

#WWDC18

# Advanced Dark Mode

Session 218

Matt Jacobson, Cocoa Frameworks

Jeff Nadeau, Cocoa Frameworks

Calendars + [Download]

Day Week Month Year

Search

# June 6, 2018

Wednesday

all-day

9 AM

9:41 AM **Coffee with Kate** 10250 Bandley Dr Cupertino, CA, United States

10 AM

11 AM

11 AM **Contract Review with Allison**

Noon

1 PM

2 PM

2:30 PM **Review Presentation with Susan**

3 PM

4 PM

5 PM

5:30 PM **Adam's Piano lesson**

6 PM

7 PM

8 PM

S	M	T	W	T	F	S
27	28	29	30	31	1	2
3	4	5	6	7	8	9
10	11	12	13	14	15	16
17	18	19	20	21	22	23
24	25	26	27	28	29	30
1	2	3	4	5	6	7

Coffee with Kate Personal

Search

## Summer Trip

- Submit vacation request
- Meet with Anna and James to plan tr...
- Borrow Rachel's binoculars
- Buy extra AA batteries
- Check sunscreen expiration date
- Buy new hiking boots
- Pack passport
- Find a good water filter

Scheduled

iCloud

Reminders

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Documents — Local

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**District Market**  
PDF document - 6 MB

Tags **Green** Important

Created May 11, 2018 at 3:20 PM

Modified May 11, 2018 at 3:20 PM

Last opened May 11, 2018 at 3:20 PM

Version 1.4

Pages 6

Resolution 612 x 792

Security None

Content Creator Pages

Encoding software Mac OS X 10.14 Quartz PDFContext

Add Password More...

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- iCloud Drive

Tags

- Red
- Orange
- Yellow
- Green
- Blue
- Purple
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- All Tags...

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# Adopting Dark Mode

Build with macOS 10.14 SDK

Dynamic colors

Template images

Materials

Asset Catalog assets in Xcode 10

# Adopting Dark Mode

Build with macOS 10.14 SDK

Dynamic colors

Template images

Materials

Asset Catalog assets in Xcode 10

# Adopting Dark Mode

Most UI will look great using just those techniques

Some cases may require more work

We'll explore those in this session

Appearance

Materials

Vibrancy

Background styles

Backward deployment

Tips and tricks

Appearance

Materials

Vibrancy

Background styles

Backward deployment

Tips and tricks





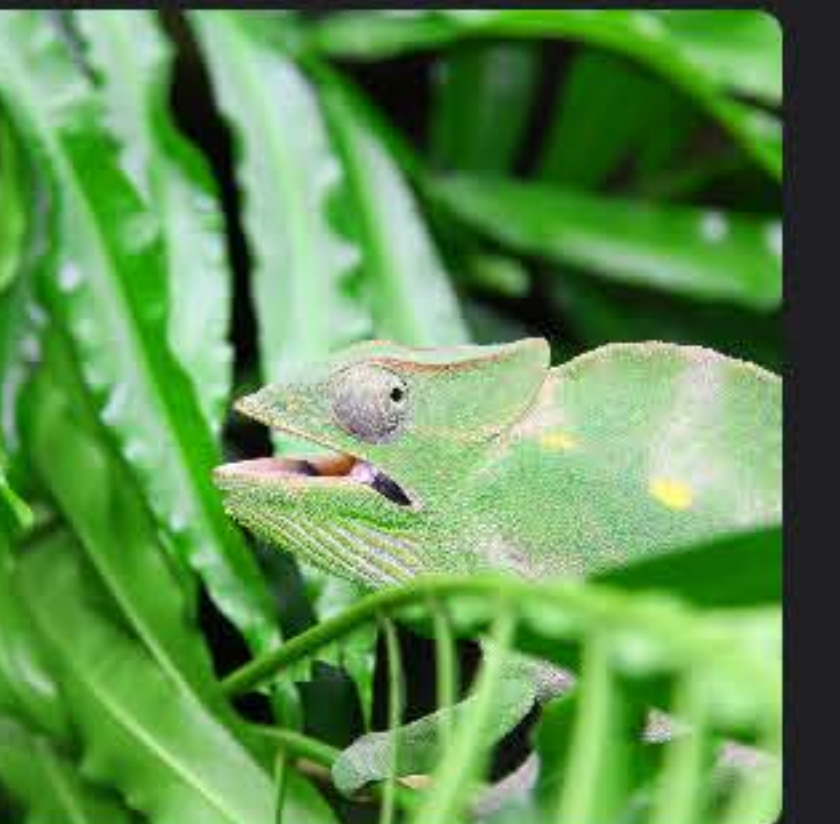





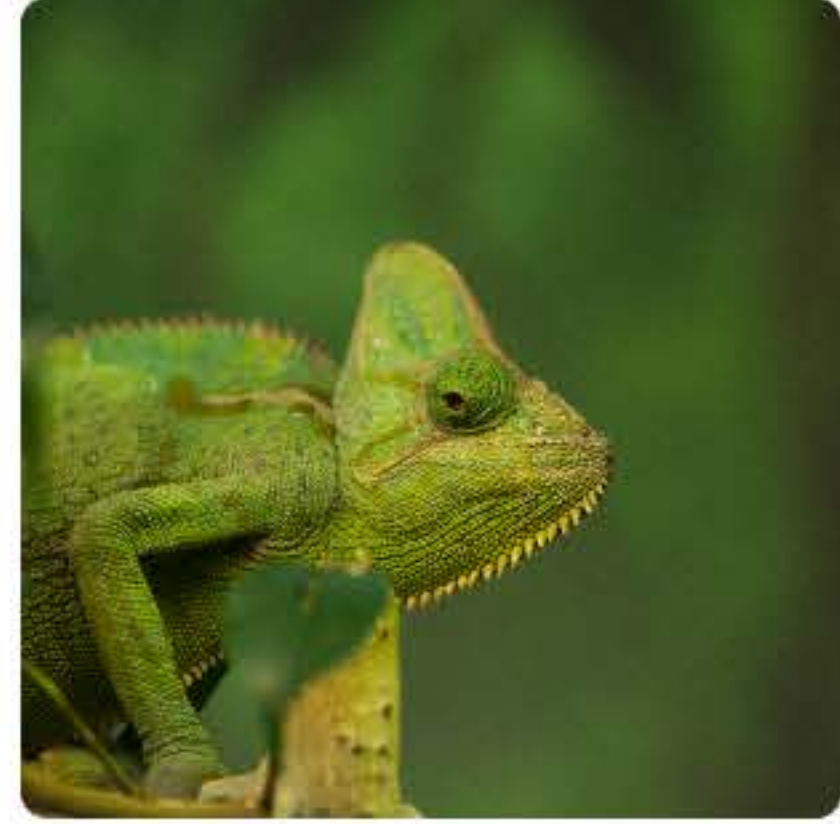



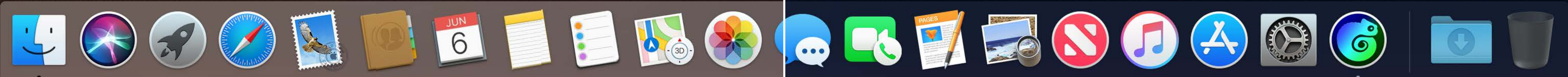
Chameleons

- Chadwick
- Chloe
- Chuy
- Chelsey
- Chevy
- Chiwetel
- Chester
- Chubs
- Cleopatra
- Charlotte

Chloe  
2 years old

Photos
Vitals
Notes



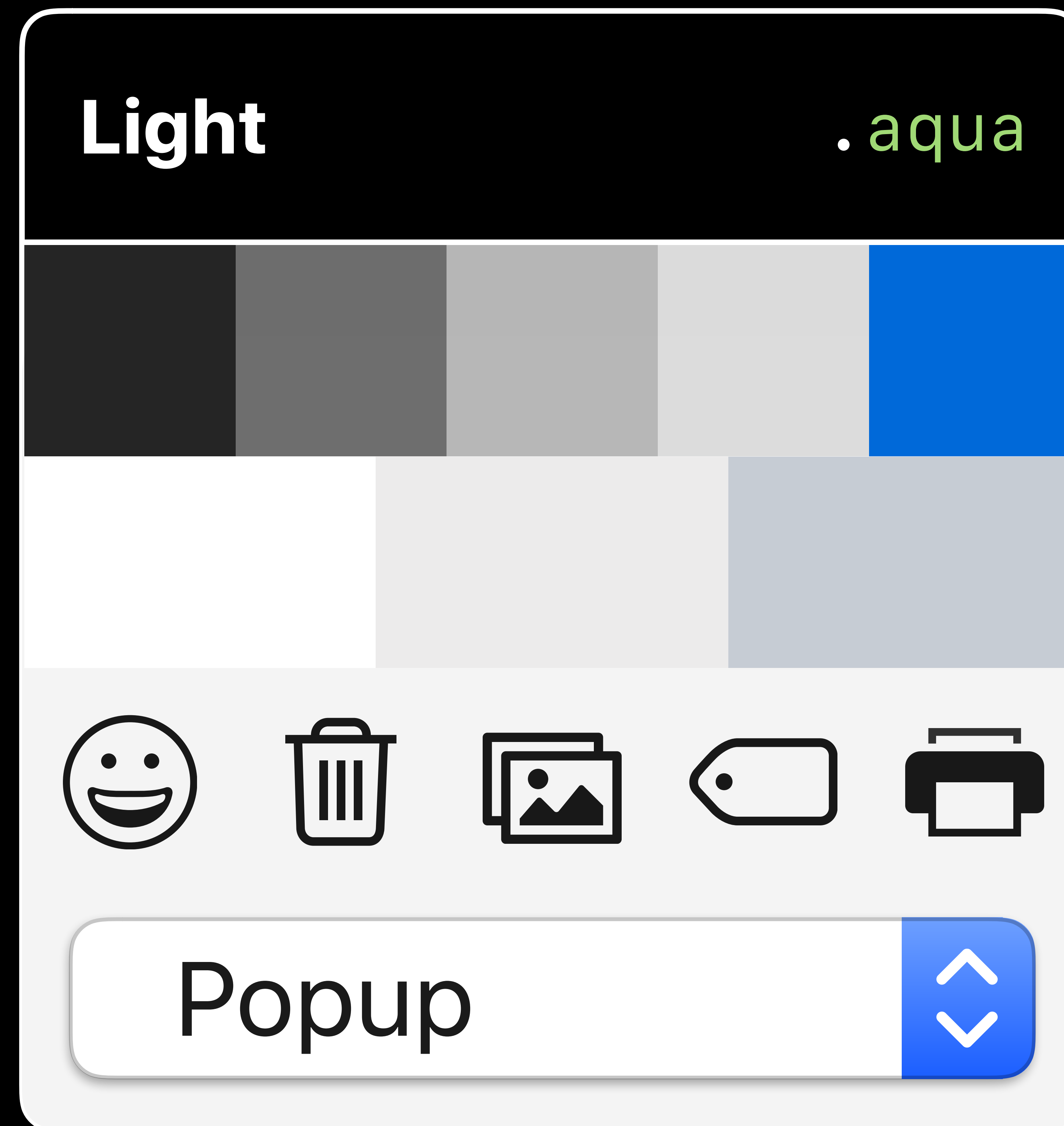
# NSAppearance

Cocoa's UI theme system

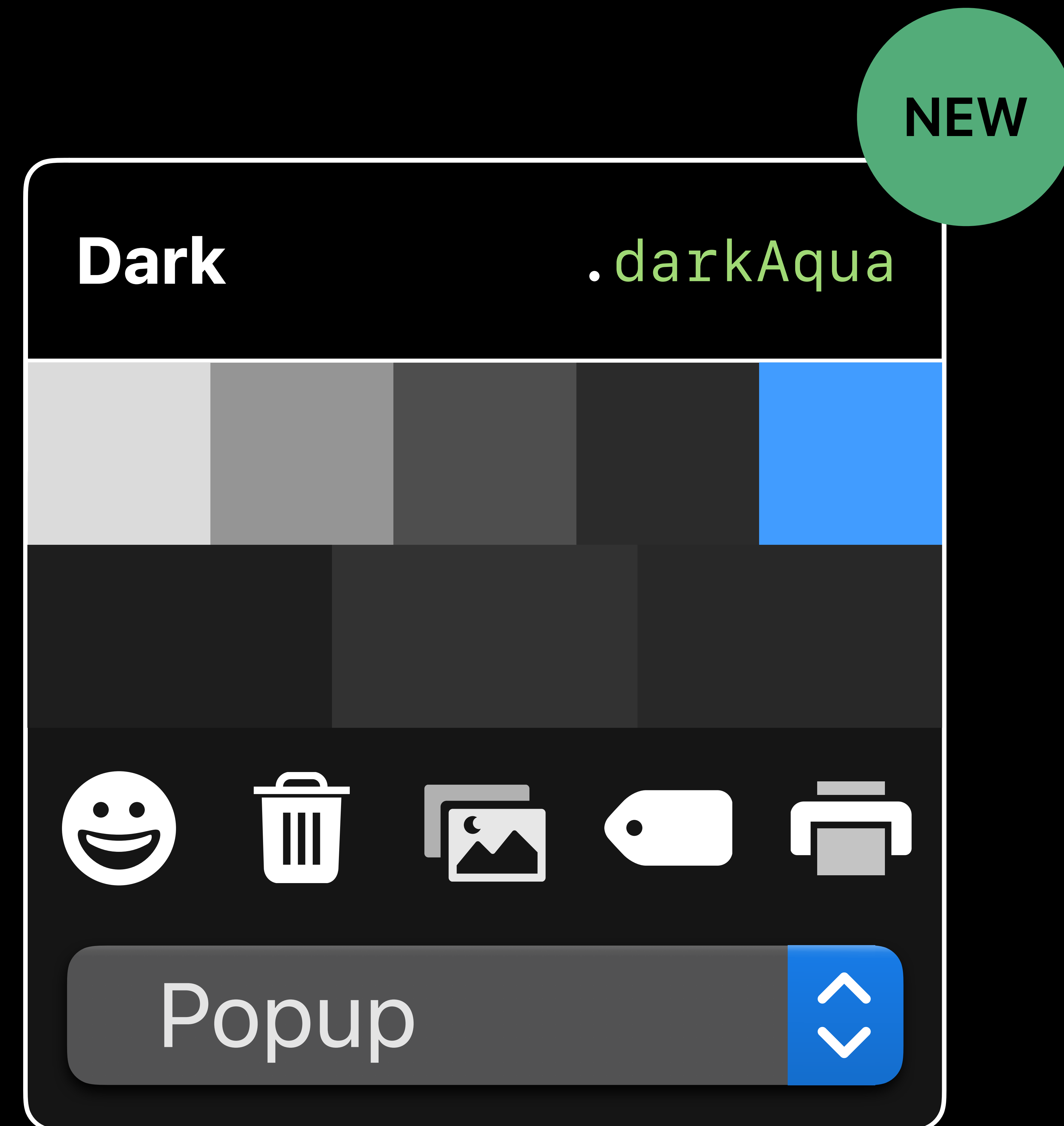
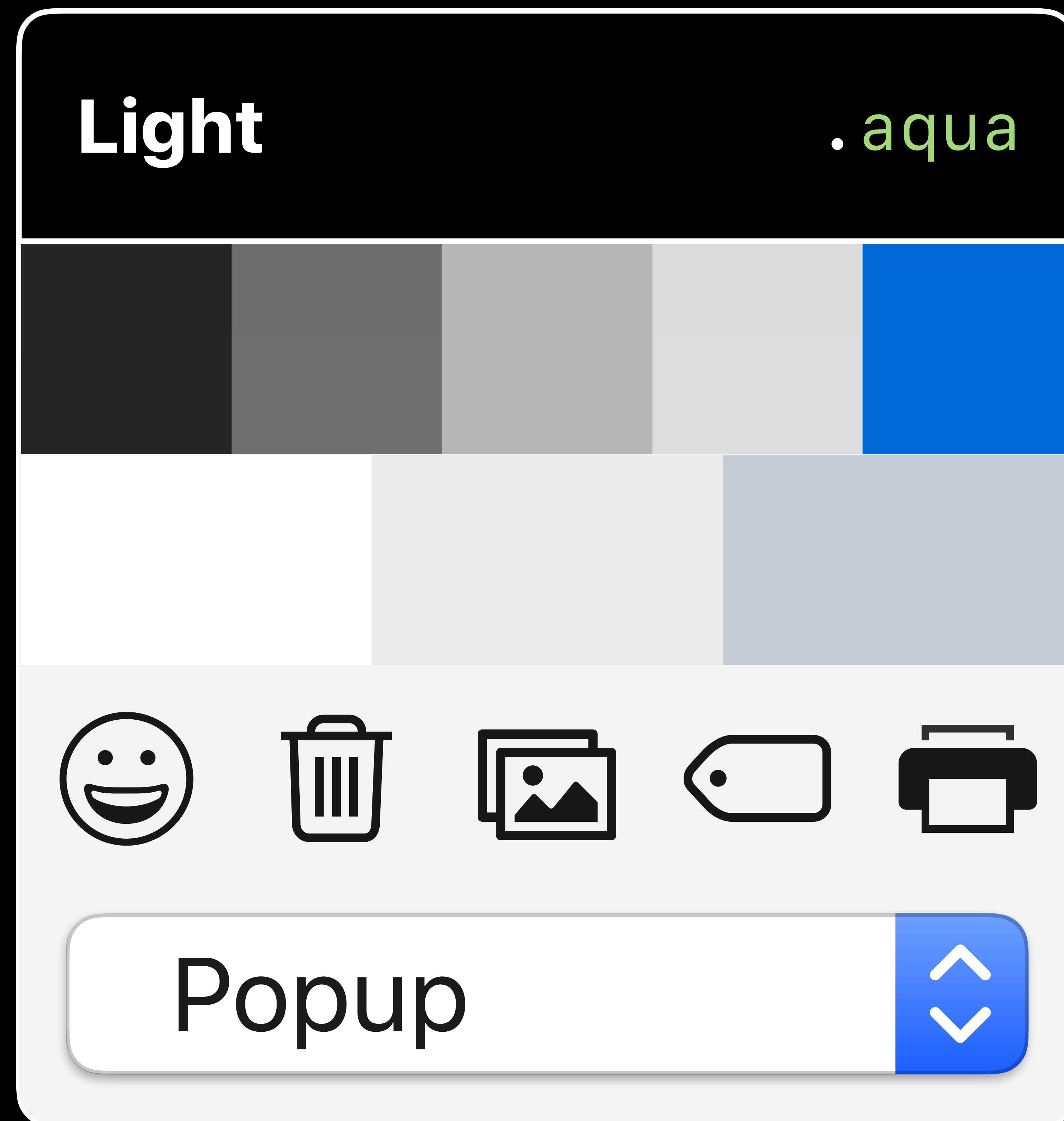
One view hierarchy for both light and dark

Underlies Dark Mode, High Contrast mode, and Touch Bar

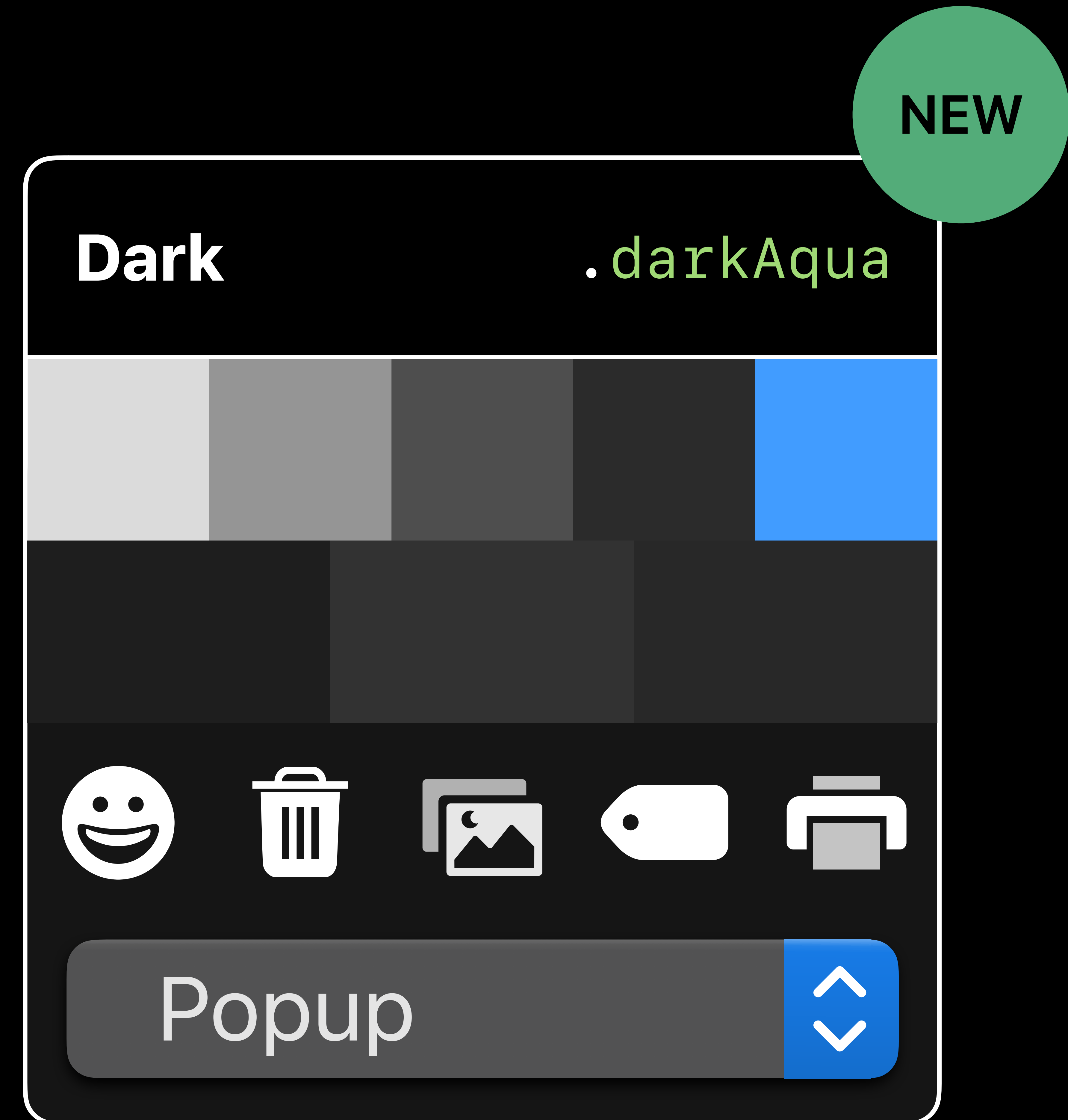
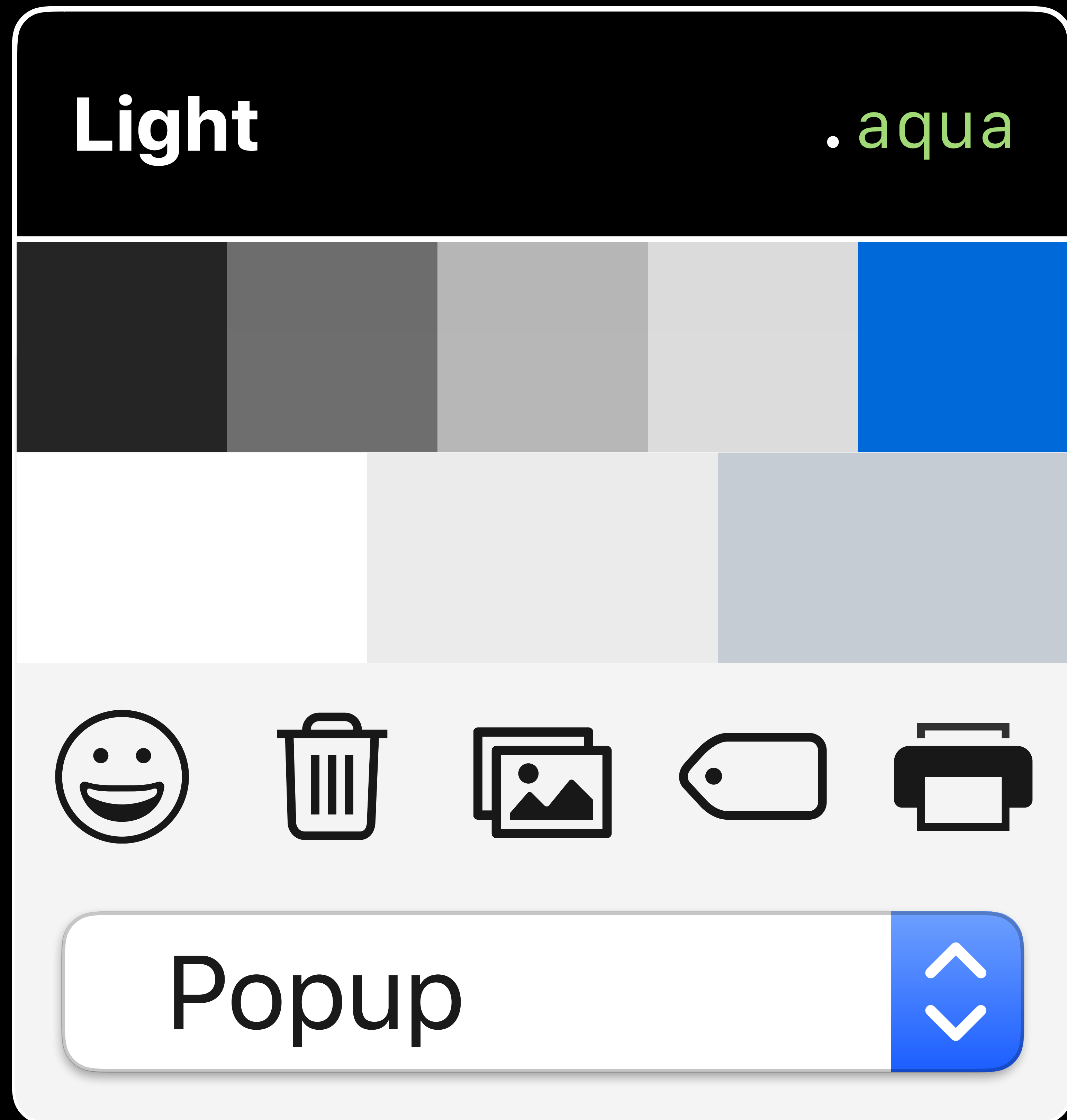
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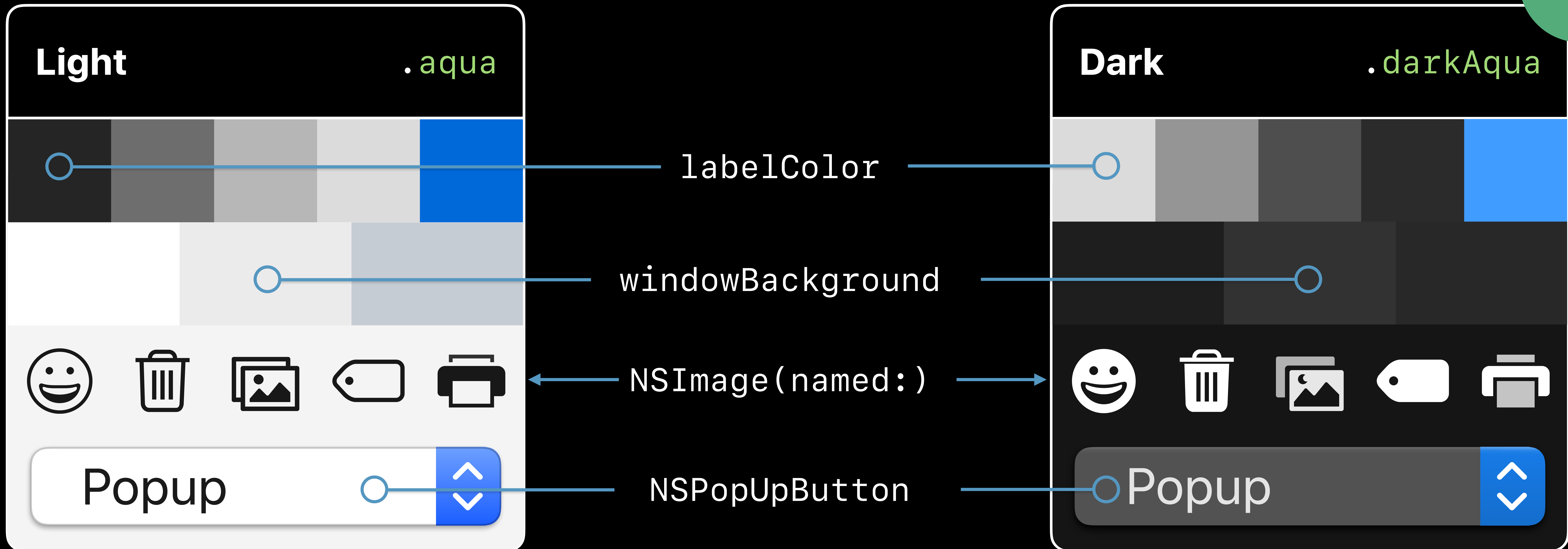


# NSAppearance



# NSAppearance

NEW



Chameleons

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- Chloe**
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## Chloe

2 years old

Photos Vitals **Notes**

**June 4, 2018**  
Chloe was very good today. She watched me practice my presentation and only fell asleep *twice*! Either I'm getting better or she's being more patient.

**June 1, 2018**  
Today Chloe was feeling a little green. I think she must have a bug or something. The doctor said it was nothing to worry about, and to just make sure she gets plenty of water. 🚰

**May 25, 2018**  
Tuesday! Took Chloe and Chester to the chameleon park today. Chloe got along great with all the chameleons in the neighborhood. It was very colorful!!!

**May 18, 2018**  
Chloe's second birthday 🎂🎁🎉  
We got her a dozen crickets.

**May 14, 2018**  
Looked around for Chloe for three hours. Turns out she was just blending into my **shirt** the whole time 😊

**May 9, 2018**  
Chloe got a bath today.  
🛁

**May 8, 2018**  
It turns out that there is a such thing as Chameleon flu. Had to give Chloe 5 spritzes from the water bottle to cool her down.

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**Dark Aqua**

A color calibration tool showing a grayscale gradient, a color bar with blue and red, and a white/black checkerboard pattern.



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**Dark Aqua**

# NSAppearanceCustomization

Adopted by NSView and NSWindow

In 10.14, NSApplication conforms too

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// Specify an appearance, or nil (by default) to inherit from parent
var appearance: NSAppearance?

// Appearance used for drawing, possibly inherited
var effectiveAppearance: NSAppearance { get }
```

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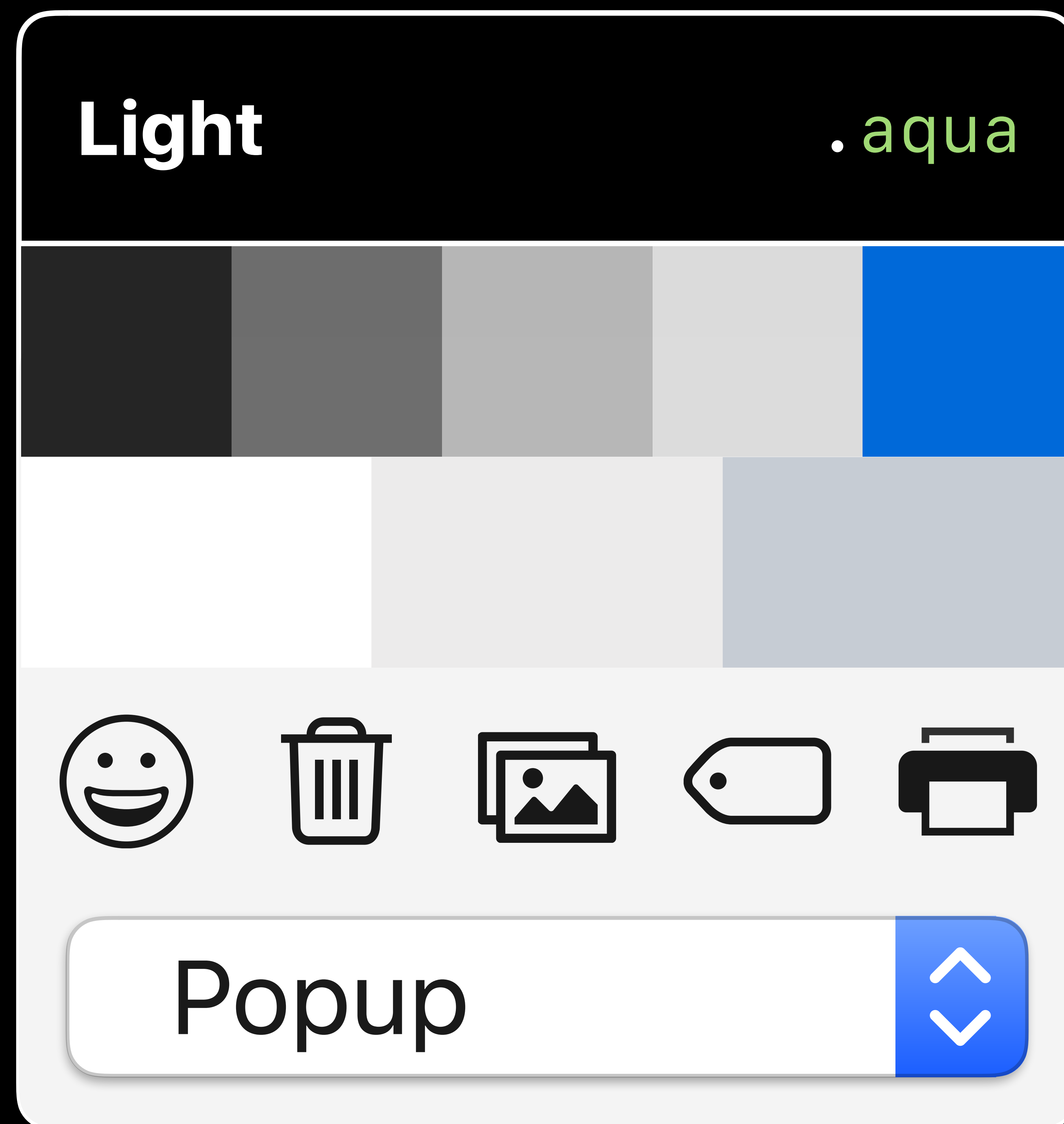
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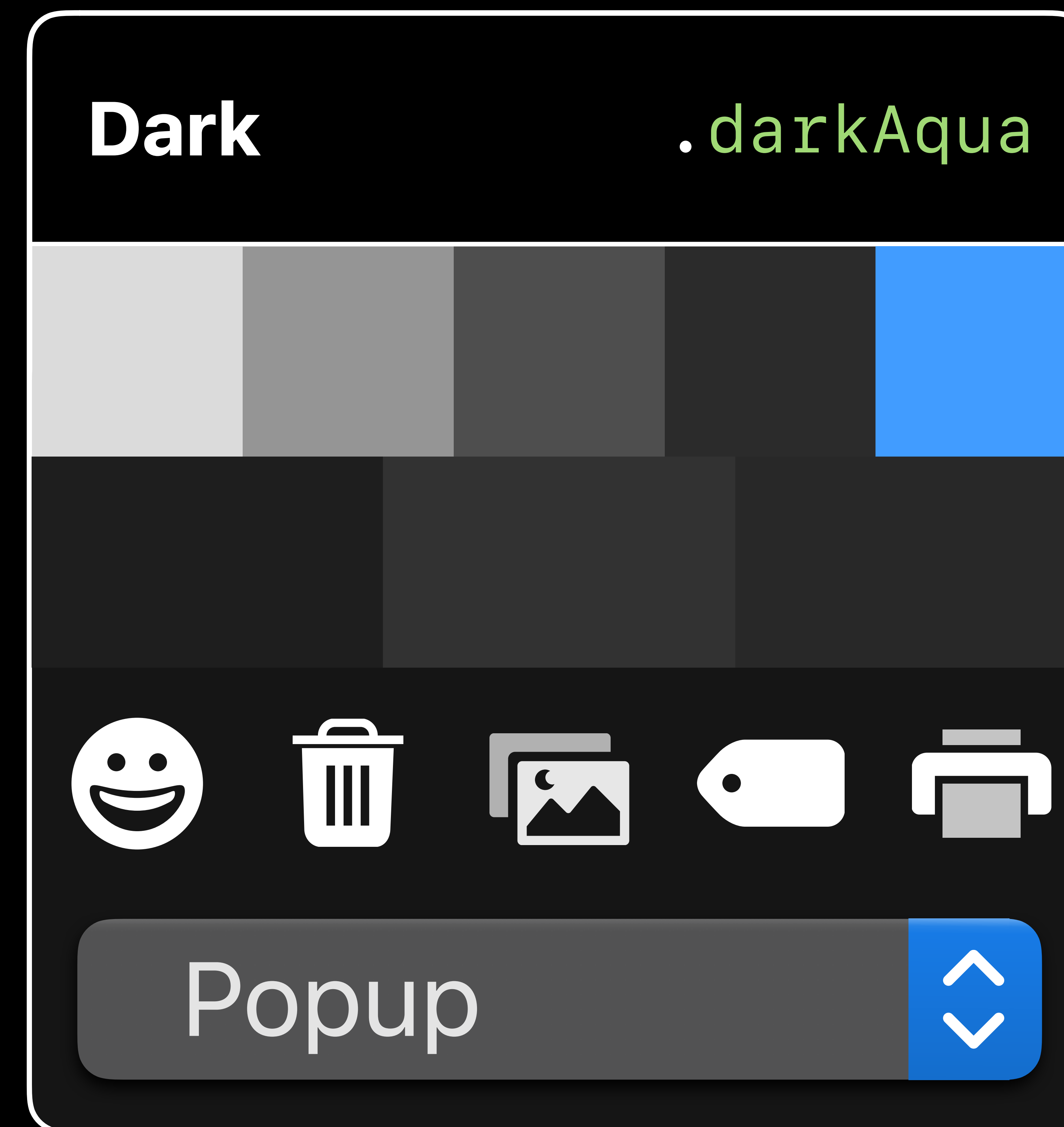
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# NSAppearance



NSAppearance(named: .aqua)



NSAppearance(named: .darkAqua)

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```
textView.appearance = NSAppearance(named: .aqua)
```

**Chloe**  
2 years old

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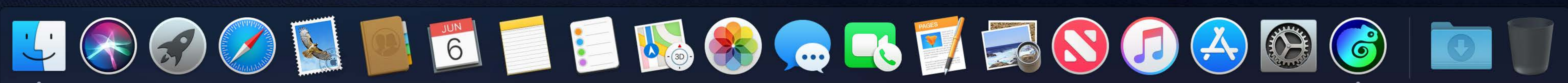
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# Appearance Source


NEW

Makes a window inherit appearance from another object

```
extension NSWindow {  
    var appearanceSource: NSAppearanceCustomization!  
}
```

Assign `nil` to reset to default inheritance


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childWindow.appearanceSource = textView
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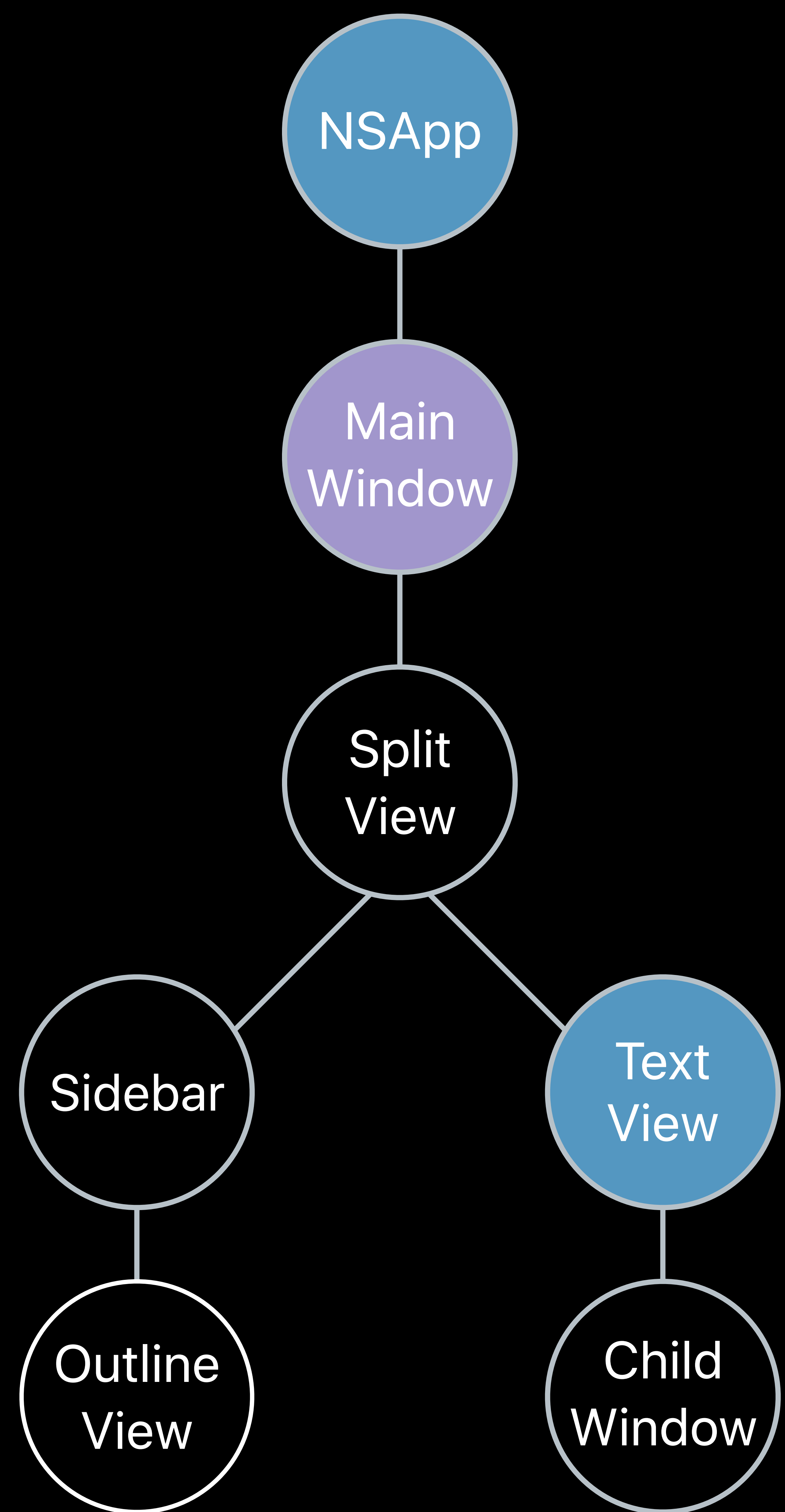
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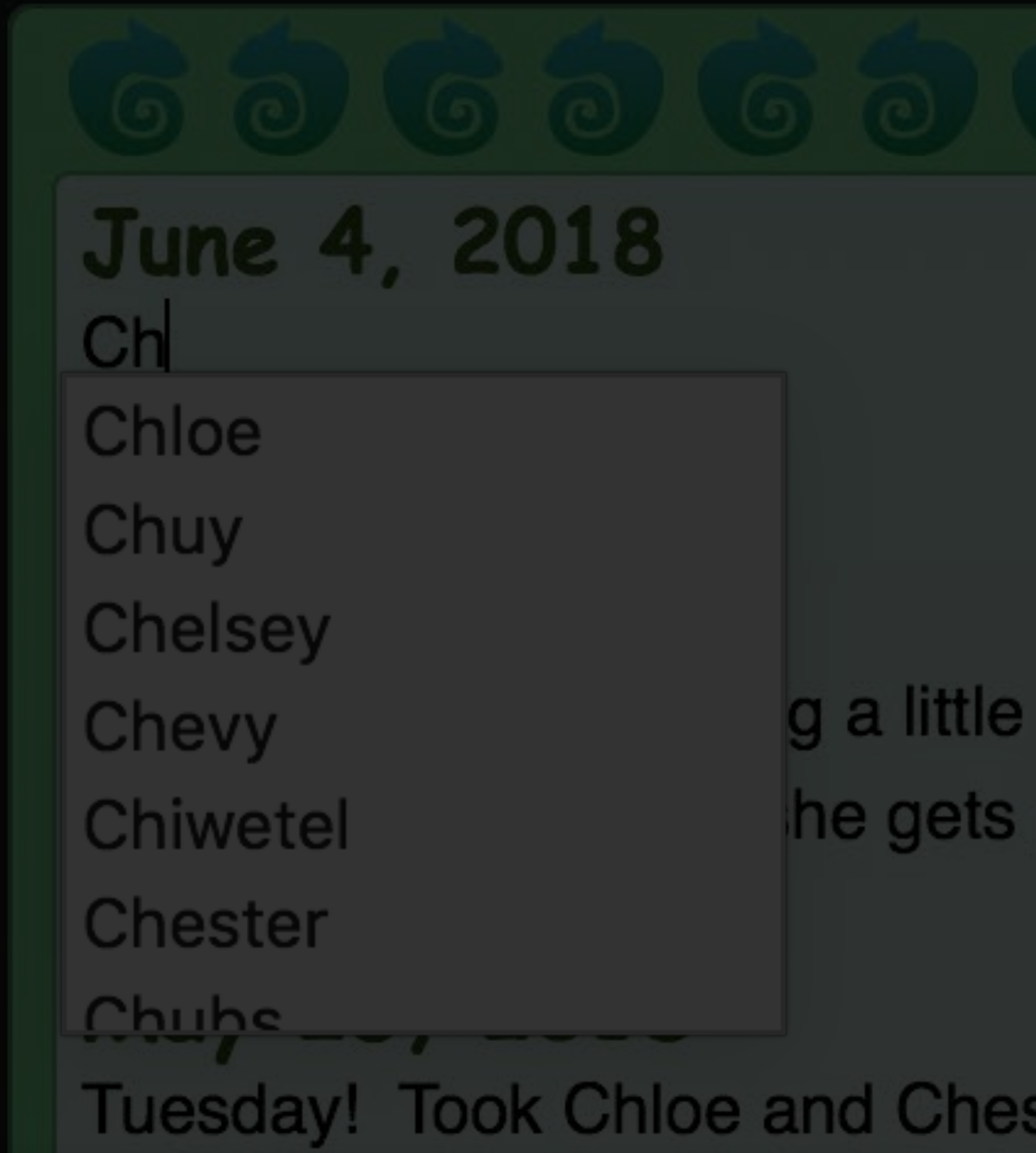
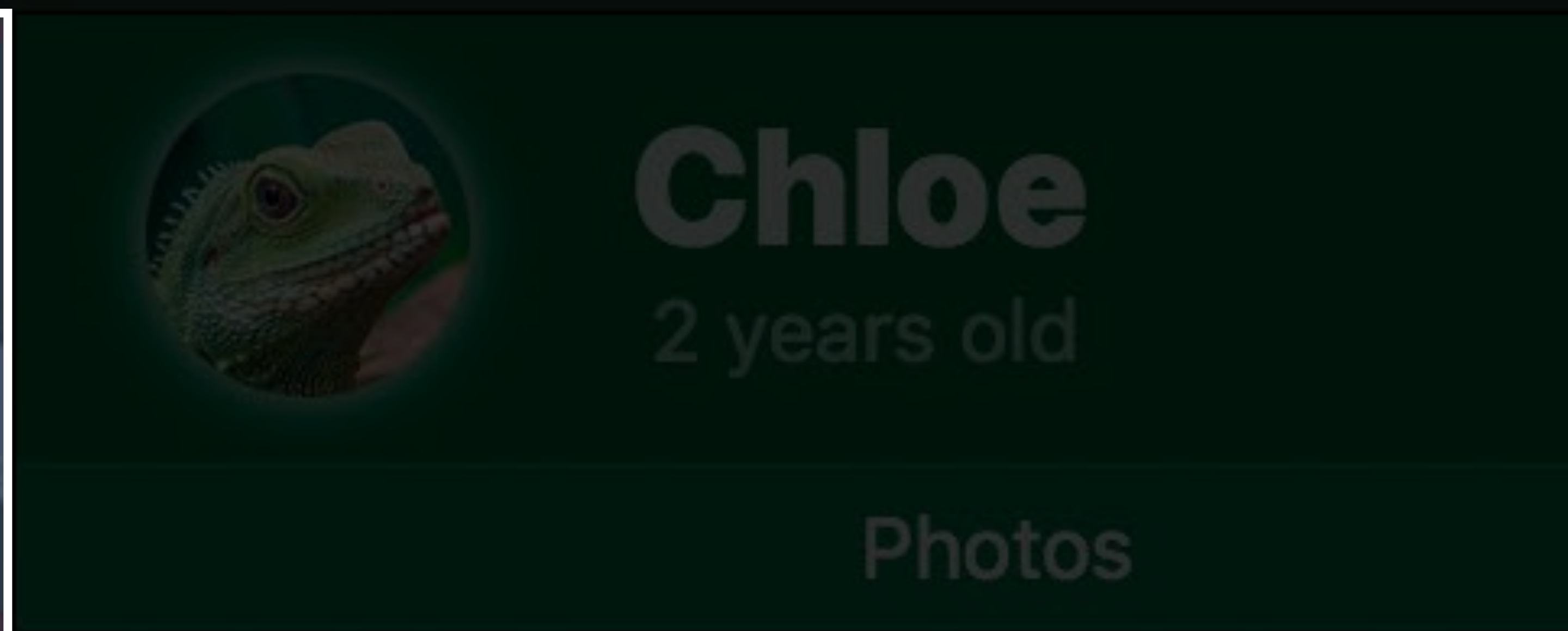
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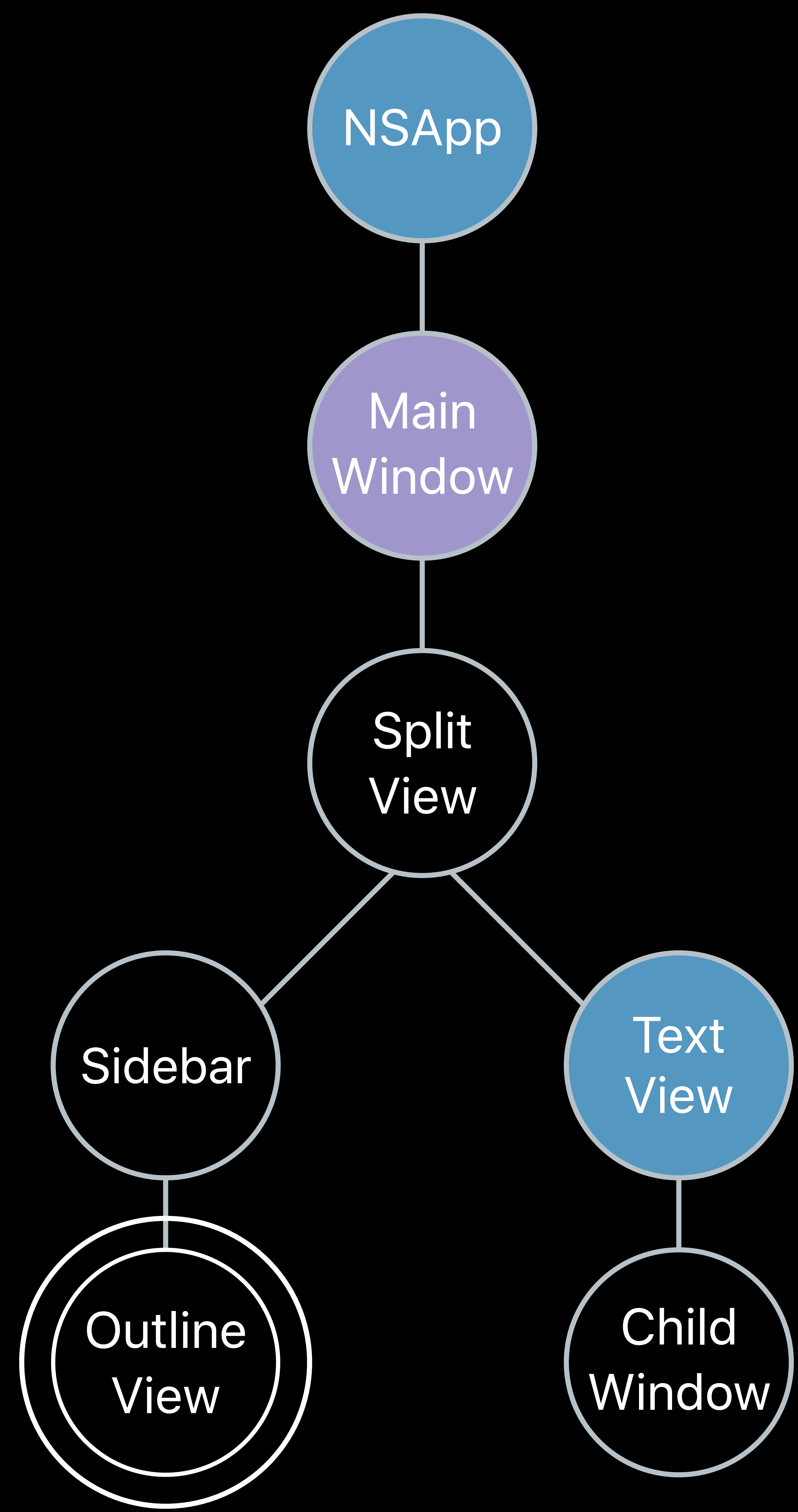
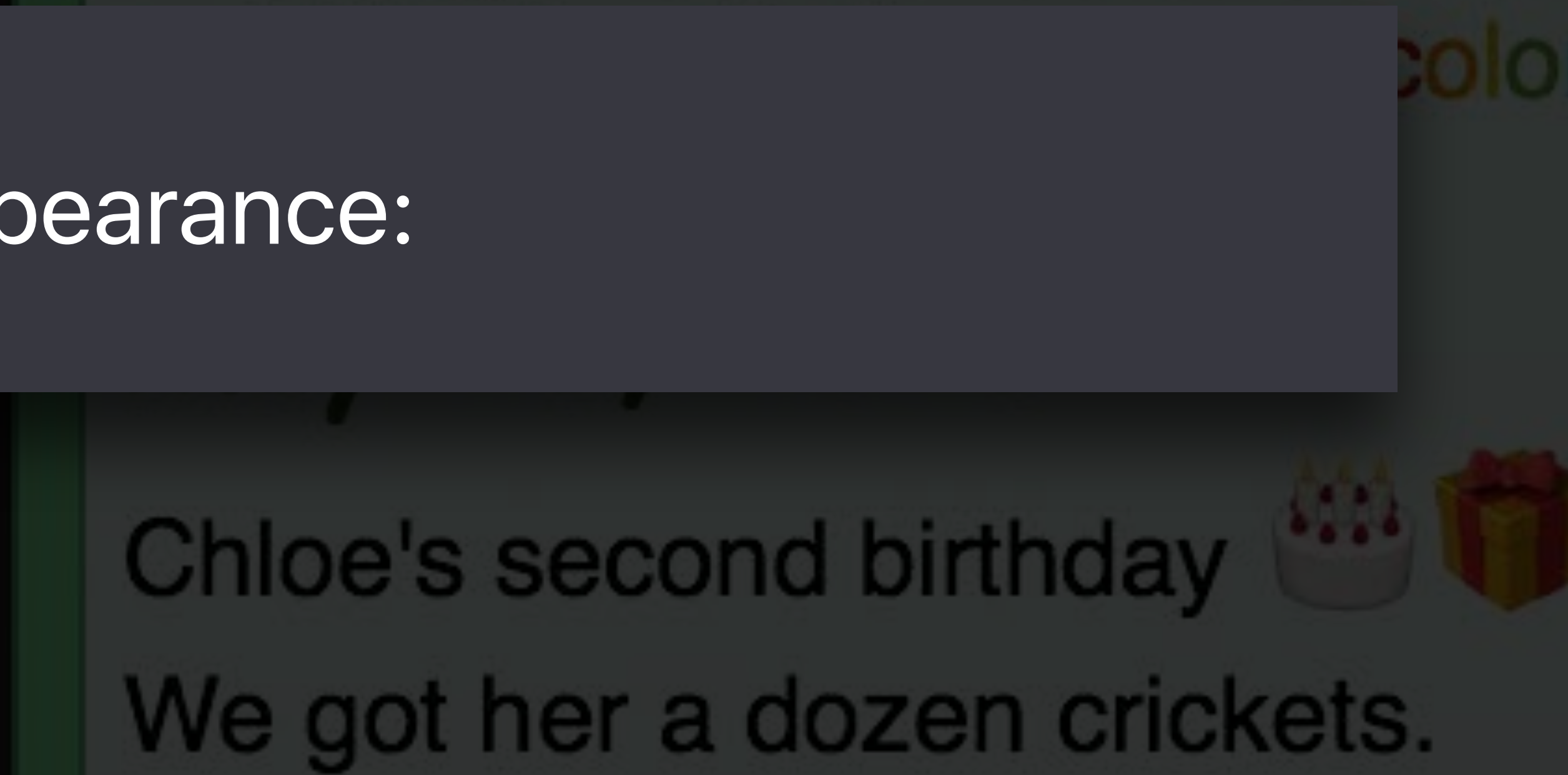




