated several collections of South African material for the Garden's African Area.

RESEARCH GRANT…We are pleased to report that the Genetic Resources Conservation Program at UC Davis funded a grant proposal by **Dr. Jason Koontz** and Holly Forbes to study the genetic variability of Baker's Larkspur, *Delphinium bakeri*. The research will seek to determine the genetic diversity of this species to obtain base-line data for future research and conservation efforts. The grant money will pay for the cost of DNA analyses to be performed by Dr. Koontz. Baker's

for new patches of resources to digest and absorb. Part of the mycelium grows into the root system of a plant, penetrating the root tissue itself, and "colonizes" it. Other parts of the same mycelium grow far beyond the range of the plant's root system, and collect nutrients such as phosphorus and calcium. Amazingly, the mycelium then gives the plant vast quantities of these nutrients, which are very often limiting to the plant's growth. But the fungus does not do this out of the goodness of its fungal heart! It gets a very valuable commodity from the plant: carbon. The plant produces sugar in its photosynthetic leaves, and it now appears that, on average, at least 20% of all the sugar produced by the plant goes to the fungus. This makes sense: the plant is limited much more by phosphorus, calcium, and other nutrients than carbon. Hence, the fungus and the plant seem to exist in a mutually beneficial system.

The importance of mycorrhizae is evident in the fossil record, which shows that the first land plants (now thought to be *Rhynia* species), growing roughly 500 million years ago, actually had mycorrhizal structures in their roots. Indeed, current estimates suggest that 90% of plants are mycorrhizal – a situation that clearly displays the importance of this unusual interaction.

Which brings us back to the orchid. Orchids are unlike any other plants. We are discovering that this is true in their biology as well as in their aesthetics. Orchids break all the rules. With most plants, germination and growth are possible without fungi, although the plant will generally be stunted throughout its life. But orchids do not appear to grow without these organisms. Although some orchids can be cultivatable in the lab under very specific conditions, these orchids generally grow poorly relative to their wild-grown kin. More and more we find that most orchids cannot even germinate without a fungus.

Why should this concern us? The kind of interaction that orchids exhibit with mycorrhizal fungi is very different from what we are used to, and this has important ramifications for propagation, and ultimately restoration. First of all, we have as yet not seen any evidence that orchids donate carbon to the fungus. Second, we have found that as seedlings, and in the case of the non-photosynthetic "ghost" and "phantom" orchids, orchids even extract sugar from the fungus! Third, orchids are very particular about which fungi they will associate with, and it appears that they choose fungi that are mycorrhizal, or sometimes even pathogenic, on local trees and other plants. So, these unusual plants indirectly acquire their sugar from other plants in the ecosystem. Fourth, orchids native to the northern temperate latitudes generally stay within the soil as seedlings for many years without developing any leaves, relying on mycorrhizae for complete nourishment. Finally, even mature, photosynthetic orchids choose not to break the surface and sprout leaves in some growing seasons. This happens particularly often in lady's slipper populations. In my Midwestern study sites, I have found that lady's slippers can stay belowground like this for many years without interruption, while still growing more root and rhizome tissue. Other researchers have found very solid evidence that this "dormant" condition can last for 25 years or more. Considering that lady's slippers have very low sugar reserves, this is an amazing feat.

The key, then, to understanding what can be done to restore native orchid populations, which are in decline all over the world, is to explore this overlooked equation: orchid + appropriate fungus + appropriate conditions = successful growth.

It is an exciting topic. We are now beginning to understand the nature of this puzzling interaction, and modern scientific methods and tools, including molecular techniques, genetic sequencing, carbon-isotopes, and mathematical and statistical theory, are helping us in tackling major environmental questions. My research is an example of the conservation issues which will be investigated by Cal scientists and graduate students at the Garden's new Center for the Study of Plant Conservation.

—Richard P. Shefferson

larkspur is one of several endangered and rare California native plants the Garden is committed to helping conserve through its participation in the Center for Plant Conservation. Dr. Koontz studied the genus *Delphinium* for his dissertation project. He is now at the Center for Biodiversity of the Illinois Natural History Survey.

NEW STAFF MEMBER...

We extend a warm welcome to **Ms. Leslie Wozniak** who has joined the staff at the Garden in the capacity of Visitor Services Specialist. Leslie is a long time fan of the Garden and brings a wealth of work skills to the new position.

EDUCATION AT THE GARDEN

Photo by Barbara Lyss

The shining silver leaves of Leucadendron argenteum *make it an interesting choice for water conservative landscaping in the Bay Area. Threatened in its native habitat in South Africa it can be seen in the Garden in the Southern African Area, where it is just one of the 125 exciting plants in the new Water-Wise Gardening Tour.*

One goal of the Education Program is to encourage visitors to discover the Garden's magnificent collection and to look at plants from new perspectives. While our seasonal self-guided tours showcase different plants in their peak flowering or display seasons, other brochures focus on ethnobotanical (Chinese medicinal herbs) or special collections (serpentine plants). Building on the interest generated through our successful collaboration at last year's San Francisco Flower and Garden Show, the Botanical Garden and the East Bay Municipal Utility District (EBMUD) have teamed up again, this time to develop a self-guided tour in the Garden. This interpretive tour of the collection focuses on plants that grow successfully in the Bay Area, but use little water.

Most people have no idea how much water their garden needs. The typical Bay Area residential landscape is irrigated enough each year to flood it six feet deep. This is at least twice as much as plants need for healthy growth. Using water-efficient plants and creative design, local gardeners can create a garden that thrives on little more than natural rainfall. Properly designed, a water-efficient garden is easier to maintain than one that is over-watered. It requires less weeding, pruning, mowing, fertilizing, and pest control. It is better adapted to fluctuations in rainfall and seasonal changes. There is no one way to create a water-efficient garden. The Botanical Garden is filled with a plethora of exciting possibilities from around the world.

This walking tour of the Garden introduces you to some of these beautiful plants that thrive in the Bay Area. California's chaparral is our local community of drought tolerant plants. The climate and plant communities in Chile's matorral, South Africa's fynbos, and the Mediterranean maquis, with their winter rains and summer drought, are but a few of the parts of the world that have water-conserving plants similar to California's chaparral. Most of the plants on this tour have been in our collection for many years. They will give you a good idea of what that seedling in the local nursery will look like once it gets established in your garden.

This new publication is the collaboration of the Garden's horticultural, educational and communications staff working with three knowledgeable and dedicated docents — Barbara Lyss, Kathryn Welch and Alison Mills. After hours of walking through the Garden and conversations with horticulturists, Barbara, Kathy and Alison wove fascinating plant histories, horticultural information, name derivations and ethnobotanical information into stories for more than 100 plants. A lot of give and take occurred as the Garden staff vetted the information from different perspectives. Weeding out some plants that we all loved but which did not fit all the criteria was one of our biggest problems. Plants included on the tour use little water, are available (or could be available) in the horticulture trade, and are not weedy or endangered.

Ten thousand preview versions of the tour are available this Spring; in the Garden, at this year's San Francisco Flower and Garden Show and at Earth Day events. Over the next several months, Education staff will be collecting evaluations from visitors. This information will be used to improve the final version of the brochure. I invite you to come to the Garden, go on the tour, and give us your feedback.

We are grateful for EBMUD's participation and support of the process and production of this new exciting self-guided tour of the Garden.

—Jennifer Meux White

Research at the Garden

The Garden recently provided research materials to these individuals:

Ms. **Eden Abram**, dissertation student with Prof. **Donald Kaplan,** UCB Dept. of Plant Biology launched her study of comparative morphology of succulent, drought-tolerant plants. She will be using the desert collections for illustration purposes.

Prof. **David D. Ackerly**, Stanford University, again visited to collect many species in the Rhamnaceae (buckthorn family). He is looking at the evolution of the "evergreen sclerophyll" strategy in California chaparral. The project is to examine each of the major taxa in comparison with their close relatives from non-chaparral habitats, employing a phylogenetic approach where possible.

Dr. **Stephen Burgess**, post-doc, UCB Dept. of Environmental Science, Policy, and Management, used the Mather Grove for an investigation of the basic physiological ecology of redwoods with the aim of relating climatic and hydrological factors with the growth and distribution of *Sequoia sempervirens* (Coast Redwood). They are particularly interested in quantifying direct foliar absorption of fog water by redwoods and determining its role in mitigating drought and allowing redwoods to grow to extreme heights. This study will principally involve the use of sensitive xylem sap flow meters to gauge patterns and amounts of water transport in branches and stems of redwoods.

Prof. **Todd Dawson's** class, Physiological Plant Ecology, used several Garden plants for measurements of photosynthesis under sun and shade conditions during the Spring Semester.

Prof. **James Eckenwalder,** University of Toronto, received leaf bases of *Zamia integrifolia*. These were plants used by Dr. Robert Orndduff for a study published in 1996: Gender performance in a cultivated cohort of the cycad *Zamia integrifolia* (Zamiaceae). *Amer. J. Bot.* 83: 1006-1015.