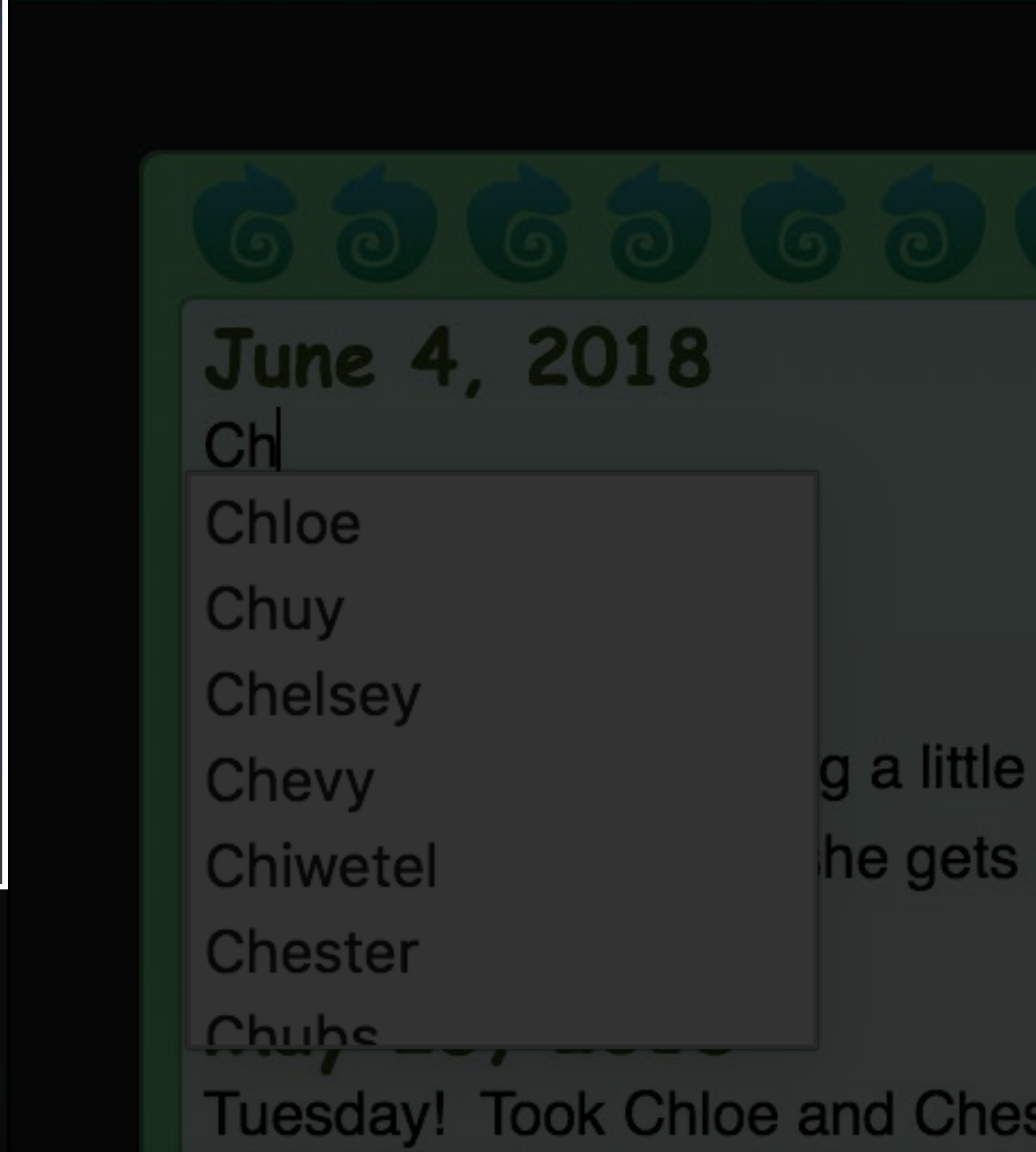
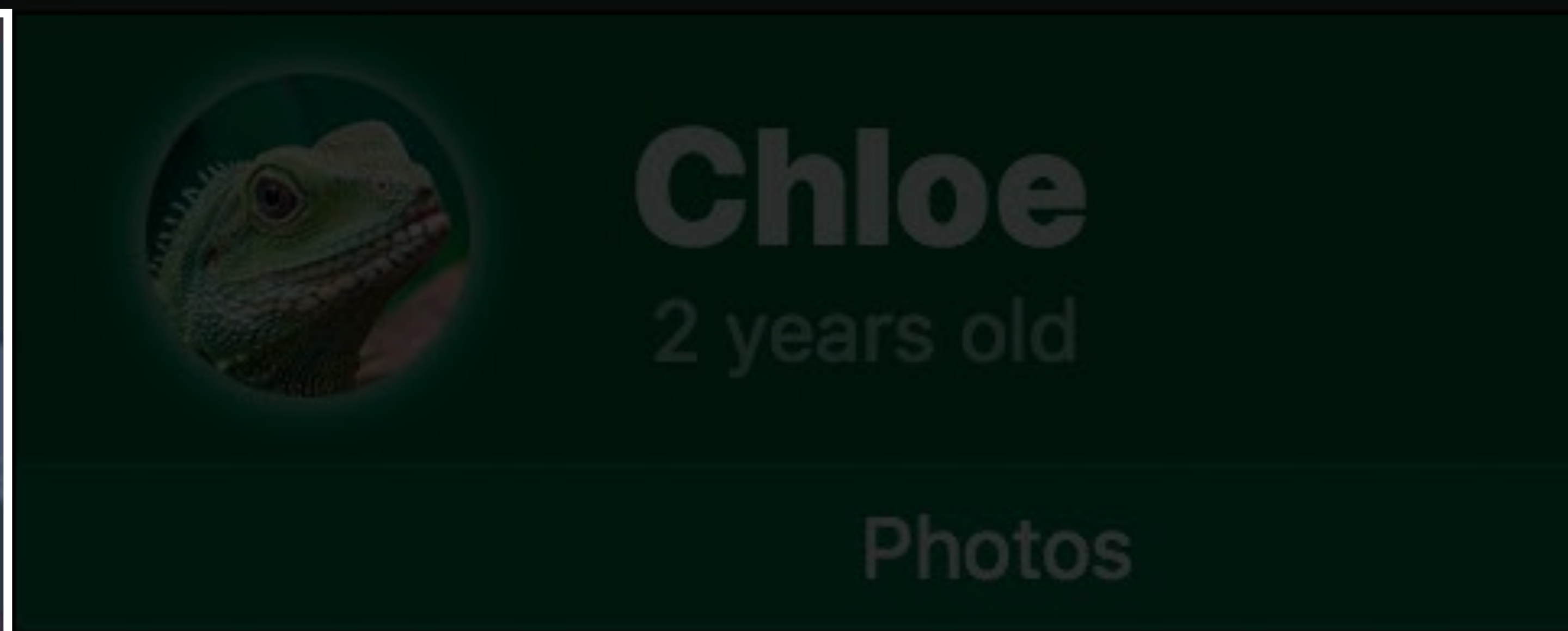
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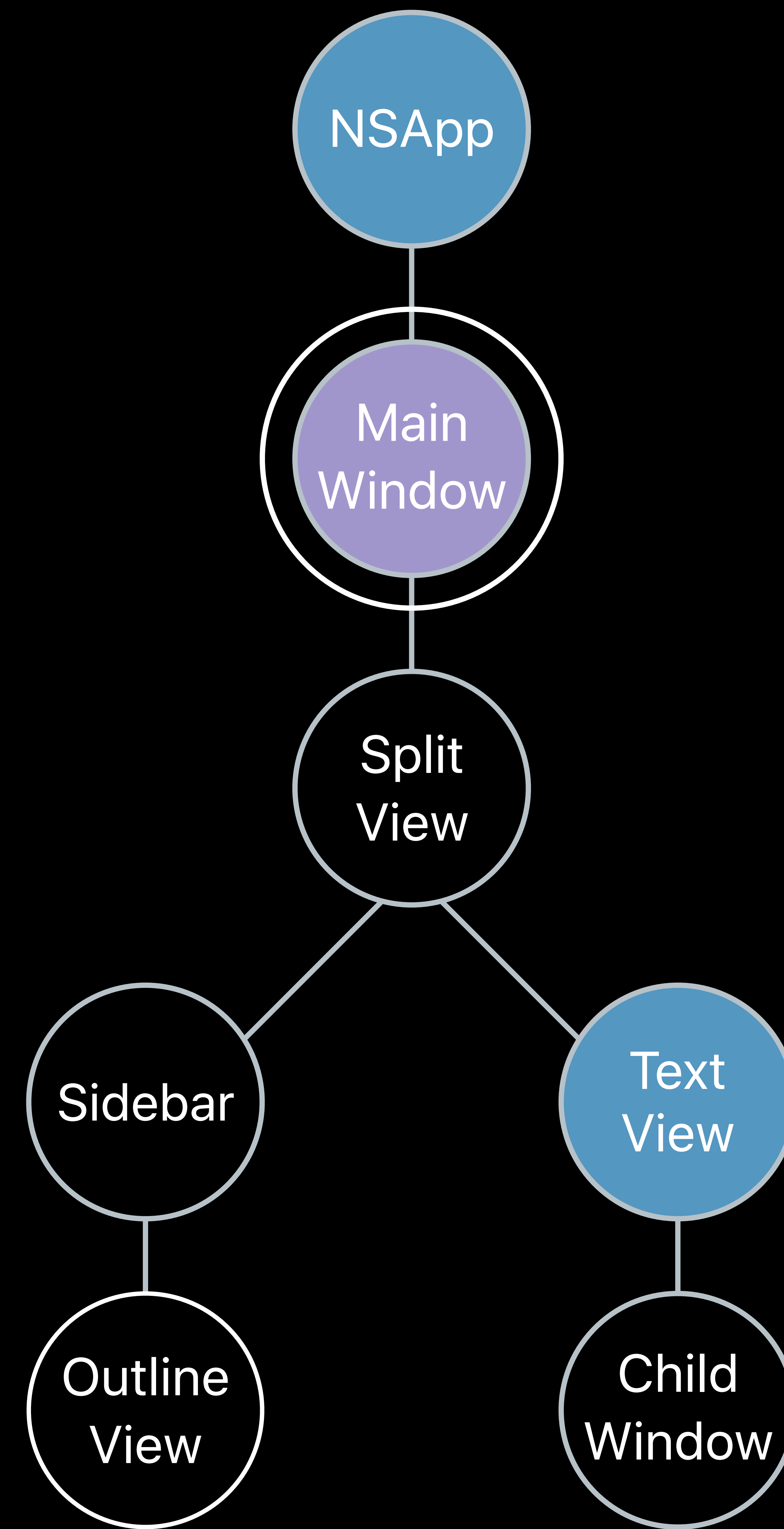
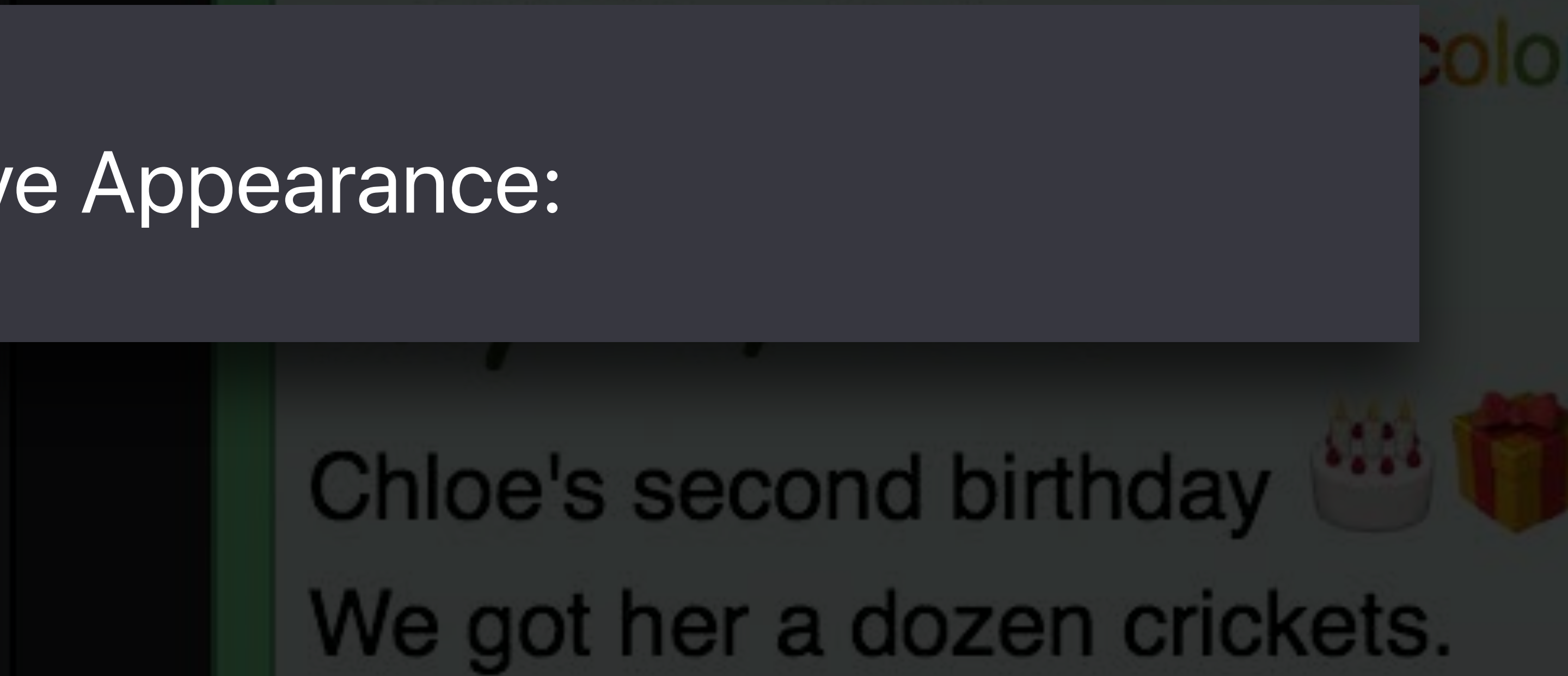
Outline View Effective Appearance:



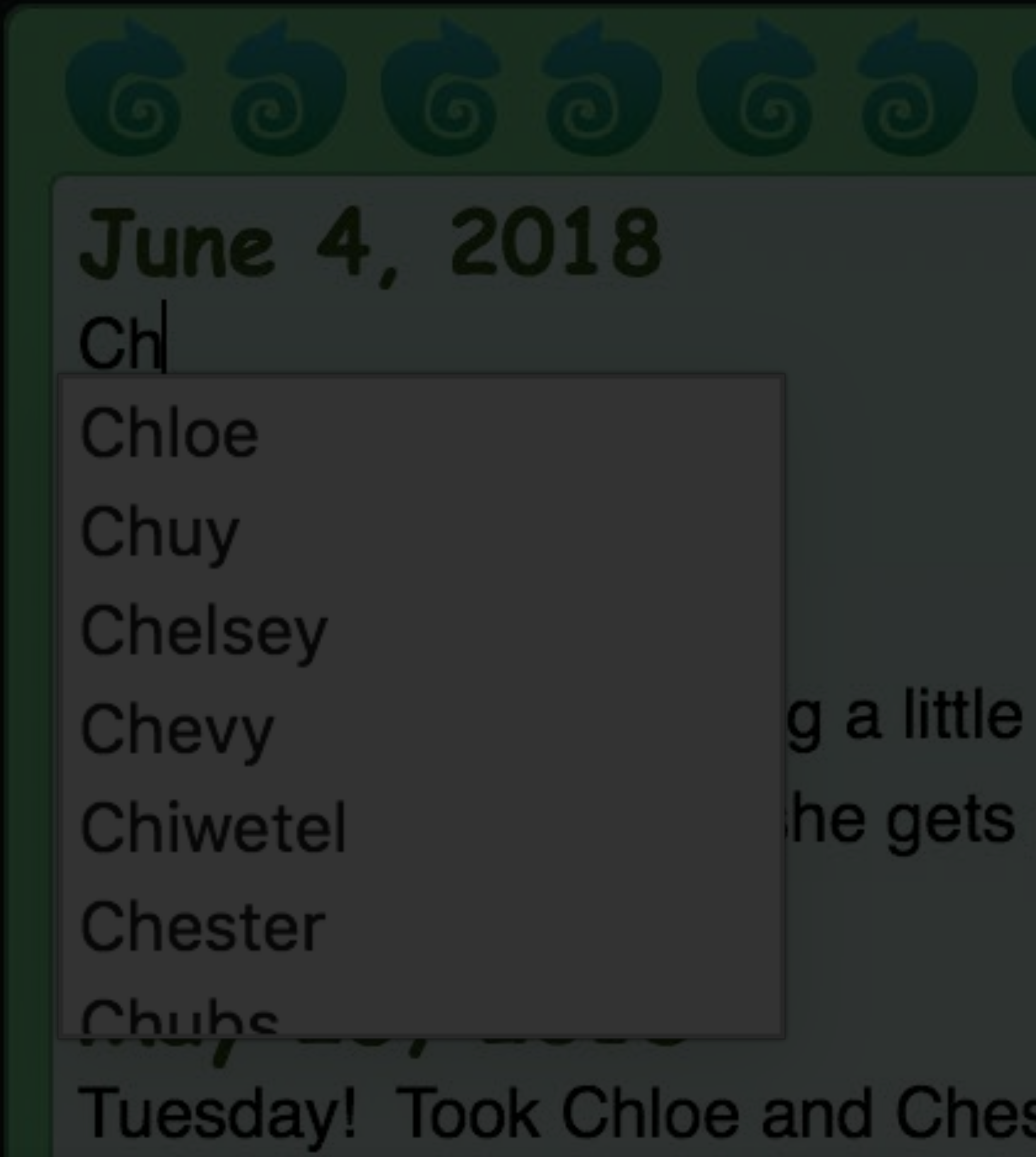
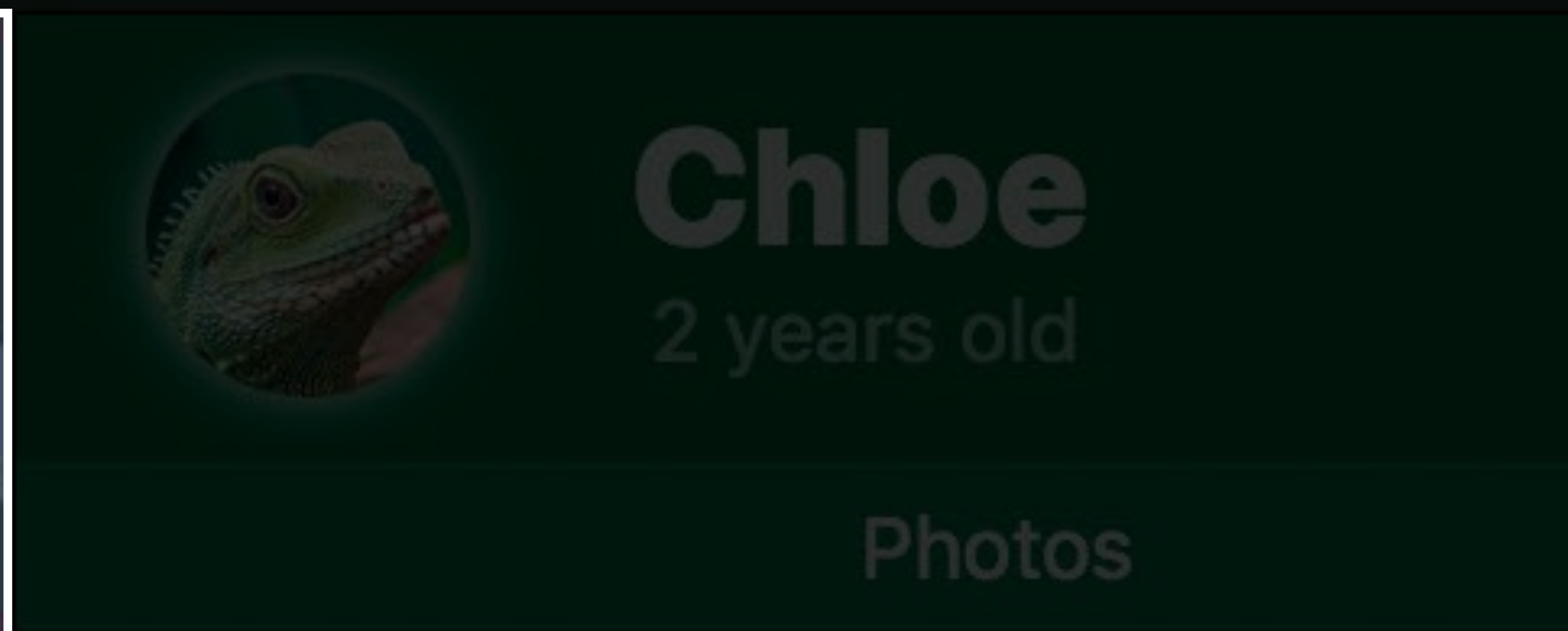
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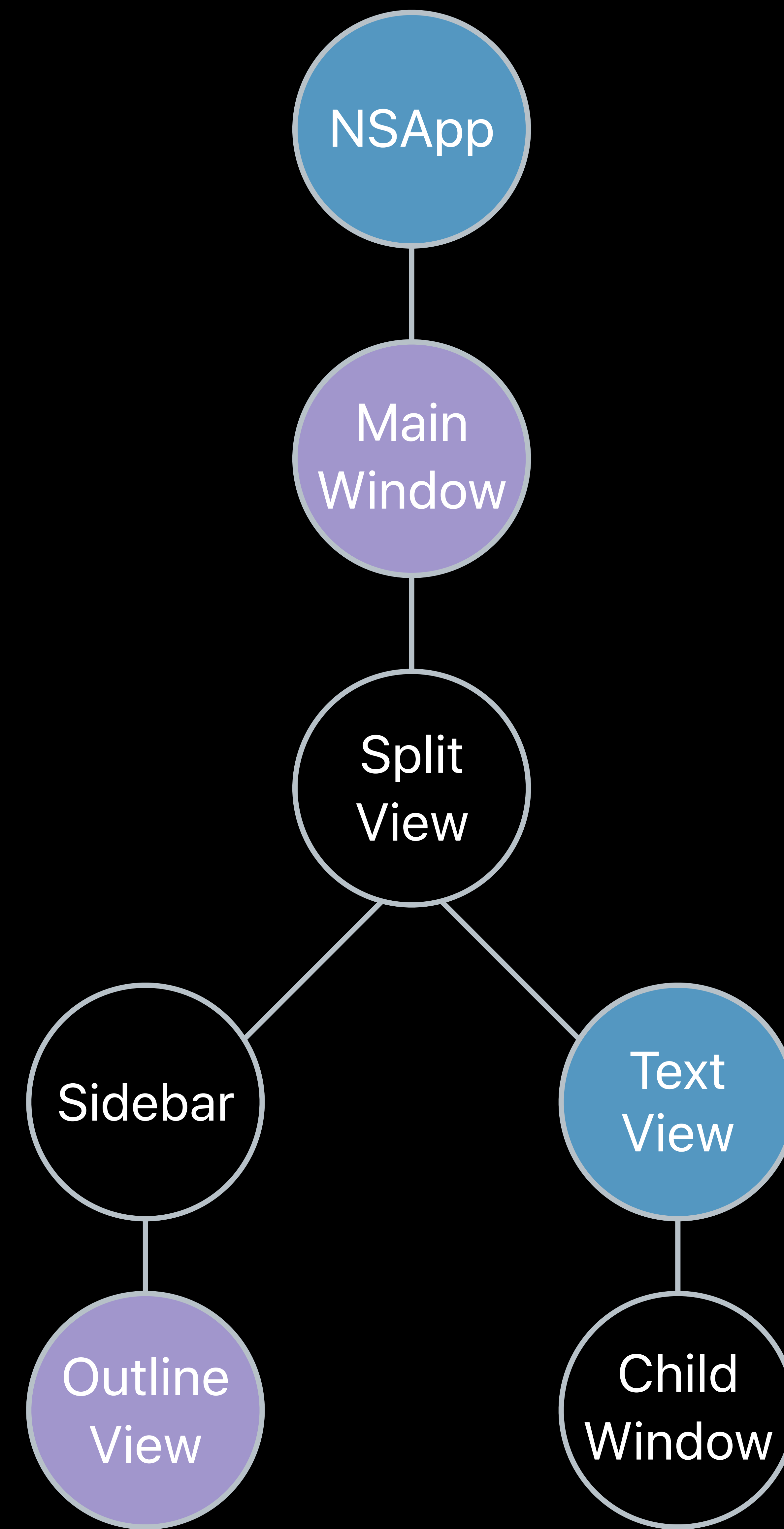
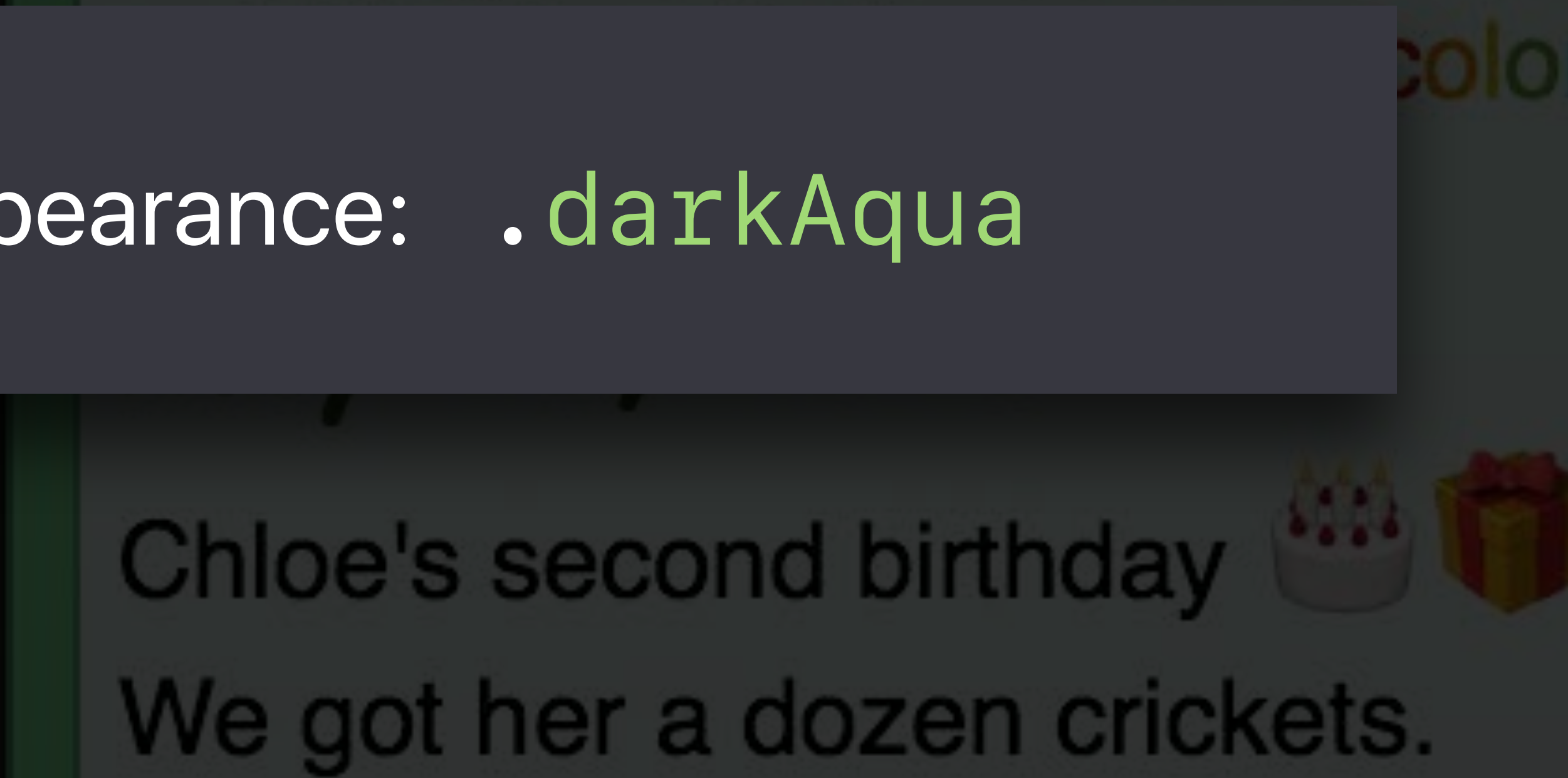
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Outline View Effective Appearance: `.darkAqua`



# Custom Views

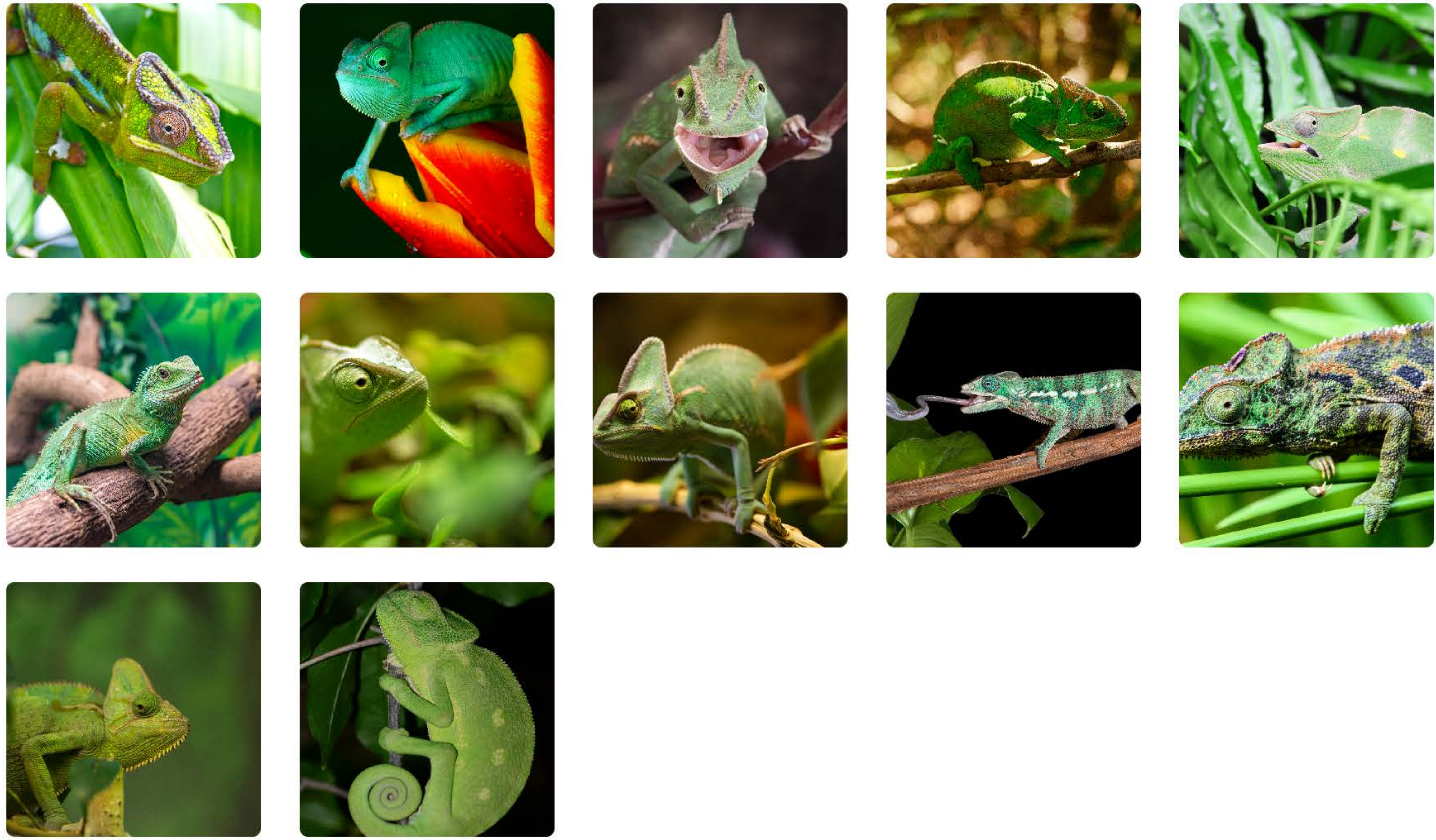
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### Chloe

2 years old


Photos Vitals Notes



The Photos tab displays a grid of 13 photographs of a green chameleon named Chloe. The photos show her in various poses and colors, including bright green, yellow, and red. She is seen perched on branches, eating, and in close-up shots of her head and body. The photos are arranged in three rows: the first row has five photos, the second row has five photos, and the third row has three photos.

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- Charlotte

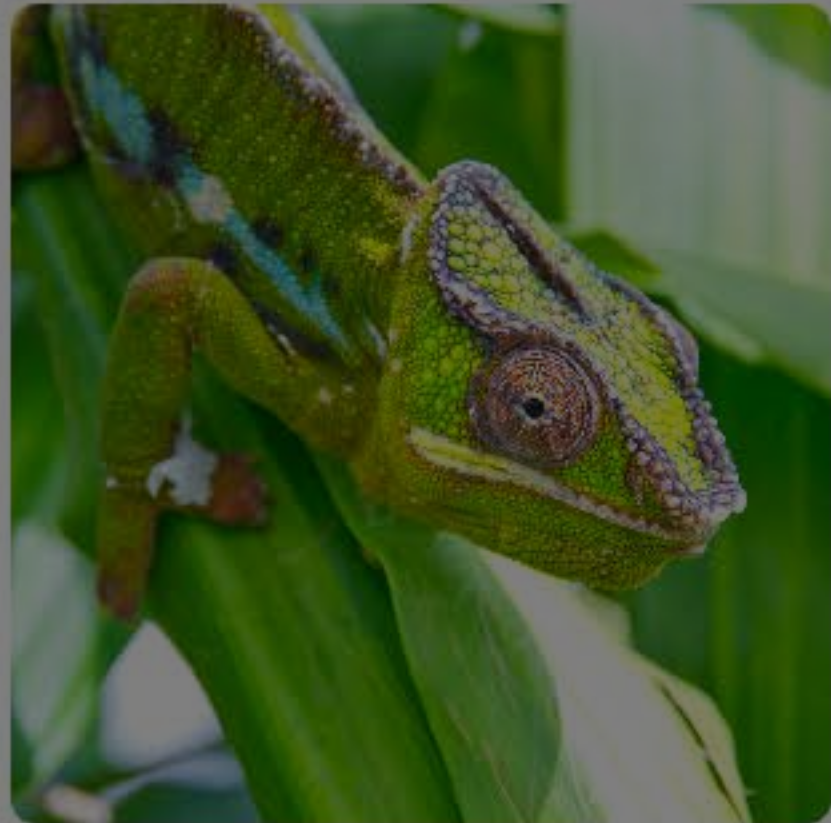









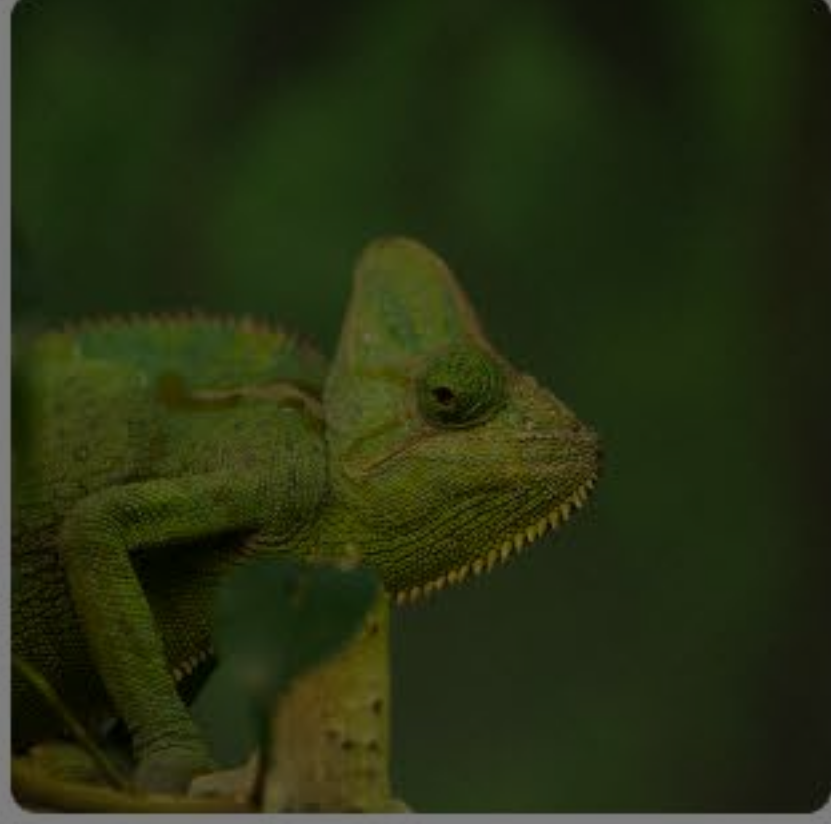
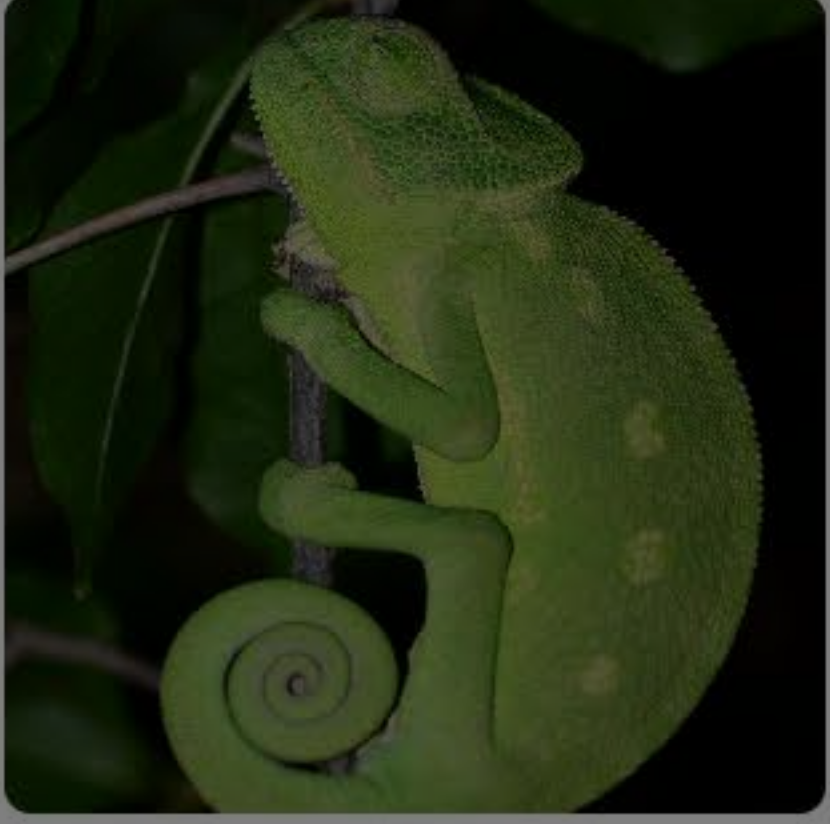


# Chloe

2 years old

Vitals

Notes



**Chloe**

2 years old



**Chloe**

2 years old



**Chloe**  
2 years old

Light



**Chloe**  
2 years old

Dark



### Assets.xcassets

Chameleon Wrangler > Chamele...Wrangler > Assets.xcassets > Colors > ChameleonGreen

- Applcon
  - Chameleon Chat
  - Colors
    - ChameleonGreen**
    - ChameleonGreenHighlight
  - Main Window
  - Mood Meter

**ChameleonGreen** Color

Any Appearance Dark Appearance

Universal

**Color Set**

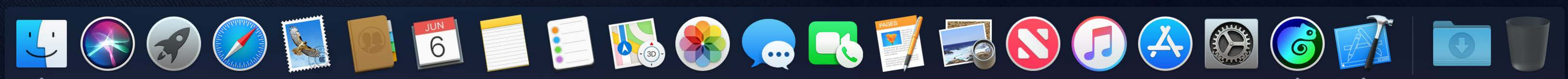
Name ChameleonGreen

Devices  Universal  
 iPhone  
 iPad  
 Apple Watch  
 Apple TV  
 Mac

Appearances Any, Dark  
 High Contrast

Gamut Any

+ - Filter Show Slicing



- AppIcon
- Chameleon Chat
- Colors
  - ChameleonGreen
  - ChameleonGreenHighlight
- Main Window
- Mood Meter

**ChameleonGreen** Color



Any Appearance    Dark Appearance

---

Universal

**Color Set**

Name

Devices  Universal  
 iPhone  
 iPad  
 Apple Watch  
 Apple TV  
 Mac

Appearances   
 High Contrast

Gamut

```
// Custom view using an asset catalog color
```

```
class ChameleonHeaderView : UIView {
```

```
}
```

```
// Custom view using an asset catalog color
```

```
class ChameleonHeaderView : UIView {  
    override init(frame frameRect: NSRect) {  
        super.init(frame: frameRect)  
        layer?.backgroundColor = headerColor?.CGColor  
    }  
  
    var headerColor = UIColor(named: "ChameleonGreen") {  
        didSet {  
            layer?.backgroundColor = headerColor?.CGColor  
        }  
    }  
}
```



```
// Custom view using an asset catalog color
```

```
class ChameleonHeaderView : UIView {  
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        super.init(frame: frameRect)  
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        super.init(frame: frameRect)  
        layer?.backgroundColor = headerColor?.CGColor  
    }  
  
    var headerColor = UIColor(named: "ChameleonGreen") {  
        didSet {  
            layer?.backgroundColor = headerColor?.CGColor  
        }  
    }  
}
```





```
// Custom view using an asset catalog color
```

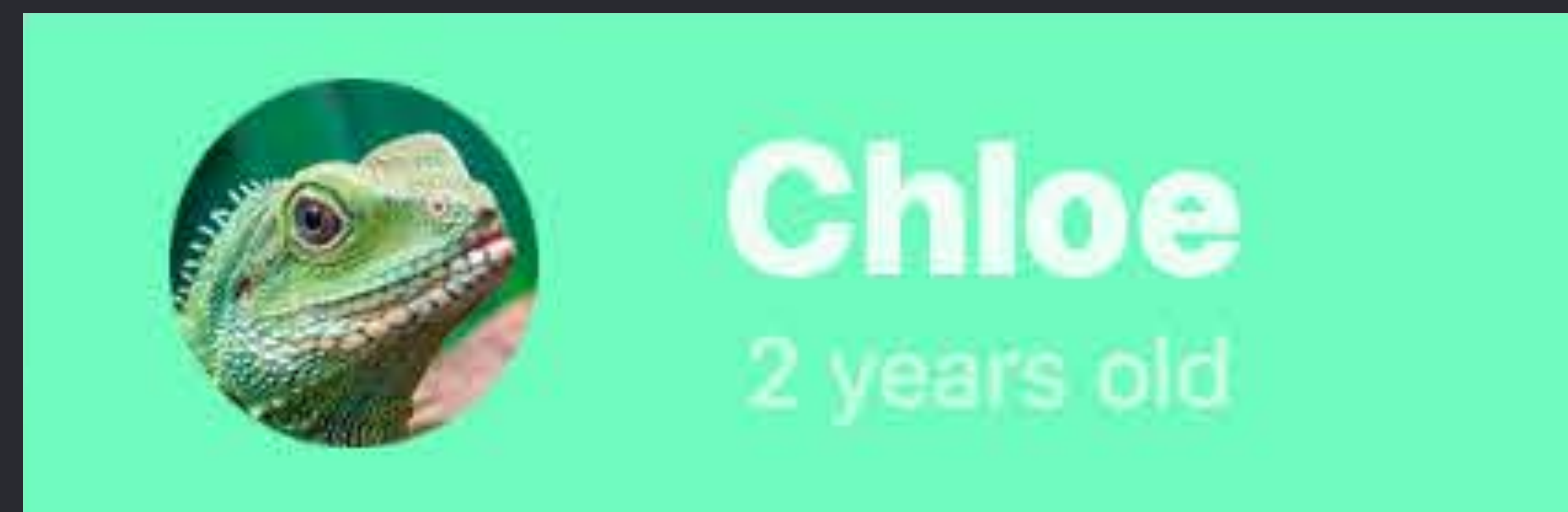
```
class ChameleonHeaderView : UIView {  
    override init(frame frameRect: CGRect) {  
        super.init(frame: frameRect)  
        layer?.backgroundColor = headerColor?.cgColor  
    }  
  
    var headerColor = UIColor(named: "ChameleonGreen") {  
        didSet {  
            layer?.backgroundColor = headerColor?.cgColor  
        }  
    }  
}
```





```
// Custom view using an asset catalog color
```

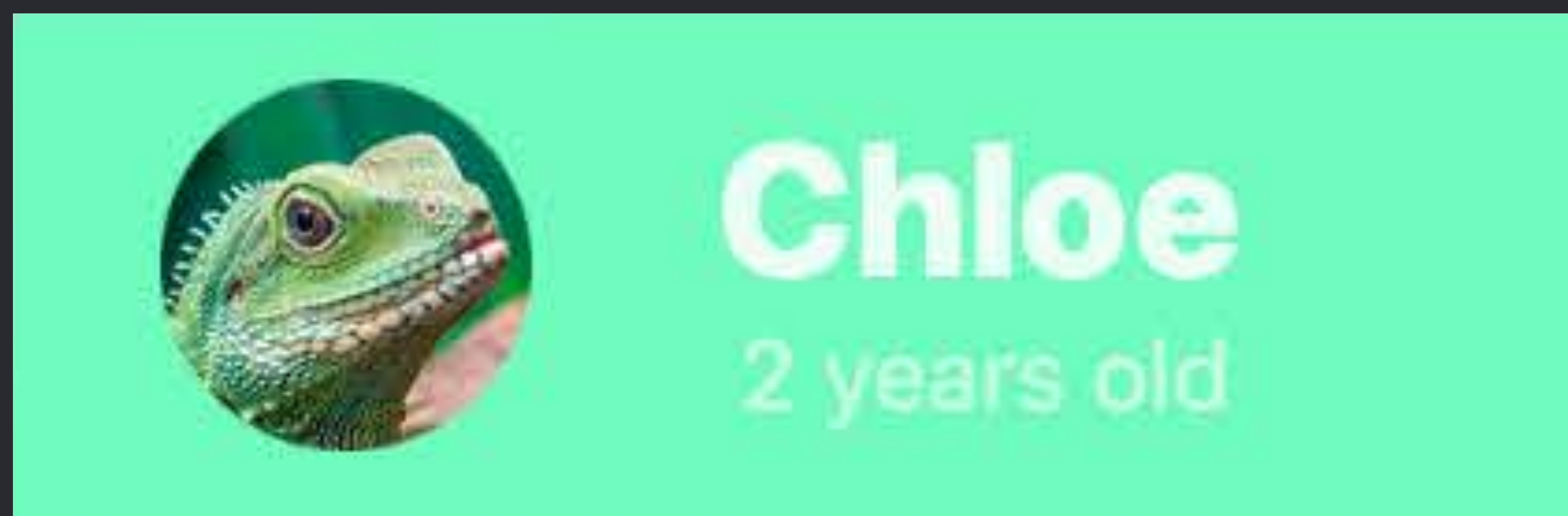
```
class ChameleonHeaderView : UIView {  
    override init(frame frameRect: CGRect) {  
        super.init(frame: frameRect)  
        layer?.backgroundColor = headerColor?.cgColor  
    }  
  
    var headerColor = UIColor(named: "ChameleonGreen") {  
        didSet {  
            layer?.backgroundColor = headerColor?.cgColor  
        }  
    }  
}
```





```
// Custom view using an asset catalog color
```

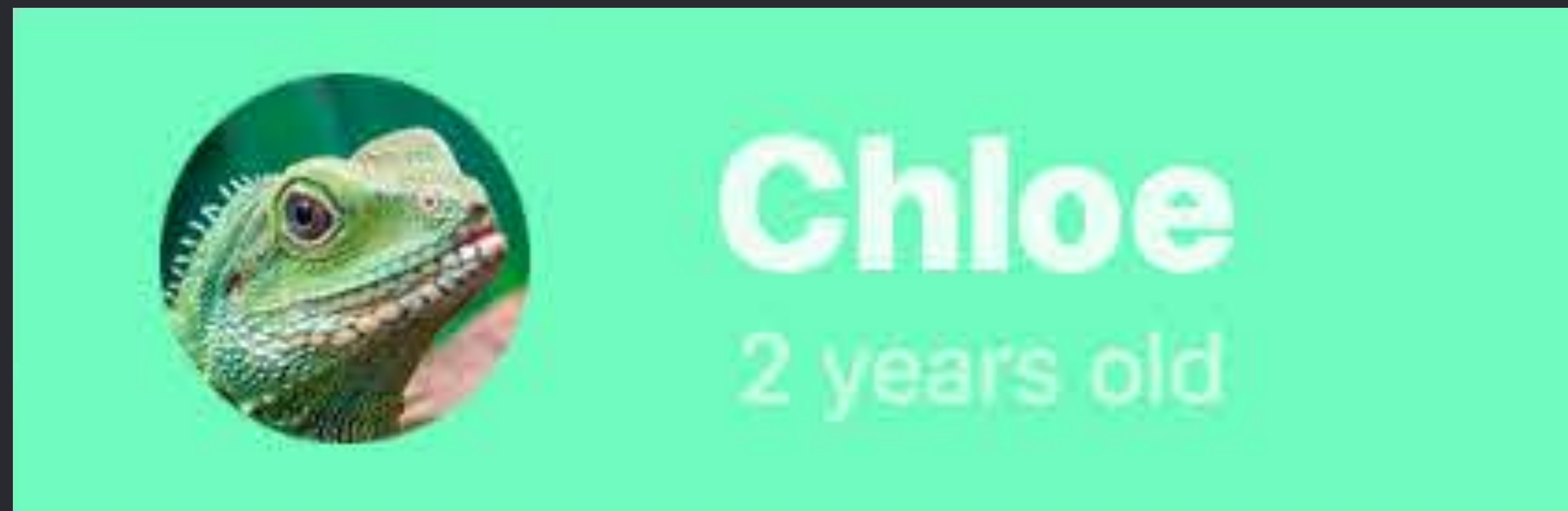
```
class ChameleonHeaderView : UIView {  
    override init(frame frameRect: CGRect) {  
        super.init(frame: frameRect)  
        layer?.backgroundColor = headerColor?.CGColor  
    }  
  
    var headerColor = UIColor(named: "ChameleonGreen") {  
        didSet {  
            layer?.backgroundColor = headerColor?.CGColor  
        }  
    }  
}
```





```
// Custom view using an asset catalog color
```

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class ChameleonHeaderView : UIView {  
    override init(frame frameRect: CGRect) {  
        super.init(frame: frameRect)  
        layer?.backgroundColor = headerColor?.CGColor  
    }  
  
    var headerColor = UIColor(named: "ChameleonGreen") {  
        didSet {  
            layer?.backgroundColor = headerColor?.CGColor  
        }  
    }  
}
```



# Custom Views

Do appearance-sensitive work in

```
func updateConstraints()  
func layout()  
func draw(_ dirtyRect: NSRect)  
func updateLayer()
```

Appearance changes will cause update

Set `needsUpdateConstraints`, `needsLayout`, or `needsDisplay` to trigger manually

```
// Custom view using an asset catalog color
```

```
class ChameleonHeaderView : UIView {  
    override init(frame frameRect: CGRect) {  
        super.init(frame: frameRect)  
        layer.backgroundColor = headerColor?.CGColor  
    }  
  
    var headerColor = UIColor(named: "ChameleonGreen") {  
        didSet {  
            layer?.backgroundColor = headerColor?.CGColor  
        }  
    }  
}
```

```
// Custom view using an asset catalog color
```

```
class ChameleonHeaderView : UIView {
```

```
    var headerColor = UIColor(named: "ChameleonGreen") {
```

```
        didSet {
```

```
            layer?.backgroundColor = headerColor?.cgColor
```

```
        }
```

```
    }
```

```
}
```

```
// Custom view using an asset catalog color
```

```
class ChameleonHeaderView : UIView {  
    override func updateLayer() {  
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```



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```

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    override func updateLayer() {
        layer?.backgroundColor = headerColor?.CGColor
    }

    var headerColor = UIColor(named: "ChameleonGreen") {
        didSet {

        }
    }
}
```

```
// Custom view using an asset catalog color

class ChameleonHeaderView : UIView {
    override func updateLayer() {
        layer?.backgroundColor = headerColor?.CGColor
    }

    var headerColor = UIColor(named: "ChameleonGreen") {
        didSet {
            needsDisplay = true
        }
    }
}
```

```
// Custom view using an asset catalog color
```

```
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        layer?.backgroundColor = headerColor?.CGColor  
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    var headerColor = UIColor(named: "ChameleonGreen") {  
        didSet {  
            needsDisplay = true  
        }  
    }  
}
```

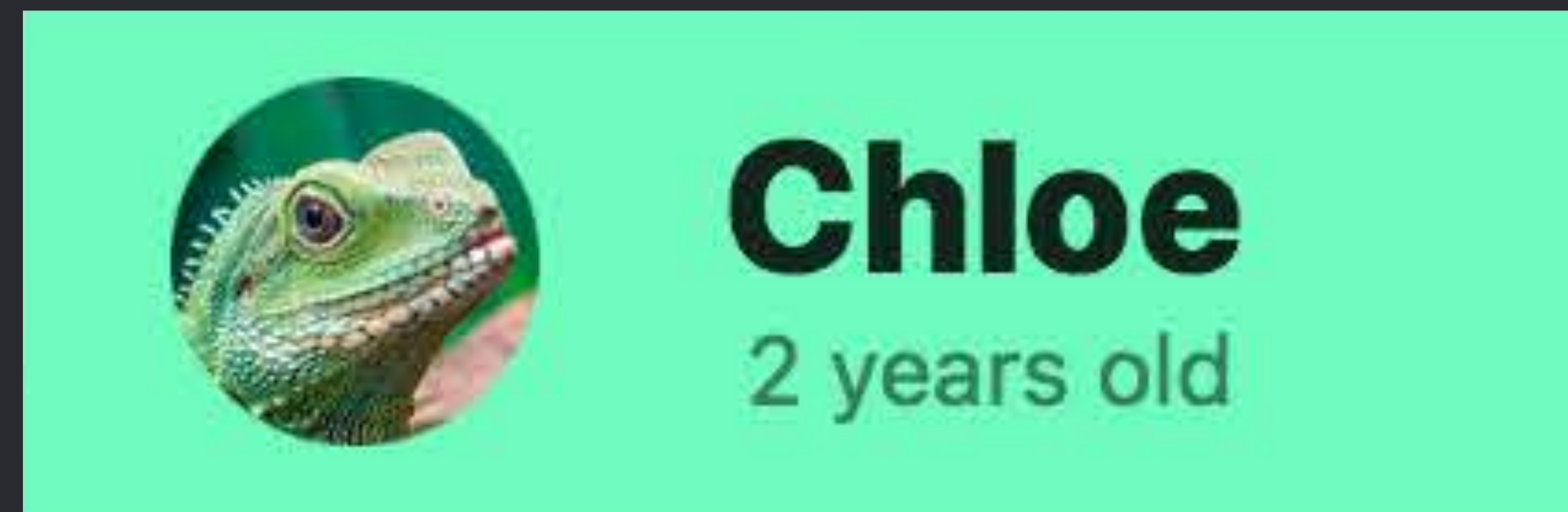




```
// Custom view using an asset catalog color

class ChameleonHeaderView : UIView {
    override func updateLayer() {
        layer?.backgroundColor = headerColor?.CGColor
    }

    var headerColor = UIColor(named: "ChameleonGreen") {
        didSet {
            needsDisplay = true
        }
    }
}
```





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// Custom view using an asset catalog color

class ChameleonHeaderView : UIView {
    override func updateLayer() {
        layer?.backgroundColor = headerColor?.CGColor
    }

    var headerColor = UIColor(named: "ChameleonGreen") {
        didSet {
            needsDisplay = true
        }
    }
}
```





**Chloe**  
2 years old

Light



**Chloe**  
2 years old

Dark





Light



Dark

```
class GlowView : NSView { ... }
```

```
class ChameleonAvatarView : NSView {
```

```
}
```



NEW

```
class GlowView : NSView { ... }
```

```
class ChameleonAvatarView : NSView {
```

```
    var glowView: GlowView
```

```
    var imageView: UIImageView
```

```
    override func layout() {
```

```
        switch effectiveAppearance.bestMatch(from: [.aqua, .darkAqua]) {
```

```
        }
```

```
    }
```

```
}
```



NEW

```
class GlowView : NSView { ... }
```

```
class ChameleonAvatarView : NSView {
```

```
    var glowView: GlowView
```

```
    var imageView: UIImageView
```

```
    override func layout() {
```

```
        switch effectiveAppearance.bestMatch(from: [.aqua, .darkAqua]) {
```

```
        }
```

```
    }
```

```
}
```



NEW

```
class GlowView : NSView { ... }
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```
class ChameleonAvatarView : NSView {
```

```
    var glowView: GlowView
```

```
    var imageView: UIImageView
```

```
    override func layout() {
```

```
        switch effectiveAppearance.bestMatch(from: [.aqua, .darkAqua]) {
```

```
        }
```

```
    }
```

```
}
```



NEW

```
class GlowView : NSView { ... }

class ChameleonAvatarView : NSView {
    var glowView: GlowView
    var imageView: UIImageView

    override func layout() {
        switch effectiveAppearance.bestMatch(from: [.aqua, .darkAqua]) {
        case .aqua?:
            subviews = [ imageView ]
        }
    }
}
}
```



NEW

```
class GlowView : NSView { ... }

class ChameleonAvatarView : NSView {
    var glowView: GlowView
    var imageView: UIImageView

    override func layout() {
        switch effectiveAppearance.bestMatch(from: [.aqua, .darkAqua]) {
        case .aqua?:
            subviews = [ imageView ]
        case .darkAqua?:
            subviews = [ glowView, imageView ]

        }
    }
}
```



NEW

```
class GlowView : NSView { ... }

class ChameleonAvatarView : NSView {
    var glowView: GlowView
    var imageView: UIImageView

    override func layout() {
        switch effectiveAppearance.bestMatch(from: [.aqua, .darkAqua]) {
        case .aqua?:
            subviews = [ imageView ]
        case .darkAqua?:
            subviews = [ glowView, imageView ]
        default:
            subviews = [ imageView ]
        }
    }
}
```





**Chloe**

2 years old



**Chloe**

2 years old

# Customizing for High Contrast

### Accessibility

Search

- General
  - General
- Vision
  - VoiceOver
  - Zoom
  - Display
- Speech
- Media
  - Descriptions
  - Captions
- Hearing

Invert colors

Use grayscale

Differentiate without color

Reduce motion

Increase contrast

Reduce transparency

Display contrast:

Cursor size:

Shake mouse pointer to locate  
Quickly move the mouse pointer back and forth to make it bigger.