Mr. **Taylor Field**, dissertation student at Harvard, visited to take cuttings of primitive angiosperms for his project *(Chloranthus, Illicium mexicanum, Illicium simonsii, Schisandra henryi).*

Ms. **Ruth Kirkpatrick**, dissertation student with Prof. **Brent Mishler**, UCB Dept. of Integrative Biology, received fronds of several xerophytic ferns for a course project on dessication tolerance.

Ms. **Nancy Kiang**, dissertation student with Prof. **Dennis Baldocchi**, UCB Dept. of Environmental Science, Policy, and Management, tested a sap flow sensor on a Garden oak for several weeks prior to using it in the field.

Ms. **Jessica Messmer McAbee**, graduate student at UC Davis with Prof. **Charles Gasser,** visited to obtain cuttings of *Impatiens hookeriana* and *Impatiens balsaminifera* for her graduate studies in ovule diversification in the angiosperms.

Dr. **Susana Magallon**, UC Davis, post-doc with Profs. **Michael Sanderson** and **James Doyle**, received a wide range of species for their study of seed plant phylogeny, the age of angiosperms, and the evolution of pentamery among basal eudicots.

Ms. **Jodi McGraw**, dissertation student with Prof. **Wayne Sousa**, in Integrative Biology completed her soil seed bank study in the Garden's research greenhouse.

Prof. **Rei Rasmussen**, Oregon Graduate Institute in Beaverton, Oregon, visited the Garden to collect emissions from several oak species for his study on terpene release by oaks.

Mr. **Andrew Salywon**, dissertation student at Arizona State University, is working on the molecular systematics of the Myrtaceae family. He received cuttings of *Eugenia capuli, Austromyrtus dulcis, Myrceugenia chrysocarpa, Syzygium jambos,* and *Ugni molinae.*

Ms. **Caroline Stromberg,** dissertation student at UC Berkeley, Department of Integrative Biology, received dozens of specimens and associated herbarium vouchers for development of a phytolith reference collection.

Dr. **Nori Yoshikawa,** a post-doc at the University of Washington in Seattle, visited to collect *Hibbertia scandens, Dillenia,* and *Aextoxicon punctatum.* His main object is to find where in the phylogeny of angiosperms particular genes (the RPB2) are duplicated.

—Holly Forbes

Recognition

Contributions received from 2/01/2001 up to and including 4/15/2001.

New Members

The Garden wishes to thank our new Individual and Family Members:

Ms. Shellie Albright & Mr. Scott Emmett
Mrs. Monica Baldzikowski
Ms. Margo W. Barry
Mrs. Wendy S. Bergman & Mr. Robert G. Bergman
Ms. Barbara Bonar
Ms. Suzanne M. Briley
Ms. Michaela Brockstedt
Dr. and Mrs. Daniel Callahan
Ms. Dwyn Daniels Robbins
Mr. and Mrs. Randy Davis
Mrs. Lois De Domenico
Mr. Bob Deloria
Ms. Carmel Drudy
Ms. Anna Eastwood
Ms. J. M. B. Edwards
Dr. and Mrs. Ray Eggs
Mr. Raymond Ford
Mr. Sam Foushee
Ms. Gloria Galindo
Ms. Judith E. Garvens
Mr. Kent N. Garvens
Mr. Patrick Gavin Duffy
Ms. Penelope E. Gordon
Ms. Anna Greenwood
Ms. Alix Greenwood
Ms. Jeane Hamilton-Lecky
Mr. and Mrs. Alan Hoben
Ms. Lynne Hosley
Mr. and Mrs. David Huang
Ms. Laura J. Kainik
Ms. Gretchen Kell
Ms. Sydney Kuntz
Ms. Marie C. Lagarde
Ms. A. Linn & Mr. K. Henderson
Ms. Kiamara Ludwig
Ms. Caren Maghrebian
Ms.Pradeep & Mr. Kanik Mathew
Ms. Helen McKinley
Mrs. Laura Miller & Mr. Dave Miller
Mr. Charles L. Morgan
Ms. Alexandra Moss
Ms. Phyllis Peacock
Ms. Phyllis Porter & Ms. Nora Underwood
Ms. Delaine Renard & Mr. Bruce Bedortha
Ms. Janet A. Rudolph
Ms. Jeanine Sidran
Mr. Steve Sivier
Ms. Jean Smith
Ms. Laura Sumka
Ms. Anita L. Thomas
Mr. Dan Vieira
Ms. Virginia C. van Colden
Mr. Whitney Vosburgh
Ms. Herta Weinstein
Ms. Karen Wenon
Ms. Charlotte Woody

Grateful Thanks

The Garden thanks these new members for their substantial gifts over and above membership:

Ms. Pam Barker
Mr. and Mrs. David Benning
Ms. Beth Burnside
Mr. and Mrs. Ronald Clendenen
Mr. and Mrs. Fred Dengler
Mr. and Mrs. Jack Dalhstrom
Dr. and Mrs. A. Carl Helmholz
Ms. Fonda Kardini
Mr. and Mrs. Ron Lai
Mr. Jim Lovekin & Prof. Iris Tommelein
Mr. and Mrs. Geoff Machin
Mr. and Mrs. Shiner McDonald
Mr. Bill McJohn
Mr. Ron Morrison
Ms. Sally O'Connell
Ms. Ann Reynolds
Mr. and Mrs. Weldon Rucker
Mr. Bernard Taper & Ms. Gwen Head
Ms. Carol Thompson & Mr. Roderic Duncan
Mr. and Mrs. William D. Watkins
Mr. Stewart Winchester
Mr. Thomas (Rex) Wolf

In Appreciation

The Garden offers appreciation and thanks to these donors for their generous contributions:

Mr. and Mrs. Earl Hamlin
Dr. and Mrs. A. Carl Helmholz
Mr. Bernard Taper & Ms. Gwen Head
Mr. Stewart Winchester
(Orradeff Fund for Garden Interpretation & Docent Activities)

In Memory

The Garden offers appreciation and thanks for gifts from these donors in memory of:

Shih Ning Chen from:
Mr. & Mrs. Kenneth Palladino
(Chinese Medicinal Herb Garden)

Jean & Earl Hyde from:
Mr. and Mrs. Harry Heckman
(Myrtle Wolf Library)

Josephine Tonge Larson from:
Mr. and Mrs. Bill Bade
(Myrtle Wolf Library)
Mr. Ellen Felker
Ms. Elenor Malkey
Ms. Mildred J. O'Connor
Ms. Jean Portello
Ms. Jacqueline Woodfill & Mr. John Woodfill
(Myrtle Wolf Library)

James Harrold Van Sicklen from:
Mr. and Mrs. Richard Amundson
Mr. and Mrs. Bill Bade
(Entrance Improvement)
Mr. Michael Gilmore & Family
Mr. Bruce Hayes
Mr. & Mrs. R. Sheldon Milligan, Jr.
Mr. John P. Stock

Gifts In Kind

The Garden offers appreciation and thanks for gifts in kind:

Ms. B. Sonja Ahuna
Ms. Mary Lynn Cox
Ms. Louise Darton
Mrs. Myrtle Wolf

WISHLIST

The Garden particularly thanks Dr. and Mrs. David Reiffel for their contributions of a sofa and a projector for the new Center for the Study of Plant Conservation.

This issue we are asking our readers if they could support us by donating:

- A "point and shoot" camera
- Card tables

If you can donate, please call (510) 643-2937—we would appreciate the help.

Pictured after receiving their awards from the Director at the recent ceremony are: (Back, left to right) John Domzalski, Judith Finn, Jerry Parsons, Peter Klement, Gerald Ford. (Front, left to right) Elaine Sedlack, Nancy Swearengen, Holly Forbes and Dr. Ellen Simms, Garden Director.

Staff Members Honored

Various members of the Garden staff were recently recognized and applauded for their many years of service. Director Ellen Simms commented that the Garden is the envy of many campus units for the longevity of its staff! University service award pins were given to **Holly Forbes, Gerald Ford, Jerry Parsons** and **Nancy Swearengen** for 10+ years of service; to **Elaine Sedlack** for 15+ years; to **Peter Klement** and **Roger Raiche** for 20+; and to **John Domzalski** for 25. **Judith Finn** had already received her 25-year pin! Congratulations to all you long-timers!

Noteworthy Donations…

The Garden Library received several donations of books and journals. **Mrs. Mary Lynn Cox** donated over 130 books on garden design, horticulture, and botanical subjects. **Mrs. Myrtle Wolf,** donated a complete run of *Pacific Horticulture Magazine*, many issues of the *Journal of the California Horticultural Society*, several volumes of the *Bulletin* of the American Rock Garden Society, the early issues of *The Four Seasons* (journal of the Regional Parks Botanic Garden), and *Fremontia* (journal of the California Native Plant Society), among others. Additional donations of books for the library were made by **Mrs. Sonja Altena** and **Ms. Louise Dutton.** Thank you very much indeed!