Display resolution and brightness can be adjusted in Display preferences:  
[Open Display Preferences...](#)

Show Accessibility status in menu bar ?



Accessibility

Search

General

- General
- Vision
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  - Speech
- Media
  - Descriptions
  - Captions
- Hearing

Invert colors

Use grayscale

Differentiate without color

Reduce motion

Increase contrast

Reduce transparency

Display contrast:  Normal Maximum

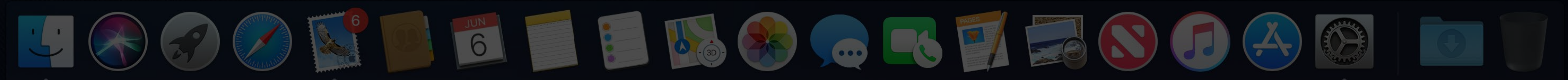
Cursor size:  Normal Large

Shake mouse pointer to locate  
Quickly move the mouse pointer back and forth to make it bigger.

Display resolution and brightness can be adjusted in Display preferences:  
[Open Display Preferences...](#)

Show Accessibility status in menu bar

?



Accessibility

Search

General

- General
- Vision
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  - Display
  - Speech
- Media
  - Descriptions
  - Captions
- Hearing

Invert colors
  Reduce motion
  Use grayscale
  Increase contrast
  Reduce transparency
  Differentiate without color

Display contrast:  Normal Maximum

Cursor size:  Normal Large

Shake mouse pointer to locate  
 Quickly move the mouse pointer back and forth to make it bigger.

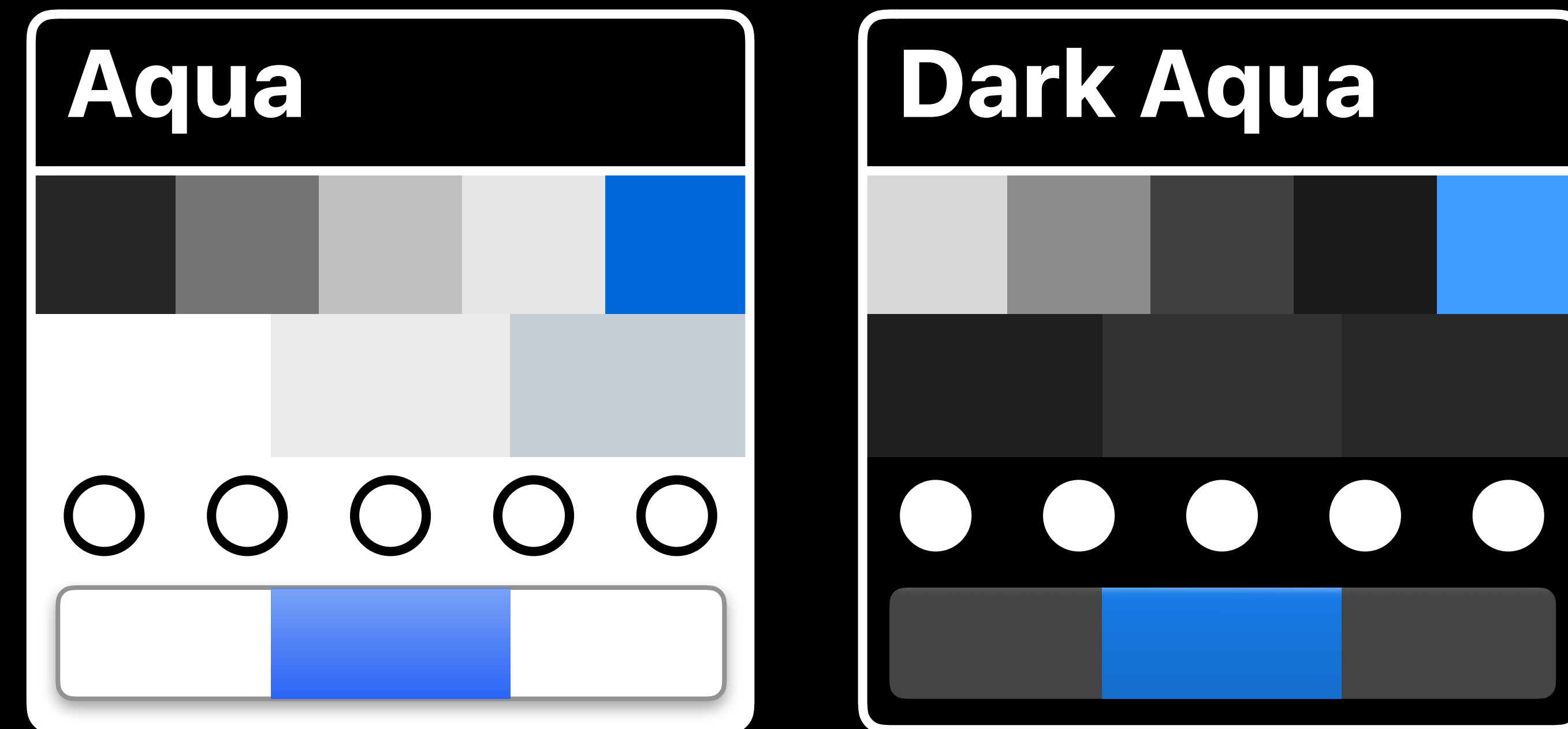
Display resolution and brightness can be adjusted in Display preferences:  
[Open Display Preferences...](#)

Show Accessibility status in menu bar

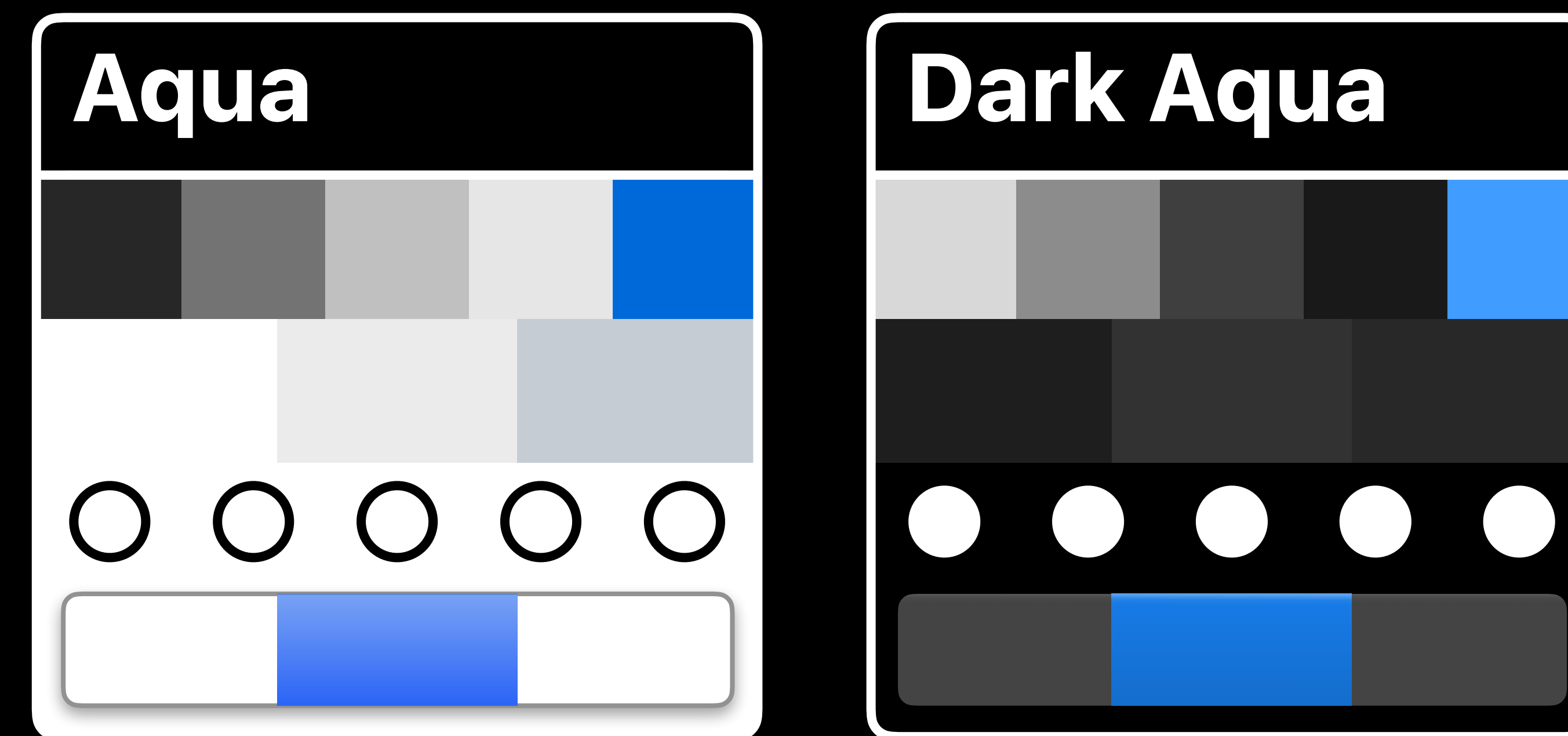
?



# Customizing for High Contrast

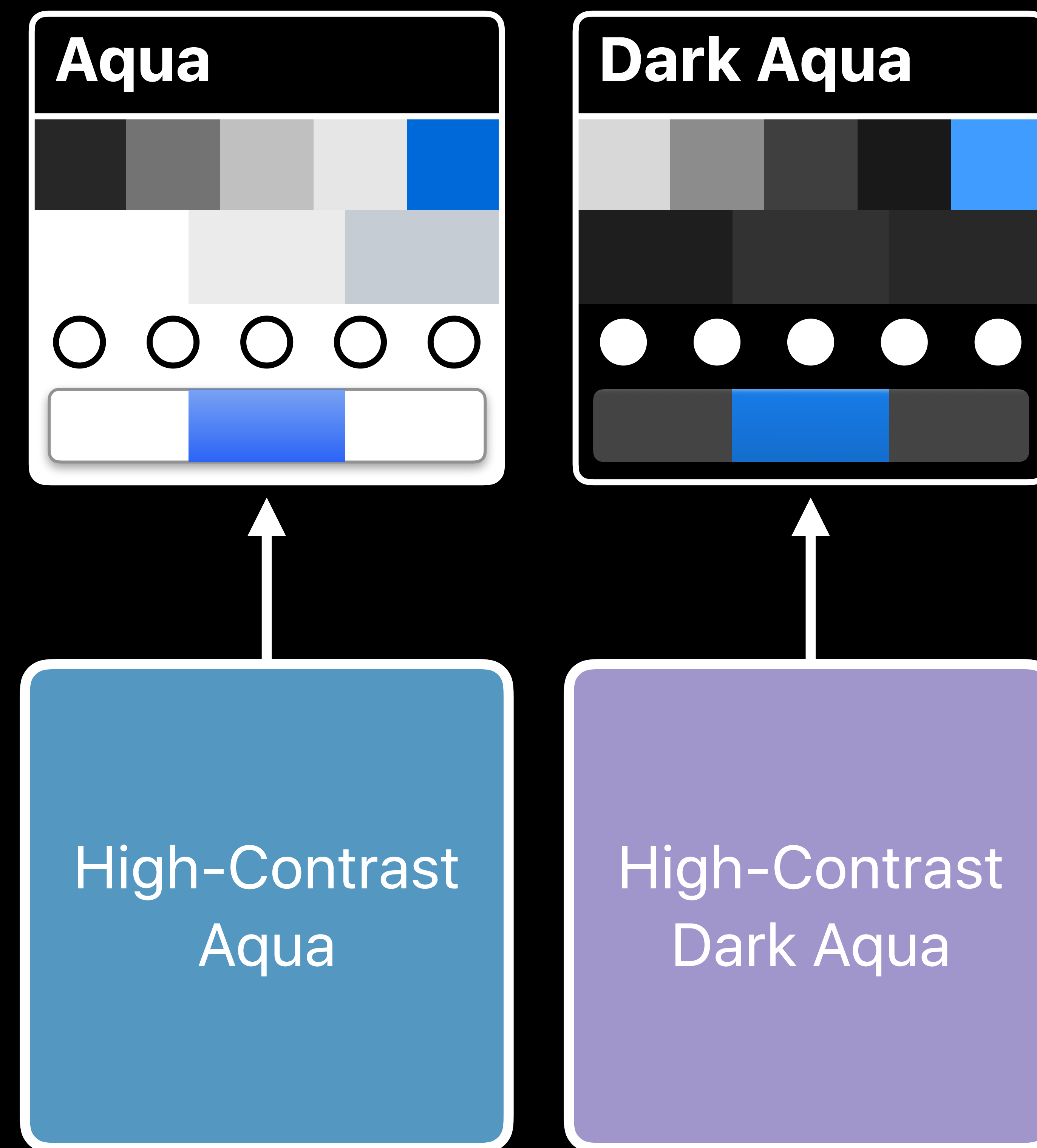


# Customizing for High Contrast





# Customizing for High Contrast



Assets.xcassets

Chameleon Wrangler > Chamele...Wrangler > Assets.xcassets > Colors > ChameleonGreen

Applcon

- Chameleon Chat
- Colors
  - ChameleonGreen
  - ChameleonGreenHighlight
- Main Window
- Mood Meter

**ChameleonGreen** Color

Any Appearance Dark Appearance

Universal

**Color Set**

Name ChameleonGreen

Devices  Universal  
 iPhone  
 iPad  
 Apple Watch  
 Apple TV  
 Mac

Appearances Any, Dark  
 High Contrast

Gamut Any

+ - Filter Show Slicing



Assets.xcassets

Wrangler > Chamele...Wrangler > Assets.xcassets > Colors > ChameleonGreen

ChameleonGreen

Color



Any Appearance



Dark Appearance

Universal



Color Set

Name ChameleonGreen

- Devices
- Universal
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Appearances Any, Dark

High Contrast

Gamut Any

Assets.xcassets

Wrangler > Chamele...Wrangler > Assets.xcassets > Colors > ChameleonGreen

ChameleonGreen

Color



Any Appearance



Dark Appearance

Universal



Color Set

Name ChameleonGreen

- Devices
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  - Apple TV
  - Mac

Appearances Anv. Dark

High Contrast

Gamut Any

Assets.xcassets

Wrangler > Chamele...Wrangler > Assets.xcassets > Colors > ChameleonGreen

ChameleonGreen

Color



Any Luminosity  
Normal Contrast



Dark Appearance  
Normal Contrast



Any Luminosity  
High Contrast



Dark Appearance  
High Contrast

Universal

Color Set

Name ChameleonGreen

- Devices
- Universal
  - iPhone
  - iPad
  - Apple Watch
  - Apple TV
  - Mac

Appearances Any. Dark

High Contrast

Gamut Any

Assets.xcassets

Wrangler > Chamele...Wrangler > Assets.xcassets > Colors > ChameleonGreen



ChameleonGreen

Color



Any Luminosity  
Normal Contrast



Dark Appearance  
Normal Contrast



Any Luminosity  
High Contrast



Dark Appearance  
High Contrast

Universal

Color Set

Name ChameleonGreen

- Devices
- Universal
  - iPhone
  - iPad
  - Apple Watch
  - Apple TV
  - Mac

Appearances Any, Dark

- High Contrast

Gamut Any

# Customizing for High Contrast

High-contrast appearance names:

```
extension NSAppearance.Name {  
    static let accessibilityHighContrastAqua: NSAppearance.Name  
    static let accessibilityHighContrastDarkAqua: NSAppearance.Name  
}
```

# Customizing for High Contrast



Not available directly

```
NSAppearance(named: .accessibilityHighContrastAqua)
```

```
NSAppearance(named: .accessibilityHighContrastDarkAqua)
```

Only via System Preferences



# Customizing for High Contrast



Pass to `bestMatch(from:)` to provide custom behavior

```
switch effectiveAppearance.bestMatch(from: [.aqua, .accessibilityHighContrastAqua, ... ]) {
```

# Managing Custom Sublayers

# Managing Custom Sublayers

Custom sublayers **don't** inherit appearance automatically

If possible, switch to using views

Otherwise, manage layers manually with

- `viewDidChangeEffectiveAppearance()`
- `NSAppearance.current`

# Detecting Appearance Change



NEW

```
extension UIView {  
    func viewDidChangeEffectiveAppearance()  
}
```

Good time to

- Perform custom invalidation
- Drop caches

No need to invalidate view itself!

# Current Appearance

```
extension NSAppearance {  
  class var current: NSAppearance!  
}
```

## Thread-local state

- Like `NSGraphicsContext.current`

Appearance used to resolve colors and images

# Current Appearance

Current appearance is set up automatically for

```
func updateConstraints()  
func layout()  
func draw(_ dirtyRect: NSRect)  
func updateLayer()
```

You can also set it yourself

```
// Updating a Custom Sublayer
```

```
class CustomViewWithSublayers : UIView, CALayerDelegate {  
    override func viewDidChangeEffectiveAppearance() {  
        sublayer.setNeedsDisplay()  
    }  
  
    func display(_ sublayer: CALayer) {  
        let oldAppearance = NSAppearance.current  
        NSAppearance.current = effectiveAppearance  
  
        // Update layer using our new effective appearance  
        sublayer.borderColor = NSColor.systemRed.cgColor  
  
        NSAppearance.current = oldAppearance  
    }  
}
```





```
// Updating a Custom Sublayer
```

```
class CustomViewWithSublayers : UIView, CALayerDelegate {  
    override func viewDidChangeEffectiveAppearance() {  
        sublayer.setNeedsDisplay()  
    }  
  
    func display(_ sublayer: CALayer) {  
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        NSAppearance.current = effectiveAppearance  
  
        // Update layer using our new effective appearance  
        sublayer.borderColor = NSColor.systemRed.cgColor  
  
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    }  
}
```





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    }

    func display(_ sublayer: CALayer) {
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        NSAppearance.current = effectiveAppearance

        // Update layer using our new effective appearance
        sublayer.borderColor = NSColor.systemRed.cgColor

        NSAppearance.current = oldAppearance
    }
}
```



```
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```



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func display(_ sublayer: CALayer) {  
    let oldAppearance = NSAppearance.current  
    NSAppearance.current = effectiveAppearance
```

```
// Update layer using our new effective appearance  
sublayer.borderColor = NSColor.systemRed.cgColor
```

```
NSAppearance.current = oldAppearance
```

```
}
```

```
}
```



```
// Updating a Custom Sublayer

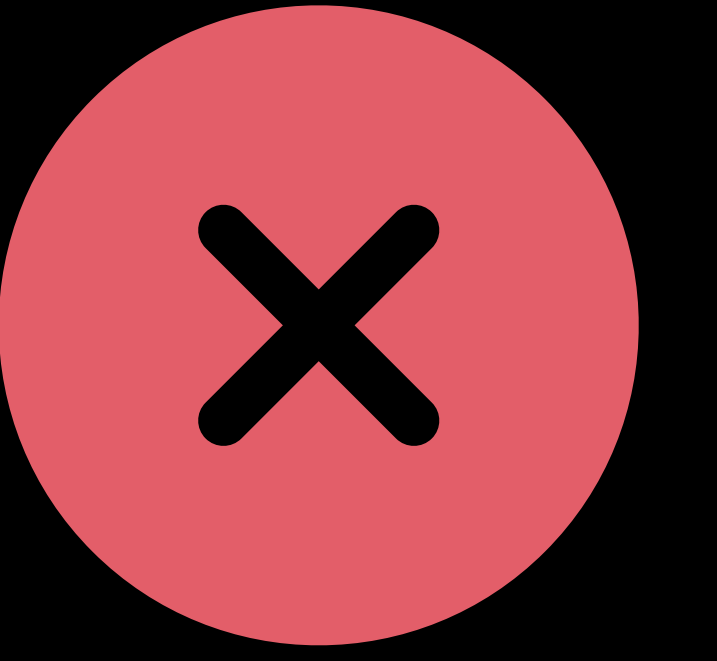
class CustomViewWithSublayers : UIView, CALayerDelegate {
    override func viewDidChangeEffectiveAppearance() {
        sublayer.setNeedsDisplay()
    }

    func display(_ sublayer: CALayer) {
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        NSAppearance.current = effectiveAppearance

        // Update layer using our new effective appearance
        sublayer.borderColor = NSColor.systemRed.cgColor

        NSAppearance.current = oldAppearance
    }
}
```

# UIImage as Layer Contents



```
layer.contents = someUIImage
```

```
let scale = someUIImage.recommendedLayerContentsScale(window.backingScaleFactor)  
layer.contents = someUIImage.layerContents(forContentsScale: scale)
```

These **won't** inherit appearance!

# UIImage as Layer Contents



If possible, switch to UIImageView

Automatically updates for appearance

# UIImage as Layer Contents



Create a UIImage in `updateLayer()`

```
override fun updateLayer() {
    var rect = layer.bounds
    layer.contents = image.cgImage(forProposedRect: &rect, context: nil, hints:
                                    [ .CTM : AffineTransform(scale: window?.backingScaleFactor) ])
}
```



Appearance

**Materials**

Vibrancy

Background styles

Backward deployment

Tips and tricks

# Materials

Dynamic backgrounds

Use effects like blur, tinting, and gradients

Provide depth, context, and beauty to the interface

Calendars +

Day Week Month Year

# June 6, 2018

Wednesday

all-day

9 AM

9:41 AM **Coffee with Kate** 10250 Bandley Dr Cupertino, CA, United States

10 AM

11 AM

11 AM **Contract Review with Allison**

Noon

1 PM

2 PM

3 PM **2:30 PM Review Presentation with Susan**

4 PM

5 PM

6 PM **5:30 PM Adam's Piano lesson**

7 PM

8 PM

S M T W T F S

27 28 29 30 31 1 2

3 4 5 6 7 8 9

10 11 12 13 14 15 16

17 18 19 20 21 22 23

24 25 26 27 28 29 30

1 2 3 4 5 6 7

Coffee with Kate Personal

## Summer Trip

Scheduled

iCloud Reminders Home

- Submit vacation request
- Meet with Anna and James to plan tr...
- Borrow Rachel's binoculars
- Buy extra AA batteries
- Check sunscreen expiration date
- Buy new hiking boots
- Pack passport
- Find a good water filter

Documents — Local

District Market PDF document - 6 MB

Tags **Green** Important

Created May 11, 2018 at 3:20 PM

Modified May 11, 2018 at 3:20 PM

Last opened May 11, 2018 at 3:20 PM

Version 1.4

Pages 6

Resolution 612 x 792

Security None

Content Creator Pages

Encoding software Mac OS X 10.14 Quartz PDFContext

Add Password More...

Calendars +

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27 28 29 30 31 1 2

3 4 5 6 7 8 9

10 11 12 13 14 15 16

17 18 19 20 21 22 23

24 25 26 27 28 29 30

1 2 3 4 5 6 7

Coffee with Kate Personal

Blur

Tinting

Gradient

Search

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iCloud

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Documents — Local

Search



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Tinting

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Blur

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Calendars + [Download Icon]

Day Week Month Year Search

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S	M	T	W	T	F	S
27	28	29	30	31	1	2
3	4	5	6	7	8	9
10	11	12	13	14	15	16
17	18	19	20	21	22	23
24	25	26	27	28	29	30
1	2	3	4	5	6	7

**Coffee with Kate** Personal

Search

Scheduled

iCloud

Reminders

Home

## Summer Trip

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Documents — Local

Search



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Favorite Locations:

- AirDrop
- Recents
- Applications
- Desktop
- Documents
- Downloads
- iCloud Drive

Tags:

- Red
- Orange
- Yellow
- Green
- Blue
- Purple
- Gray
- All Tags...

Add Password More...



# Materials

Automatically used in

- Window titlebars and backgrounds
- Table views
- Sidebar split view items
- Popovers
- Menus

# NSVisualEffectView

A view that shows a material

```
var state: NSVisualEffectView.State
var blendingMode: NSVisualEffectView.BlendingMode
var material: NSVisualEffectView.Material
```

# NSVisualEffectView

```
var state: NSVisualEffectView.State
```

Controls whether material uses active window look

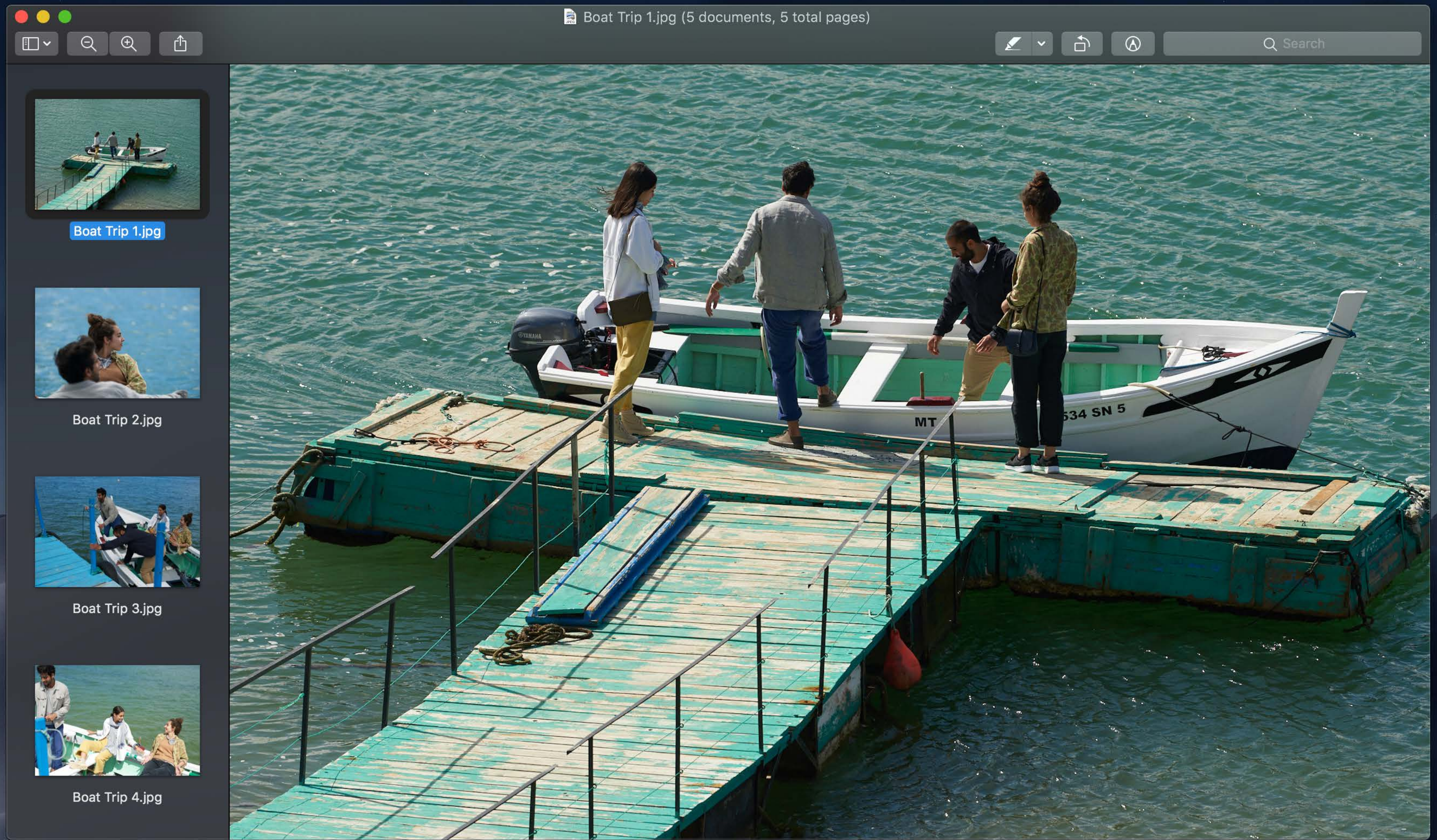
By default, matches enclosing window



# NSVisualEffectView

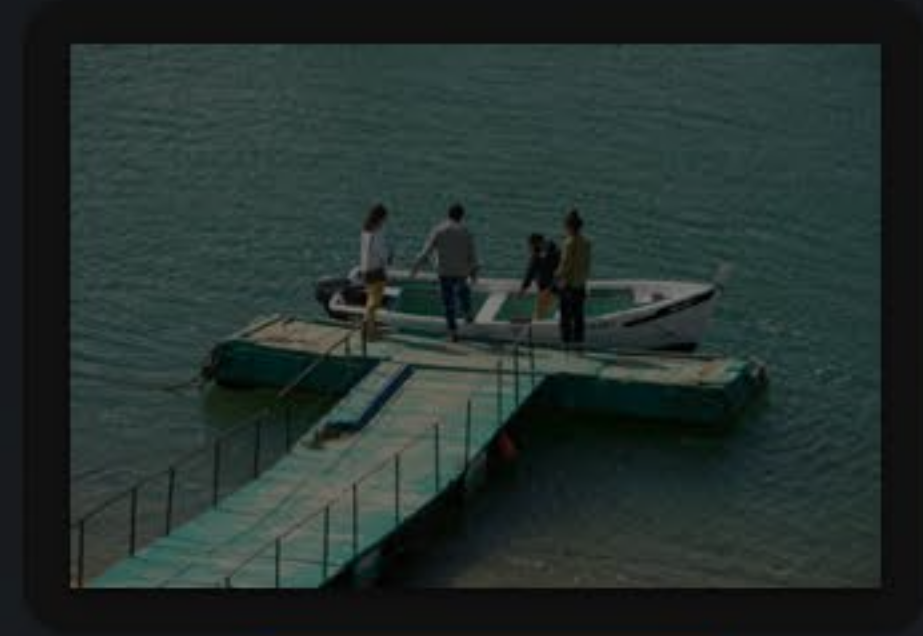
```
var blendingMode: NSVisualEffectView.BlendingMode
```

Controls whether material “punches through” window



Boat Trip 1.jpg (5 documents, 5 total pages)

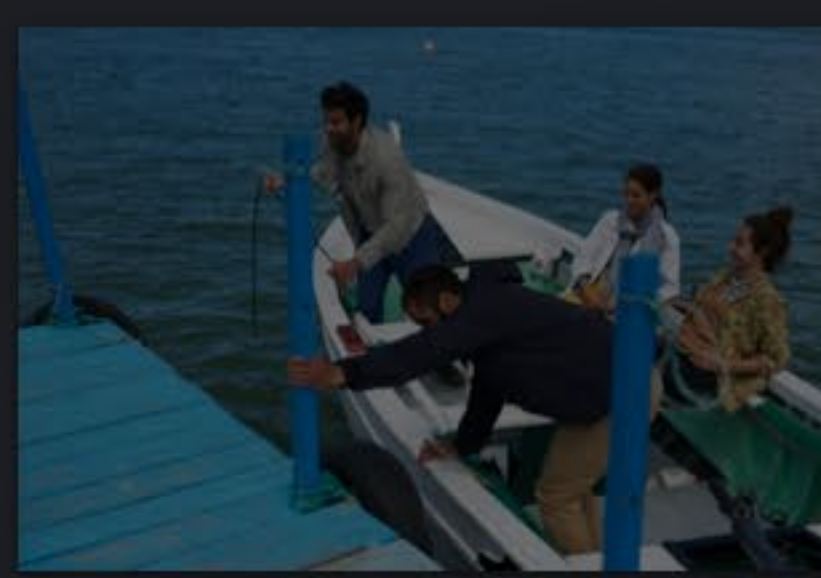
[View] [Zoom In] [Zoom Out] [Share] [Edit] [Print] [Fullscreen] [Search]



Boat Trip 1.jpg



Boat Trip 2.jpg

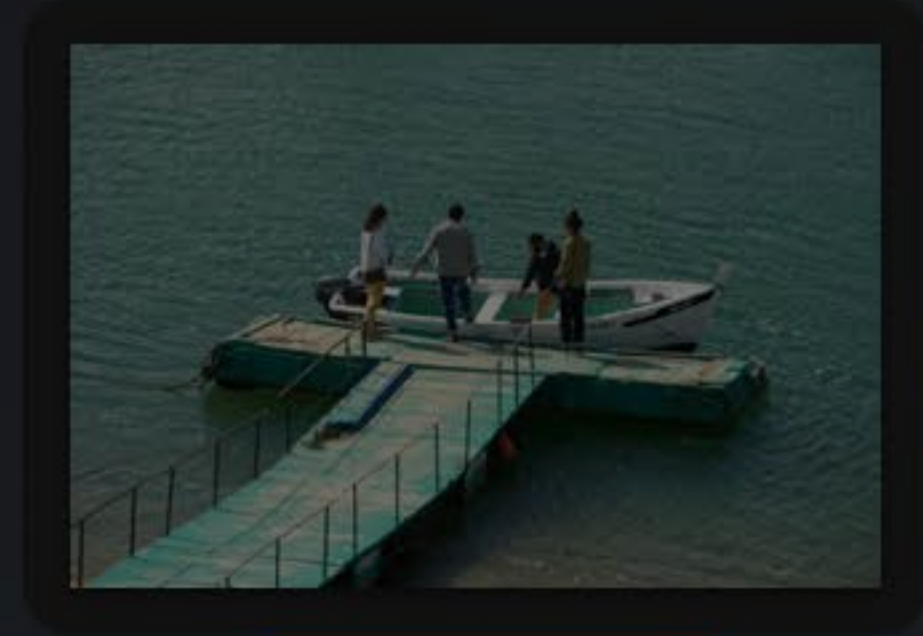
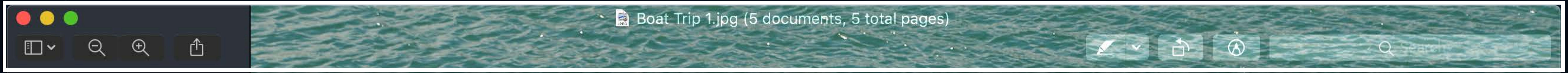


Boat Trip 3.jpg



Boat Trip 4.jpg

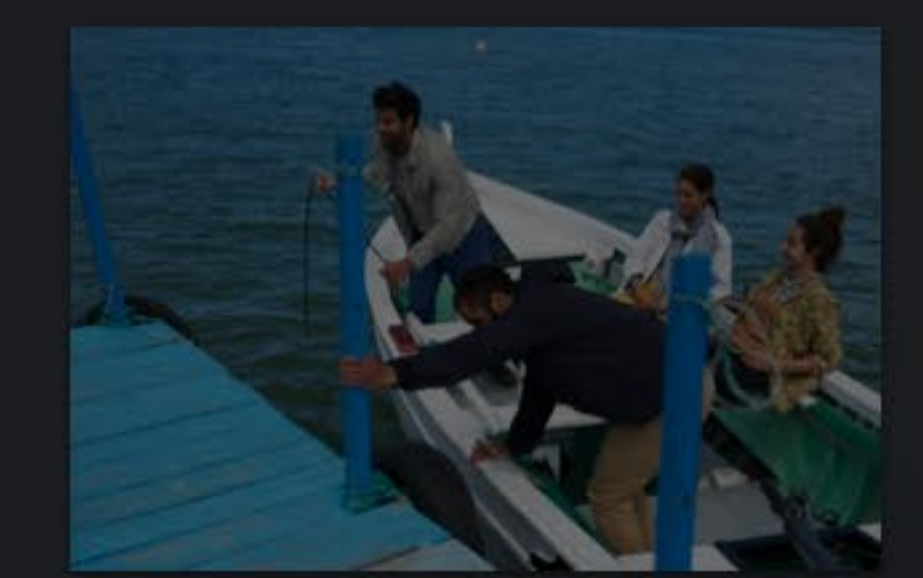




Boat Trip 1.jpg



Boat Trip 2.jpg

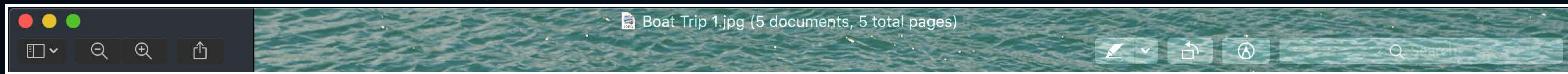


Boat Trip 3.jpg



Boat Trip 4.jpg





← Within window



Boat Trip 1.jpg



Boat Trip 2.jpg

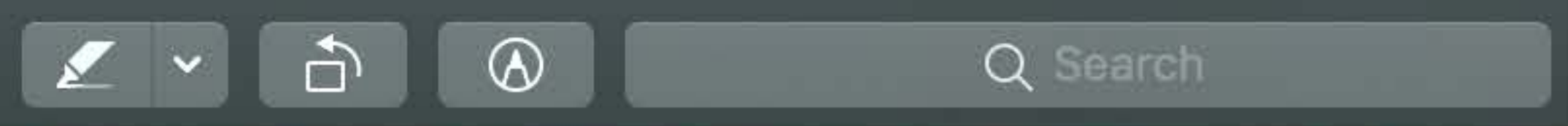


Boat Trip 3.jpg

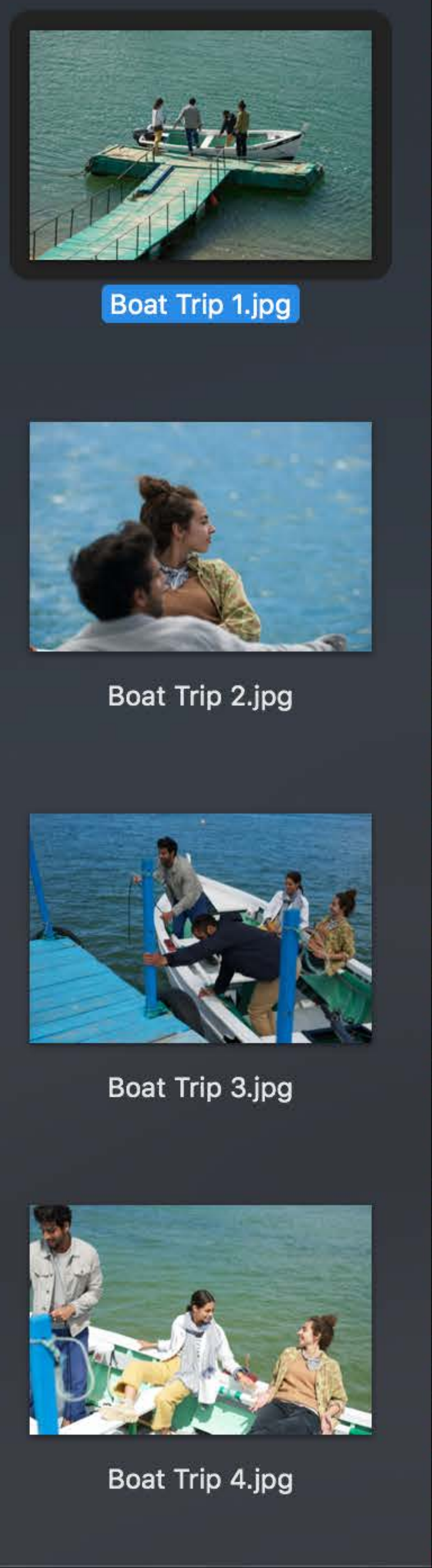


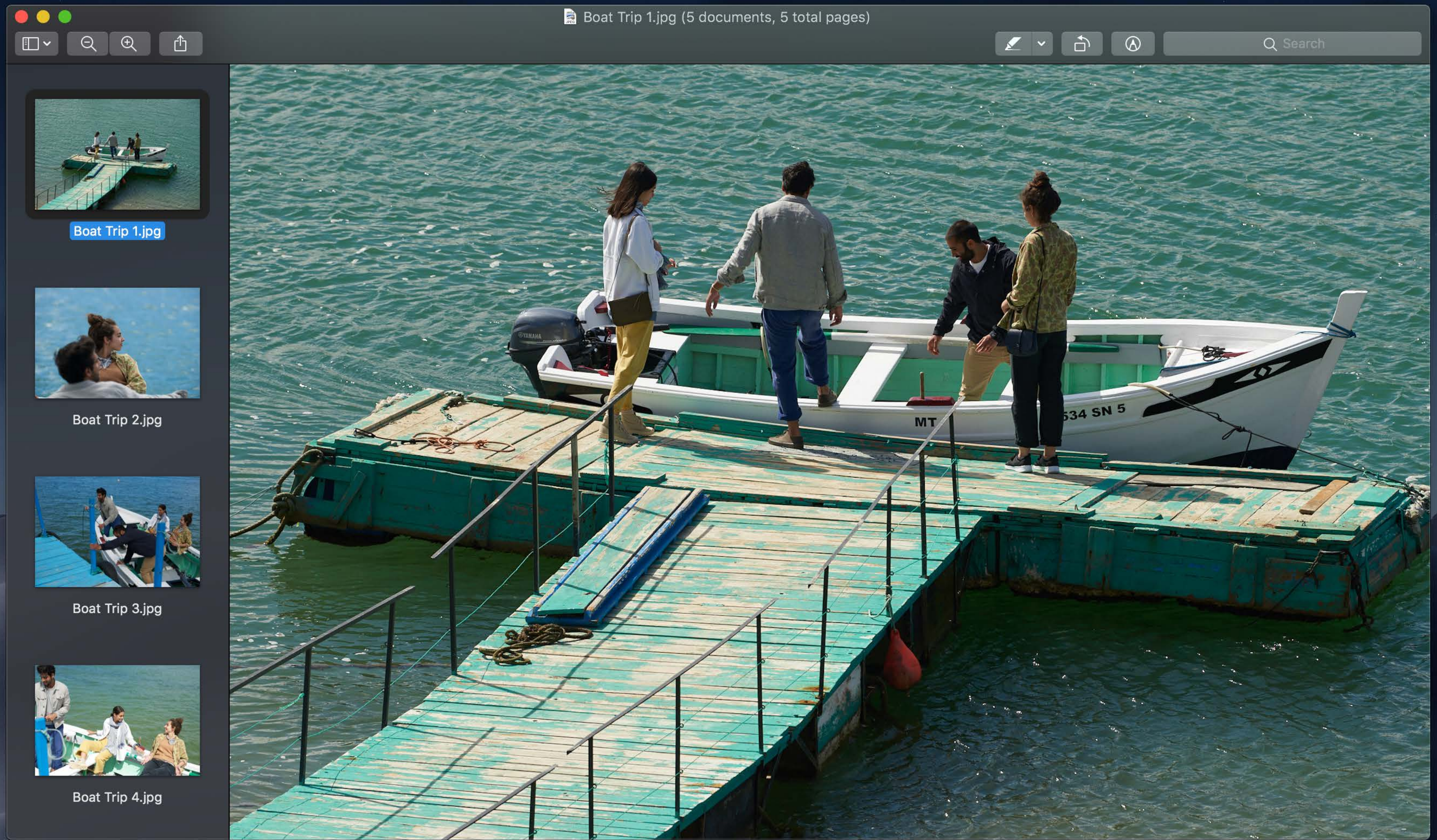
Boat Trip 4.jpg






← Within window






Boat Trip 1.jpg (5 documents, 5 total pages)


Search




Boat Trip 1.jpg



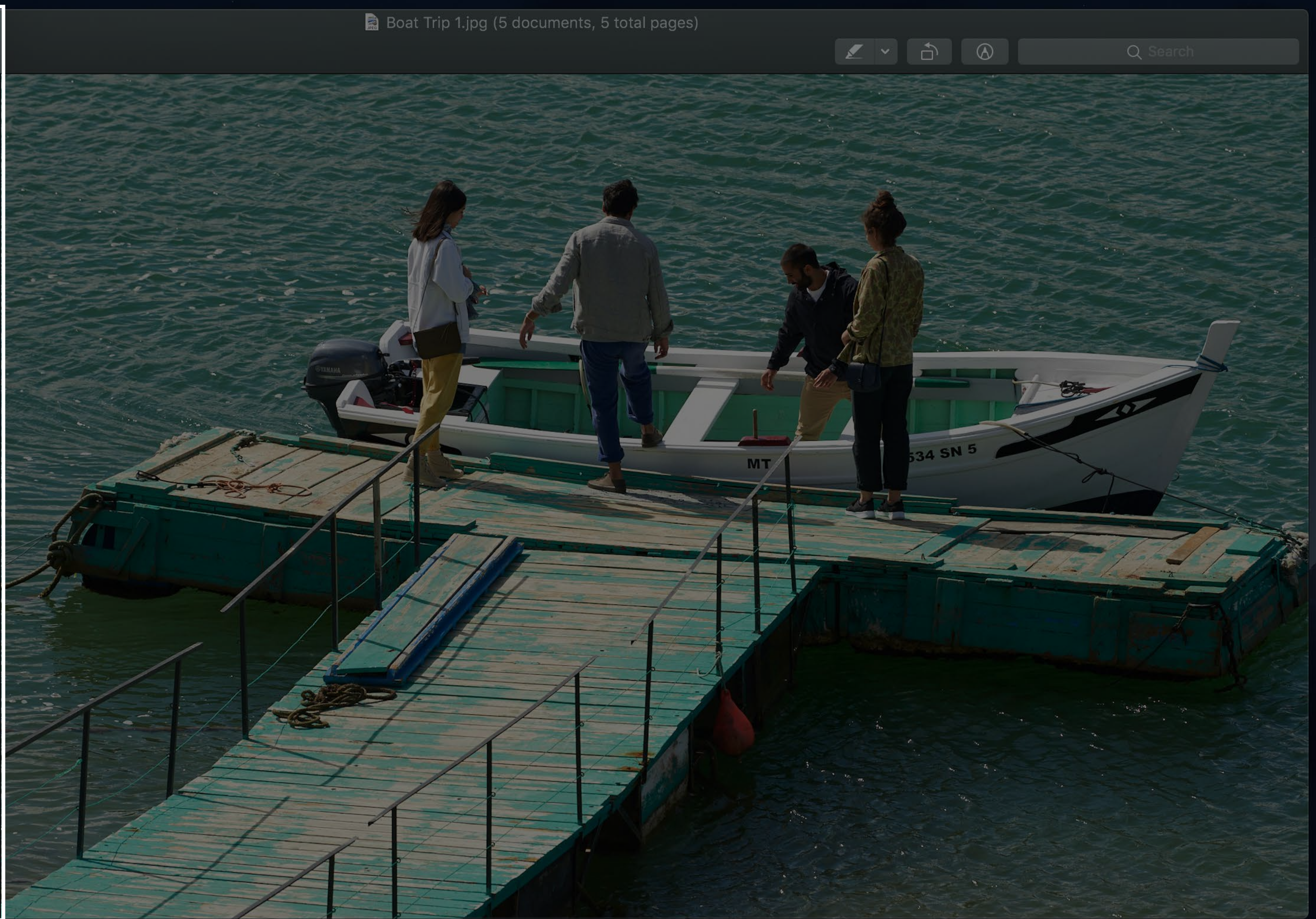
Boat Trip 2.jpg



Boat Trip 3.jpg



Boat Trip 4.jpg





Boat Trip 1.jpg (5 documents, 5 total pages) ▾

🔍 🔍 🔍



Boat Trip 1.jpg



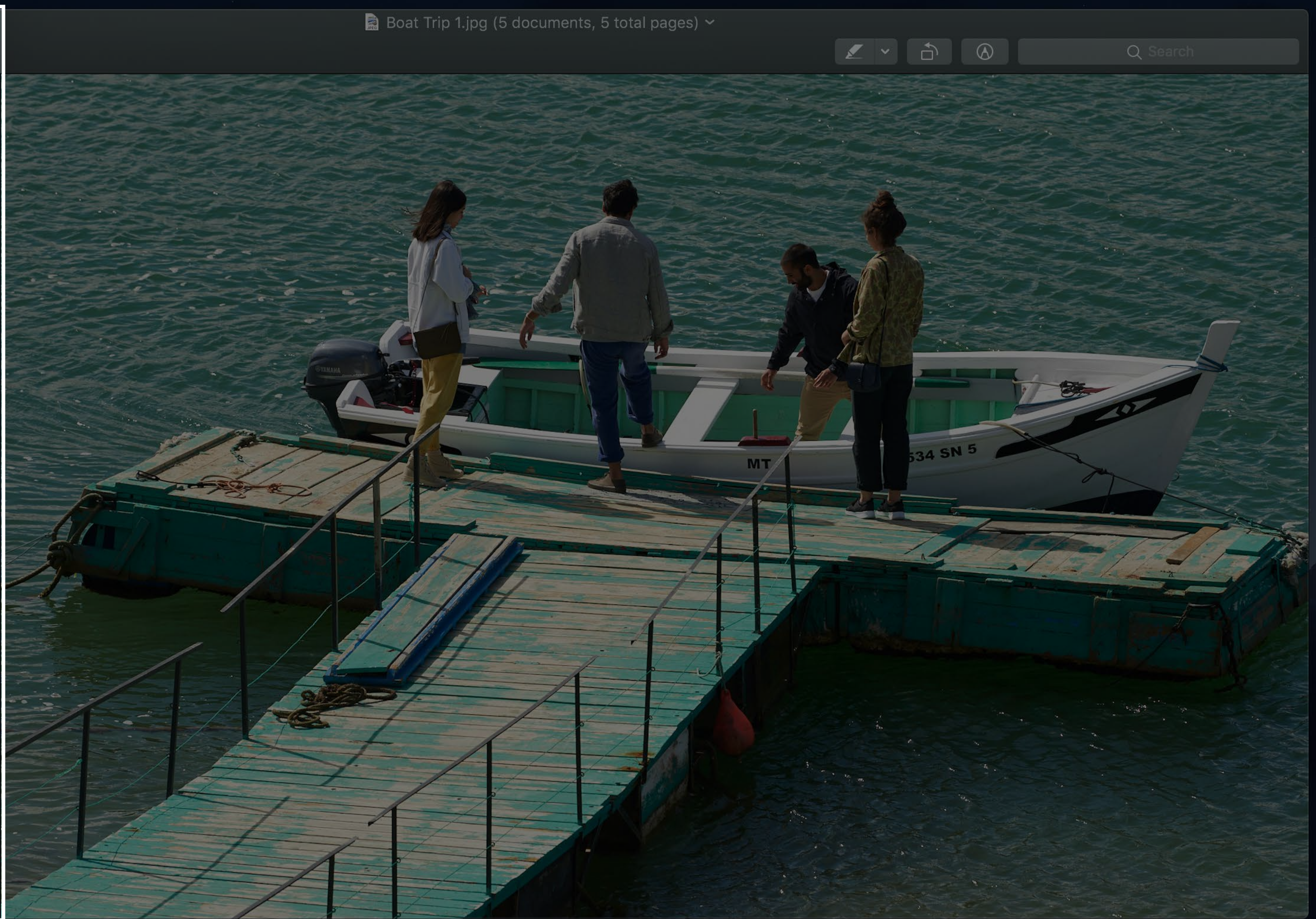
Boat Trip 2.jpg



Boat Trip 3.jpg

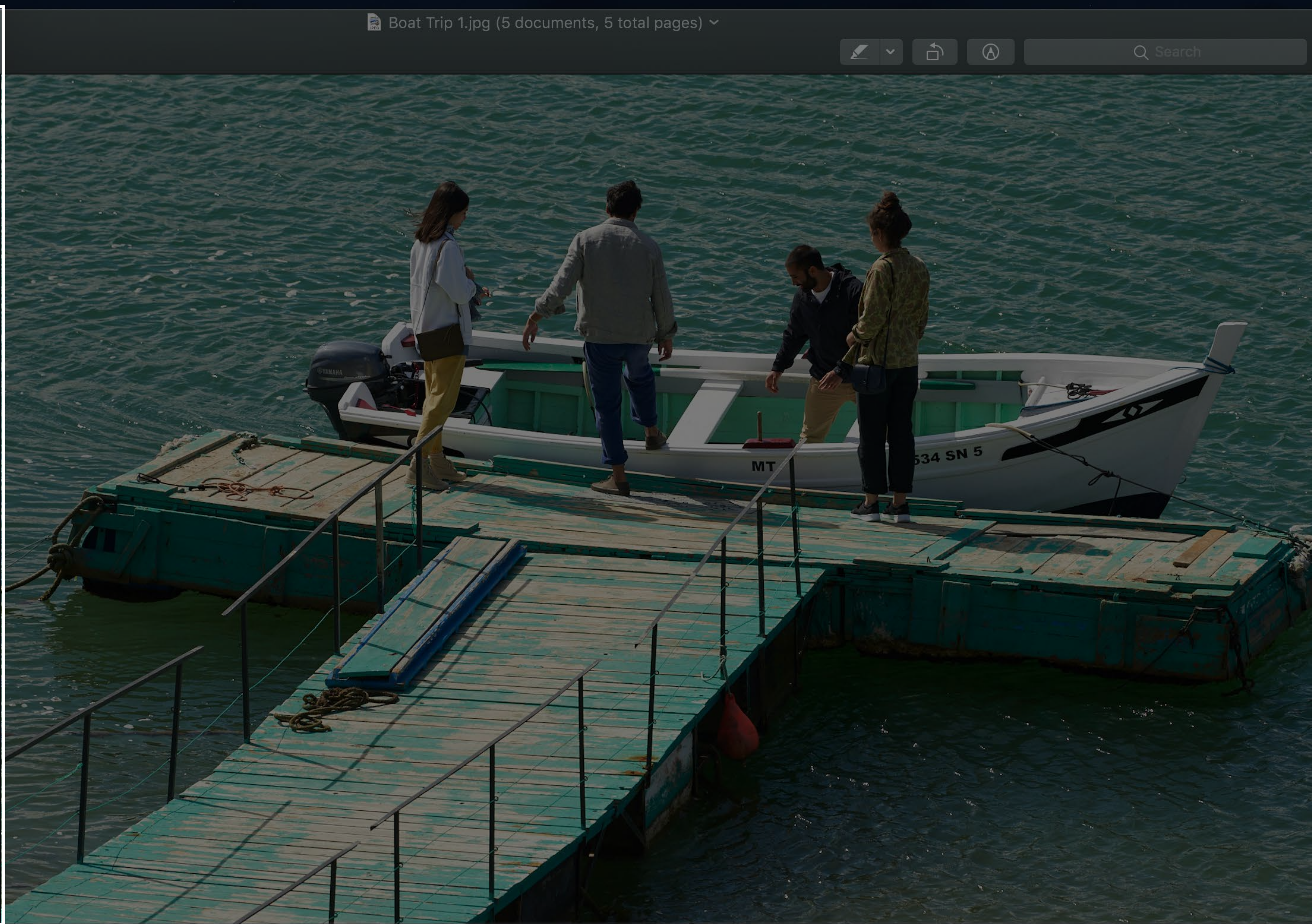


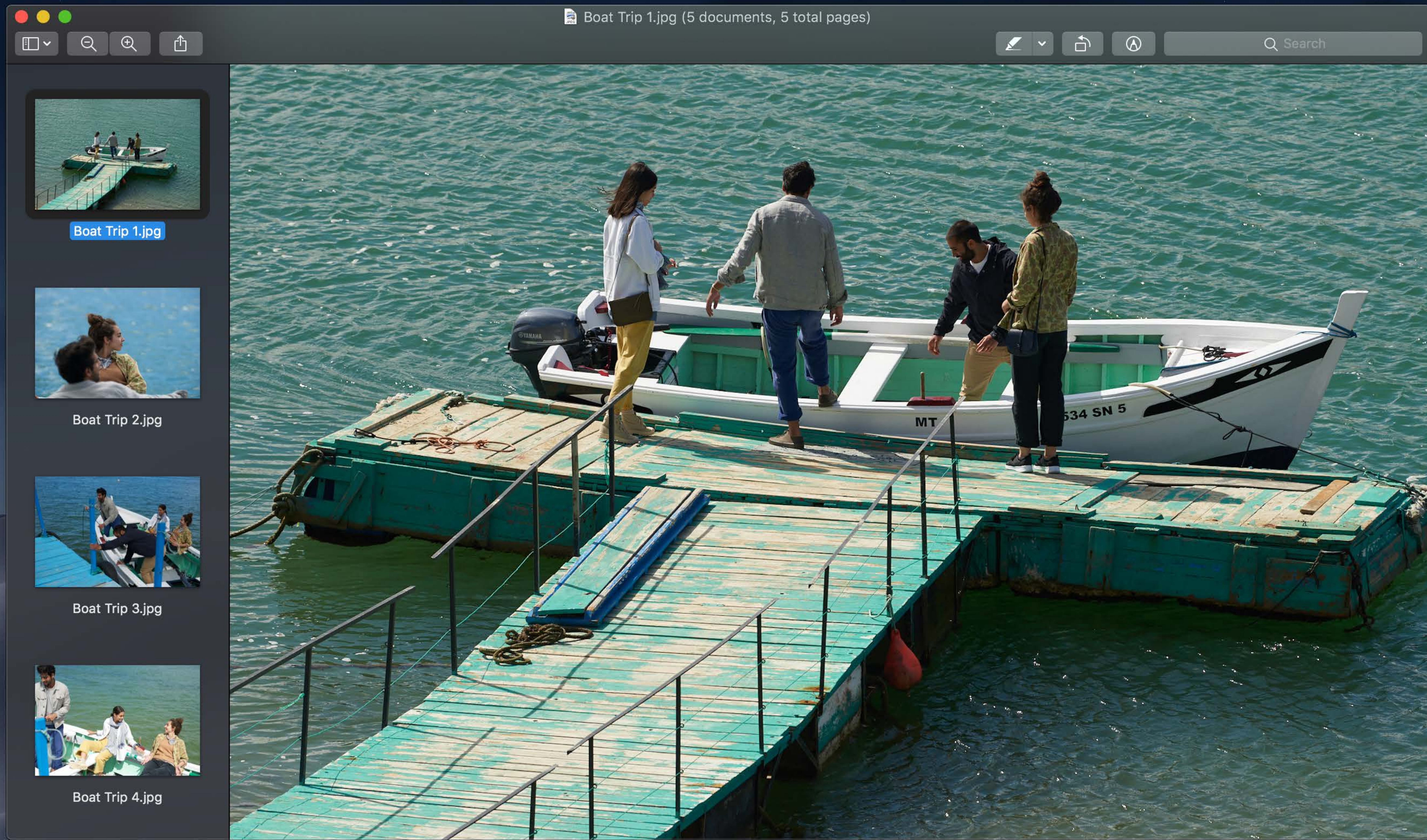
Boat Trip 4.jpg





Behind window





↑  
Behind window



# NSVisualEffectView

```
var blendingMode: NSVisualEffectView.BlendingMode
```

Controls whether material “punches through” window

Behind-window by default

# NSVisualEffectView

```
var material: NSVisualEffectView.Material
```

Encapsulates effect definition



Light



Dark

# Semantic Materials

NEW

Popover

Menu

Sidebar

Selection

Titlebar

# Semantic Materials

NEW

Popover

Sheet

Tool tip

Menu

HUD window

Content background

Sidebar

Header view

Window background

Selection

Under window background

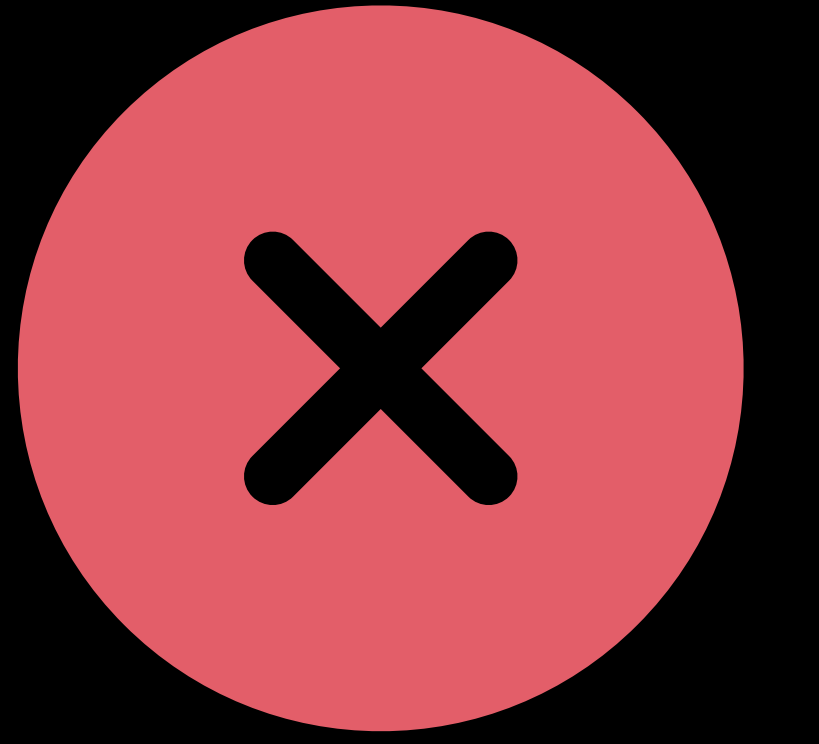
Under page background

Titlebar

Full-screen UI



# Materials



Nonsemantic materials are deprecated:

- Light
- Dark
- Medium light
- Ultra dark



Documents — Local

Search

**Favorites**

- AirDrop
- Recents
- Applications
- Desktop
- Documents**
- Downloads

**iCloud**

- iCloud Drive

**Tags**

- Red
- Orange
- Yellow
- Green
- Blue
- Purple
- Gray
- All Tags...

Applied Chemistry	Bangkok Street Food	Cell Biology	Chinese Opera	Contemporary Folk Jewelry
Desert Dunes	District Market	Easy Rides Custom Bikes	History of Skateboards	Introduction to Plants
John Appleseed Resume	Lebanese Family Recipes	Pisa Report	Roommate Budget	Scenic Pacific Trails
The Art of Sign Painting	The Art of Tea	THREE TALES	Whjsestone Farm	INTRODUCTION



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The Art of Sign Painting

The Art of Tea

THREE TALES

Whjjeonsa Farm

INTRODUCTION

Titlebar

Sidebar





Inbox (16 messages, 6 unread)

Sort by Date


- Jane Daniels 9:21 AM  
More photos from our trip!!  
Sorry, I couldn't help myself! I had to share a couple more photos from the trip, haha! I'll try save the rest for whenever...
- Raymond Sepulveda 9:02 AM**  
Vietnam Trip  
Hi John! We just got back from our trip to Vietnam and I wanted to share some of our photos with you. We backpacked through the country for two weeks and had an experience we'll never forget. The people were all incredibly friendly and we made a lot of new friends as we traveled around the country. You should join us next time!  
Let's schedule a lunch date soon so that we can catch up, I'll show you the rest of the trip photos then!
- Katie Abeles 8:47 AM  
Trip to San Francisco  
John, Visiting you in San Francisco was so much fun. We definitely need to head back soon. Here are some pictures...
- Taylor Kelly 8:16 AM  
Pick up from airport?  
Hi John! Hope all is well with you. I am coming home from London and was wondering if you might be able to pick me up...
- Rachel Goldeen Yesterday  
Dinner  
Hi Everyone, I'm so excited to see everyone at dinner tonight. Parking can be tough around the restaurant so I w...
- Mary Ellen Mason Yesterday  
Troy's Birthday  
Hey Everyone, Thanks for joining us for Troy's birthday. We all had an amazing time celebrating together. The kids...
- Jeff Nadeau Yesterday  
Backpacking Thailand  
Hey Everyone, We just got back from our trip to Thailand. We backpacked the country for two weeks and had an exp...
- Ivy Calhoun Yesterday  
Coming to the Bay Area!  
John, Looking forward to seeing you this year! Quick favor. I'm planning on doing some hiking while I'm there. D...
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Hi John, I was thinking we could take the kids out for brunch one of these days. It'd be nice to get everyone tog...
- Ethan Izzarelli Yesterday  
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- Ailish Kimber Yesterday  
Baby Jessica  
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To: John Appleseed

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Header view


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Vietnam Trip  
To: John Appleseed

Inbox - iCloud 4:09 PM



Content background





Chameleons

- Chadwick
- Chloe**
- Chuy
- Chelsey
- Chevy
- Chiwetel
- Chester
- Chubs
- Cleopatra
- Charlotte

**Chloe**  
2 years old

Photos Vitals **Notes**

**June 4, 2018**  
Chloe was very good today. She watched me practice my presentation and only fell asleep *twice*! Either I'm getting better or she's being more patient.

**June 1, 2018**  
Today Chloe was feeling a little green. I think she must have a bug or something. The doctor said it was nothing to worry about, and to just make sure she gets plenty of water. 🚰

**May 25, 2018**  
Tuesday! Took Chloe and Chester to the chameleon park today. Chloe got along great with all the chameleons in the neighborhood. It was very colorful!!

**May 18, 2018**  
Chloe's second birthday 🎂🎁🎉  
We got her a dozen crickets.


**May 14, 2018**  
Looked around for Chloe for three hours. Turns out she was just blending into my **shirt** the whole time 😊

**May 9, 2018**  
Chloe got a bath today. 🛁

**May 8, 2018**  
It turns out that there is a such thing as Chameleon flu. Had to give Chloe 5 spritzes from the water bottle to cool her down.

Chameleons

- Chadwick
- Chloe**
- Chuy
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- Chiwetel
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🛁


**May 8, 2018**  
It turns out that there is a such thing as Chameleon flu. Had to give Chloe 5 spritzes from the water bottle to cool her down.

Under page background



### General

Appearance:  

Accent color: 

Highlight color: Blue

Sidebar icon size: Medium

Automatically hide and show the menu bar

---

Show scroll bars:  Automatically based on mouse or trackpad  
 When scrolling  
 Always

Click in the scroll bar to:  Jump to the next page  
 Jump to the spot that's clicked

---

Default web browser: Safari

---

Ask to keep changes when closing documents  
 Close windows when quitting an app  
When selected, open documents and windows will not be restored when you re-open an app.

Recent items: 10 Documents, Apps, and Servers

Allow Handoff between this Mac and your iCloud devices



---


Use LCD font smoothing when available



Window background

General

Appearance:  

Accent color: 

Highlight color: Blue

Sidebar icon size: Medium

Automatically hide and show the menu bar

Show scroll bars:  Automatically based on mouse or trackpad  
 When scrolling  
 Always

Click in the scroll bar to:  Jump to the next page  
 Jump to the spot that's clicked

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Allow Handoff between this Mac and your iCloud devices


Use LCD font smoothing when available







**General** Search

Appearance:  

Accent color: 

Highlight color: Blue 

Sidebar icon size: Medium 


Automatically hide and show the menu bar

---

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Use LCD font smoothing when available 

Window background



# Desktop-Tinted Materials

Automatic support

NSWindow

NSScrollView

NSTableView

NSCollectionView

# Desktop-Tinted Materials

Custom NSBox support

NSBox fill color

NSVisualEffectView material

Window Background	<code>.windowBackgroundColor</code>	<code>.windowBackground</code>
Content Background	<code>.controlBackgroundColor</code>	<code>.contentBackground</code>
	<code>.textBackgroundColor</code>	
Under Page Background	<code>.underPageBackgroundColor</code>	<code>.underPageBackground</code>



# Desktop-Tinted Materials

NSBox and NSVisualEffectView support

```
// Using NSBox  
box.boxType = .custom  
box.fillColor = .underPageBackgroundColor
```



```
// Using NSVisualEffectView  
visualEffectView.material = .underPageBackground
```



# Desktop-Tinted Materials

Untinted color in light

Desktop-tinted in dark

Tint effect might be disabled

General Search

Appearance:  

Accent color: 

Highlight color: Blue ▾

Sidebar icon size: Medium ▾

Automatically hide and show the menu bar

---

Show scroll bars:  Automatically based on mouse or trackpad  
 When scrolling  
 Always

Click in the scroll bar to:  Jump to the next page  
 Jump to the spot that's clicked

---

Default web browser: Safari ▾

---

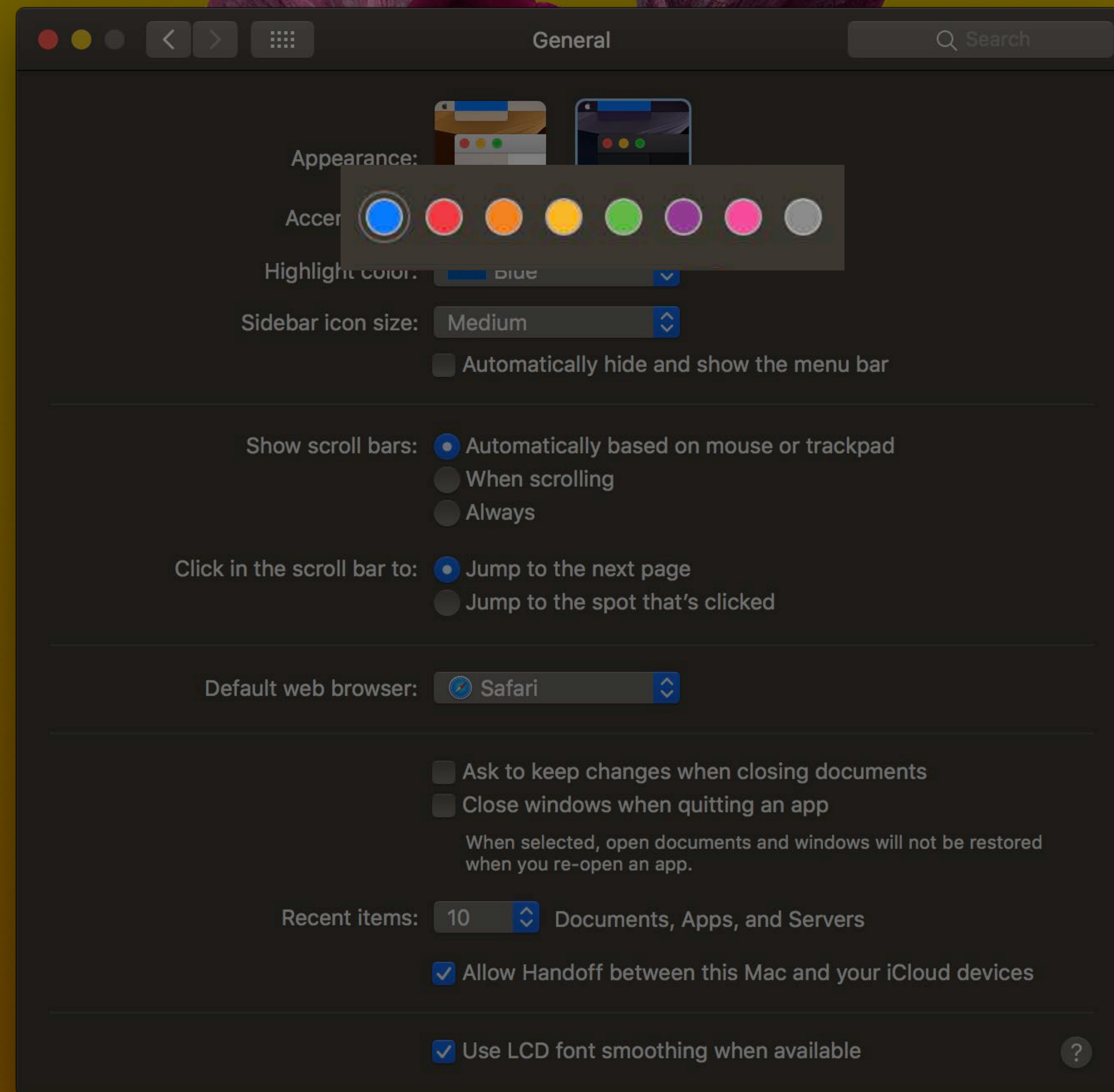
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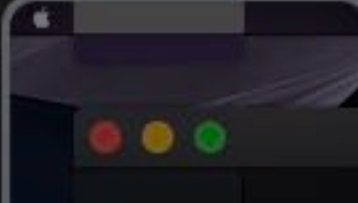
Allow Handoff between this Mac and your iCloud devices









---

Use LCD font smoothing when available ?



General Search

Appearance:  

Accent color:        

Highlight color: Blue

Sidebar icon size: Medium

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Default web browser: Safari


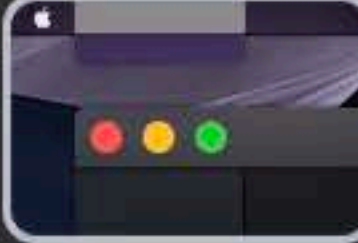
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Use LCD font smoothing when available ?

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Recent items: 10 Documents, Apps, and Servers

Allow Handoff between this Mac and your iCloud devices

---

Use LCD font smoothing when available ?





```
visualEffectView.material = .contentBackground
```



Hello, world!

```
visualEffectView.material = .contentBackground
```

```
// Using backgroundColor to fill the bubble
```

```
class BubbleView : NSView {  
  
    override func draw(_ dirtyRect: NSRect) {  
        let bubblePath: NSBezierPath = makeBubblePath()  
  
        NSColor.backgroundColor.setFill()  
        bubblePath.fill()  
    }  
  
}
```



```
// Using backgroundColor to fill the bubble
```

```
class BubbleView : NSView {
```

```
    override func draw(_ dirtyRect: NSRect) {
```

```
        let bubblePath: NSBezierPath = makeBubblePath()
```

```
        NSColor.backgroundColor.setFill()
```

```
        bubblePath.fill()
```

```
    }
```

```
}
```



```
// Using backgroundColor to fill the bubble
```

```
class BubbleView : NSView {
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    override func draw(_ dirtyRect: NSRect) {
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```

```
    }
```

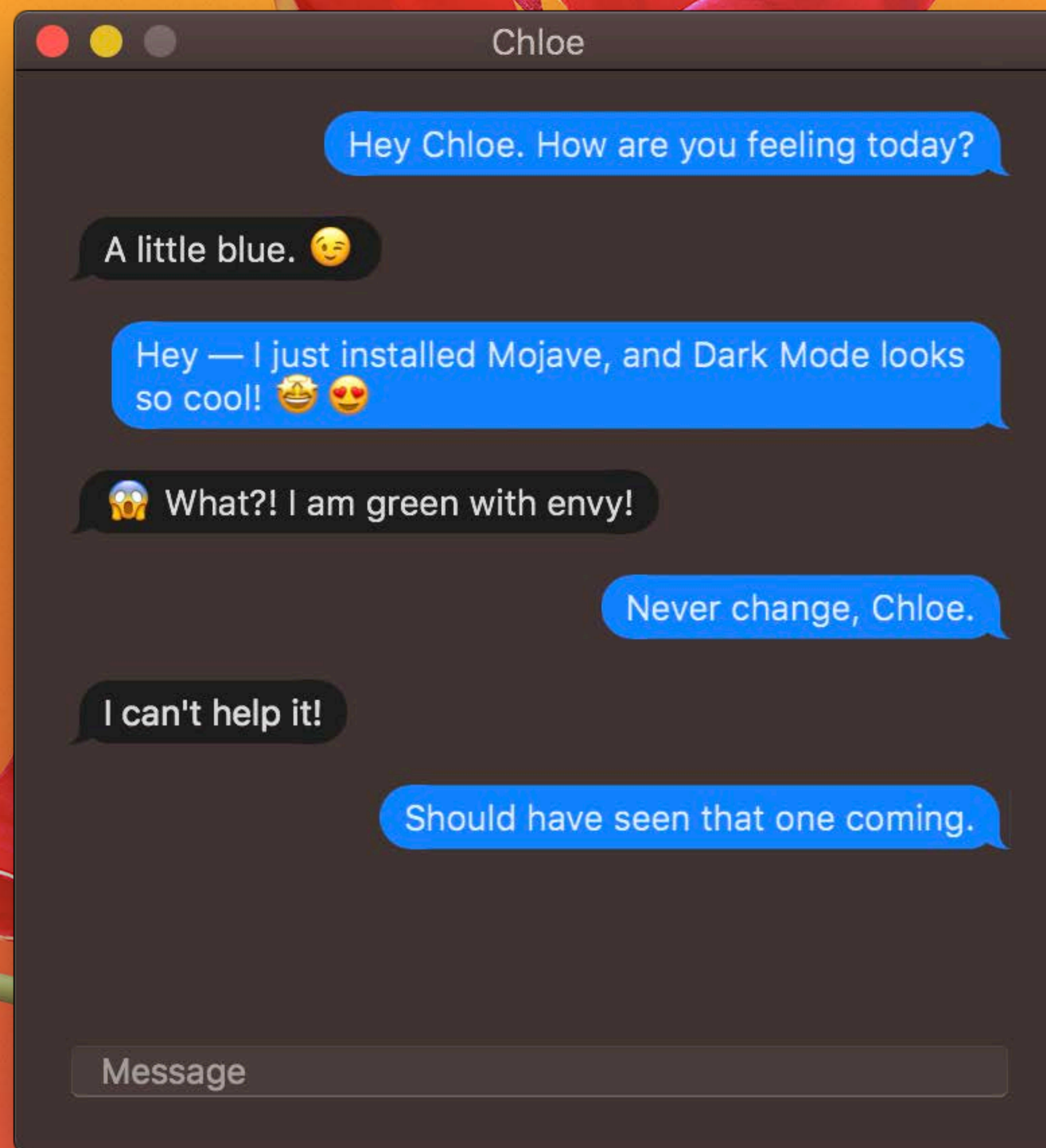
```
}
```



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class BubbleView : NSView {  
  
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        NSColor.backgroundColor.setFill()  
        bubblePath.fill()  
    }  
  
}
```





Hey Chloe. How are you feeling today?

A little blue. 😞

Hey — I just installed Mojave, and Dark Mode looks so cool! 😄👁️

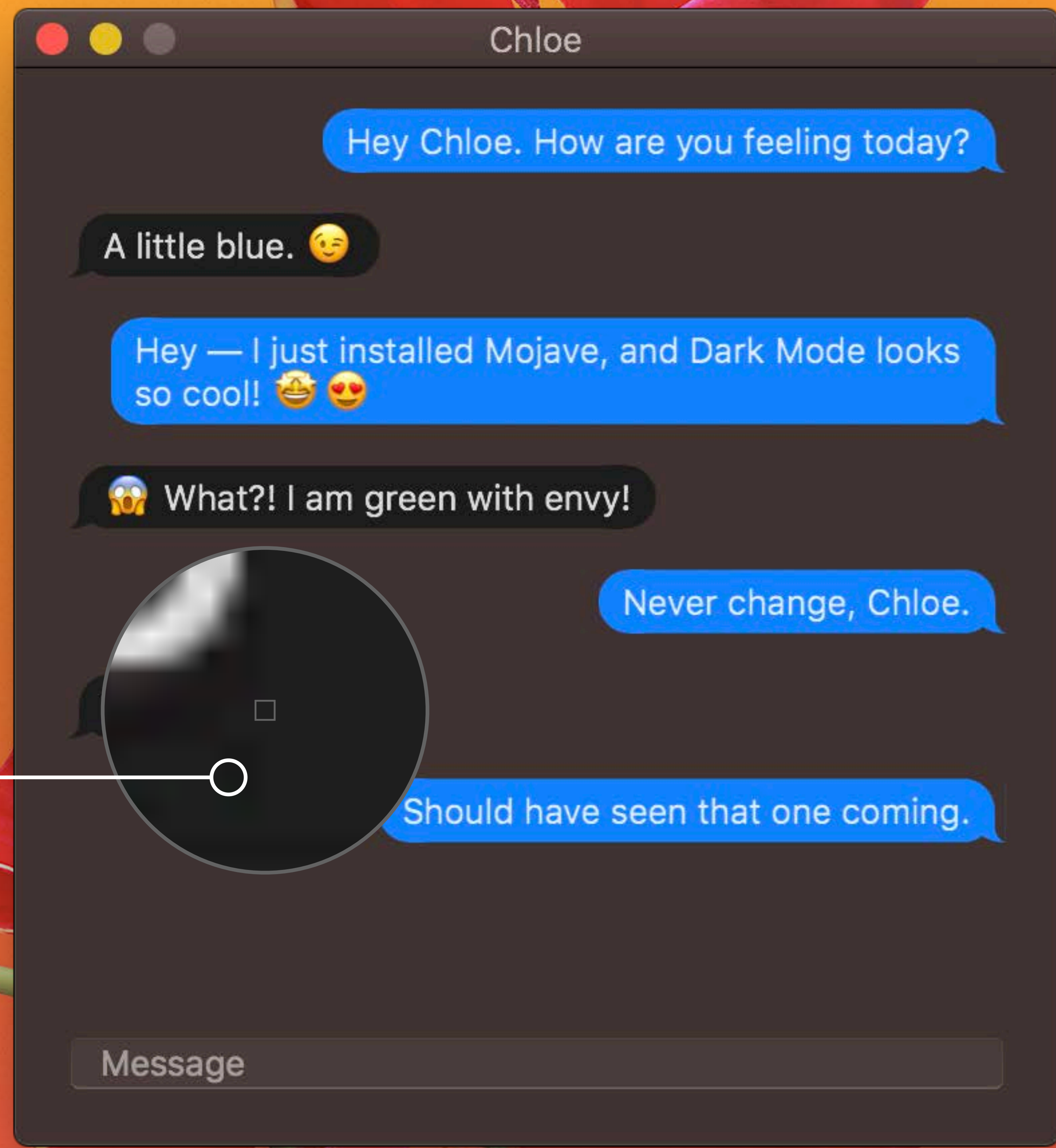
😱 What?! I am green with envy!

Never change, Chloe.

I can't help it!

Should have seen that one coming.

Message



RGB (30,30,30)



# Desktop-Tinted Materials

Effect is provided by Quartz window server

Updates asynchronously from your app

But can't draw with the color (or get RGB values)

Instead, use `maskImage`



# Mask Image

```
extension NSVisualEffectView {  
    var maskImage: UIImage?  
}
```

Masks the material to a shape

Drawing-handler images supported

```
// Using a masked NSVisualEffectView for the bubble

class BubbleView : NSView {
    override func layout() {
        let bubblePath: NSBezierPath = makeBubblePath()
    }
}
```

```
// Using a masked NSVisualEffectView for the bubble
```

```
class BubbleView : NSView {  
    override func layout() {  
        let bubblePath: NSBezierPath = makeBubblePath()  
  
        let materialView = NSVisualEffectView(frame: bounds)  
        materialView.material = .contentBackground  
  
        let mask = NSImage(size: bounds.size, flipped: false) { (_) in  
            NSColor.white.setFill() // Any opaque color will do  
            bubblePath.fill()  
            return true  
        }  
        materialView.maskImage = mask  
    }  
}
```





```
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            bubblePath.fill()  
            return true  
        }  
        materialView.maskImage = mask  
    }  
}
```

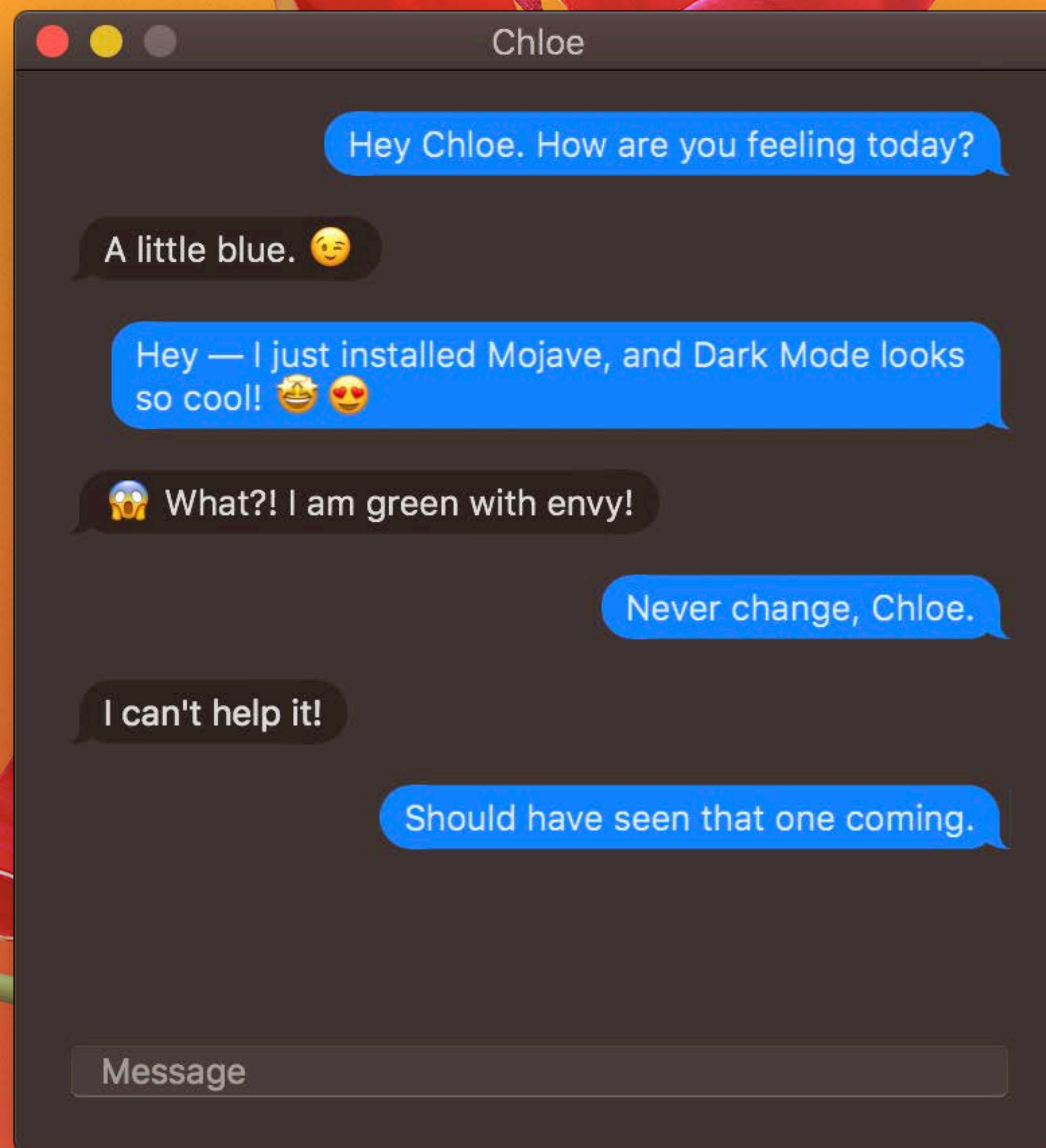


```
// Using a masked NSVisualEffectView for the bubble

class BubbleView : NSView {
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        let materialView = NSVisualEffectView(frame: bounds)
        materialView.material = .contentBackground