GARDEN STAFF

Dr. Ellen Simms, *Garden Director*

ADMINISTRATION
Alison Navid, Administrative Assistant
Margaret Richardson, *Tour & Rentals Coordinator*
Michael Rimar, *Administrative Assistant*
Candice Schurr, *Business Operations Supervisor*
Nancy Swearengen, *Volunteer Services Coordinator*
Janet Williams, *Marketing & Development Officer*
Leslie Wozniak, *Visitor Services Specialist*

COLLECTIONS & HORTICULTURE
Dr. Christopher Carmichael,
Manager of Collections and Horticulture
Holly Forbes, *Curator*
Barbara Keller, *Curatorial Assistant*
Anthony Garza,
Supervisor of Horticulture and Grounds
John Domzalski, *Propagator*
Judith Finn, *Horticulturist*
Peter Klement, *Horticulturist*
Lawrence Lee, *Horticulturist*
Jerry Parsons, *Horticulturist*
Dr. Robert Raabe, *Garden Pathologist*
Roger Raiche, *Horticulturist*
Eric Schulz, *Horticulturist*
Elaine Sedlack, *Horticulturist*
Nathan Smith, *Horticulturist*
Gerald Ford, *Building and Grounds Maintenance*

EDUCATION
Dr. Jennifer White, *Associate Director for Education*
Christine Mansour, *Program Assistant*

FACULTY ADVISORY COMMITTEE
Dr. Nan Crystal Arens, *Integrative Biology*
Dr. Lewis Feldman, *Plant Biology*
Dr. Joe McBride, *Environmental Science, Policy, & Management*
Dr. Brent Mishler, *Integrative Biology*
Dr. Vincent Resh, *Environmental Science, Policy, & Management*
Dr. Alan Smith, *Herbarium*

NEWSLETTER
Janet Williams, *Editor*

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Director's Office 643-8999
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Plant Collections 643-8040
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CALENDAR OF EVENTS

TREES AND SHRUBS OF CALIFORNIA
We are pleased to help launch a new book from University of California Press, Trees and Shrubs of California by two distinguished faculty members from Humboldt State University, John Stuart, Professor of Forestry and John Stewart, Professor of Botany. Both authors will be with us, to share highlights of their research, and to sign copies of their book. Also on hand will be their illustrator, Andrea Pickart, exhibiting samples of her work.
Wednesday, June 13, 7:30 pm
Free
Registration requested

TWILIGHT TOURS
Celebrate the long evenings of summer with us in the Garden. Members of our horticulture staff will share their favorite spots and special insights about the Garden on Wednesday evenings at 5:30 pm. Each walk will be different, so plan to come every week during July, beginning July 11, and every week during August.
Free with Garden admission.

University of California Botanical Garden

Second Annual Garden Party

Please Join Us!

Enjoy fabulous food, wine and music,
stroll around the Garden at the peak of its glory,
and tour the newly renovated South African Desert Habitat.
At 4 PM we'll celebrate the opening of
the new Desert Greenhouse!

Saturday, June 16, 2001, 3 - 6 PM

Your reservation will be acknowledged by postcard. Please bring postcard to the event.

To register for any program or event*, call 510-643-2755.

University of California Botanical Garden
200 Centennial Drive, #5045
Berkeley, California 94720-5045

Address Service Requested

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Plants are for sale at *The Garden Shop* all year. Call 510-642-3343

C. f0327896

5.23. Appendix W - Partition Tables

```
Command (m for help): F

Unpartitioned space johnDoe.dd: 2.5 GiB, 2620145664 bytes, 5117472 sectors
Units: sectors of 1 * 512 = 512 bytes
Sector size (logical/physical): 512 bytes / 512 bytes

  Start      End Sectors  Size
6137856 11255327 5117472  2.5G

Command (m for help): p
Disk johnDoe.dd: 5.4 GiB, 5762727936 bytes, 11255328 sectors
Units: sectors of 1 * 512 = 512 bytes
Sector size (logical/physical): 512 bytes / 512 bytes
I/O size (minimum/optimal): 512 bytes / 512 bytes
Disklabel type: dos
Disk identifier: 0xddb8ddb8

Device      Boot Start     End Sectors  Size Id Type
johnDoe.dd1 *       63 6136829 6136767  2.9G  7 HPFS/NTFS/exFAT
```

```
Terminal
admin@H55:~/Desktop$ mmls johnDoe.dd
DOS Partition Table
Offset Sector: 0
Units are in 512-byte sectors

      Slot      Start        End          Length       Description
000:  Meta      0000000000   0000000000   0000000001   Primary Table (#0)
001:  -------   0000000000   0000000062   0000000063   Unallocated
002:  000:000   0000000063   0006136829   0006136767   NTFS / exFAT (0x07)
003:  -------   0006136830   0011255327   0005118498   Unallocated
admin@H55:~/Desktop$
```