        let mask = NSImage(size: bounds.size, flipped: false) { (_) in
            NSColor.white.setFill() // Any opaque color will do
            bubblePath.fill()
            return true
        }
        materialView.maskImage = mask
    }
}
```



Hey Chloe. How are you feeling today?

A little blue. 😞

Hey — I just installed Mojave, and Dark Mode looks so cool! 😄👁️

😱 What?! I am green with envy!

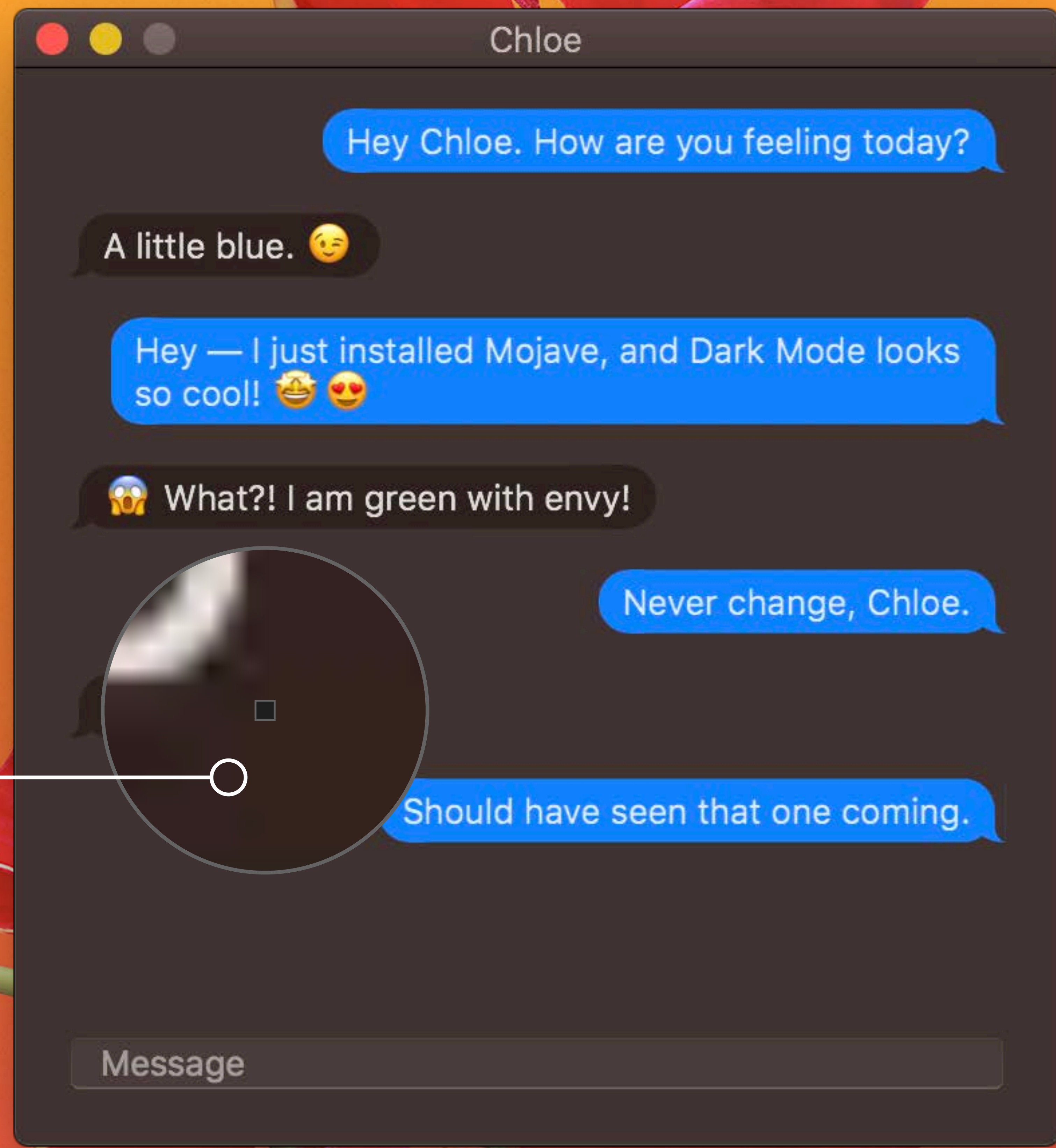
Never change, Chloe.

I can't help it!

Should have seen that one coming.

Message





Chloe

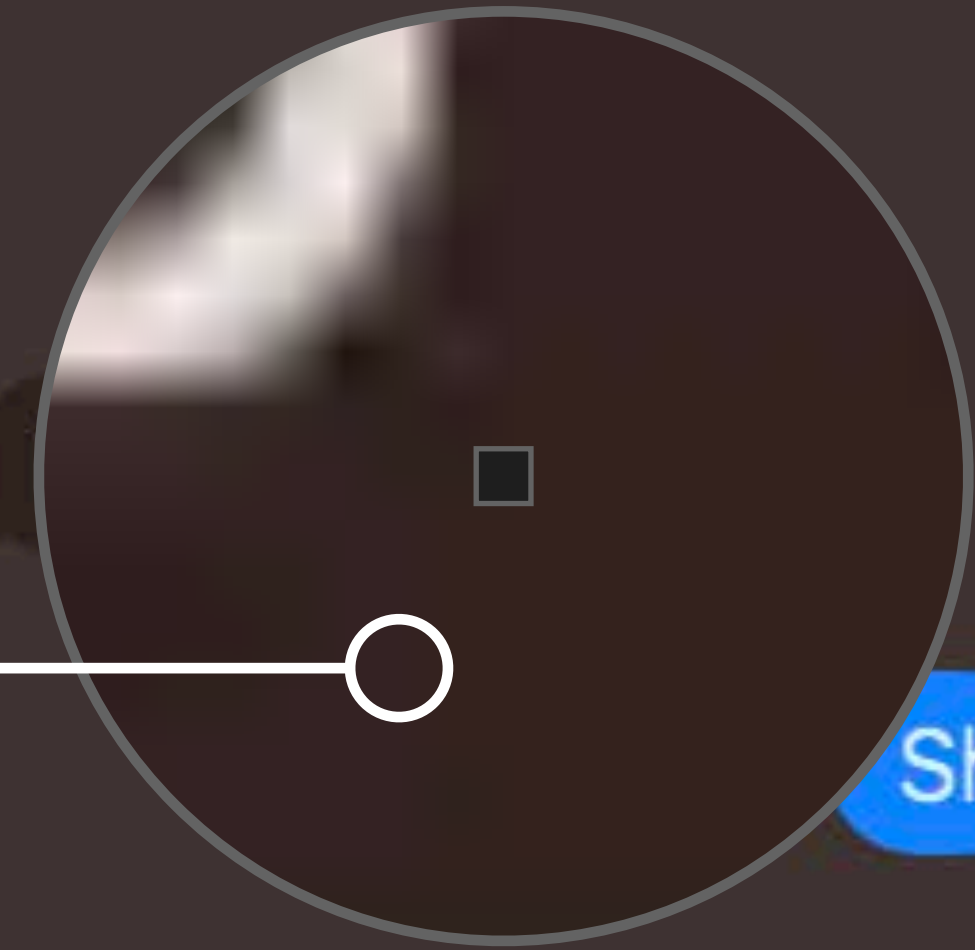
Hey Chloe. How are you feeling today?

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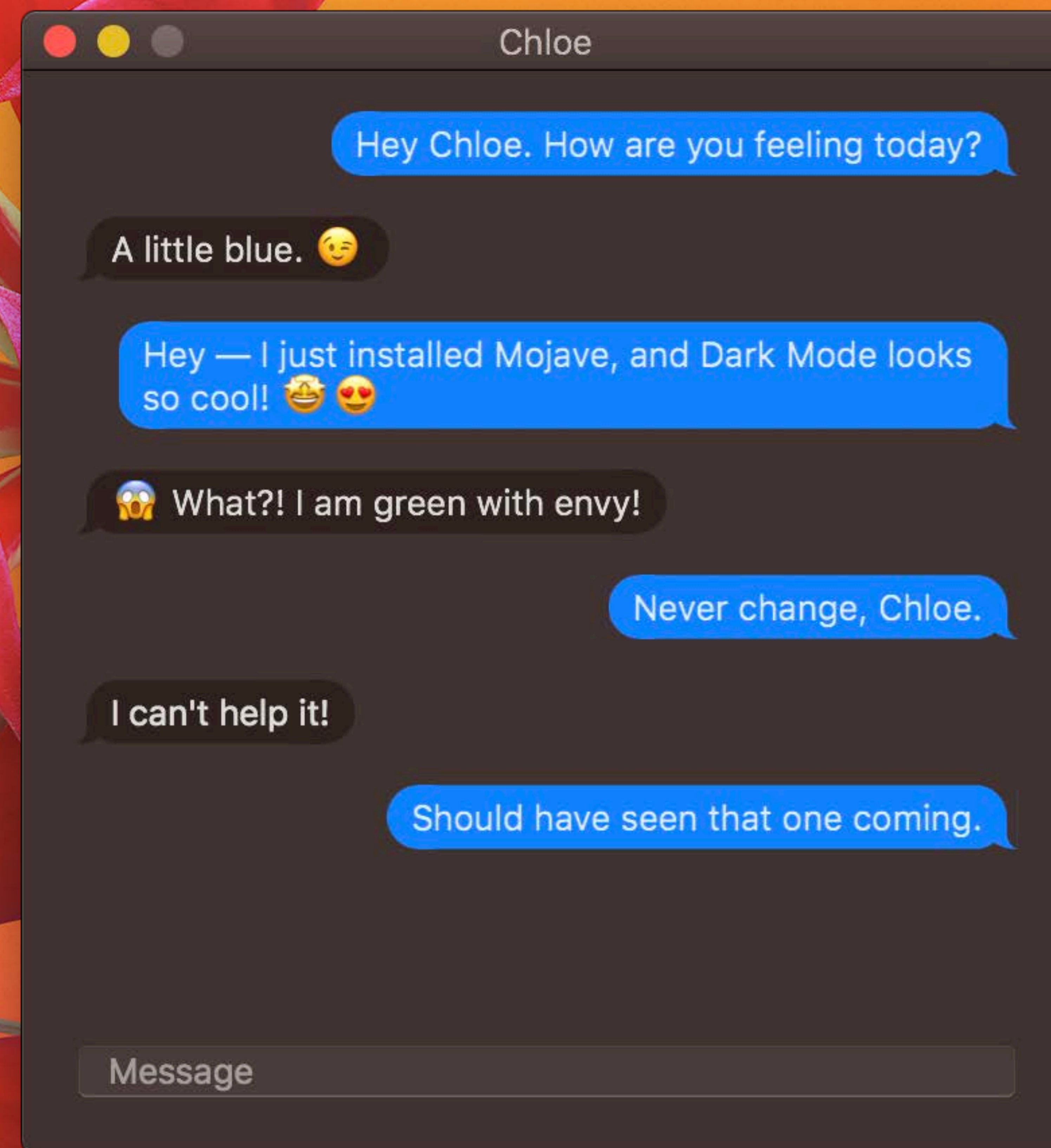
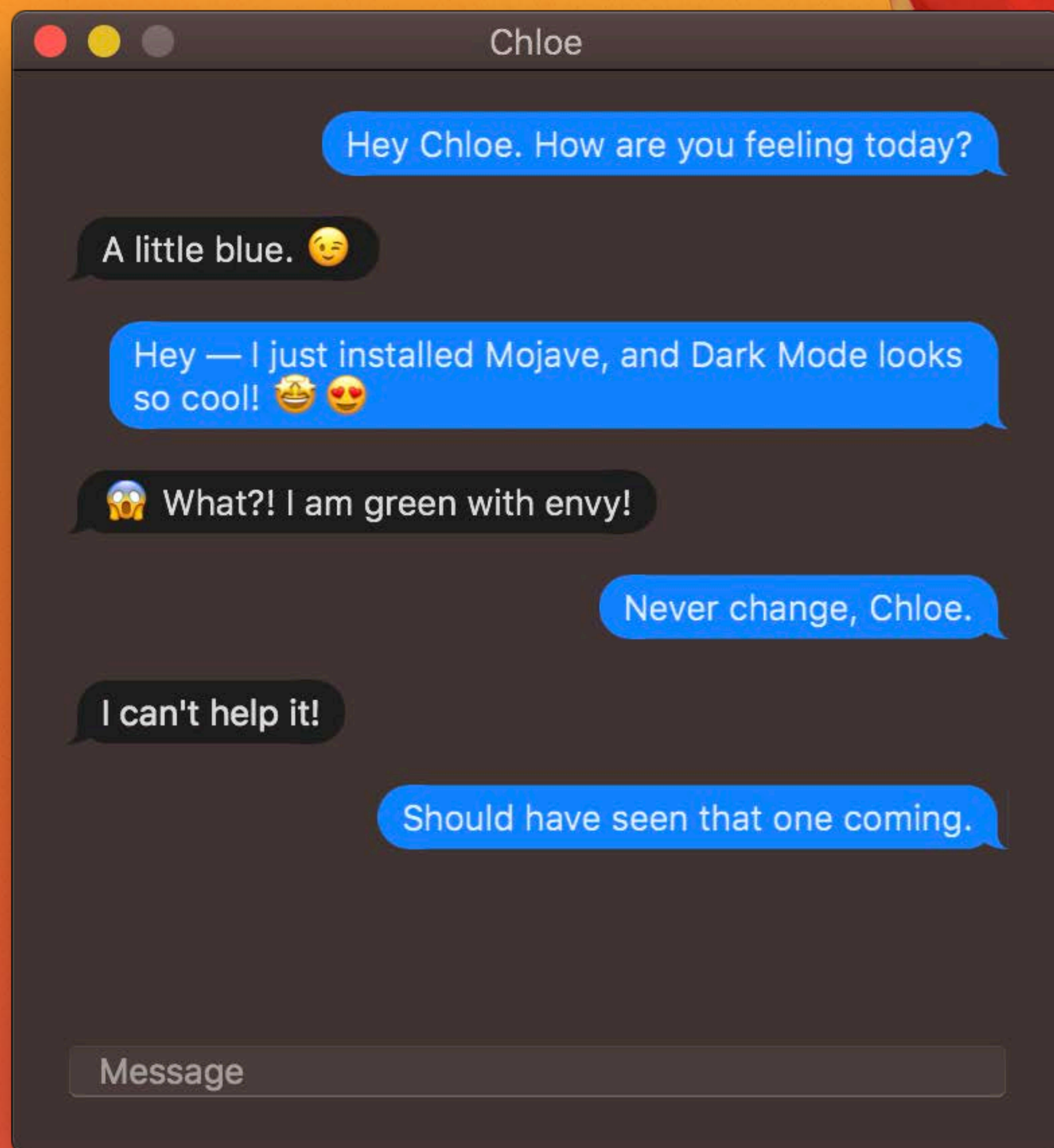
Never change, Chloe.

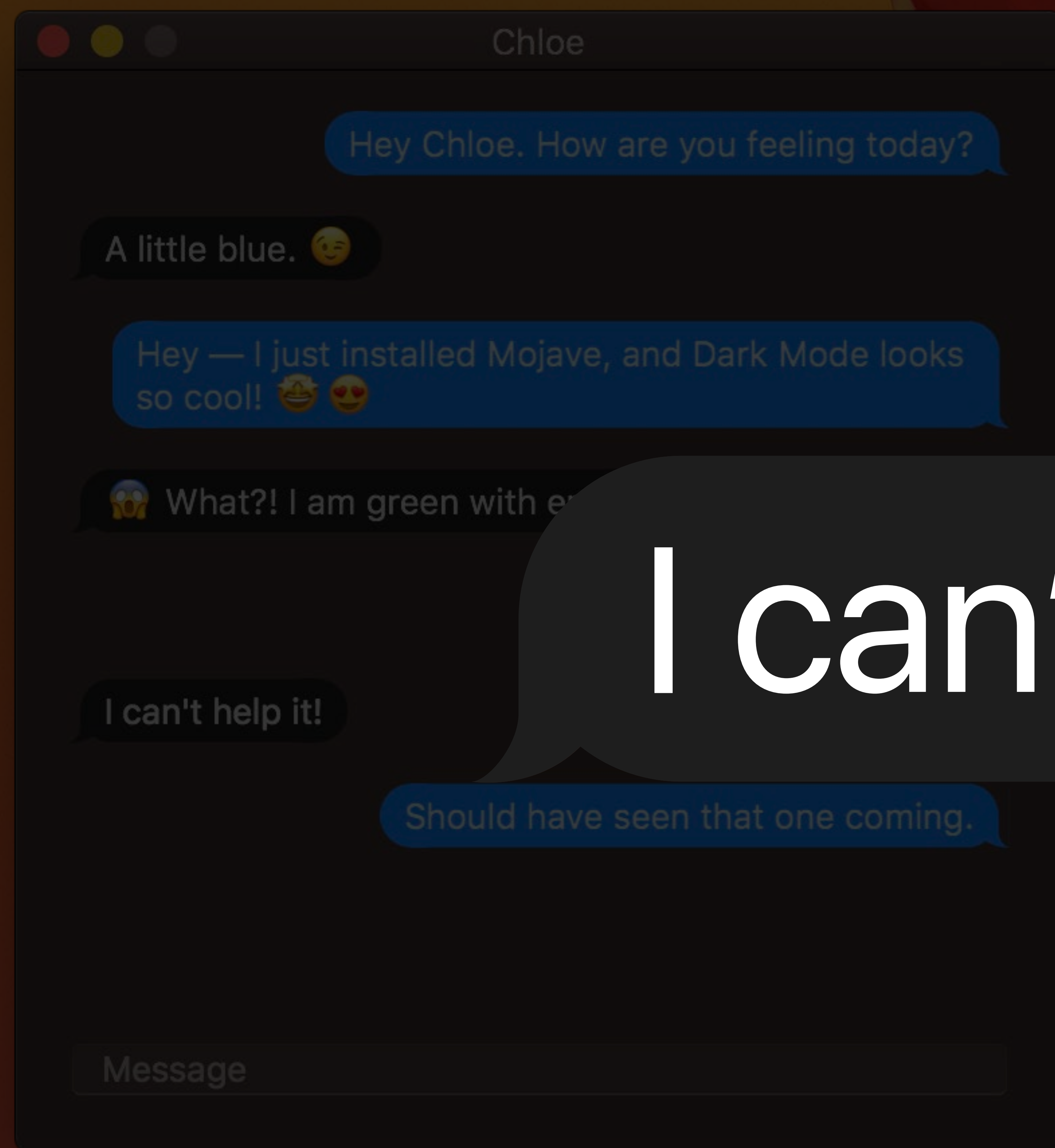


Should have seen that one coming.

Message

RGB (49,35,32)





I can't help it!

# Mask Image

Works with any material

Alpha channel used for mask

Only material (not subviews) masked

Provide a resizable image `capInsets` and `resizingMode`

Appearance

Materials

**Vibrancy**

Background styles

Backward deployment

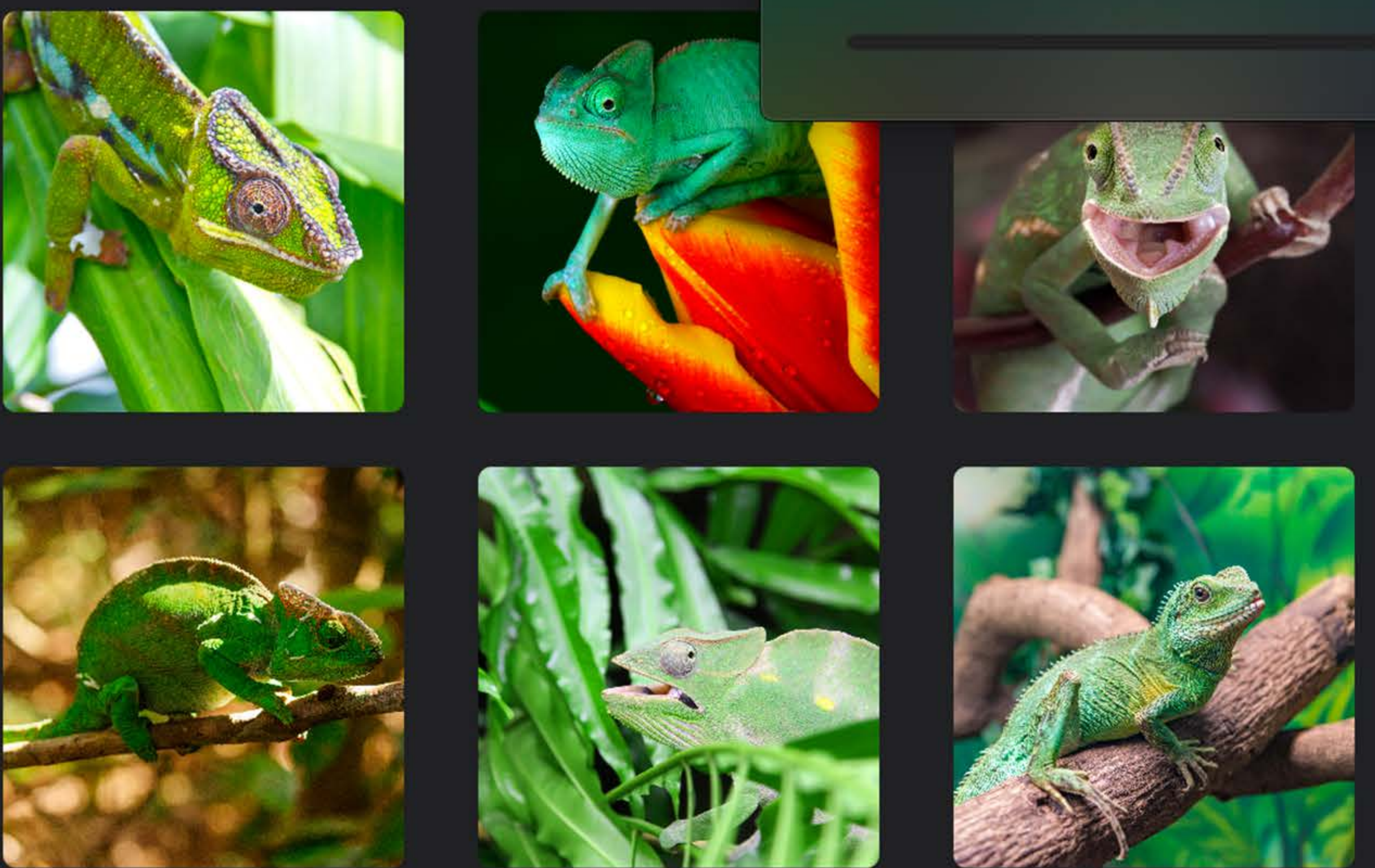
Tips and tricks

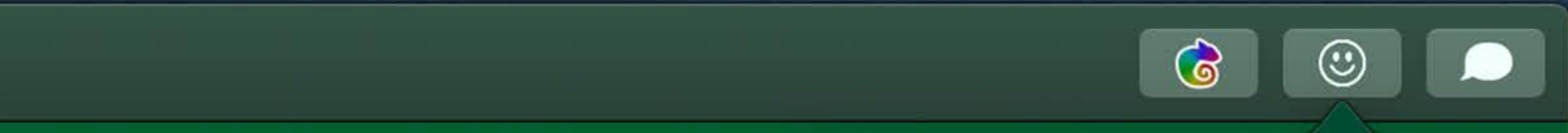
Chameleons

- Chadwick
- Chloe**
- Chuy
- Chelsey
- Chevy
- Chiwetel
- Chester
- Chubs
- Cleopatra
- Charlotte

**Chloe**  
2 years old

Photos Vitals








**Chloe**  
2 years old

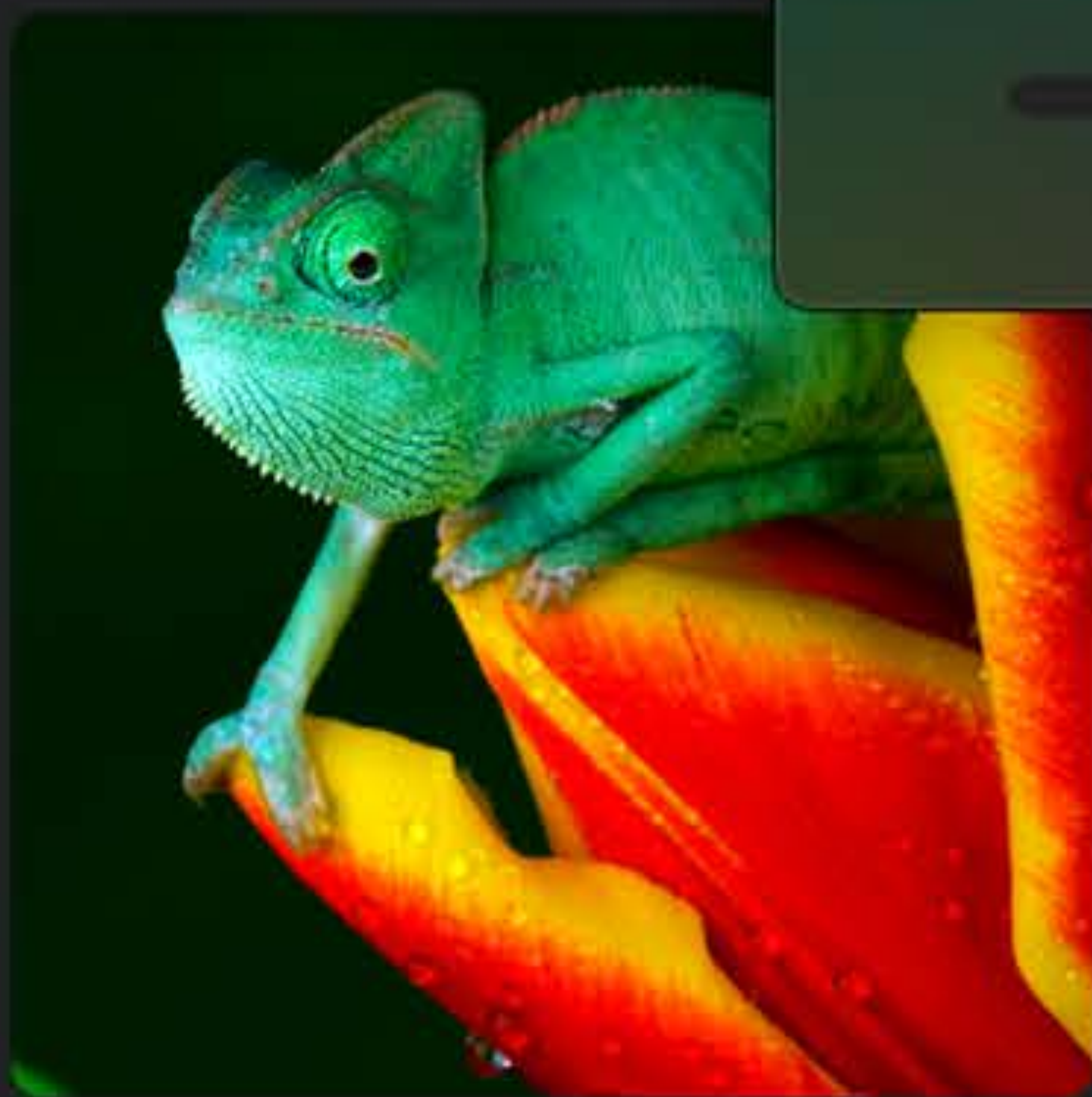
Photos

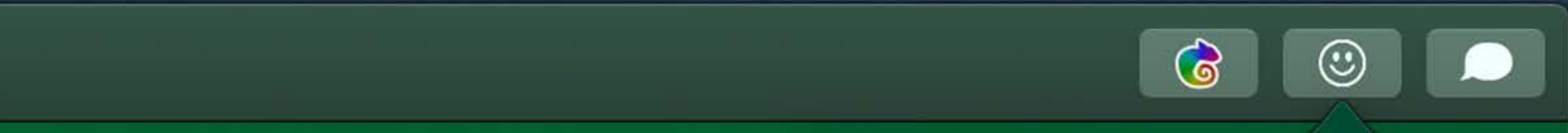
Vitals

Emotion selection panel with three options:

- 
- 
- 

A vertical slider is positioned under the green happy face emoji, with a grey triangle at the bottom.



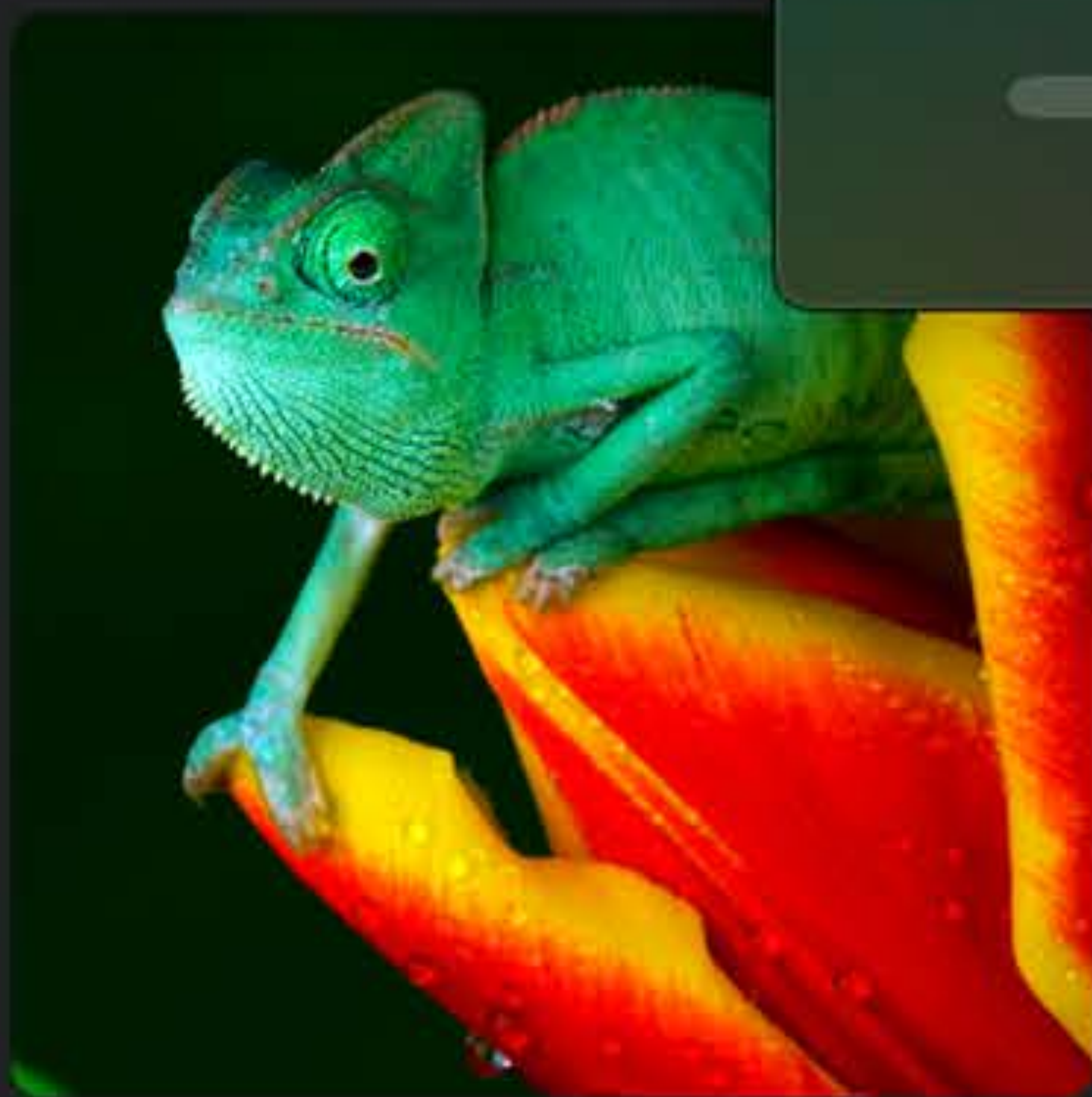


# Chloe

2 years old

Photos

Vitals





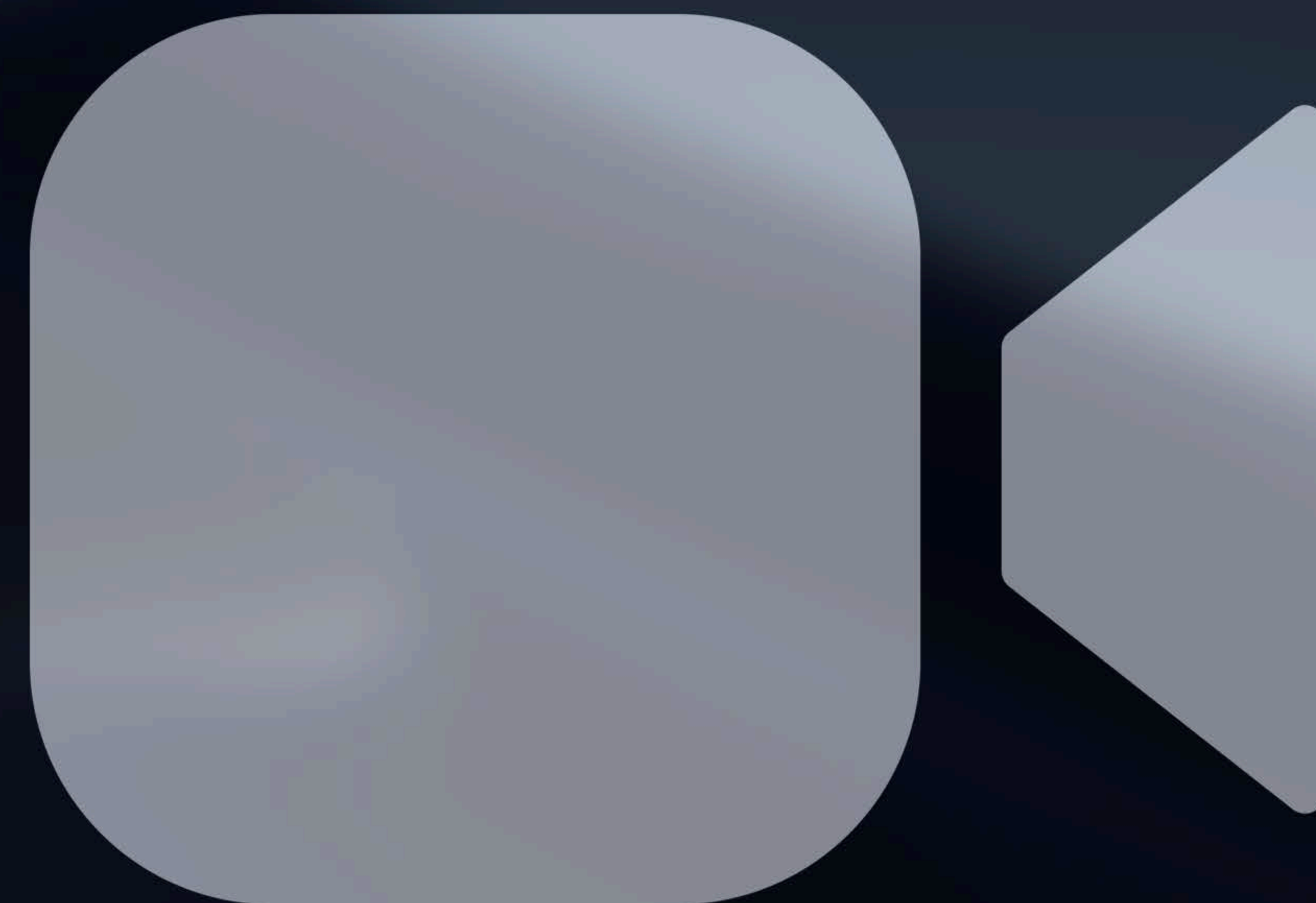
# Vibrancy

Lightens or darkens the content behind it

Similar to dodge and burn in a photo editor



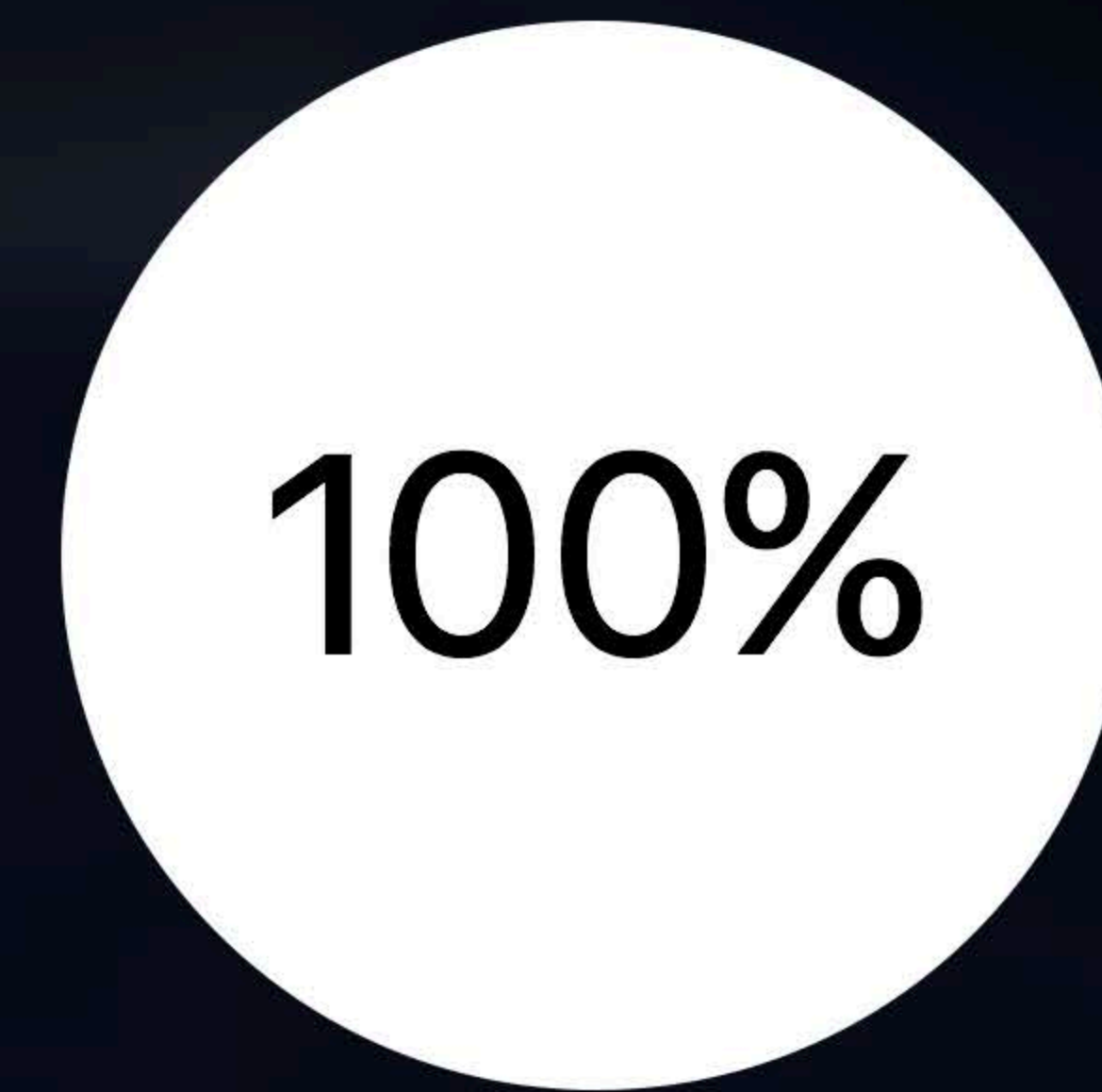
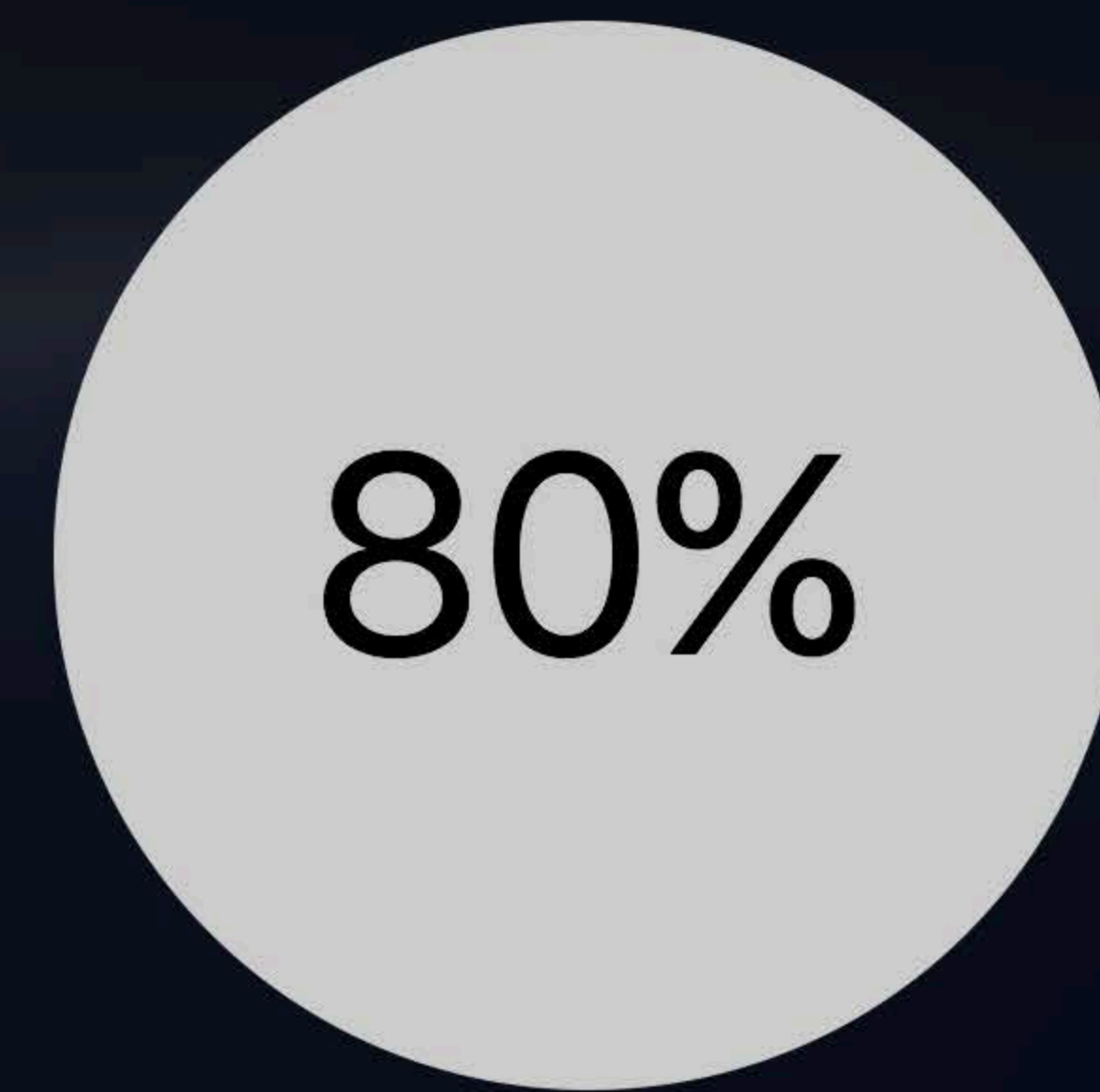
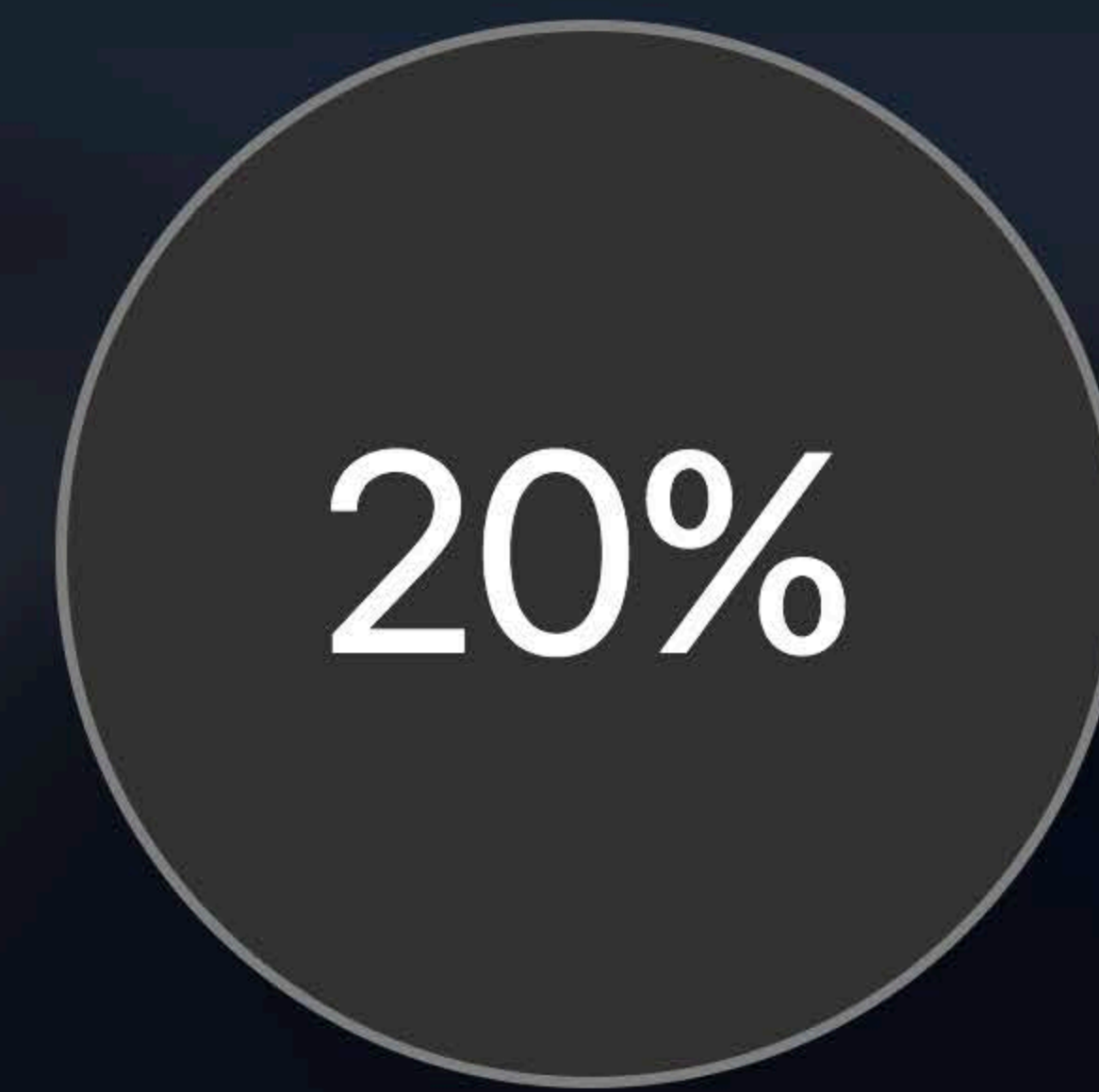
**Normal Blending**  
*Source Over*



**Vibrant Blending**  
*Plus Lighter*

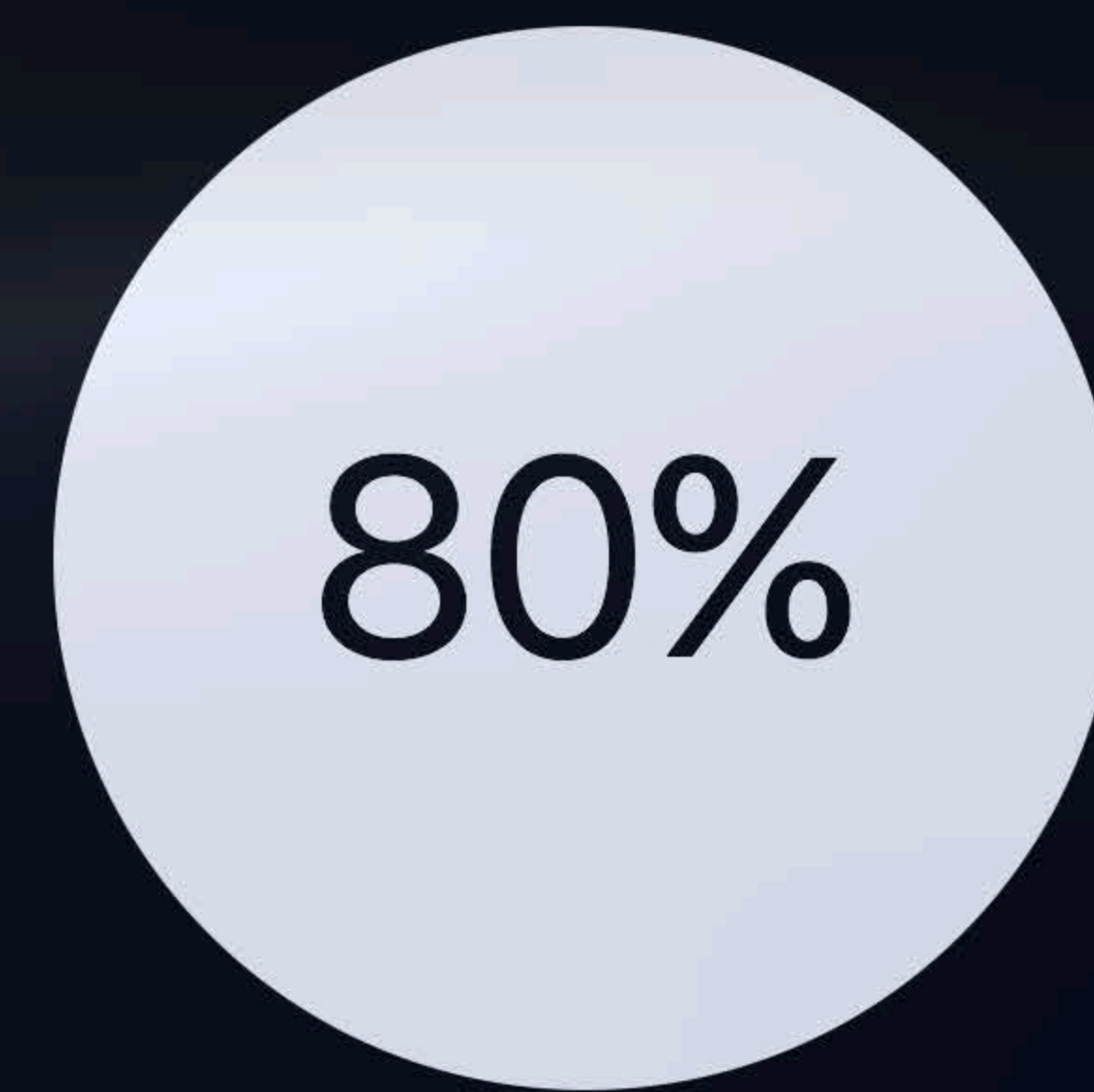
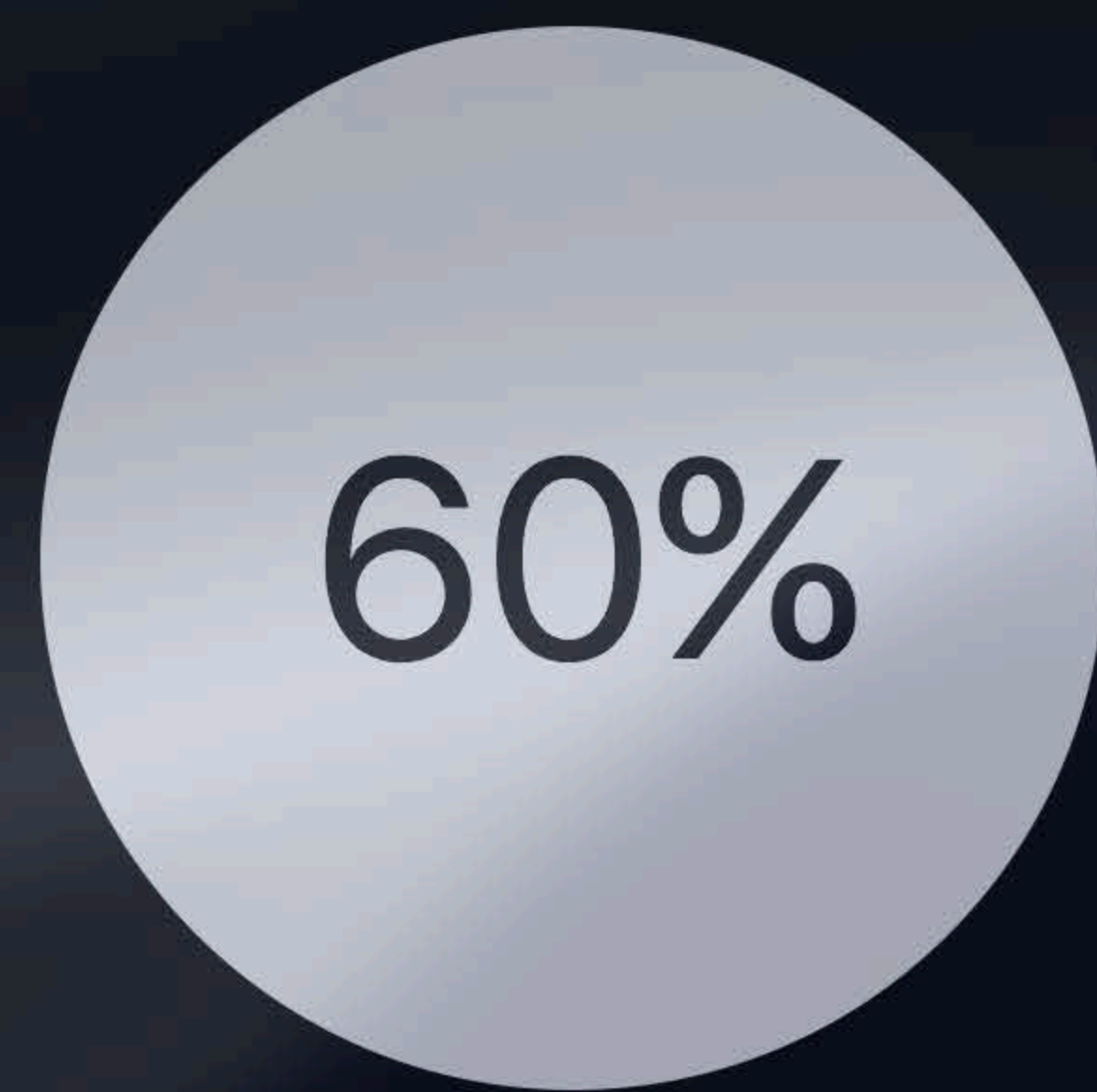
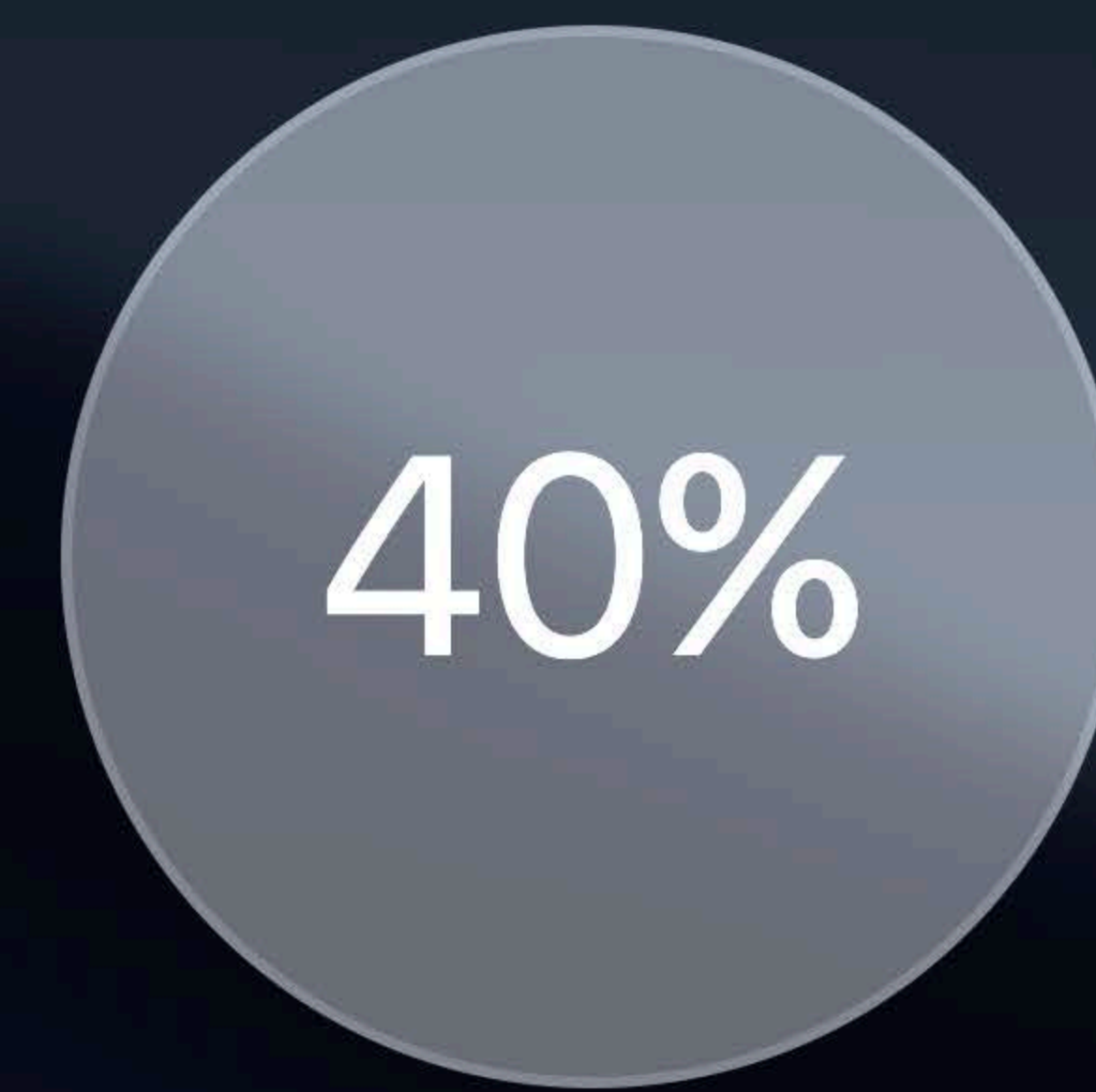
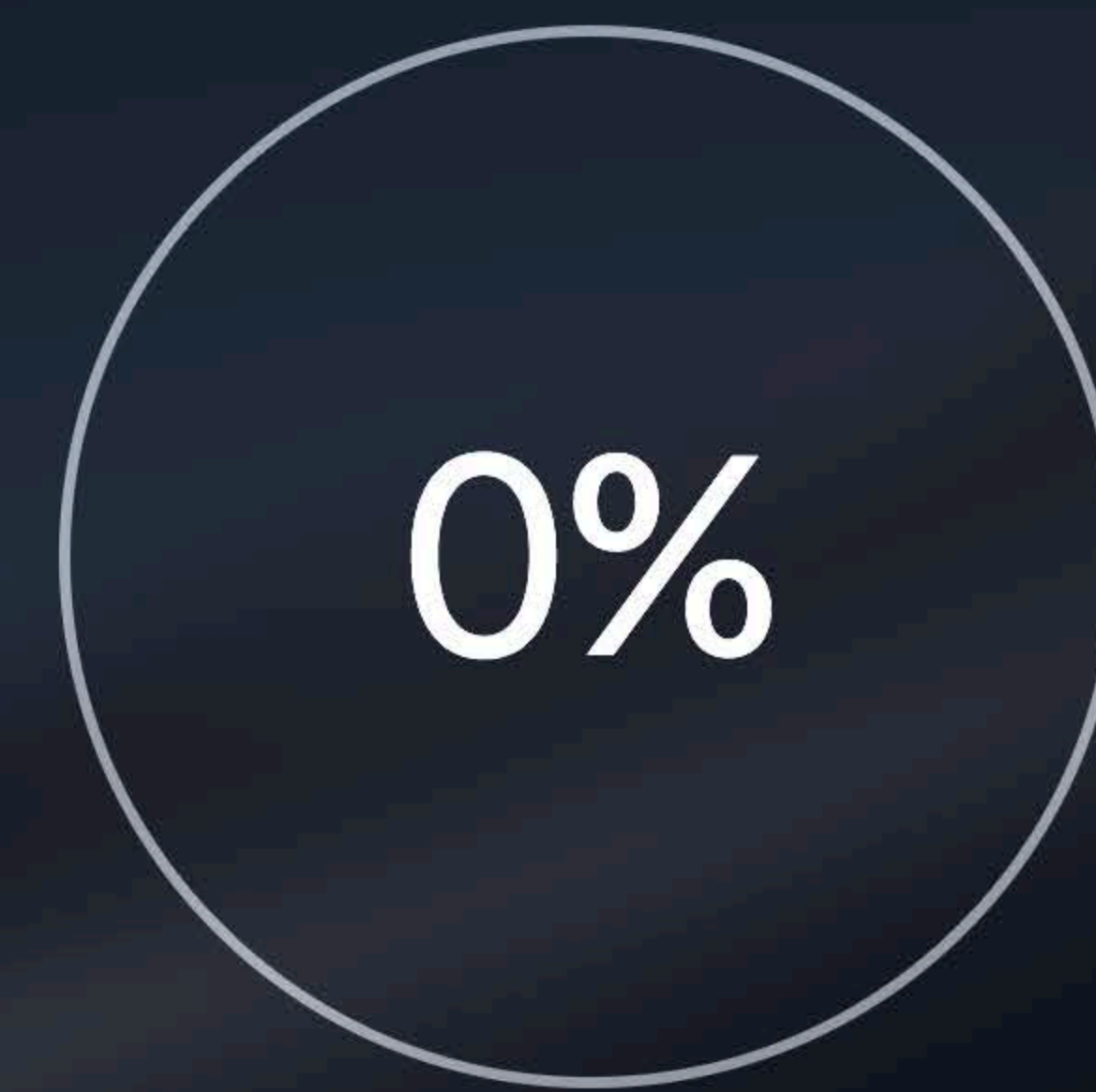
# Normal Blending

*Source Over*



# Vibrant Blending

*Plus Lighter*



# Vibrancy

Provided by “vibrant” NSAppearance objects

# Vibrancy

Provided by "vibrant" NSAppearance objects



```
NSAppearance(named: .vibrantDark)
```

# Vibrancy

Provided by "vibrant" NSAppearance objects



`NSAppearance(named: .vibrantDark)`



`NSAppearance(named: .vibrantLight)`

# Vibrancy

Override `allowsVibrancy` to return `true`

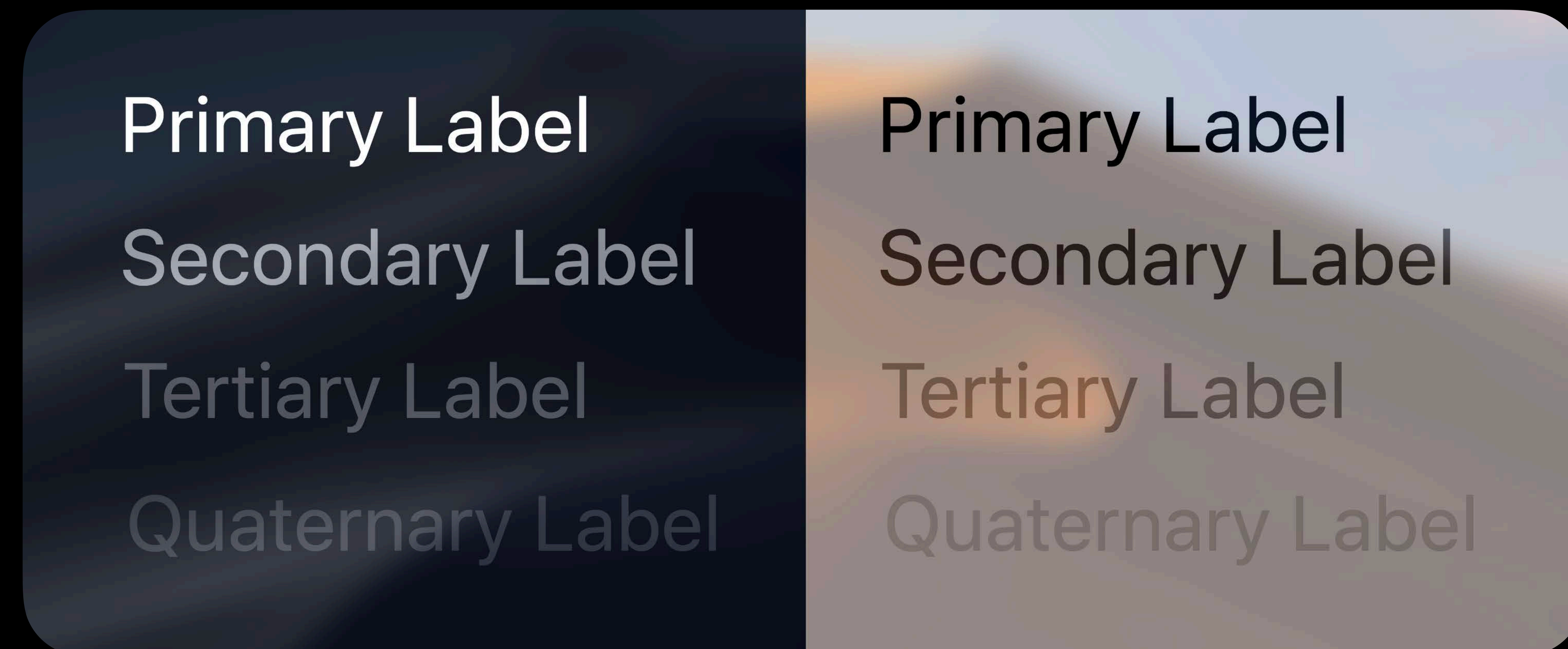
Blending effect automatically applies to your view and its descendants



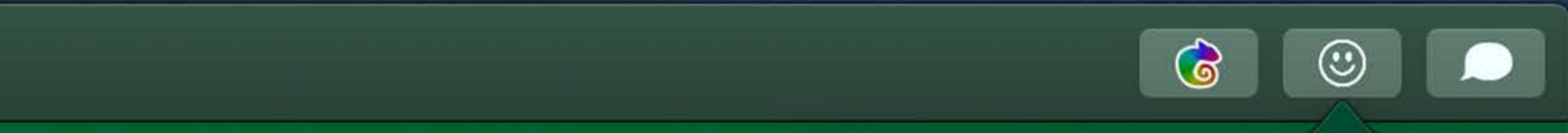
# Vibrancy

Typically, draw with a label color depending on prominence

Avoid non grayscale colors



```
class MoodMeterView : UIView {  
  
    override var allowsVibrancy: Bool {  
        return true  
    }  
  
    override func layout() {  
        subviews = [ sadFaceView, ambivalentFaceView, happyFaceView, sliderView ]  
    }  
  
}
```



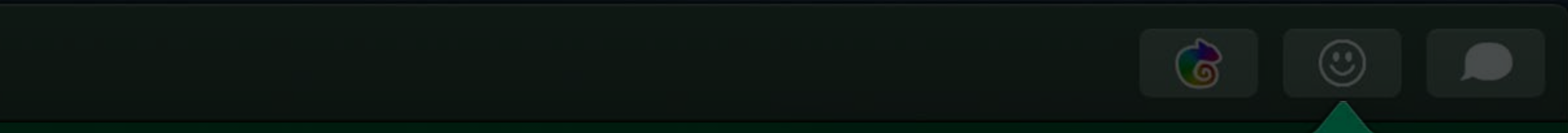
# Chloe

2 years old

Photos

Vitals

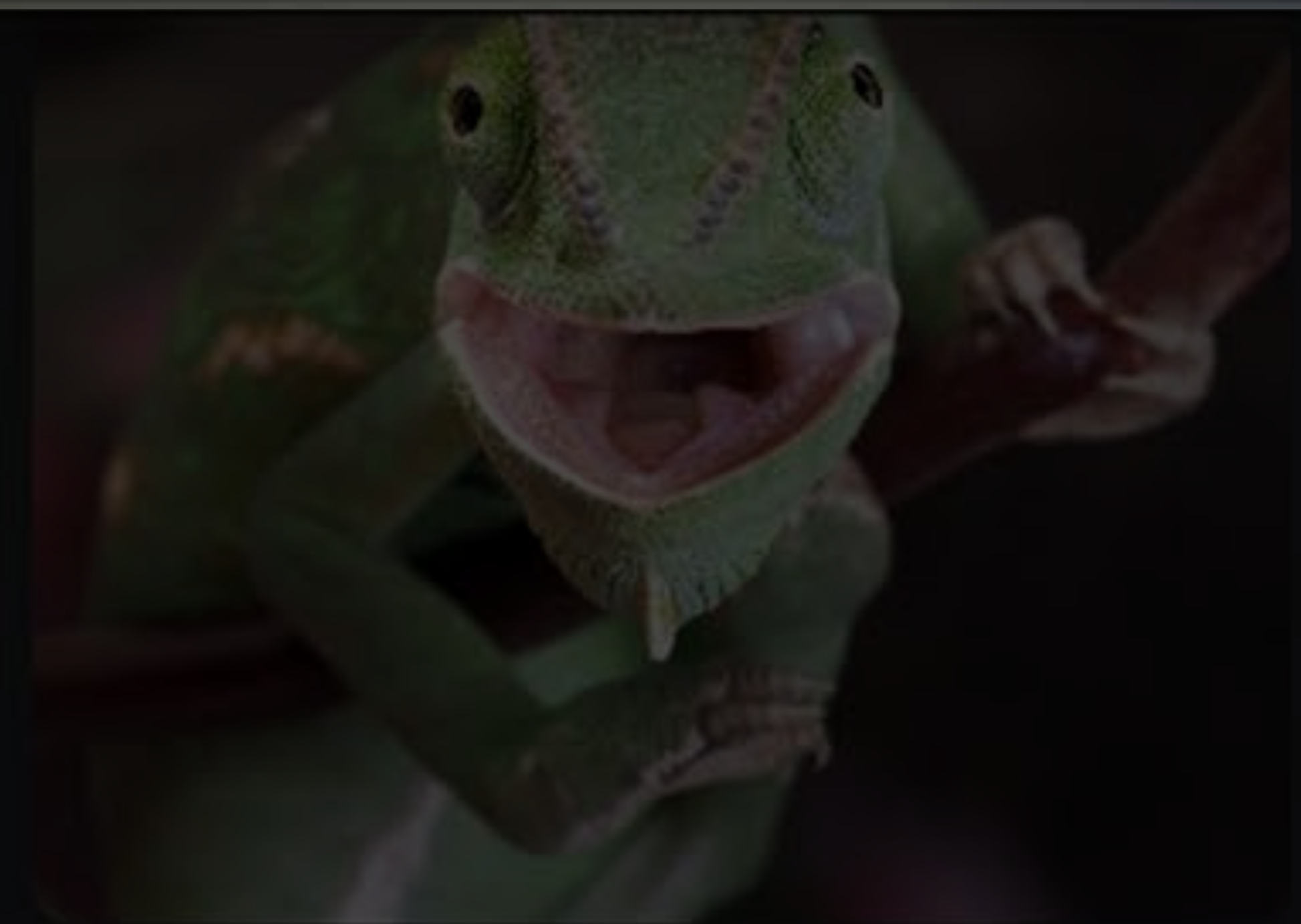
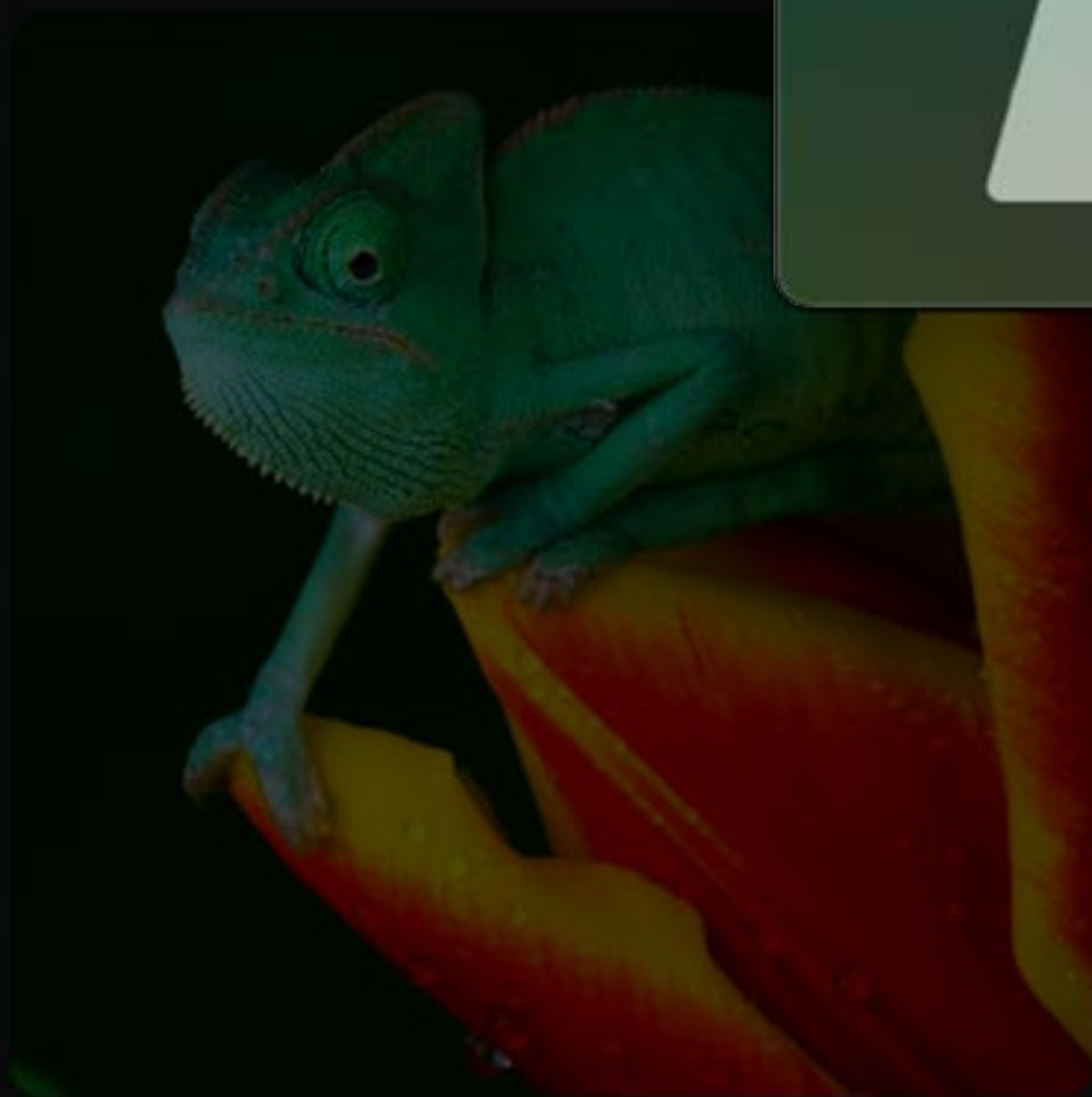
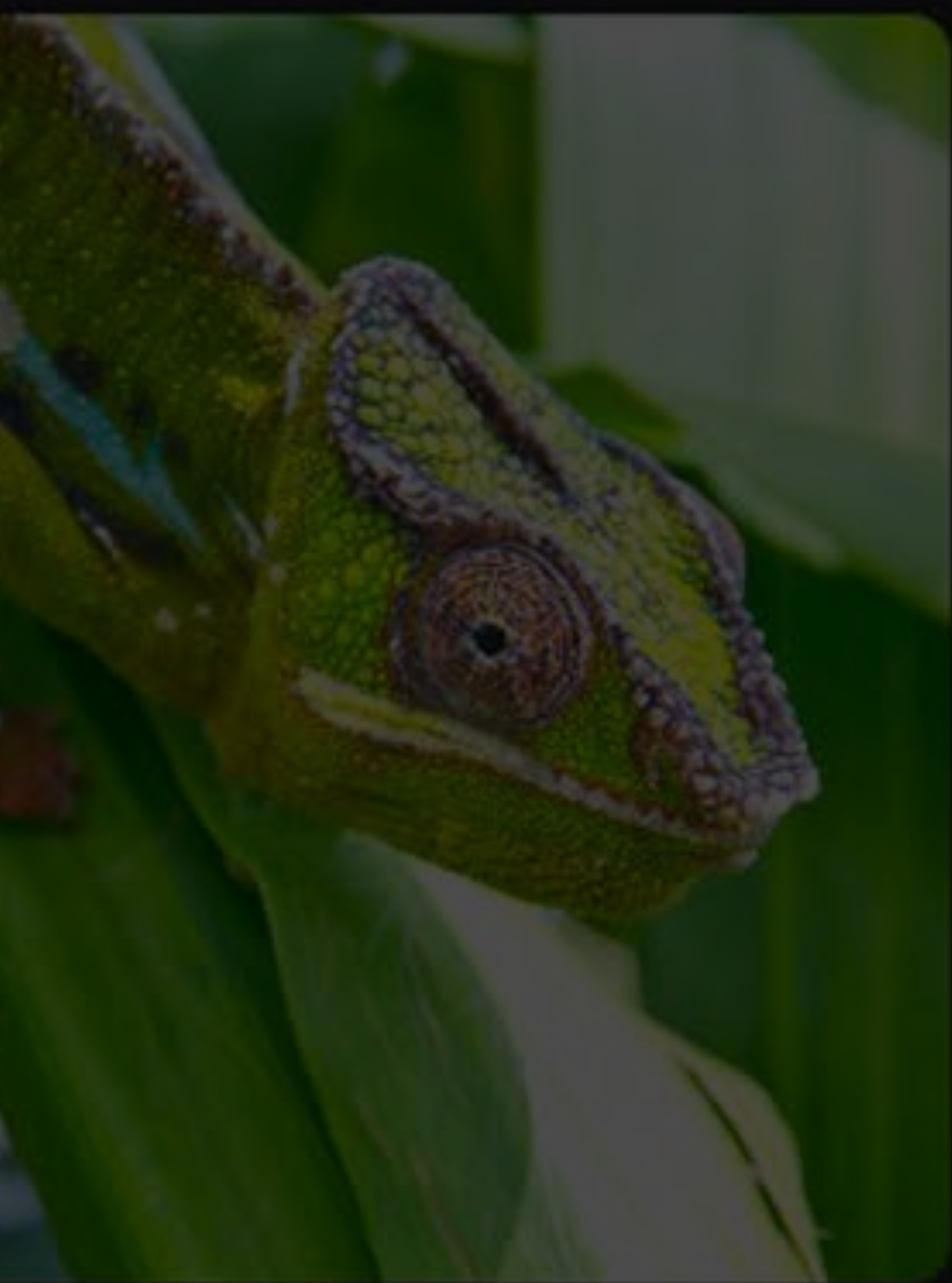




**Chloe**  
2 years old

Photos

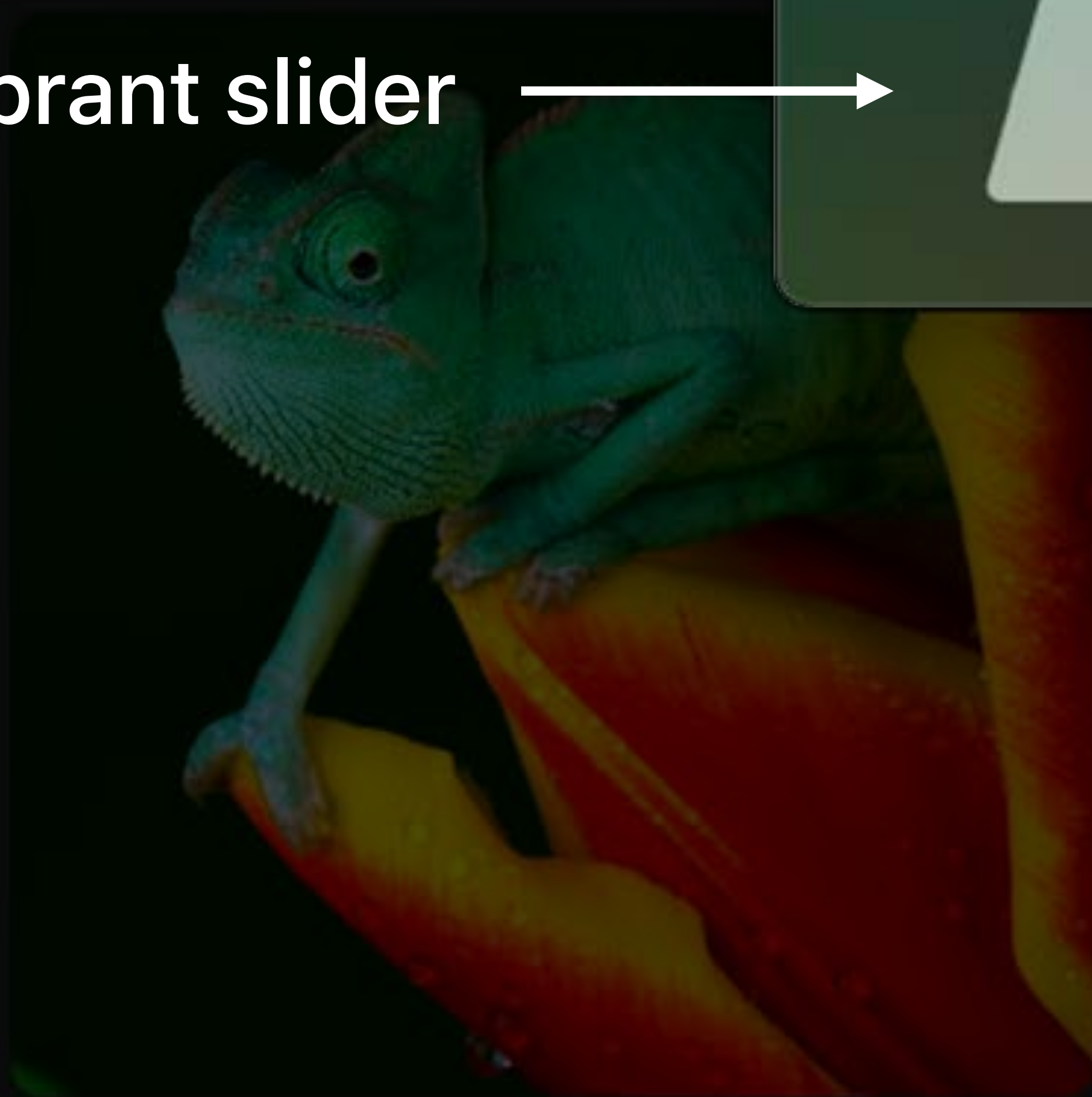
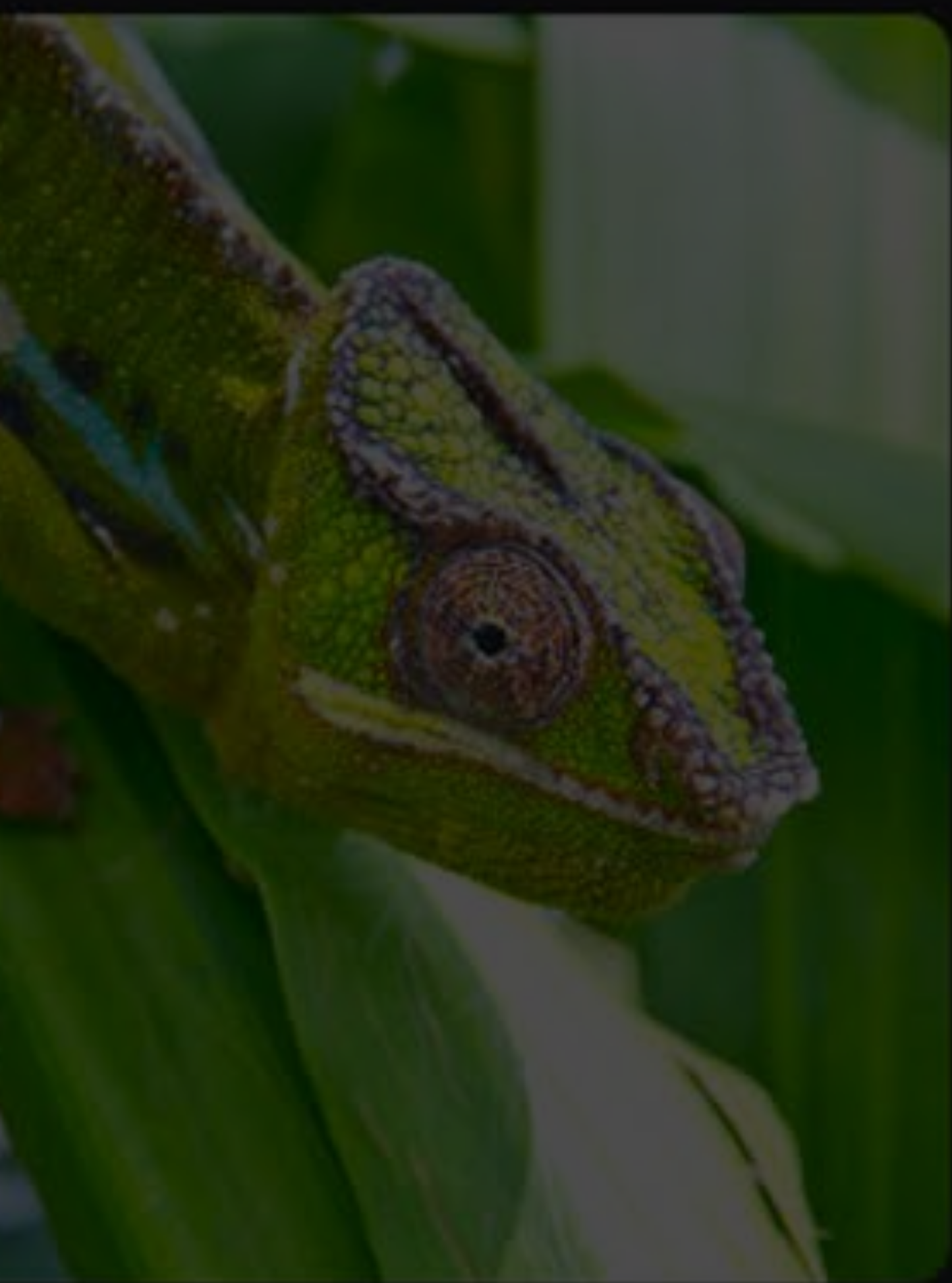
Vitals



Reaction overlay with three icons: a sad face (orange), a neutral face (yellow), and a happy face (green). Below the icons is a progress bar with a white triangle marker positioned under the sad face icon.

Chloe  
2 years old

Photos Vitals



Vibrant slider



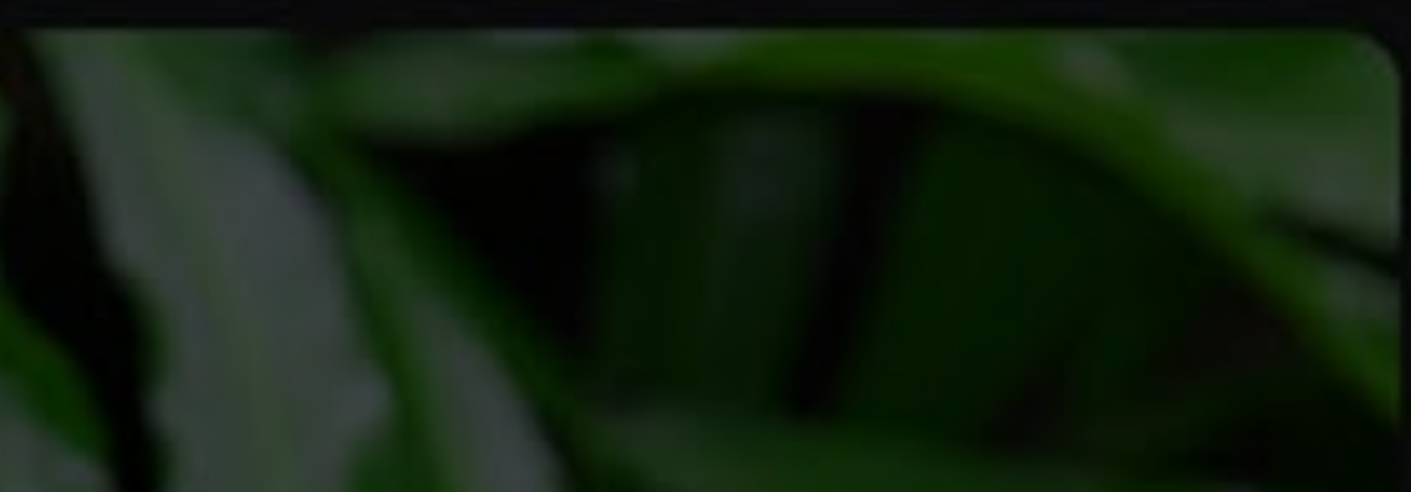
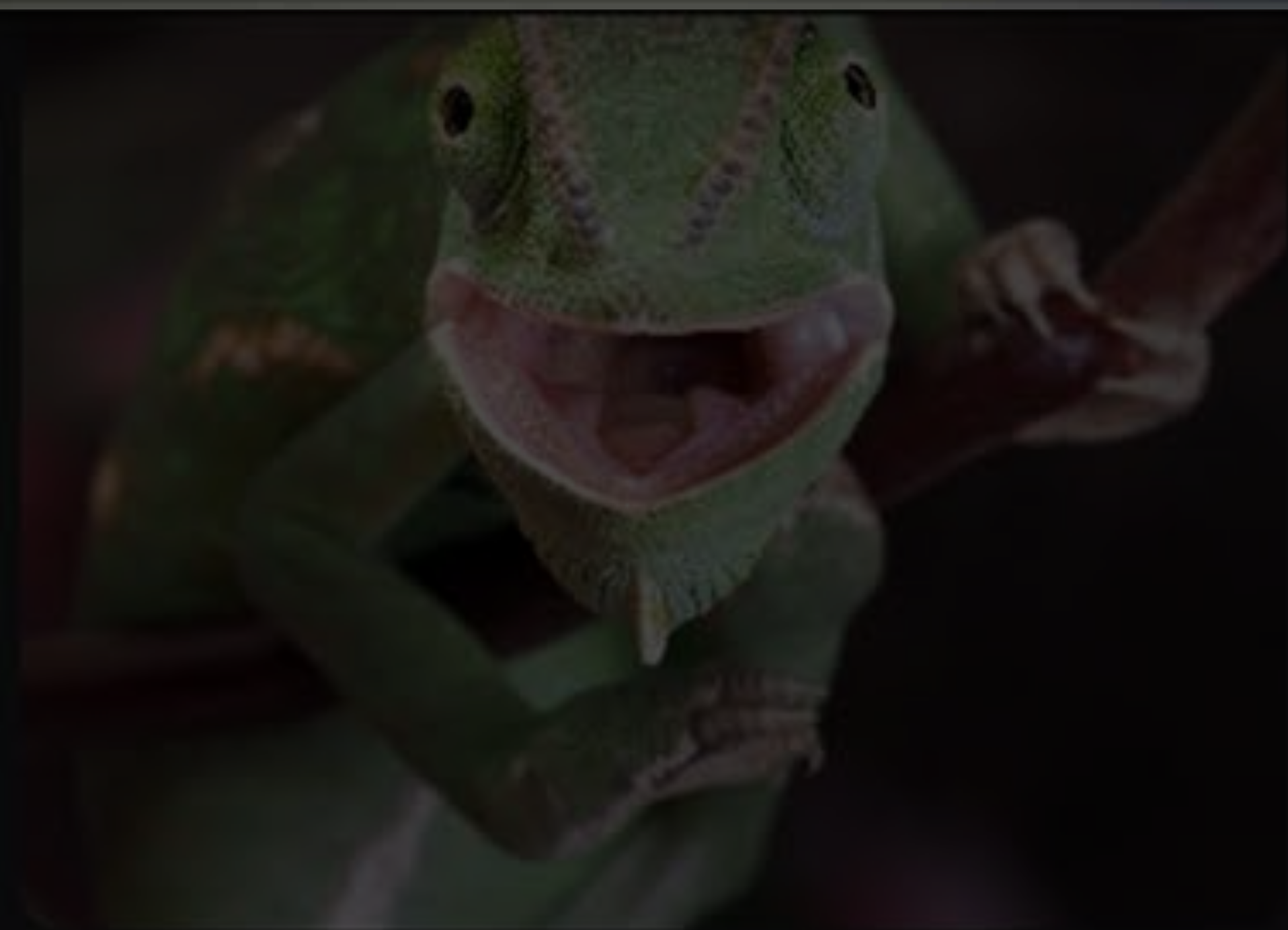
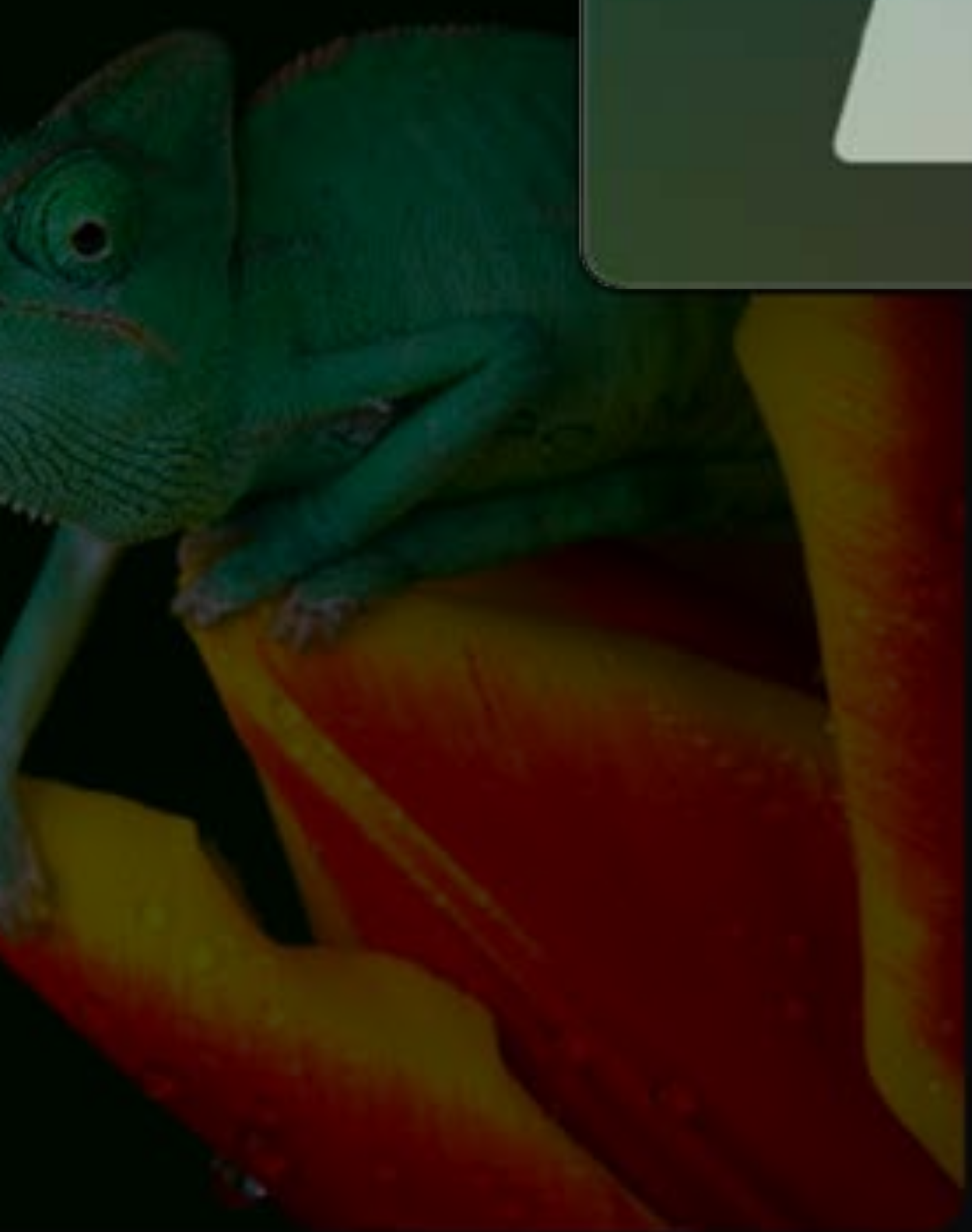
A vibrant slider control interface. It features three circular emoji icons: a sad face (orange), a neutral face (yellow), and a happy face (green). Below the icons is a horizontal slider bar with a white triangular knob positioned at the left end. The background of the slider is a dark green gradient.

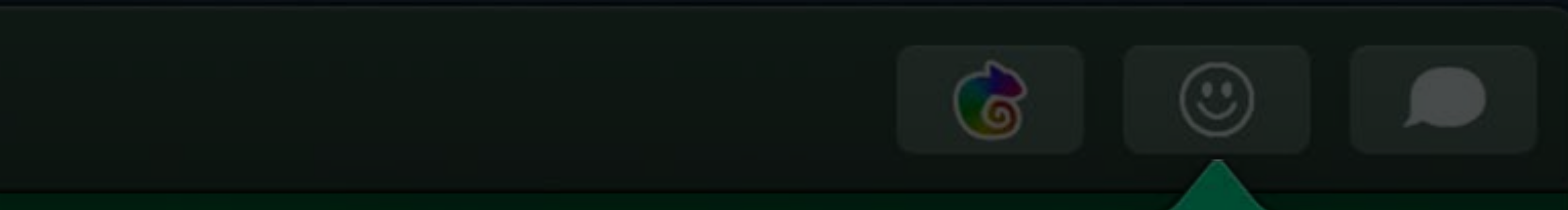
Washed out colors





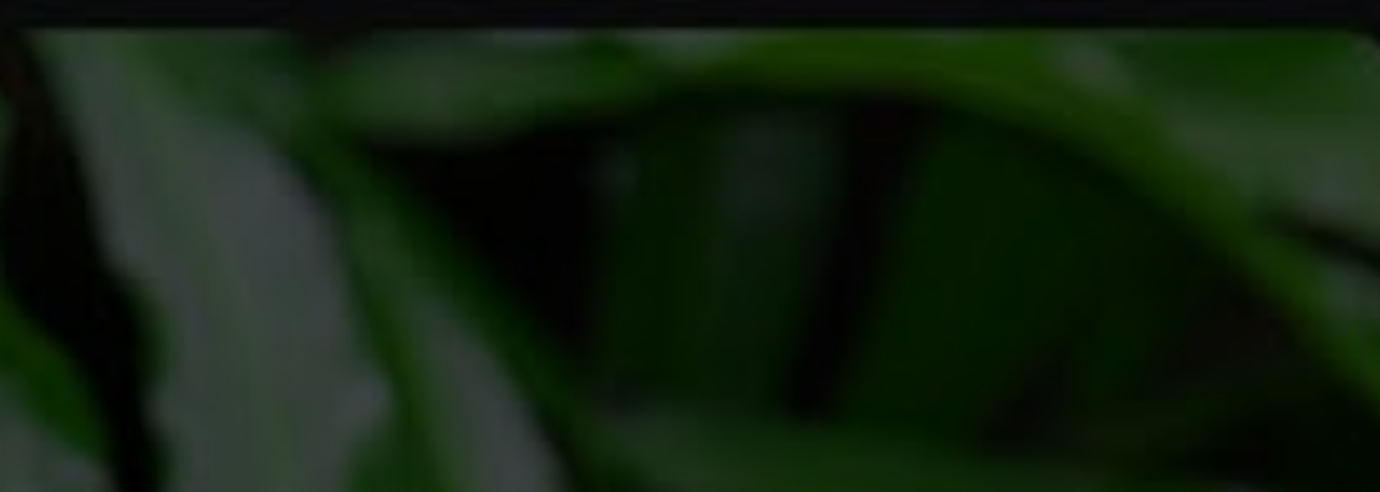
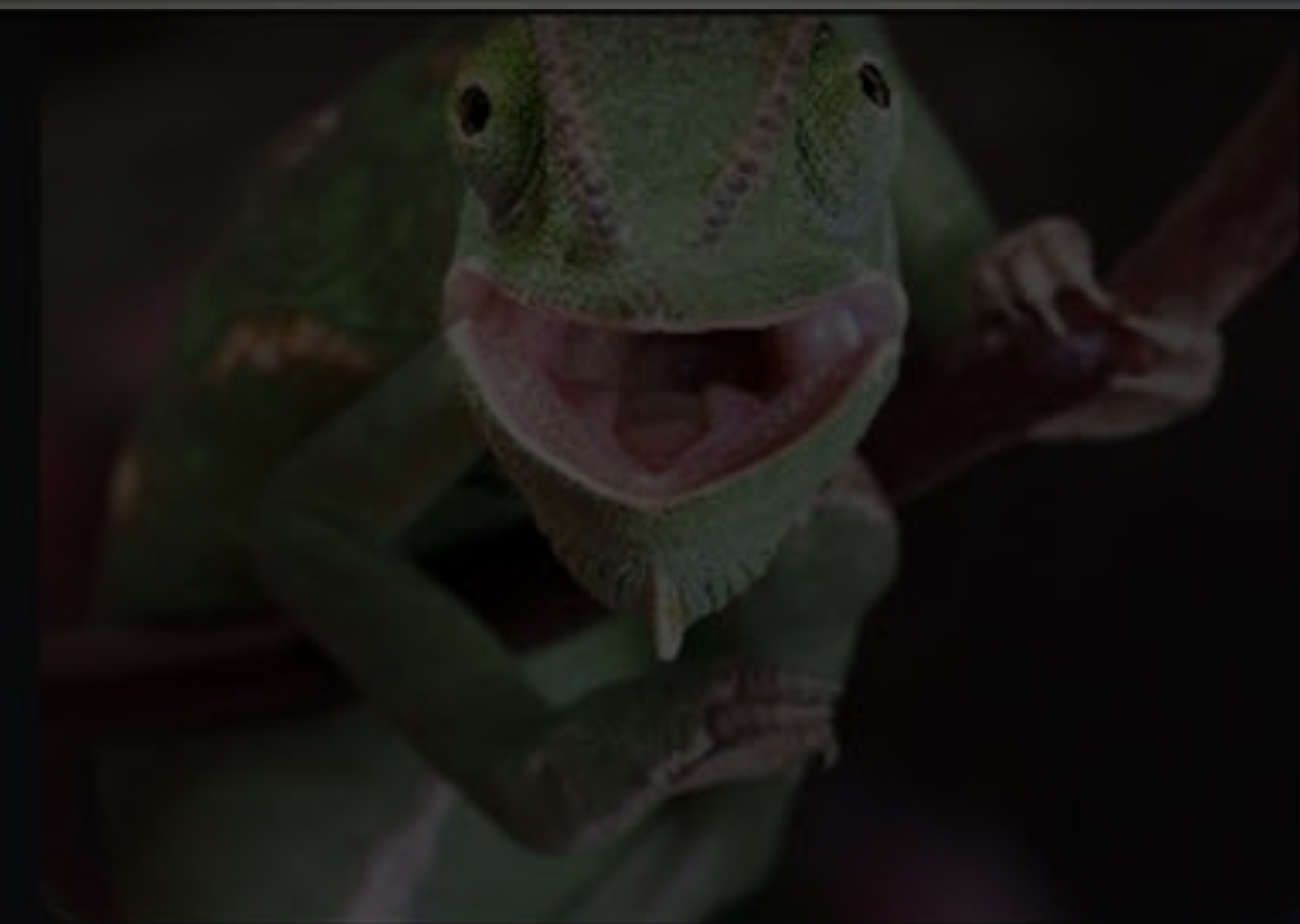
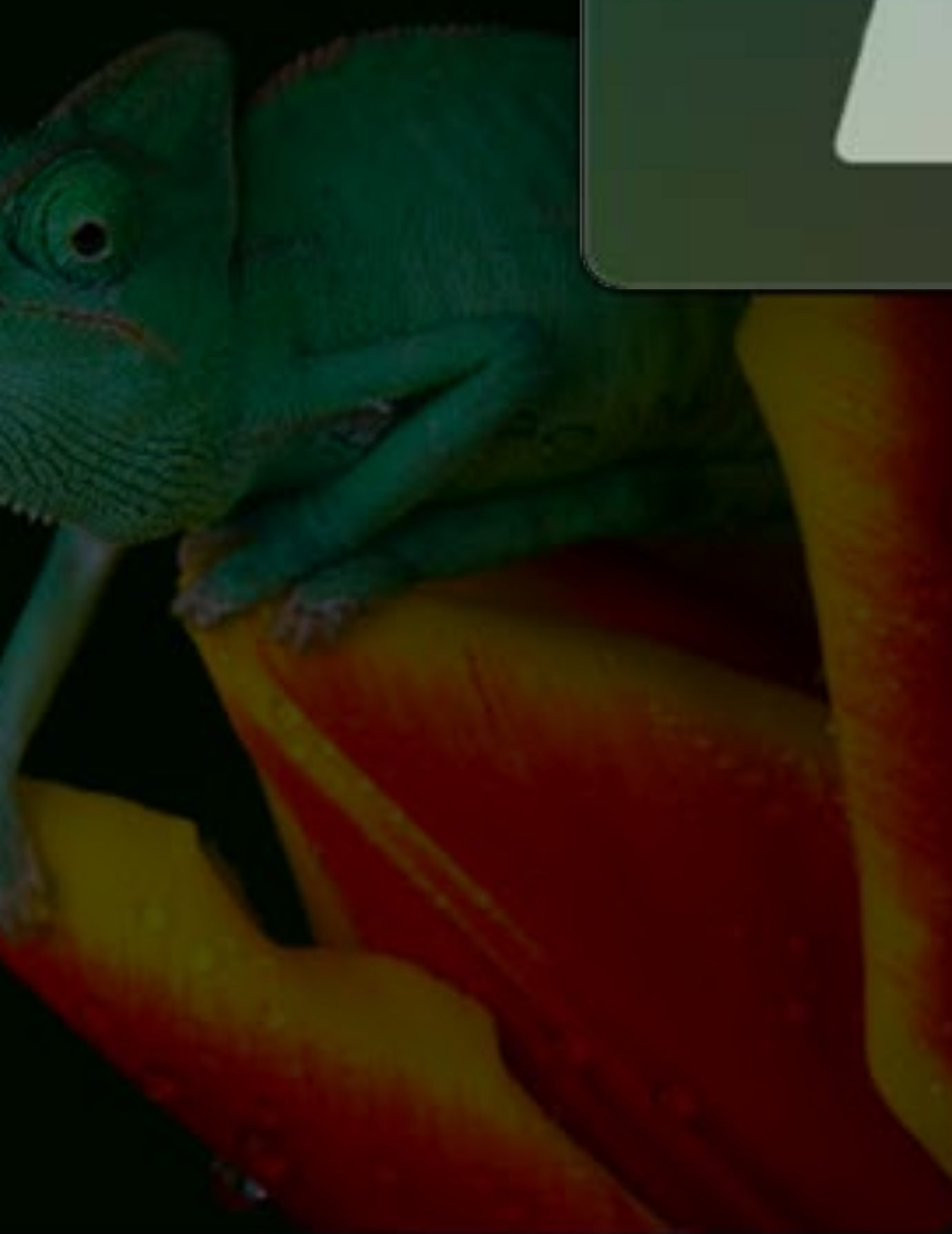
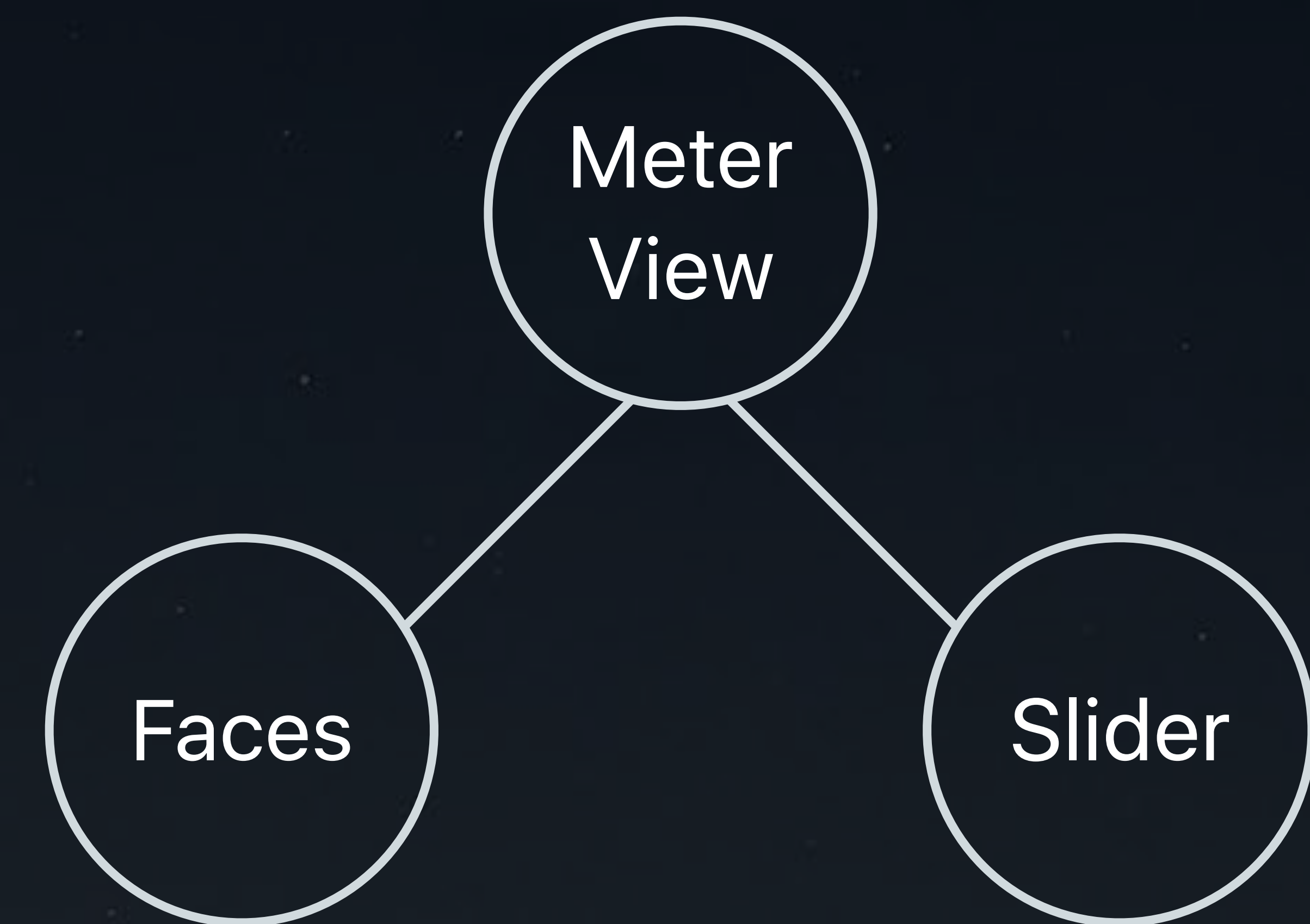
Vitals



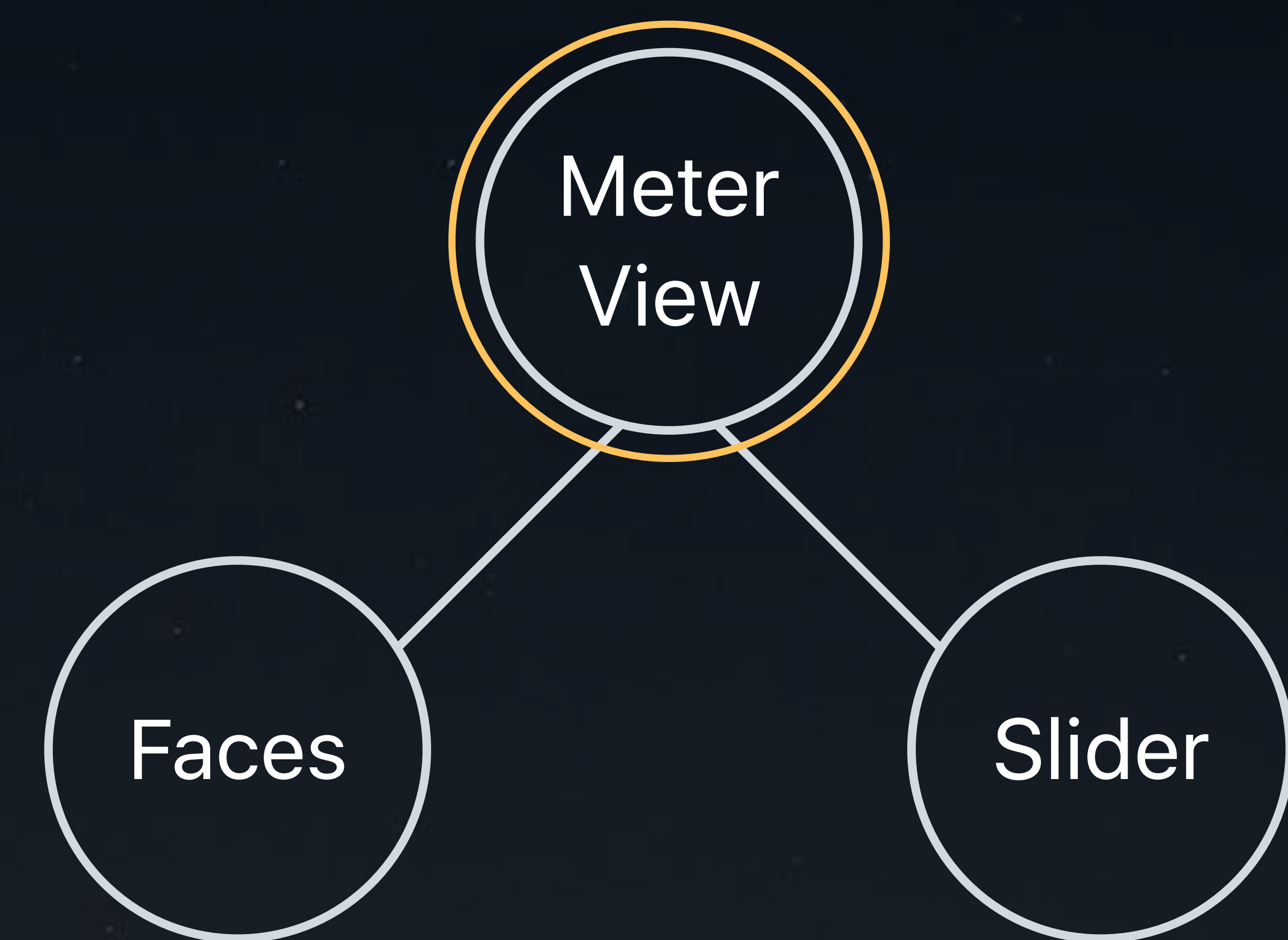
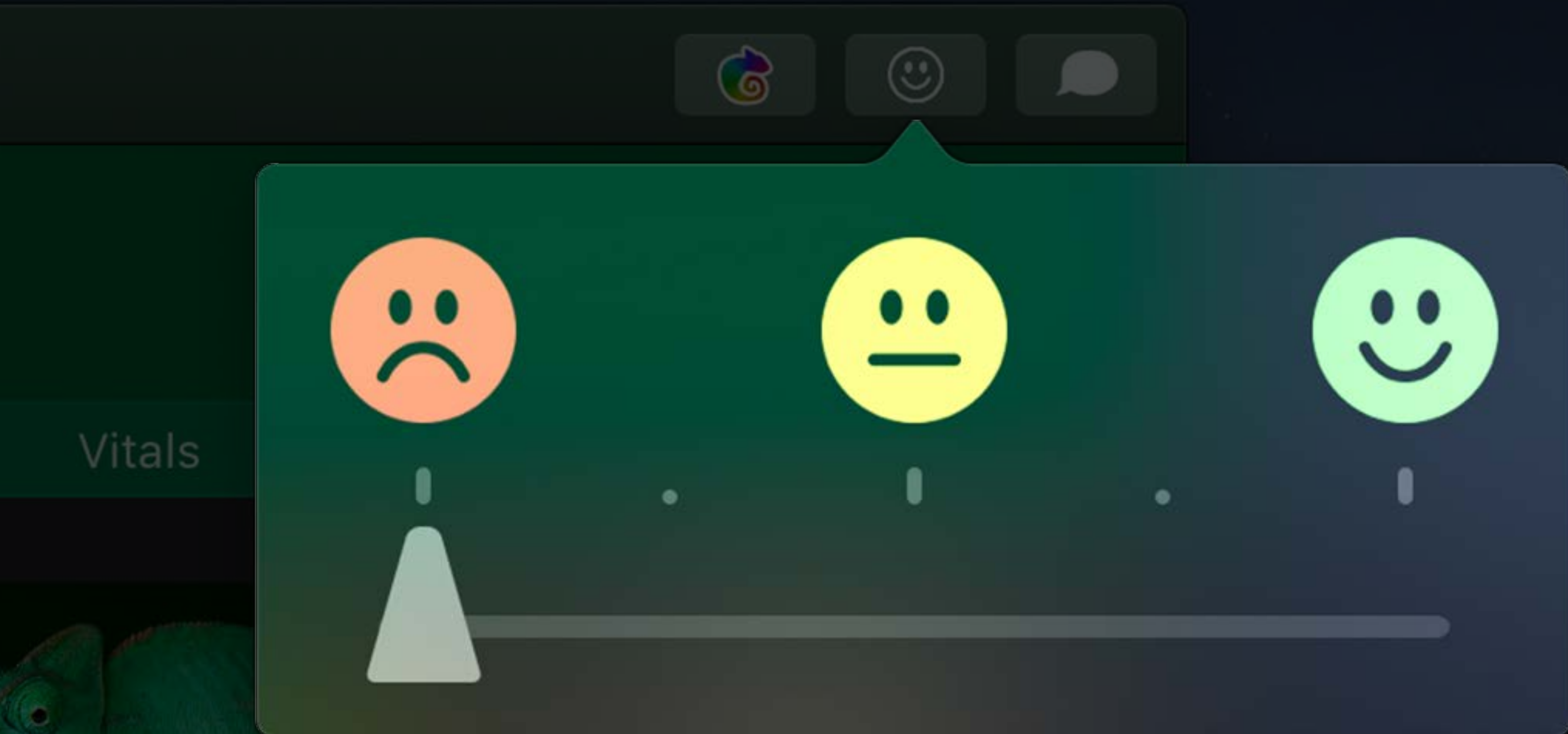


Vitals

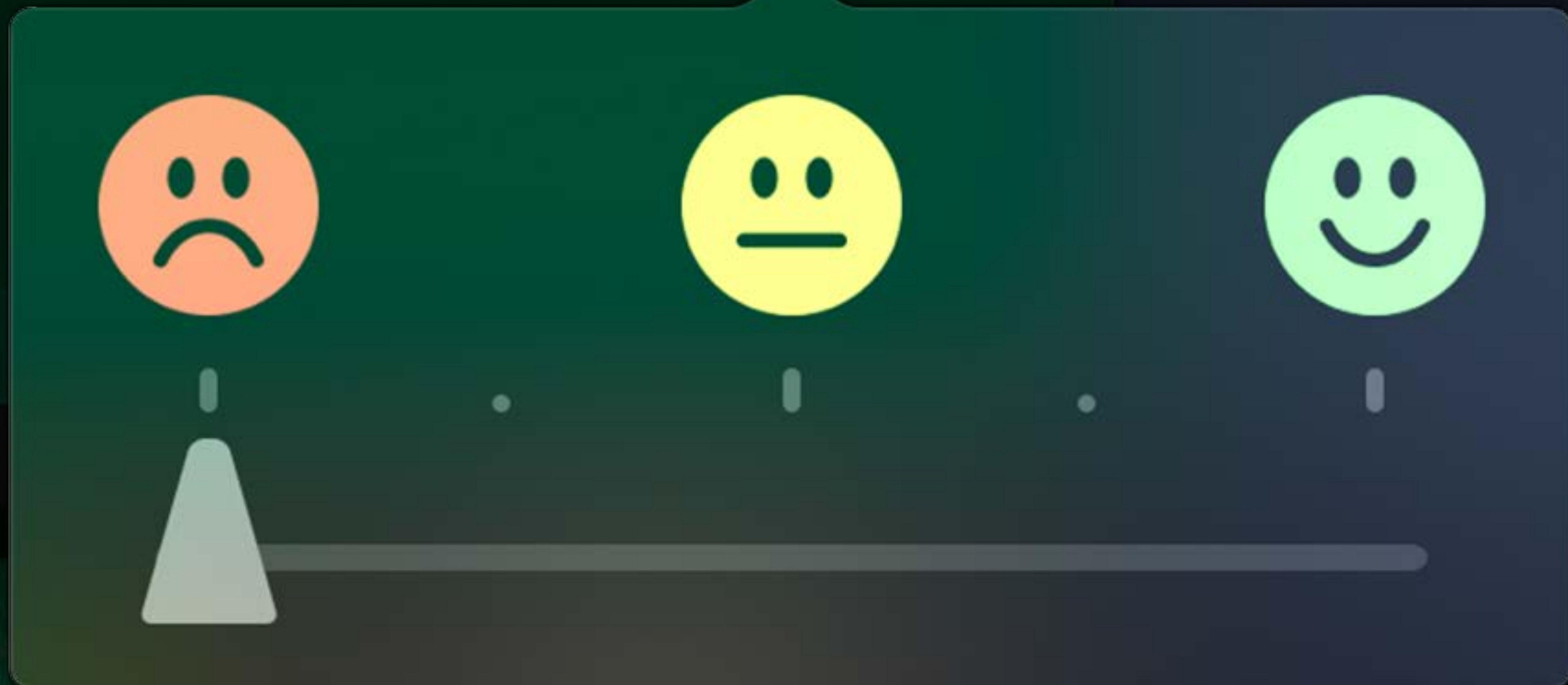
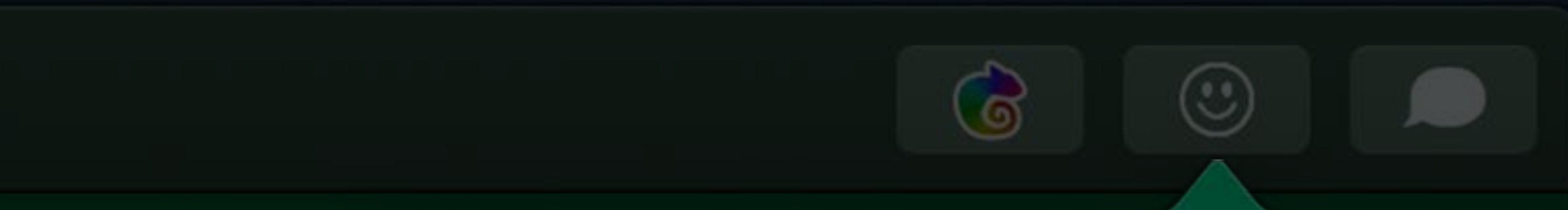
A horizontal slider control with three circular icons: a sad face (orange), a neutral face (yellow), and a happy face (green). Below the icons is a horizontal track with a white triangular slider knob positioned at the far left end.



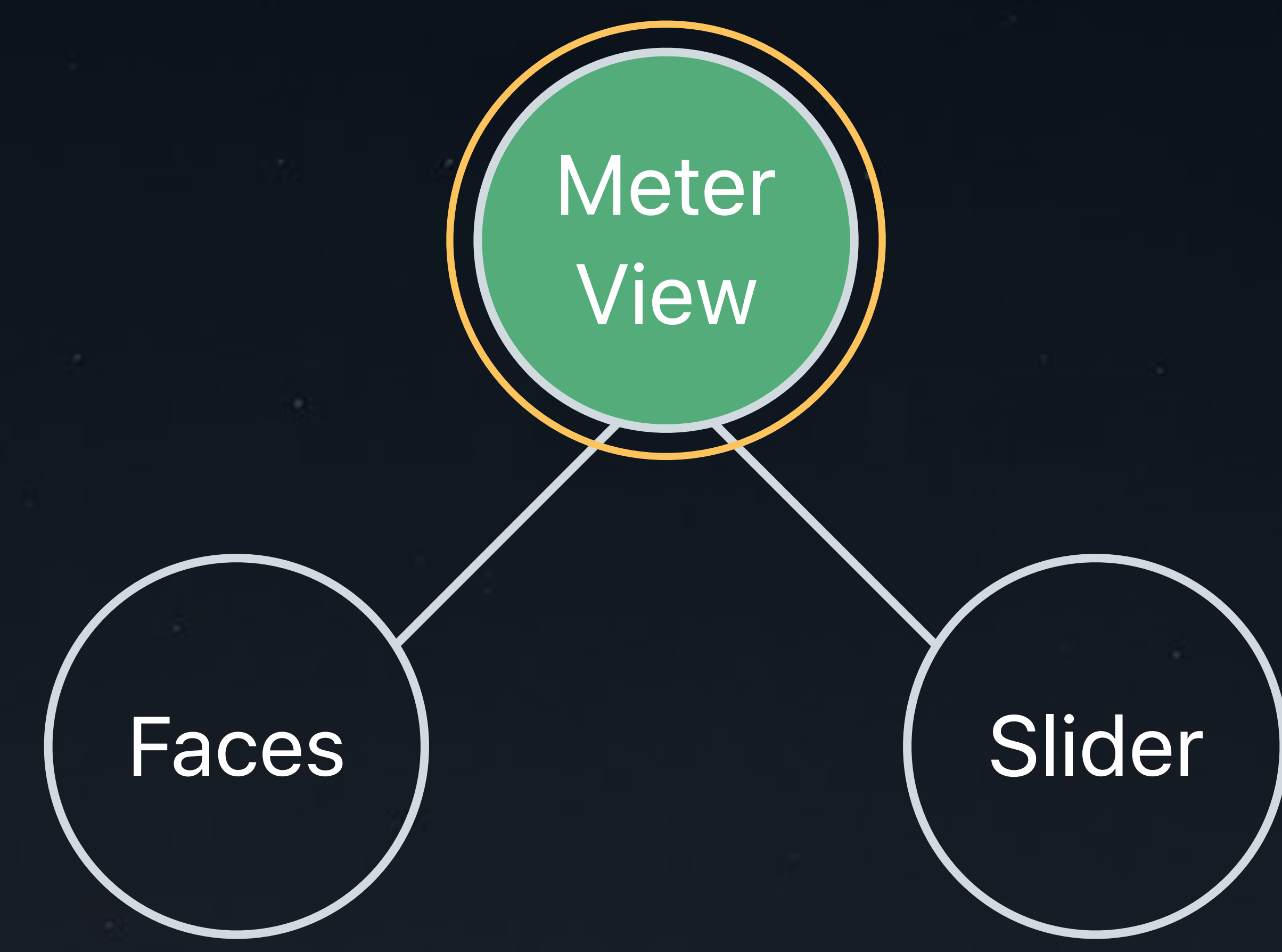
Allows  
Vibrancy





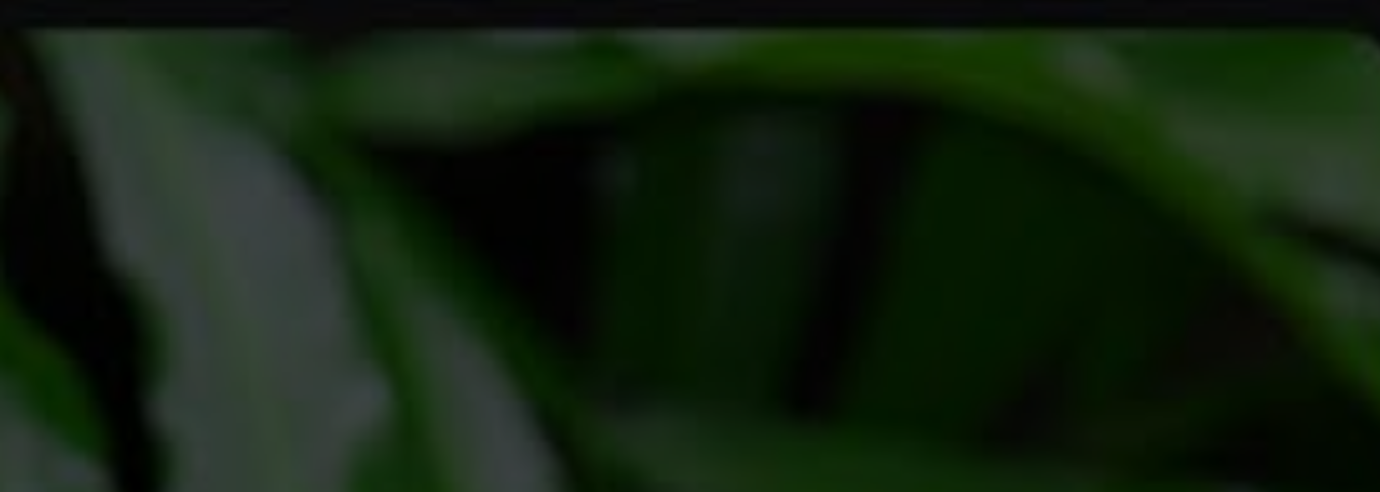
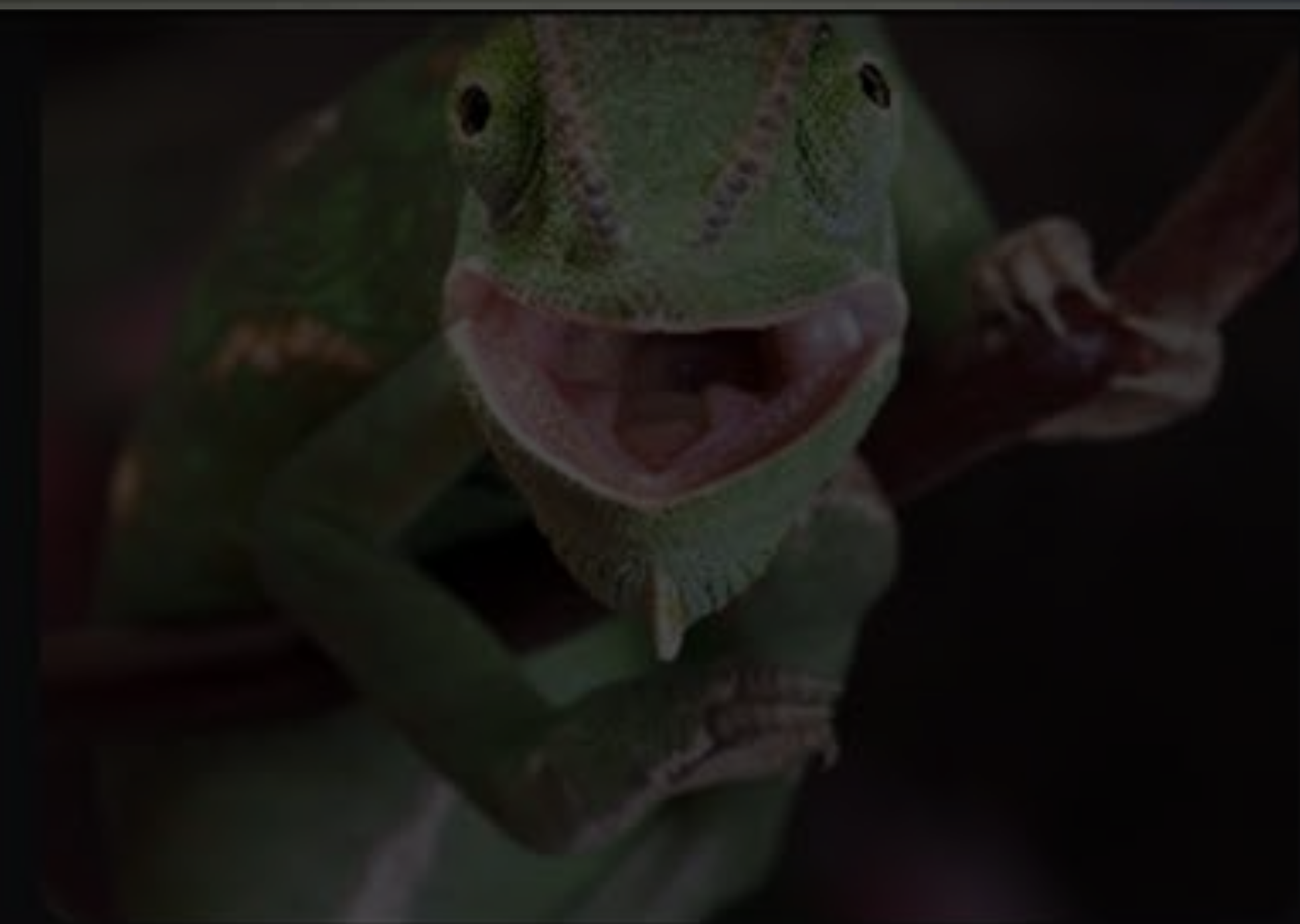
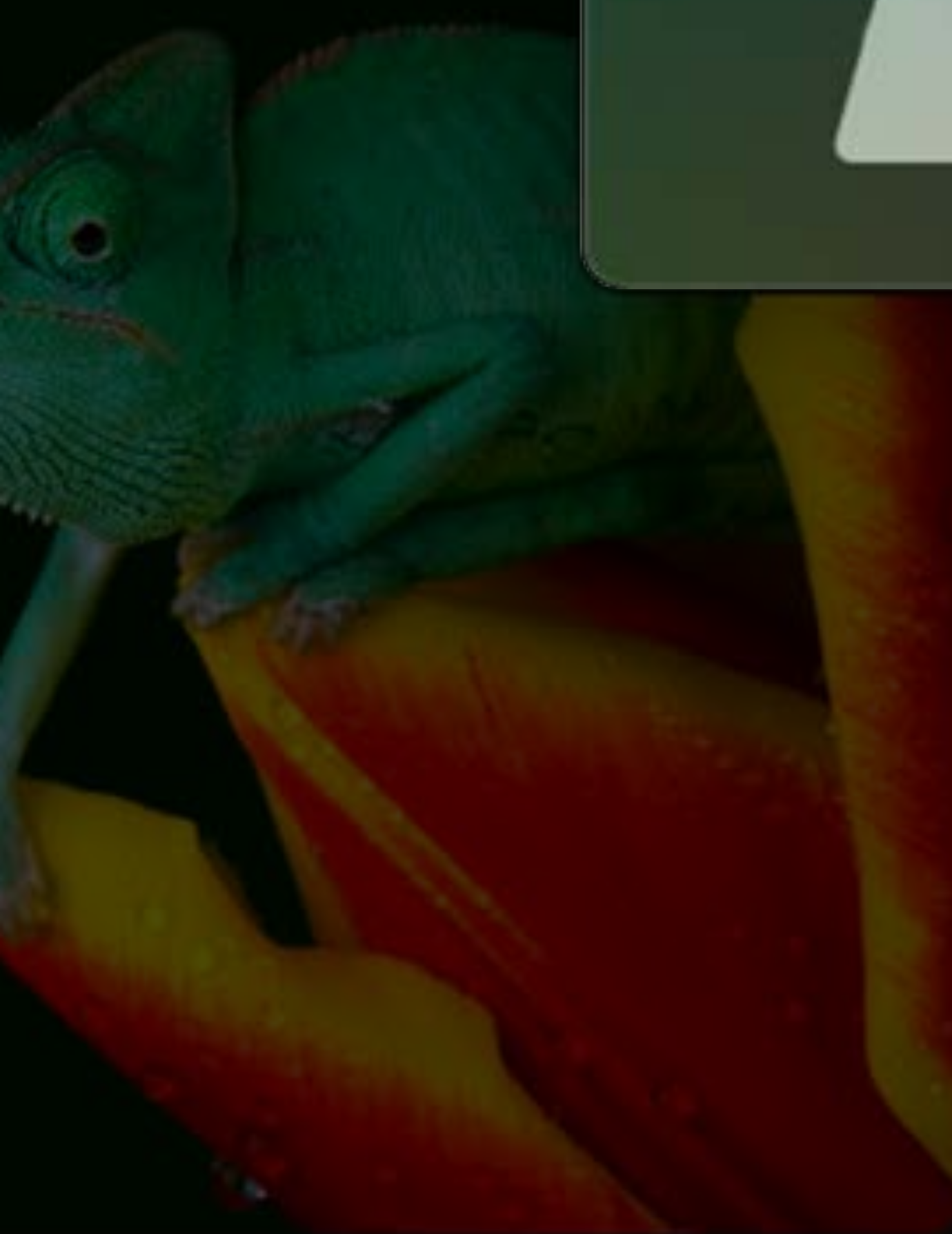


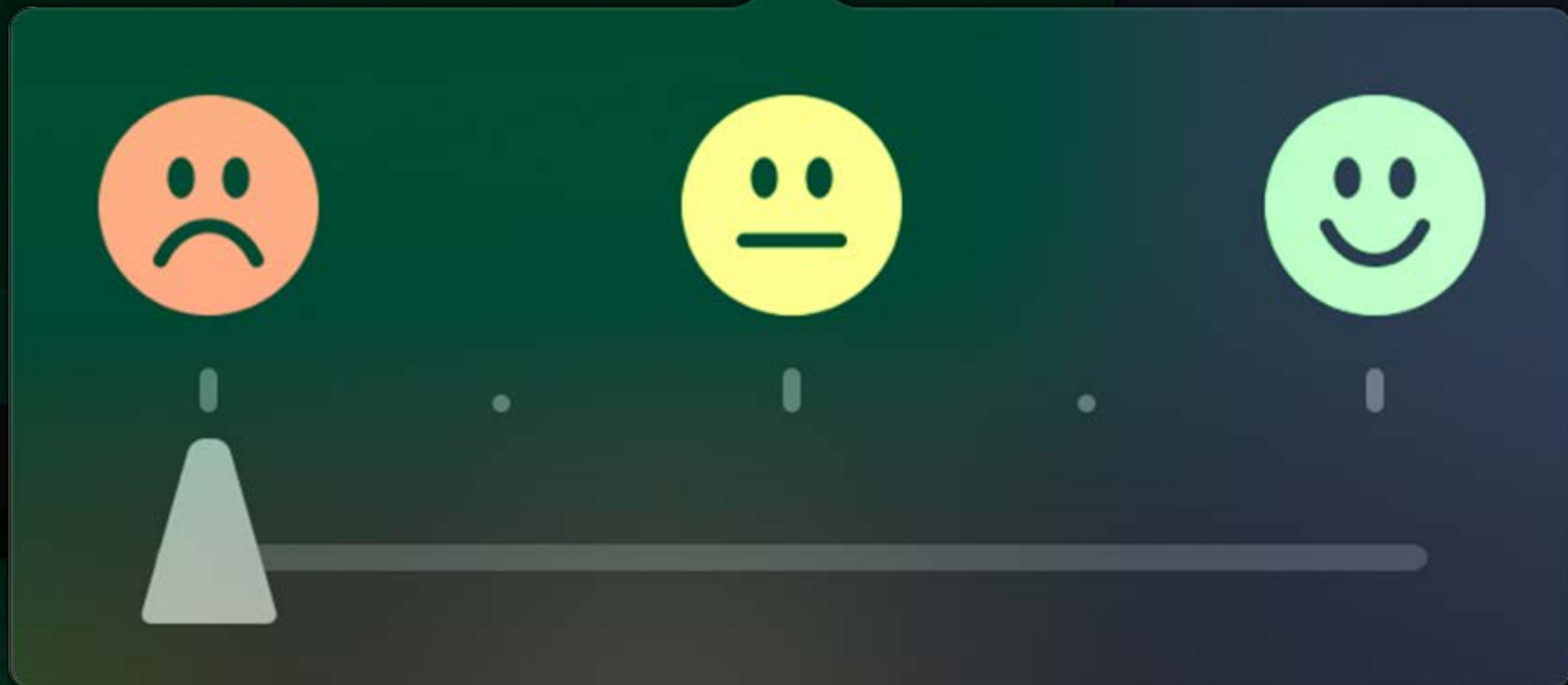
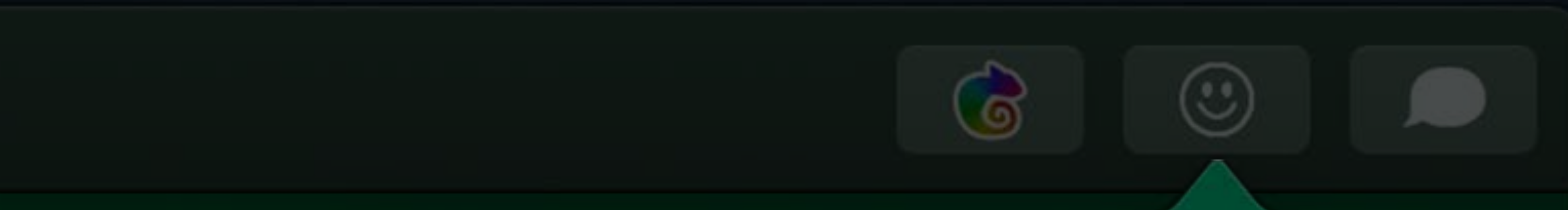
Vitals



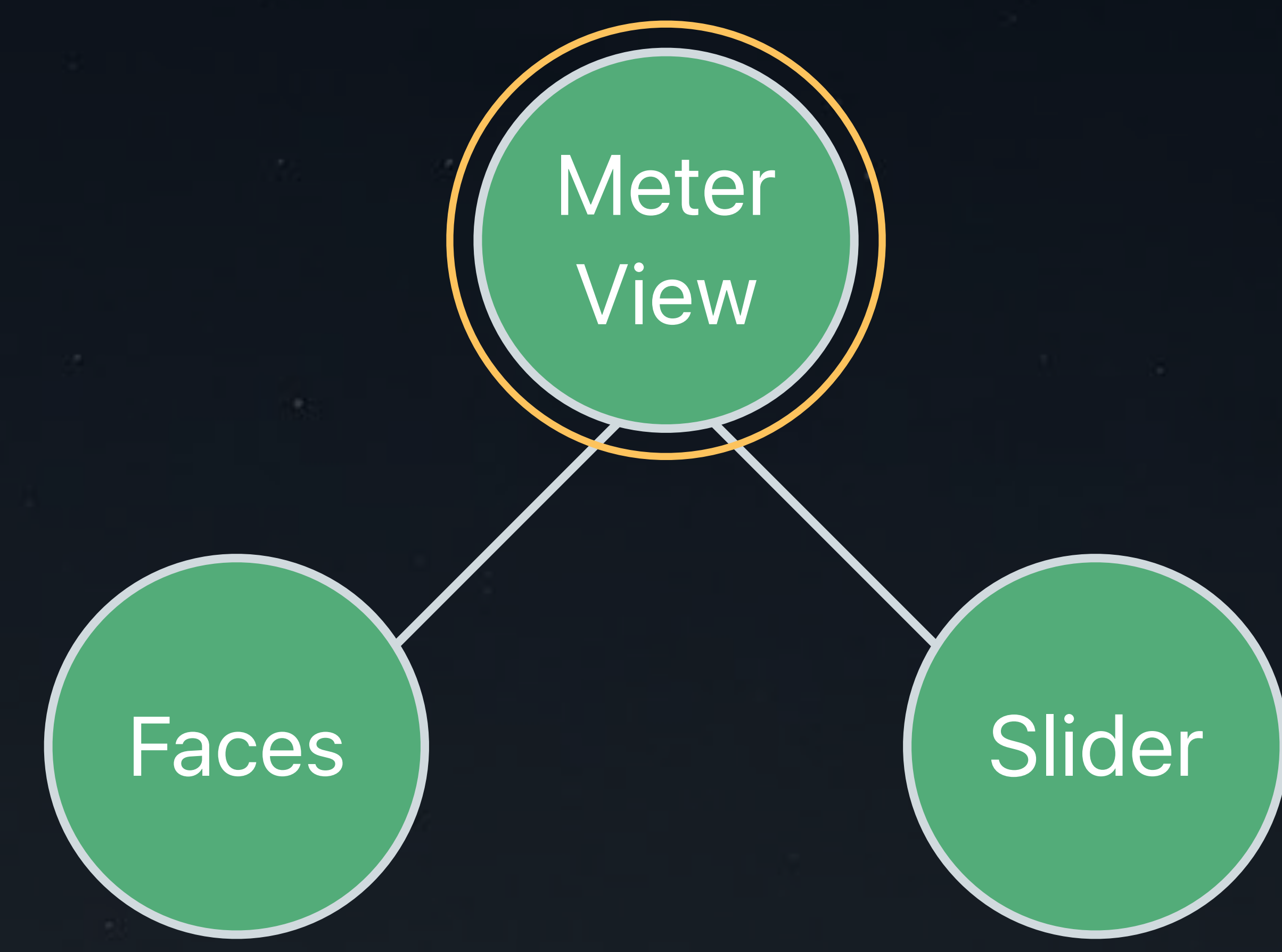
Allows Vibrancy

Blends Vibrantly



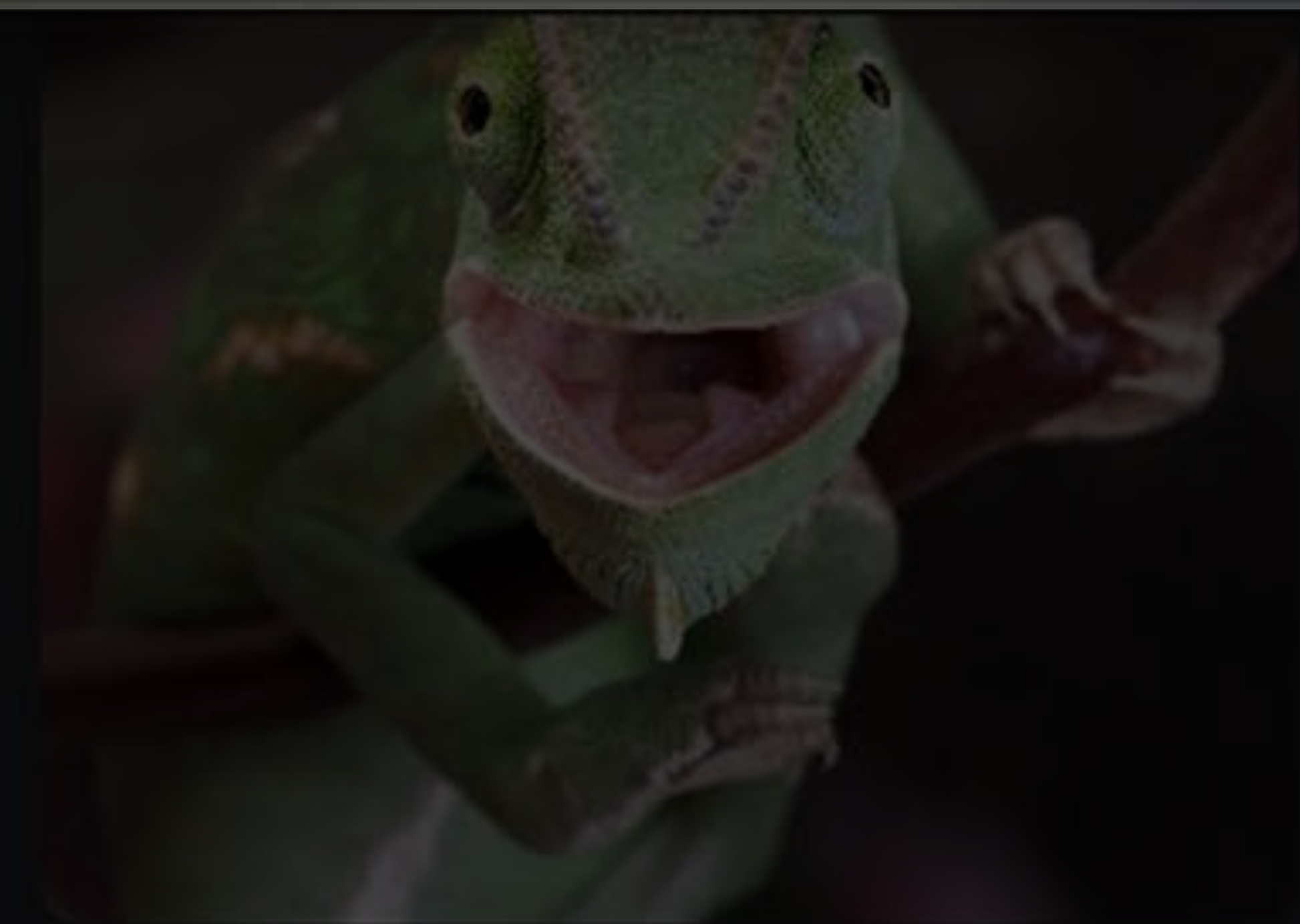
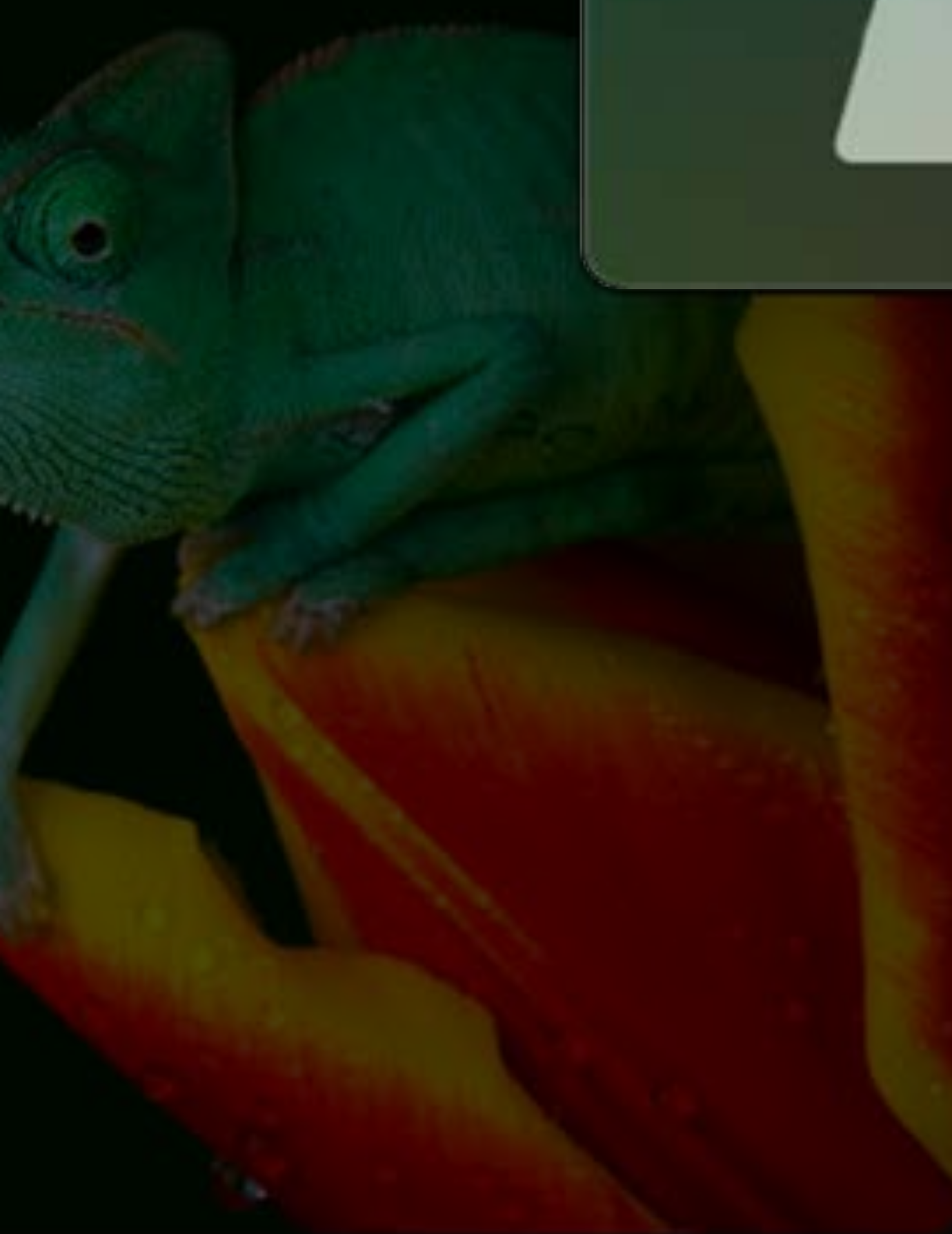


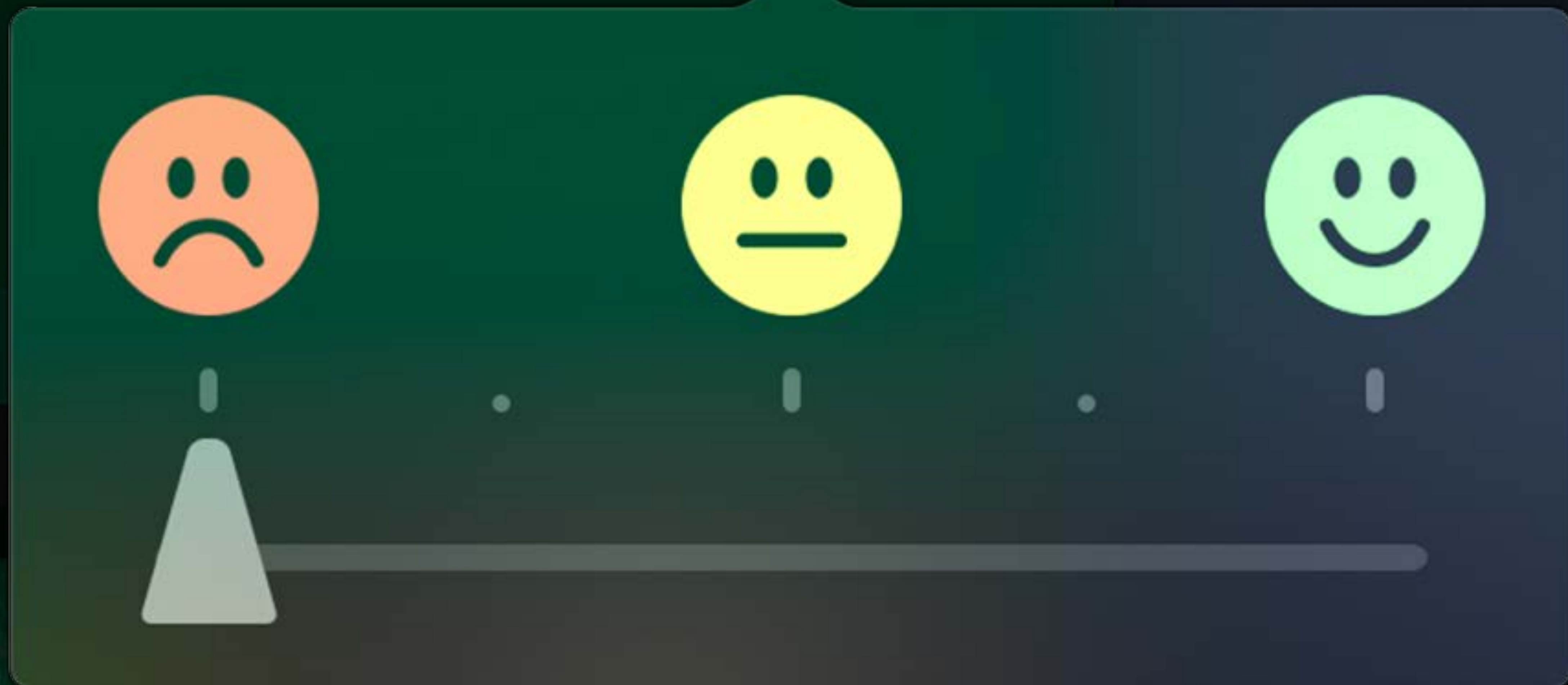
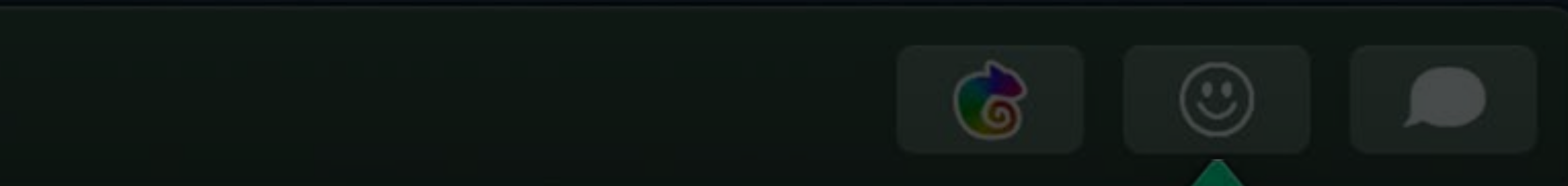
Vitals



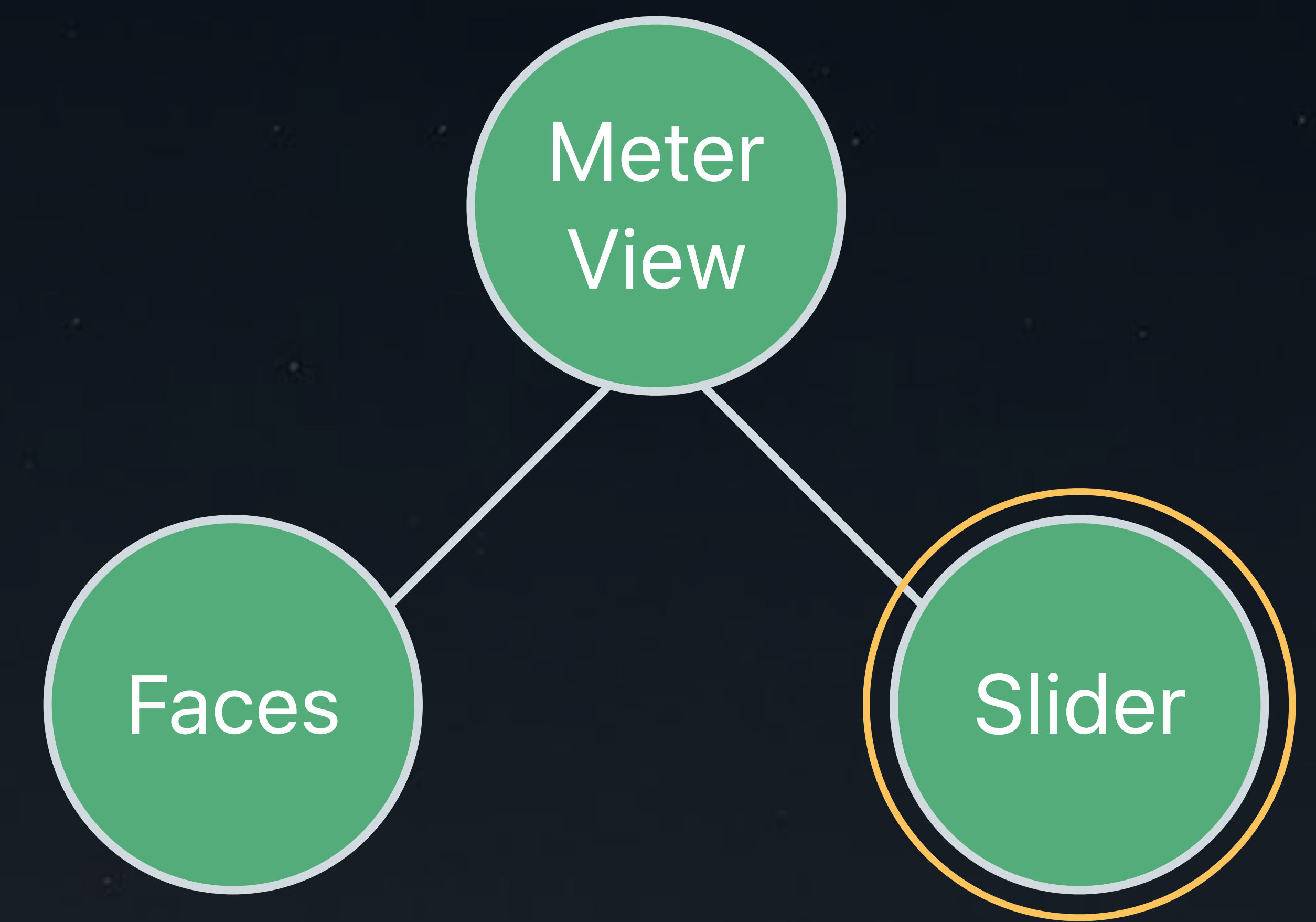
Allows Vibrancy

Blends Vibrantly



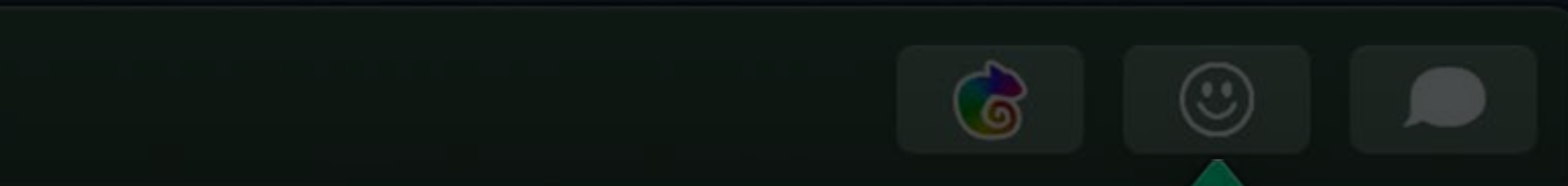


Vitals



Allows Vibrancy

Blends Vibrantly

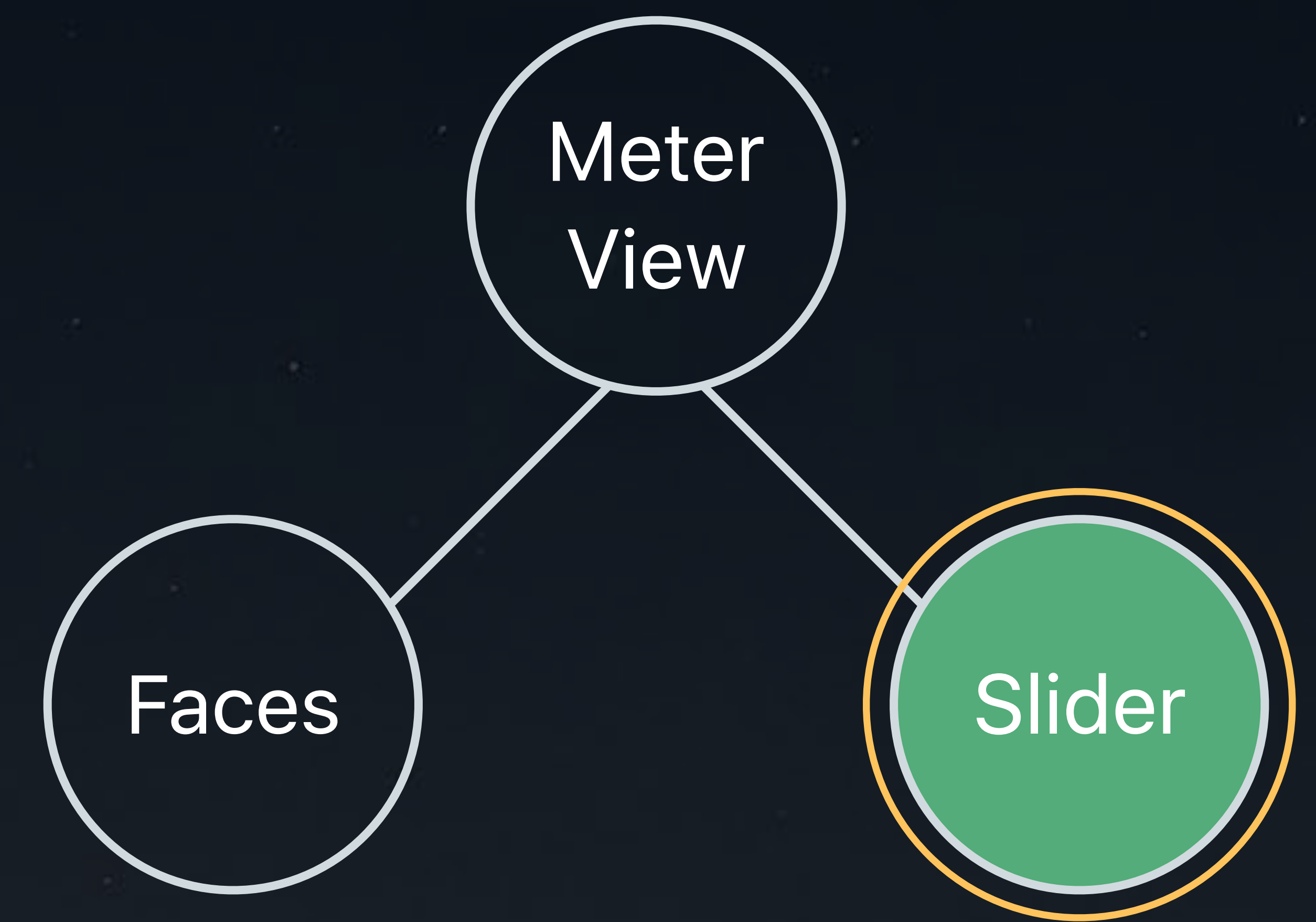


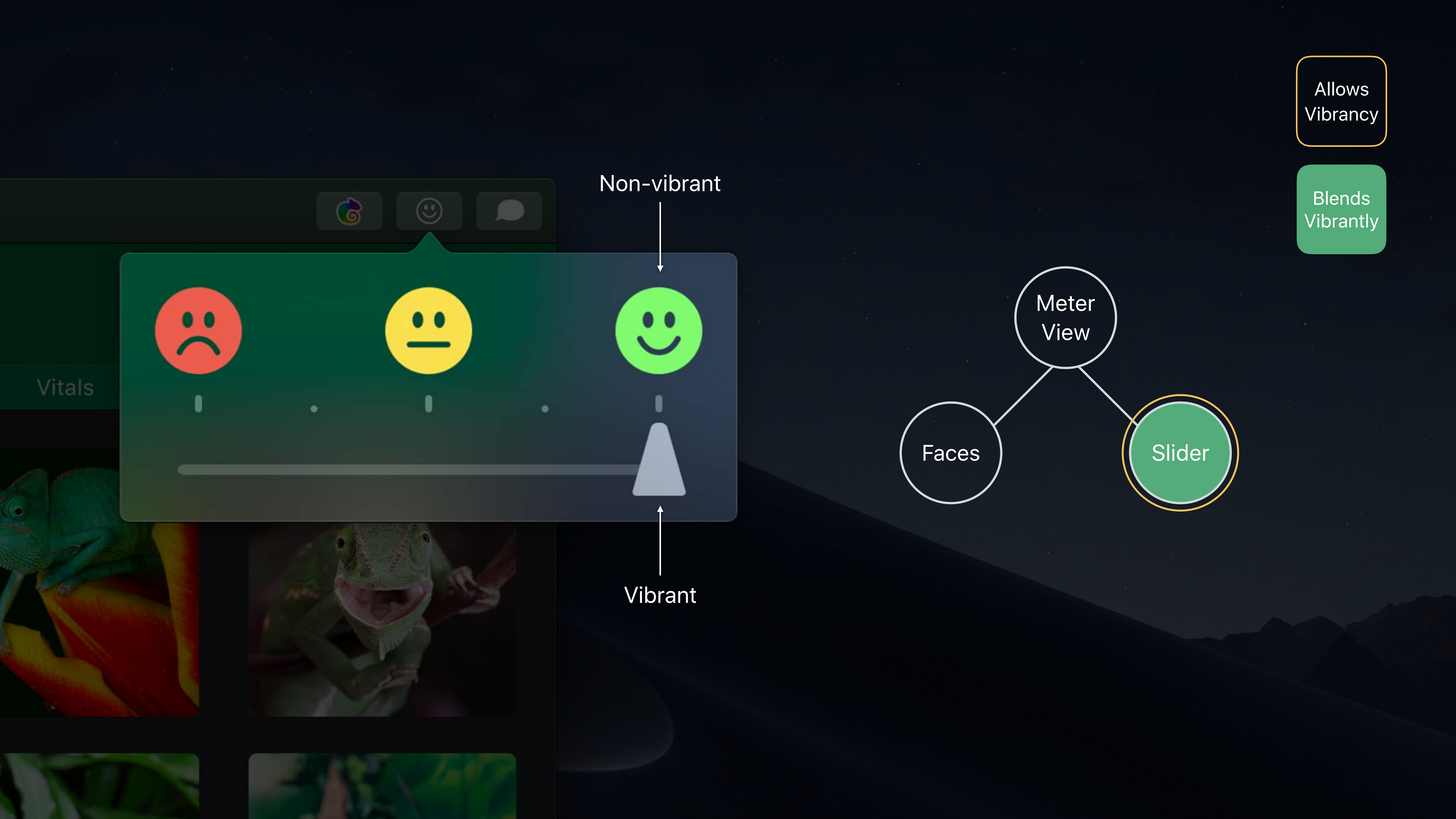
Vitals

A horizontal slider control with three emoji icons: a red sad face, a yellow neutral face, and a green happy face. A white triangular slider knob is positioned over the green happy face. Below the icons is a horizontal track with a white line and a white triangular knob.

Allows Vibrancy

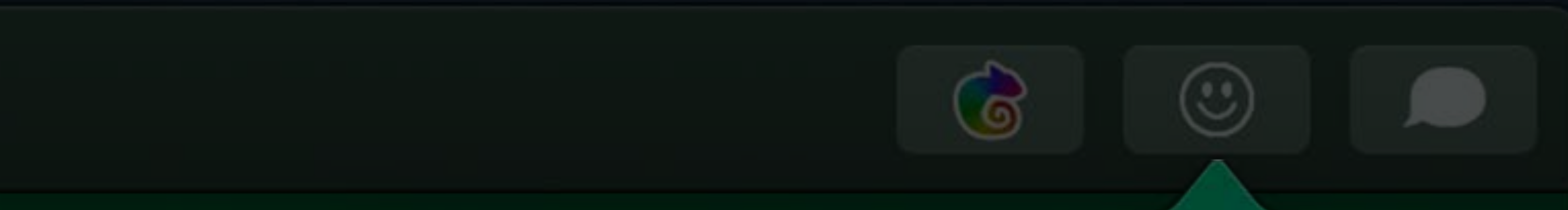
Blends Vibrantly





Allows Vibrancy

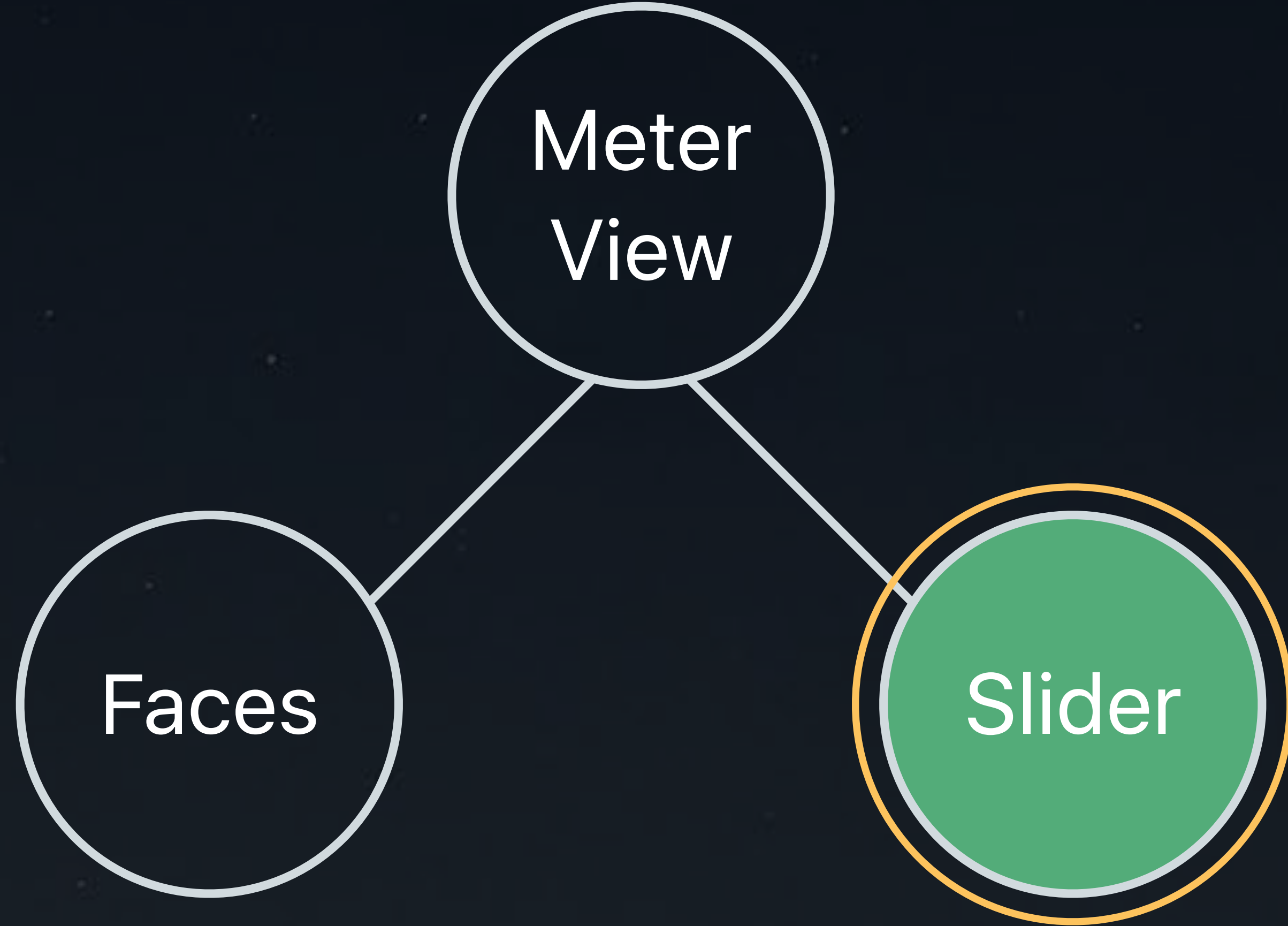
Blends Vibrantly



Vitals

Non-vibrant

Vibrant



# Vibrant Blending Tips

Vibrant blend mode applies to subtree

Typically only leaf views should be vibrant

Break non vibrant drawing out into a sibling view

# Vibrant Blending Tips

**Avoid** overlapping vibrant and non-vibrant views

Don't subclass Cocoa controls to override `allowsVibrancy`

Only override `allowsVibrancy` if you also override drawing

Appearance

Materials

Vibrancy



**Background styles**

Backward deployment





Tips and tricks



# Background Styles

	Normal	Selected / Emphasized
Aqua	<p> <b>Katie Abeles</b> 6/4/18 Pictures from Thailand Here are some of the pictures that John and I took on vacation to Thailand last su...</p>	<p> <b>Katie Abeles</b> 6/4/18 Pictures from Thailand Here are some of the pictures that John and I took on vacation to Thailand last su...</p>

# Background Styles

	Normal	Selected / Emphasized
Aqua	<p> <b>Katie Abeles</b> 6/4/18 Pictures from Thailand Here are some of the pictures that John and I took on vacation to Thailand last su...</p>	<p> <b>Katie Abeles</b> 6/4/18 Pictures from Thailand Here are some of the pictures that John and I took on vacation to Thailand last su...</p>
Dark Aqua	<p> <b>Katie Abeles</b> 6/4/18 Pictures from Thailand Here are some of the pictures that John and I took on vacation to Thailand last su...</p>	<p> <b>Katie Abeles</b> 6/4/18 Pictures from Thailand Here are some of the pictures that John and I took on vacation to Thailand last su...</p>

```
// Emphasis with NSBackgroundColor
```

```
enum NSView.BackgroundColor {
```

```
    case light
```

```
    case dark
```

```
    // ...
```

```
}
```

```
class NSTableCellView: NSView {
```

```
    var backgroundColor: NSView.BackgroundColor
```

```
}
```

```
// Emphasis with NSBackgroundColor
```

```
enum NSView.BackgroundColor {  
    case normal  
    case emphasized  
    // ...  
}
```

```
class NSTableCellView: NSView {  
    var backgroundColor: NSView.BackgroundColor  
}
```

# Background Styles

NEW

NSTableView now sets background style recursively

Label colors automatically adapt to emphasized style

labelColor

secondaryLabelColor

tertiaryLabelColor

quaternaryLabelColor

# Background Styles

NEW

NSTableView now sets background style recursively

Label colors automatically adapt to emphasized style

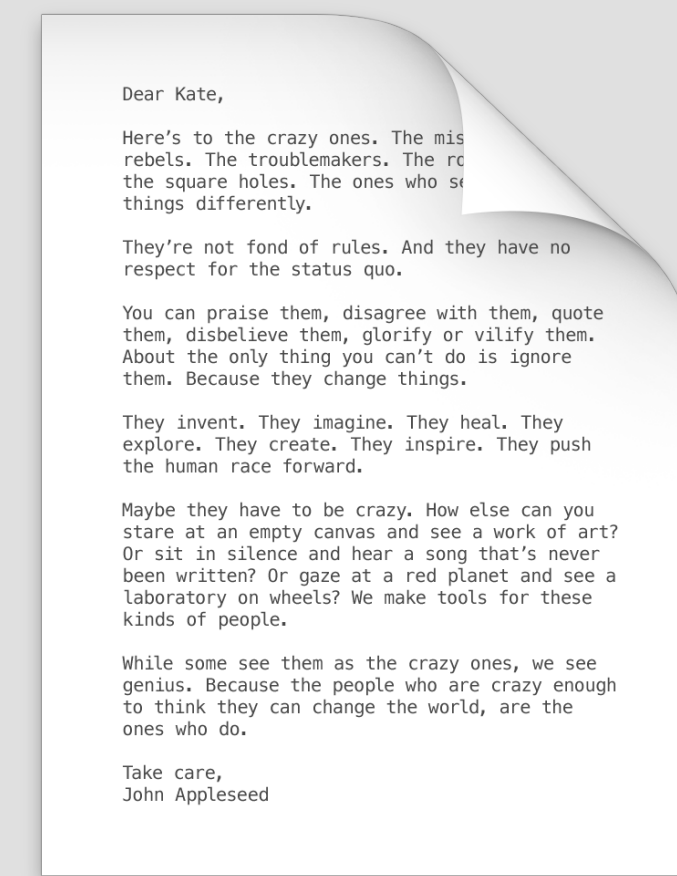
labelColor

secondaryLabelColor

tertiaryLabelColor

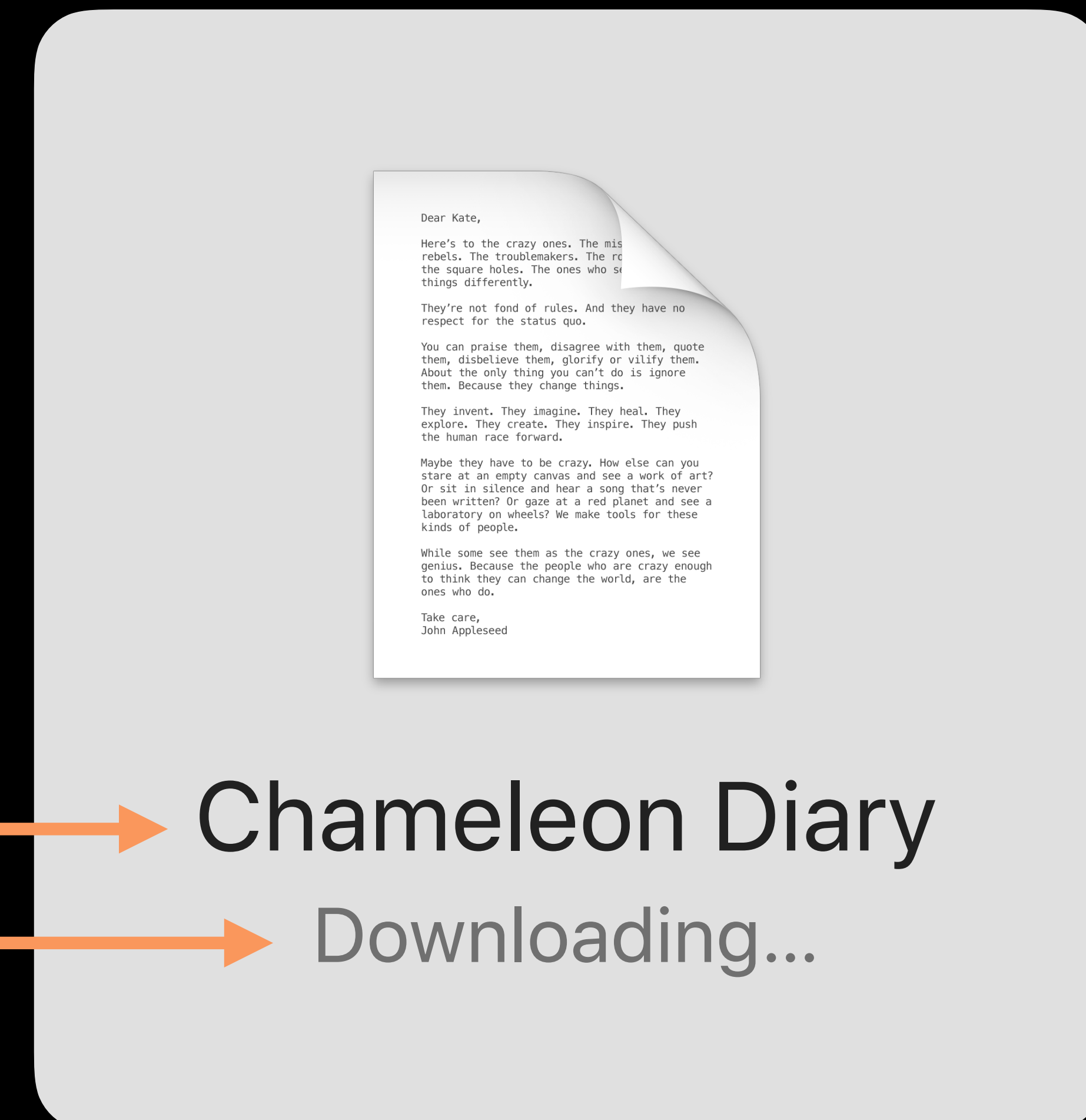
quaternaryLabelColor

# Custom Selections



Chameleon Diary  
Downloading...

# Custom Selections



labelColor  
secondaryLabelColor



Chameleon Diary  
Downloading...



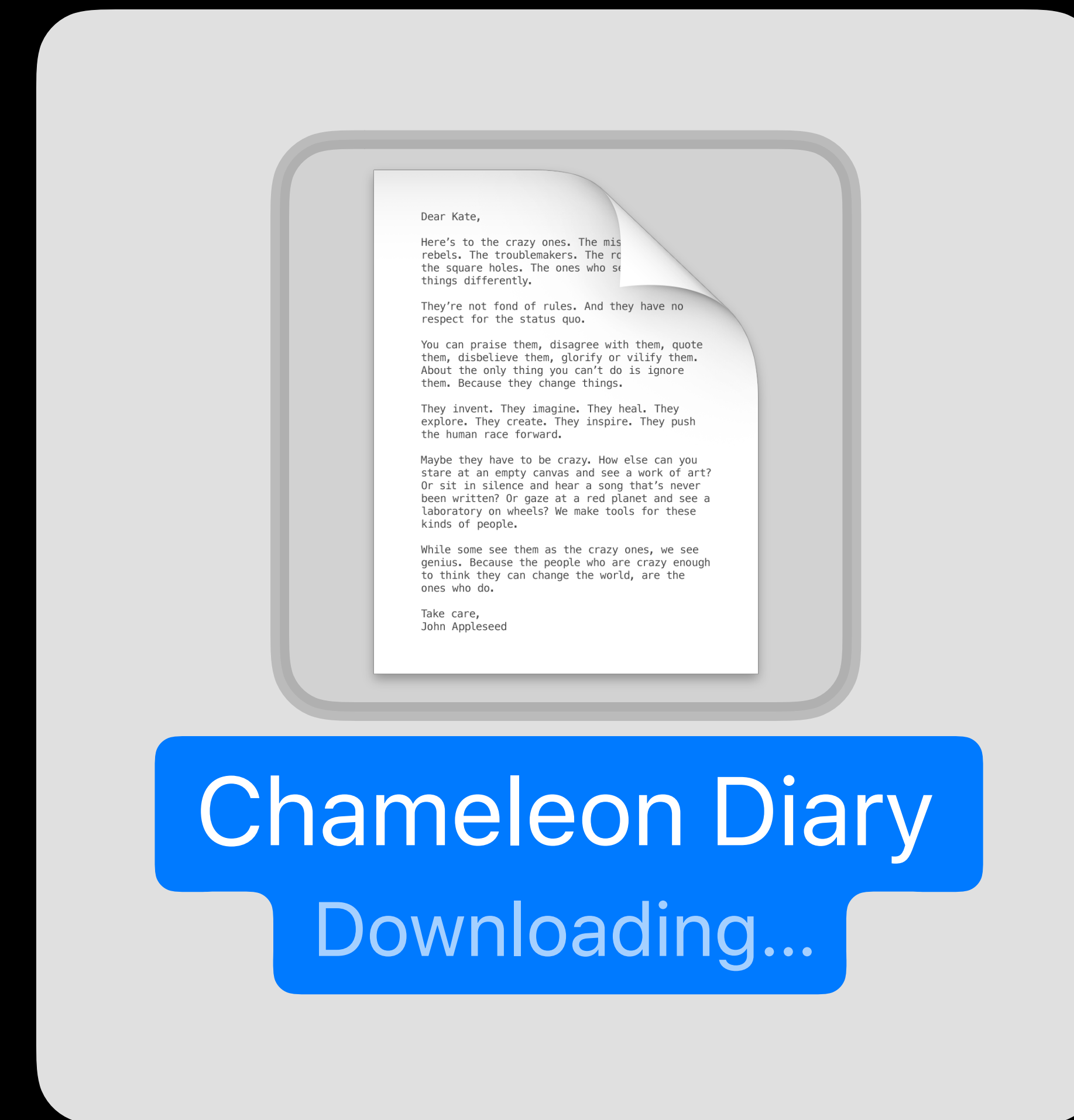
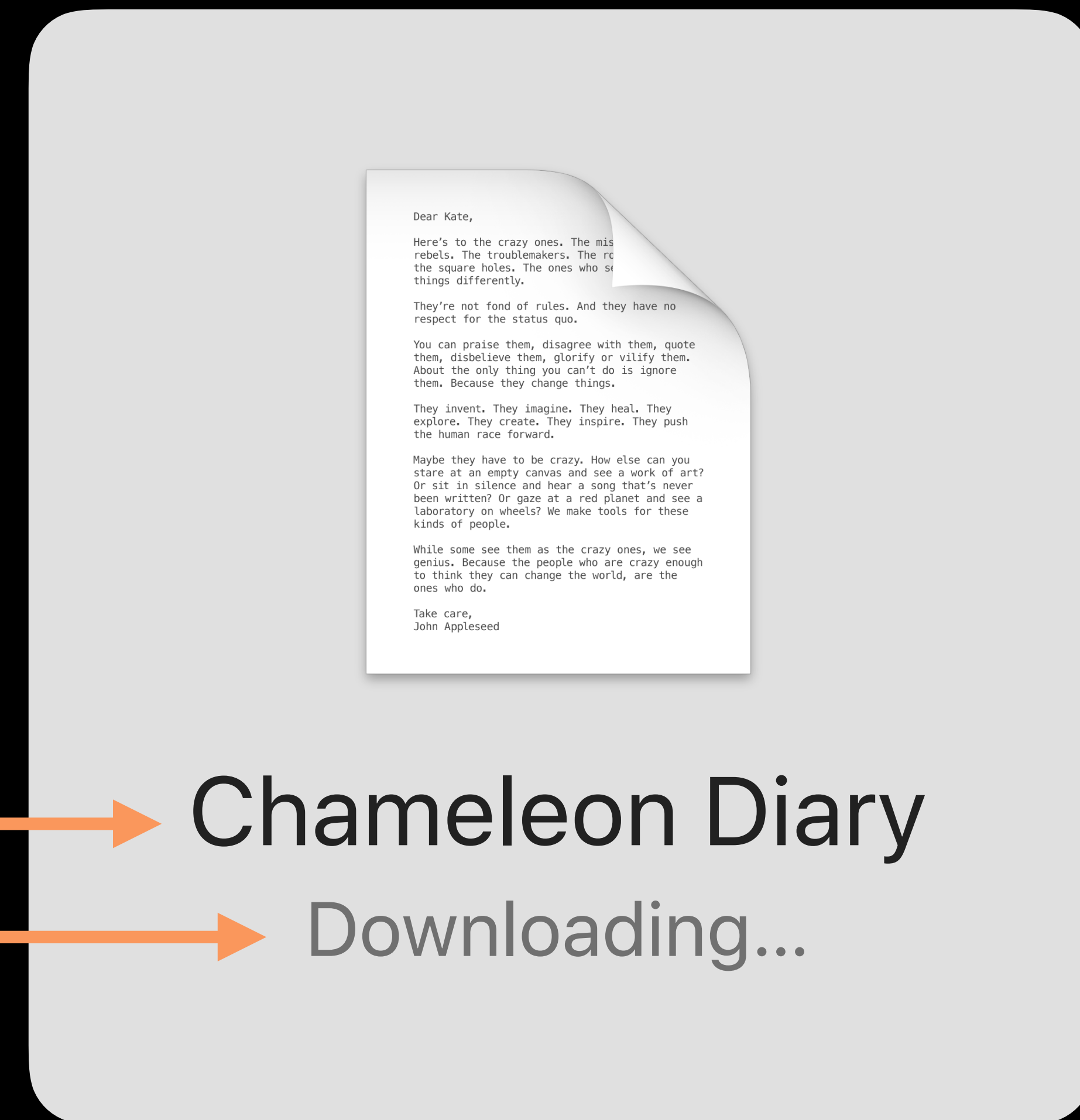
# Custom Selections

labelColor  
secondaryLabelColor



Chameleon Diary

Downloading...

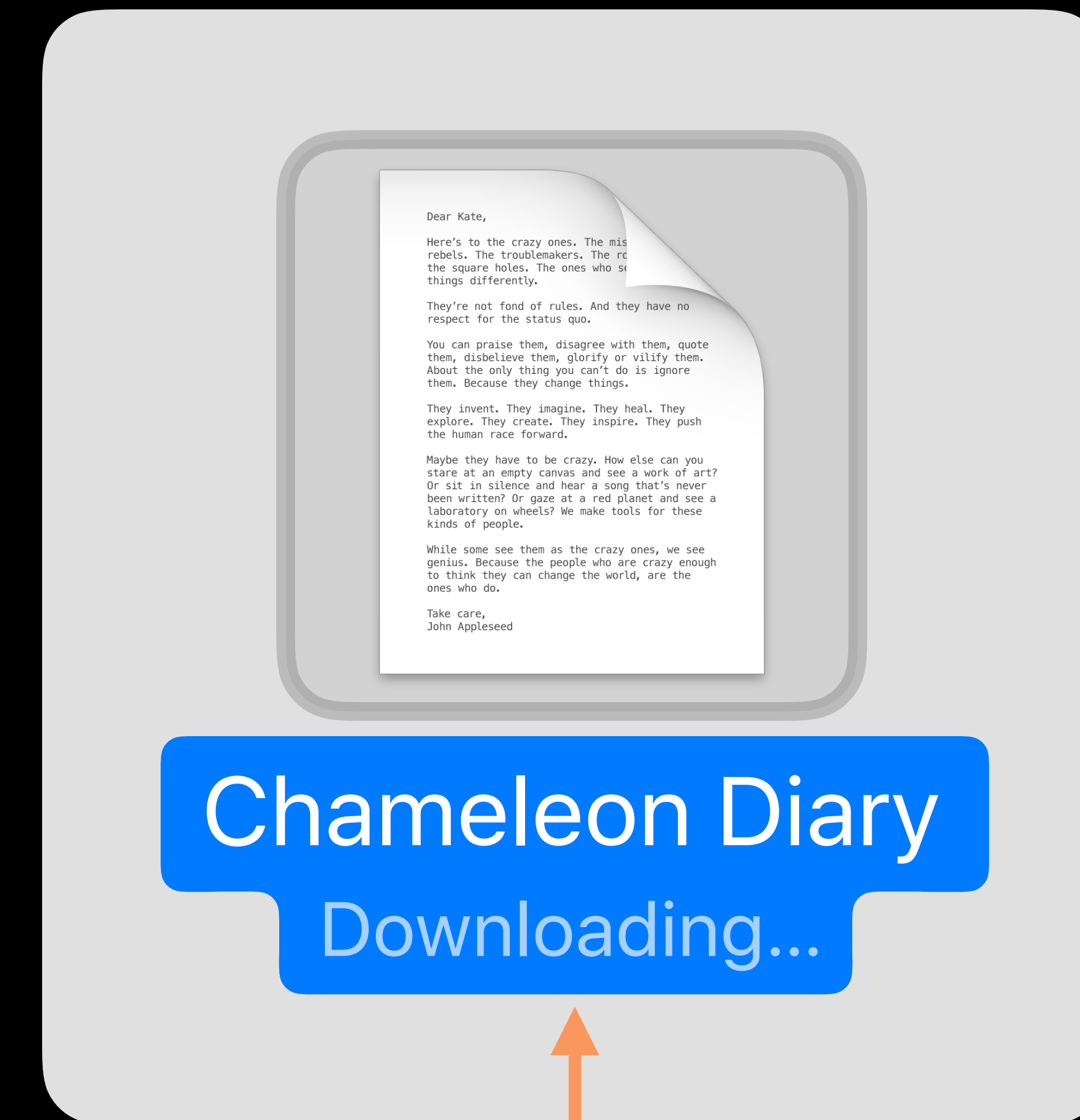
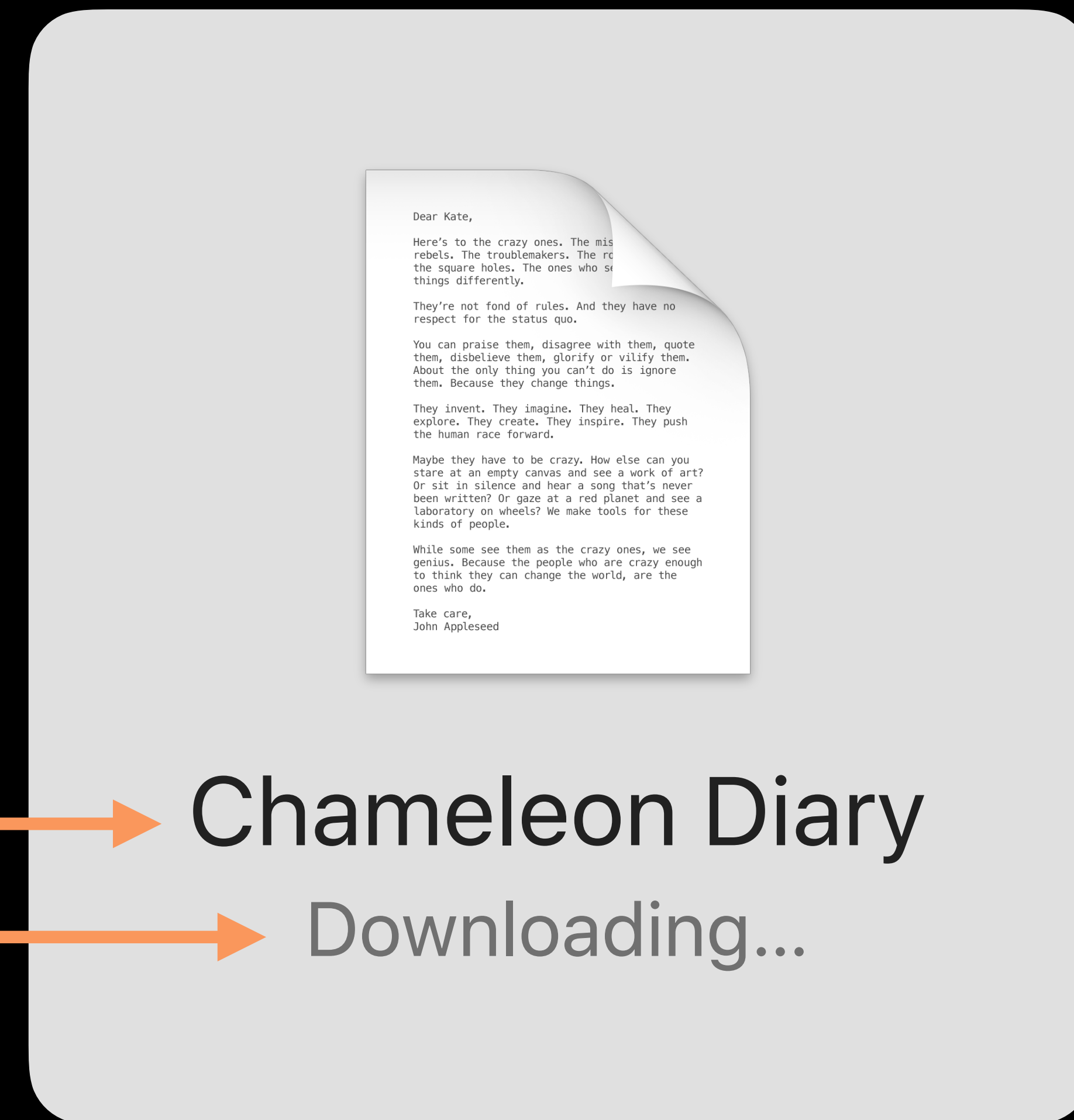


Chameleon Diary

Downloading...

# Custom Selections

labelColor  
secondaryLabelColor



```
cell.backgroundColor = .emphasized
```

# Custom Selections

Dear Kate,  
Here's to the crazy ones. The misfits. The troublemakers. The rebels. The square holes. The ones who see things differently.  
They're not fond of rules. And they have no respect for the status quo.  
You can praise them, disagree with them, quote them, disbelieve them, glorify or vilify them. About the only thing you can't do is ignore them. Because they change things.  
They invent. They imagine. They heal. They explore. They create. They inspire. They push the human race forward.  
Maybe they have to be crazy. How else can you stare at an empty canvas and see a work of art? Or sit in silence and hear a song that's never been written? Or gaze at a red planet and see a laboratory on wheels? We make tools for these kinds of people.  
Maybe some see them as the crazy ones, we see genius. Because the people who are crazy enough to think they can change the world, are the ones who do.  
Take care,  
Steve Jobs

Chameleon Diary  
Downloading...

Dear Kate,  
Here's to the crazy ones. The misfits. The troublemakers. The rebels. The square holes. The ones who see things differently.  
They're not fond of rules. And they have no respect for the status quo.  
You can praise them, disagree with them, quote them, disbelieve them, glorify or vilify them. About the only thing you can't do is ignore them. Because they change things.  
They invent. They imagine. They heal. They explore. They create. They inspire. They push the human race forward.  
Maybe they have to be crazy. How else can you stare at an empty canvas and see a work of art? Or sit in silence and hear a song that's never been written? Or gaze at a red planet and see a laboratory on wheels? We make tools for these kinds of people.  
Maybe some see them as the crazy ones, we see genius. Because the people who are crazy enough to think they can change the world, are the ones who do.  
Take care,  
Steve Jobs

Chameleon Diary  
Downloading...

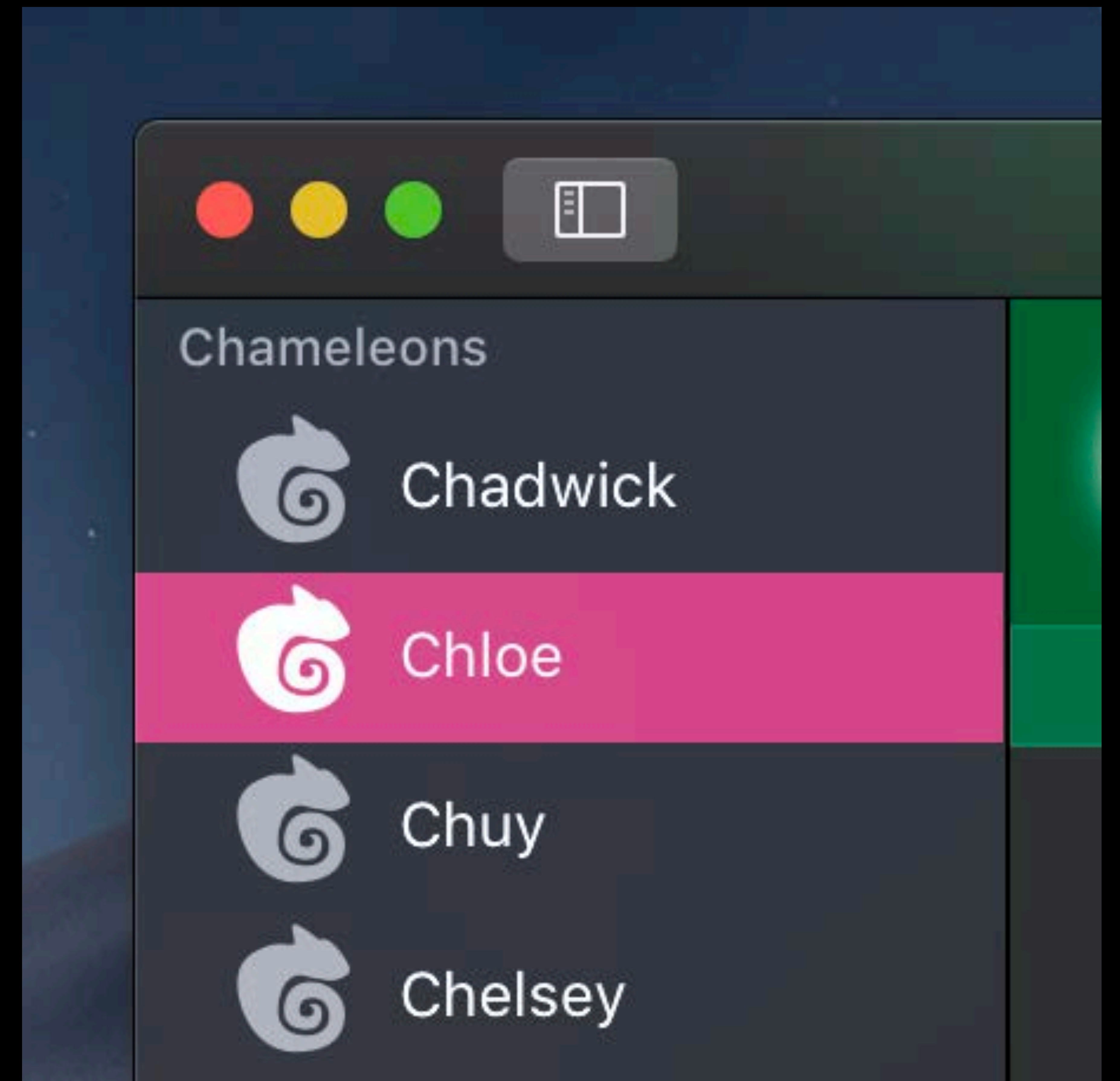
# Selection Material

Selection material follows the accent color

Avoid drawing custom blue selections

Use `NSVisualEffectView` instead:

```
visualEffectView.material = .selection
```



Appearance

Materials

Vibrancy

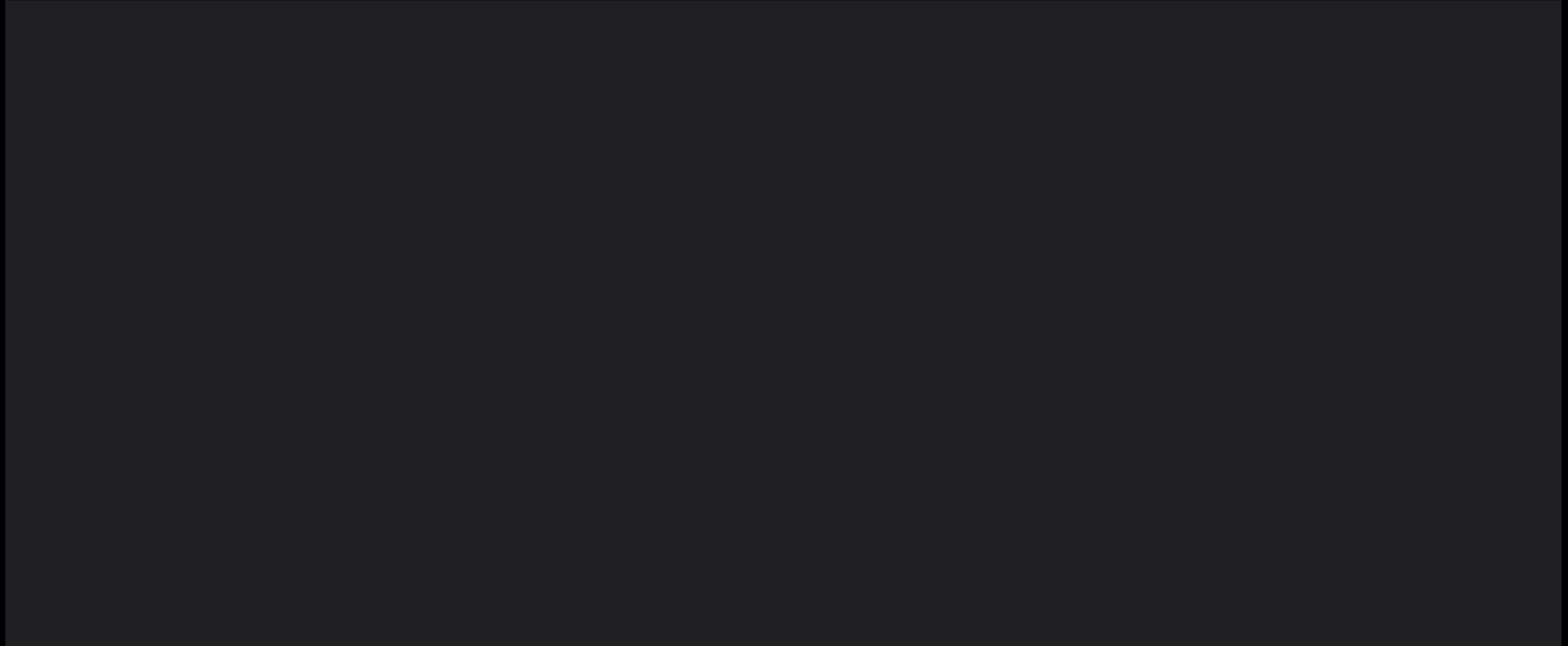
Background styles

**Backward deployment**

Tips and tricks

# Backward Deployment

System colors



# Backward Deployment

## System colors

```
alternateSelectedControlText    selectedMenuItemTextColor      textColor
controlBackgroundColor         selectedTextBackgroundColor   underPageBackgroundColor
controlColor                   selectedTextColor             windowBackgroundColor
controlTextColor               systemBlueColor              windowFrameTextColor
disabledControlTextColor       systemBrownColor             controlAccentColor
gridColor                     systemGrayColor              selectedContentBackgroundColor
keyboardFocusIndicatorColor    systemGreenColor             separatorColor
labelColor                    systemOrangeColor            unemphasizedSelectedTextColor
linkColor                     systemPinkColor
placeholderTextColor          systemPurpleColor
quaternaryLabelColor          systemRedColor
secondaryLabelColor           systemYellowColor
selectedControlColor          tertiaryLabelColor
selectedControlTextColor      textBackgroundColor
```

# Backward Deployment

## System colors

10.10+

```
alternateSelectedControlText      selectedMenuItemTextColor         textColor
controlBackgroundColor           selectedTextBackgroundColor      underPageBackgroundColor
controlColor                      selectedTextColor                 windowBackgroundColor
controlTextColor                  systemBlueColor                  windowFrameTextColor
disabledControlTextColor          systemBrownColor                 controlAccentColor
gridColor                         systemGrayColor                  selectedContentBackgroundColor
keyboardFocusIndicatorColor       systemGreenColor                  separatorColor
labelColor                        systemOrangeColor                unemphasizedSelectedTextColor
linkColor                         systemPinkColor
placeholderTextColor              systemPurpleColor
quaternaryLabelColor              systemRedColor
secondaryLabelColor               systemYellowColor
selectedControlColor              tertiaryLabelColor
selectedControlTextColor           textBackgroundColor
```



# Backward Deployment

Asset catalog colors

```
class NSColor {  
    @available(OSX 10.13, *)  
    public init?(named name: NSColor.Name)  
}
```

# Backward Deployment

Asset catalog colors

```
class NSColor {  
    @available(OSX 10.13, *)  
    public init?(named name: NSColor.Name)  
}
```

# Backward Deployment

## Asset catalog colors

```
extension NSColor {
  class var chameleonHeaderColor: NSColor {
    if #available(OSX 10.13, *) {
      return NSColor(named: "ChameleonHeaderColor")!
    } else {
      return NSColor(srgbRed: 0.585, green: 0.971, blue: 0.762, alpha: 1.0)
    }
  }
}
```

# Backward Deployment

Desktop-tinted materials

Desktop-tinted NSVisualEffectView materials are new in 10.14

Classes providing automatic materials:

10.0+

---

NSWindow

---

NSScrollView

---

NSTableView

---

10.5+

---

NSBox (Custom)

---

NSCollectionView

# Backward Deployment

Manually enable or disable Dark Mode

Automatically opted in with 10.14 SDK

Info.plist key: `NSRequiresAquaSystemAppearance`

- Set to NO to enable Dark Mode with earlier SDKs
- Set to YES to disable it temporarily

Appearance

Materials

Vibrancy

Background styles

Backward deployment

**Tips and tricks**

# Find Hardcoded Colors

## Static named colors

```
label.textColor = .black
```



## Hardcoded components

```
customBox.fillColor = NSColor(red: 1.0, green: 0.95, blue: 0.90, alpha: 1.0)
```



# Find Hardcoded Colors

## Static named colors

```
label.textColor = .labelColor
```



## Hardcoded components

```
customBox.fillColor = NSColor(red: 1.0, green: 0.95, blue: 0.90, alpha: 1.0)
```





# Find Hardcoded Colors

## Static named colors

```
label.textColor = .labelColor
```

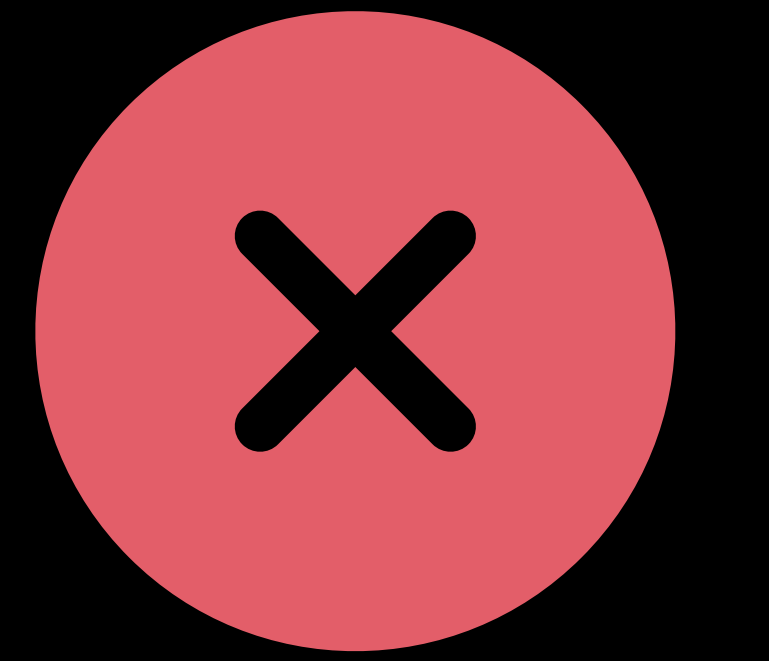


## Hardcoded components

```
customBox.fillColor = NSColor(named: "ChameleonHeaderColor")
```



# Offscreen Drawing

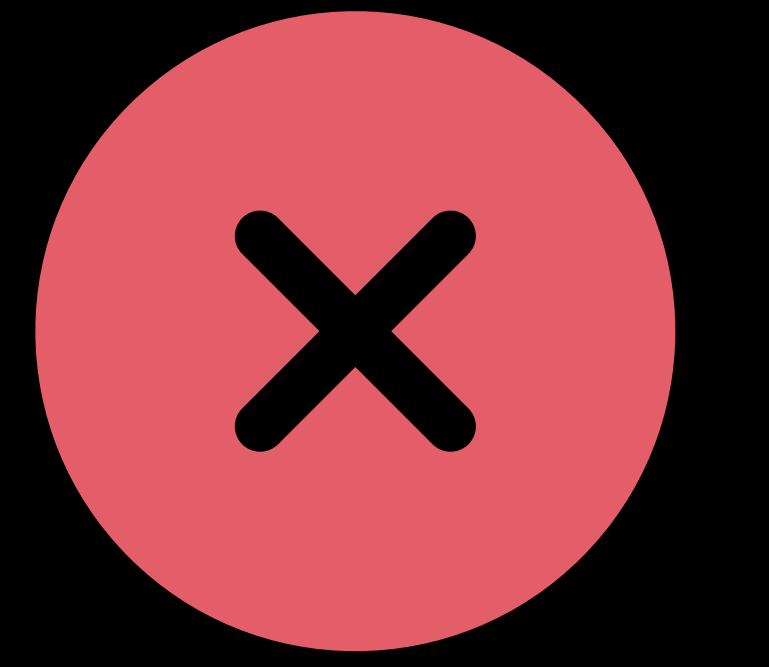


Prefer block-based UIImage over lockFocus

```
let badgedImage = UIImage(size: imageSize)
badgedImage.lockFocus()
// Draw chameleon
baseImage.draw(in: rect, from: .zero, operation: .sourceOver,
              fraction: 1.0)
// Draw badge
NSColor(named: "ChameleonBadgeFill")?.set()
badgePath.fill()
badgedImage.unlockFocus()
```



# Offscreen Drawing



Prefer block-based UIImage over lockFocus

```
UIImage(size: imageSize, flipped: false) { imageRect -> Bool in
    // Draw chameleon
    baseImage.draw(in: imageRect, from: .zero,
                   operation: .sourceOver, fraction: 1.0)

    // Draw badge
    UIColor(named: "ChameleonBadgeFill")?.set()
    badgePath.fill()
    return true
}
```



# Offscreen Drawing



Prefer block-based UIImage over lockFocus

```
UIImage(size: imageSize, flipped: false) { imageRect -> Bool in
    // Draw chameleon
    baseImage.draw(in: imageRect, from: .zero,
                  operation: .sourceOver, fraction: 1.0)

    // Draw badge
    UIColor(named: "ChameleonBadgeFill")?.set()
    badgePath.fill()
    return true
}
```



# Offscreen Drawing

Other offscreen drawing techniques, including:

```
NSGraphicsContext(bitmapImageRep: NSBitmapImageRep)
```

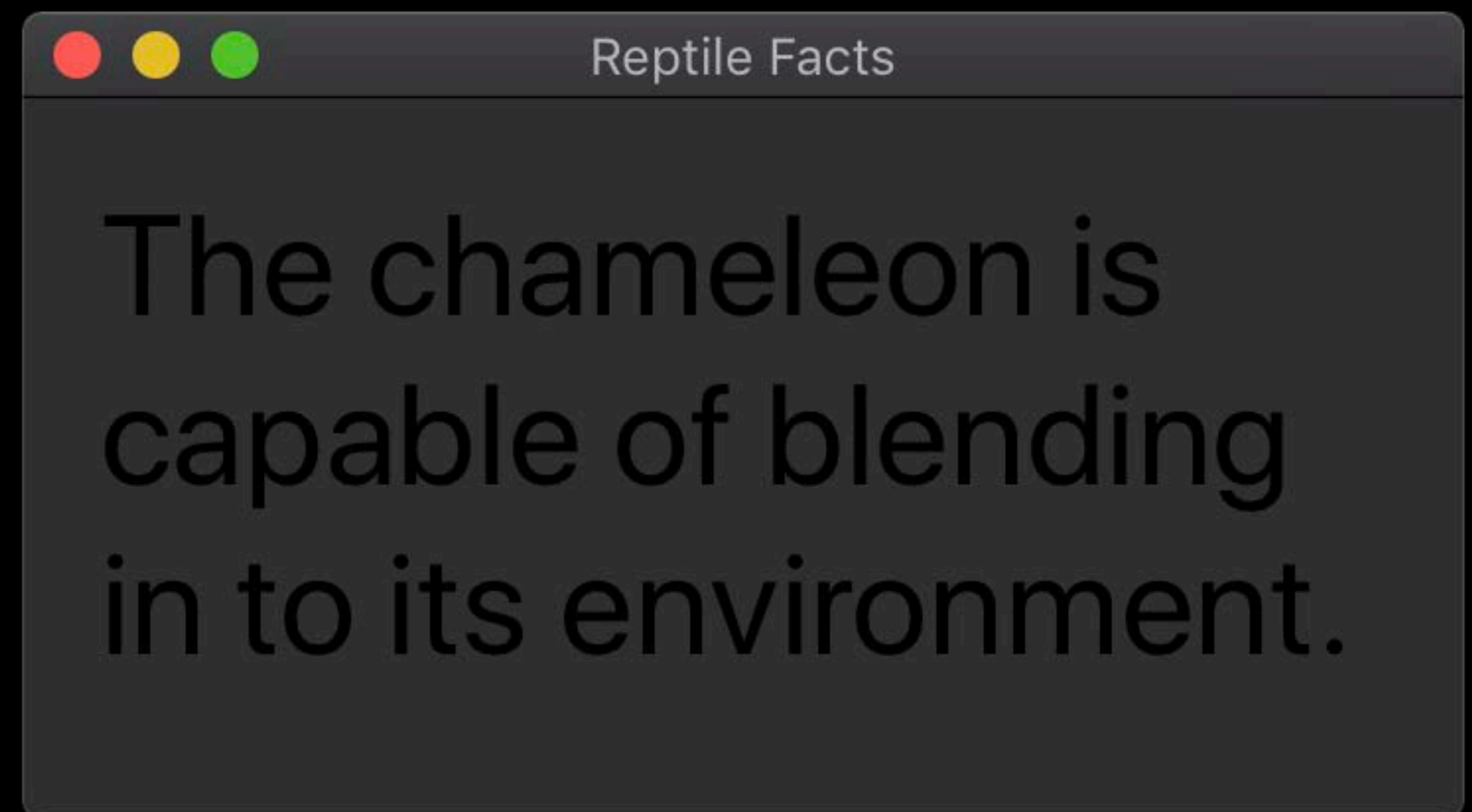
```
CGBitmapContext()
```

```
NSView.cacheDisplay(in: NSRect, to: NSBitmapImageRep)
```

# NSAttributedString Drawing

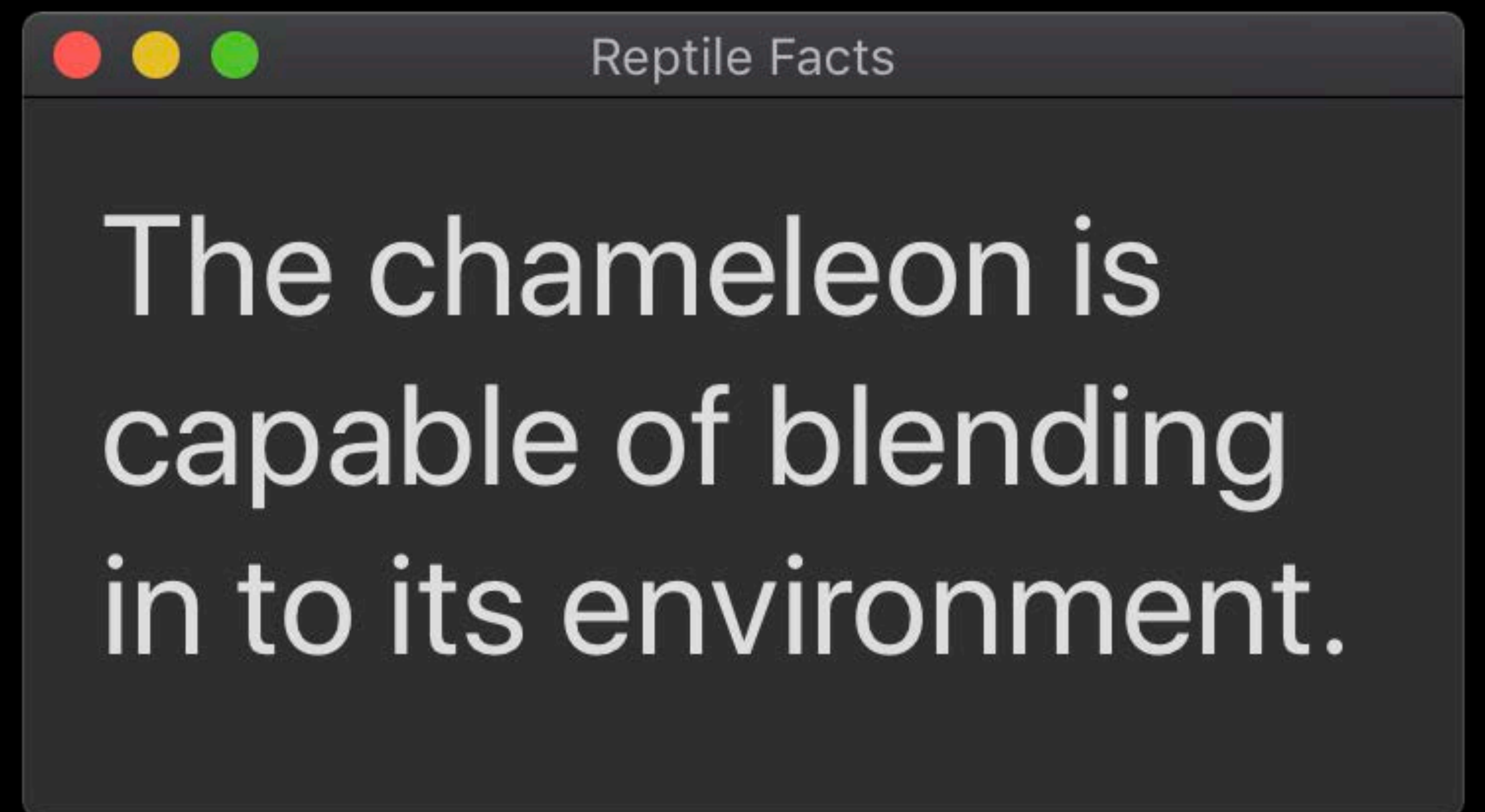


```
let attributes: [NSAttributedString.Key : Any] = [  
    .font : NSFont.systemFont(ofSize: 36.0)  
]
```



# NSAttributedString Drawing

```
let attributes: [NSAttributedString.Key : Any] = [  
    .font : NSFont.systemFont(ofSize: 36.0),  
    .foregroundColor : NSColor.labelColor  
]
```



# NSAttributedString Drawing



```
let attributes: [NSAttributedString.Key : Any] = [  
    .font : NSFont.systemFont(ofSize: 36.0),  
    .foregroundColor : NSColor.labelColor  
]
```





# NSAttributedString Drawing



```
let attributes: [NSAttributedString.Key : Any] = [  
    .font : NSFont.systemFont(ofSize: 36.0),  
    .foregroundColor : NSColor.labelColor  
]
```

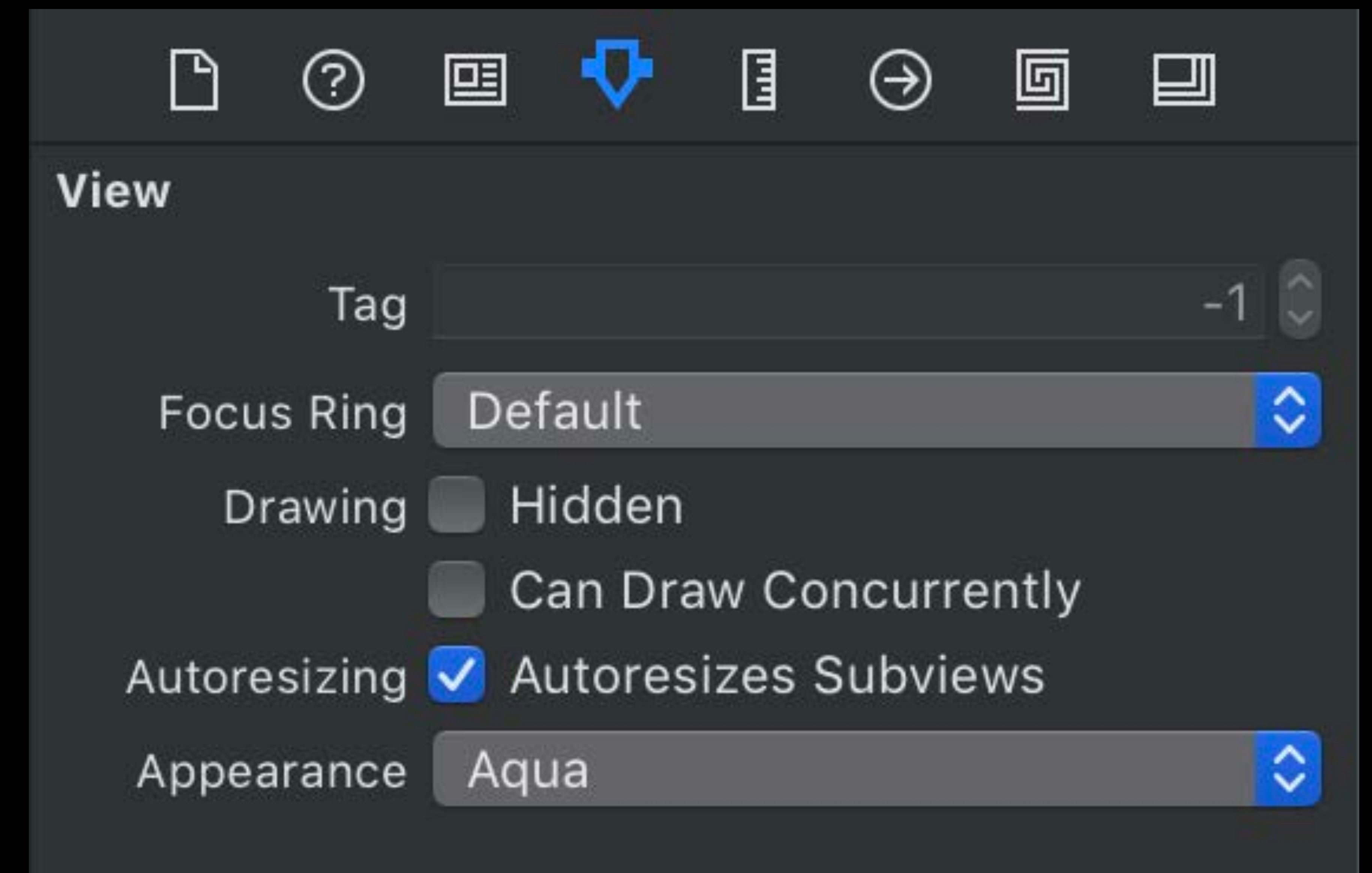
```
textView.performValidatedReplacement(in: range,  
                                     with: attributedStr)
```



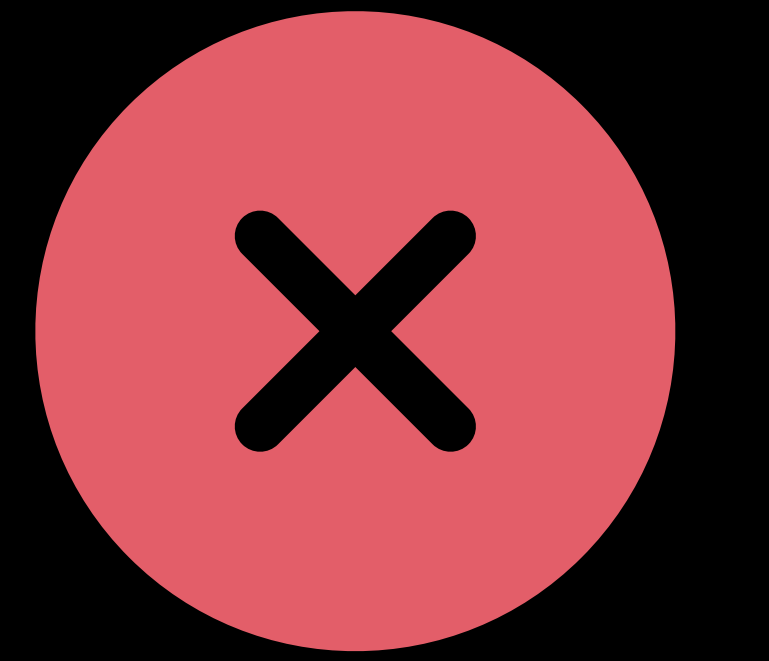
# Appearances in Interface Builder

Views set to Aqua won't change dynamically

Choose "Inherited" to match the superview

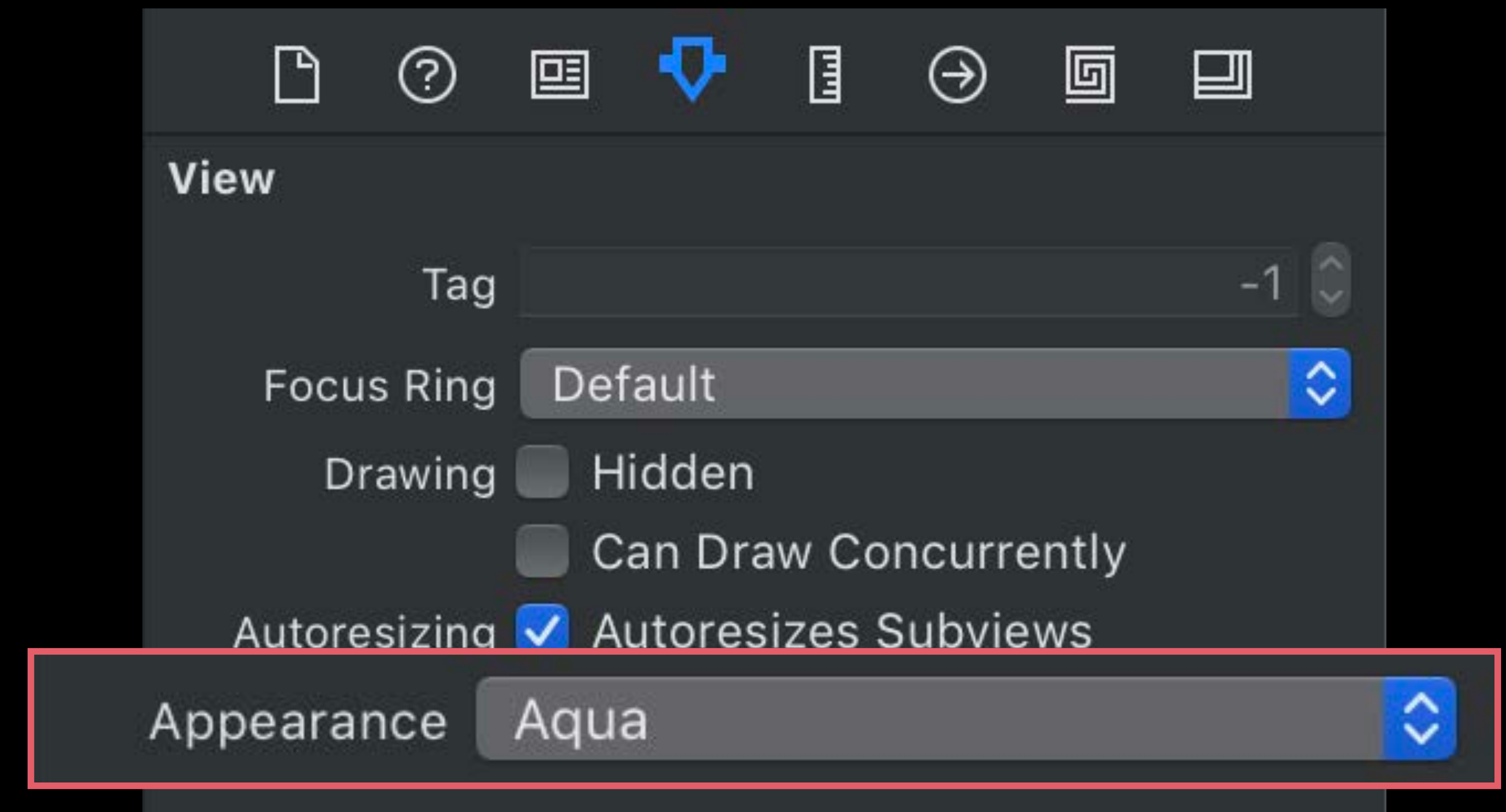


# Appearances in Interface Builder



Views set to Aqua won't change dynamically

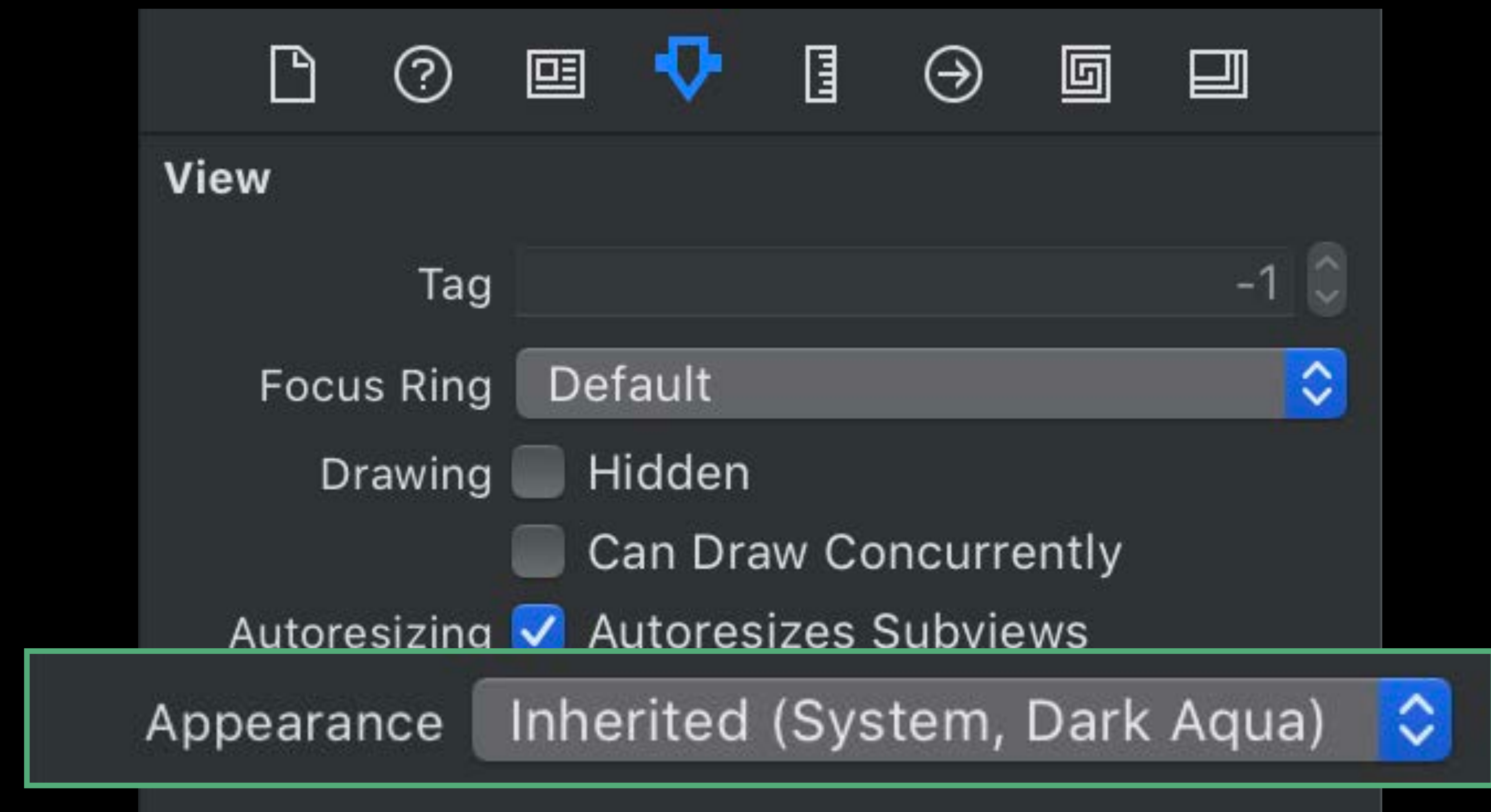
Choose "Inherited" to match the superview



# Appearances in Interface Builder

Views set to Aqua won't change dynamically

Choose "Inherited" to match the superview

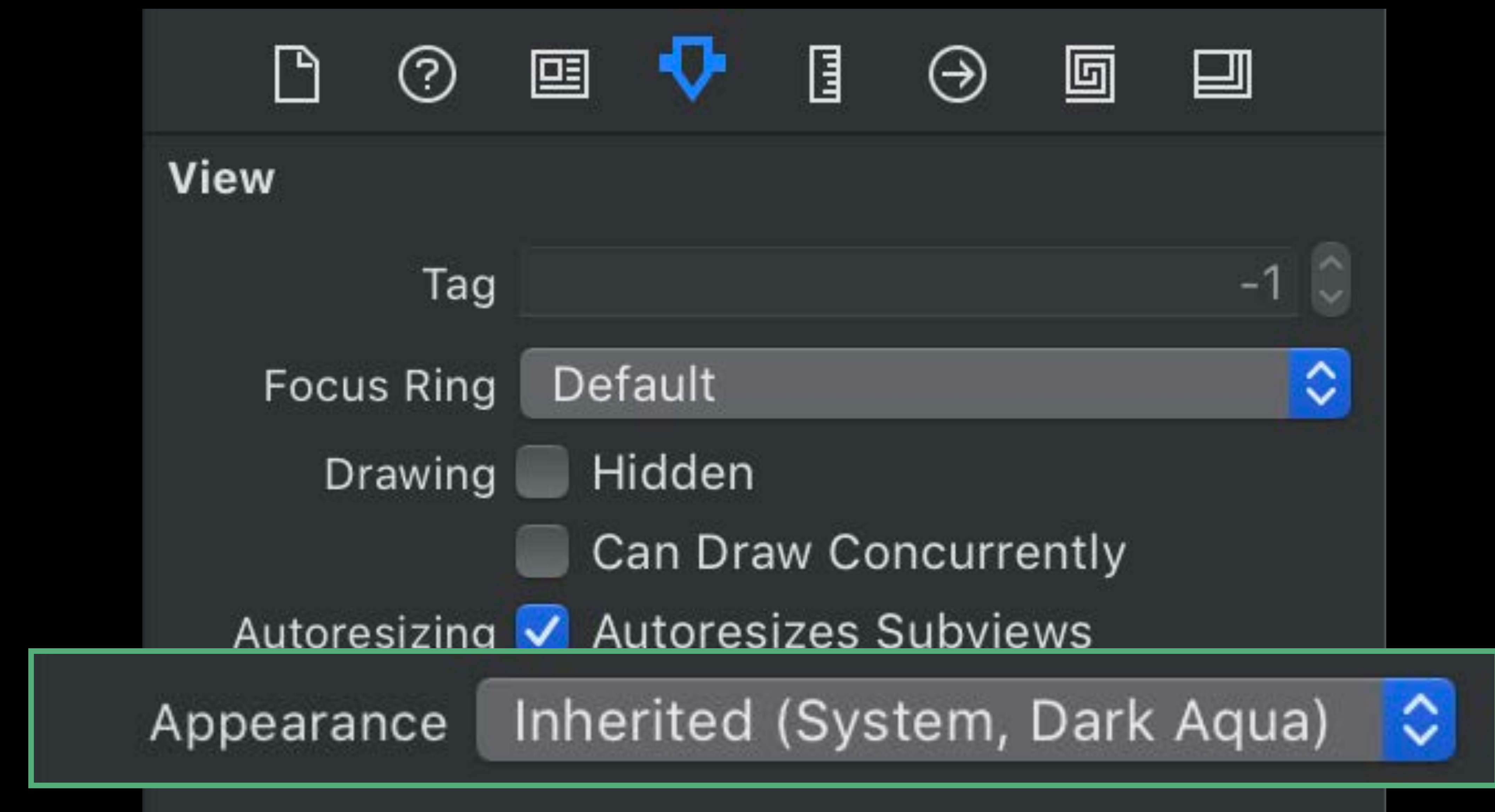


# Appearances in Interface Builder



Views set to Aqua won't change dynamically

Choose "Inherited" to match the superview



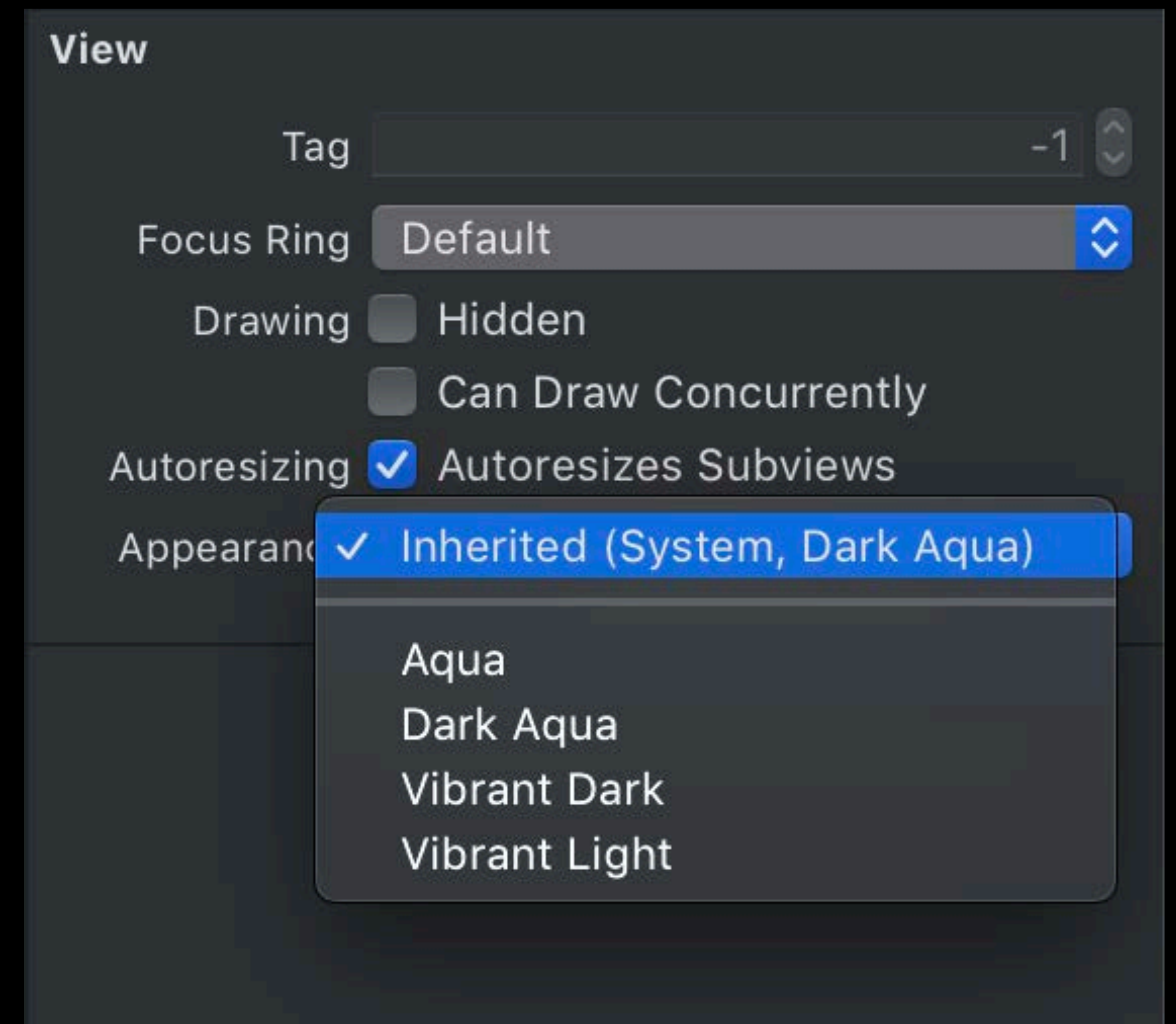
# NSVisualEffectView Appearance

NEW

NSVisualEffectView now automatically uses the correct vibrant appearance

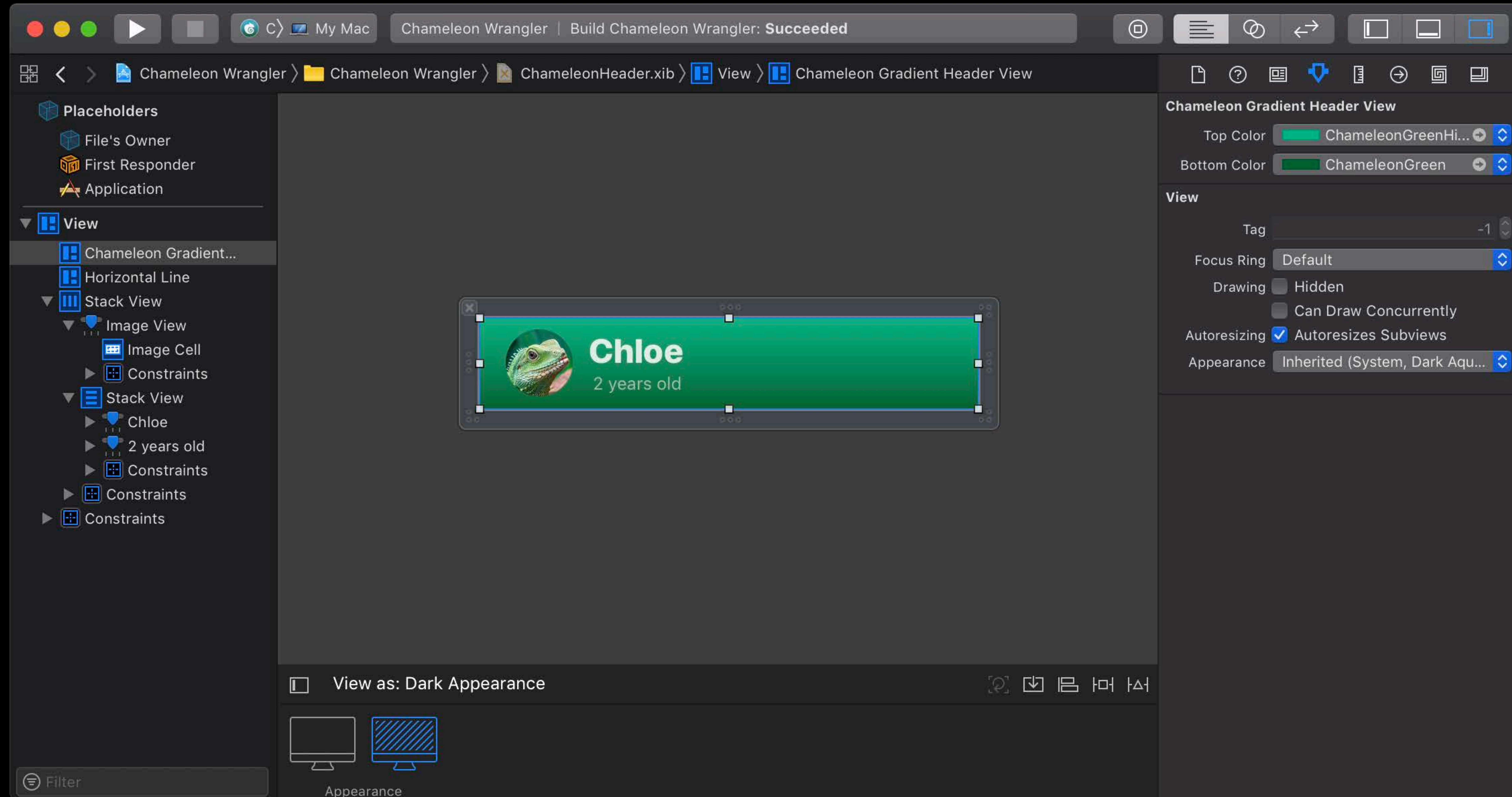
Avoid overriding the appearance

- Interface Builder: select "Inherited"
- In code: set `appearance` to `nil`



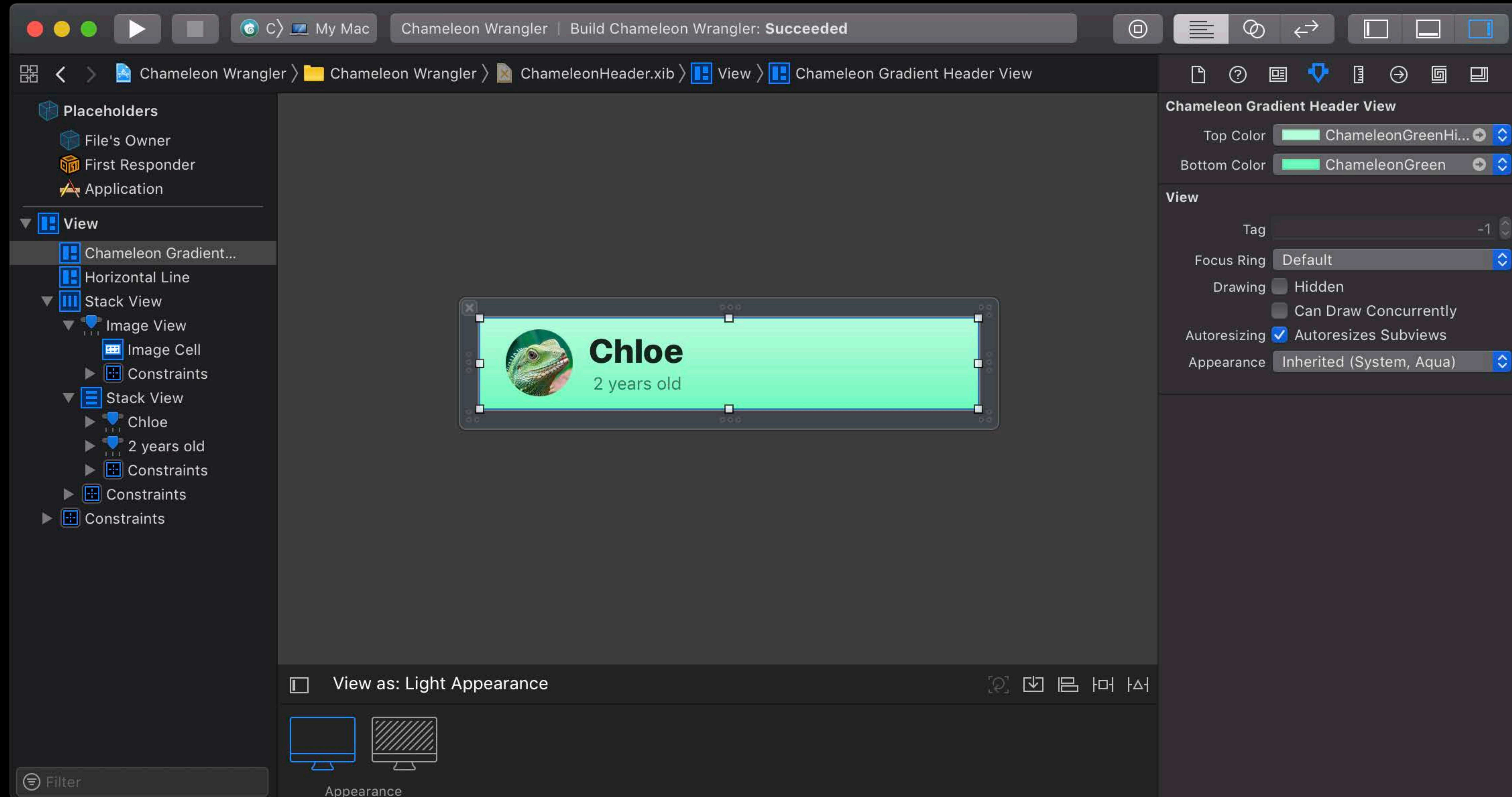
# Designing in Interface Builder

NEW



# Designing in Interface Builder

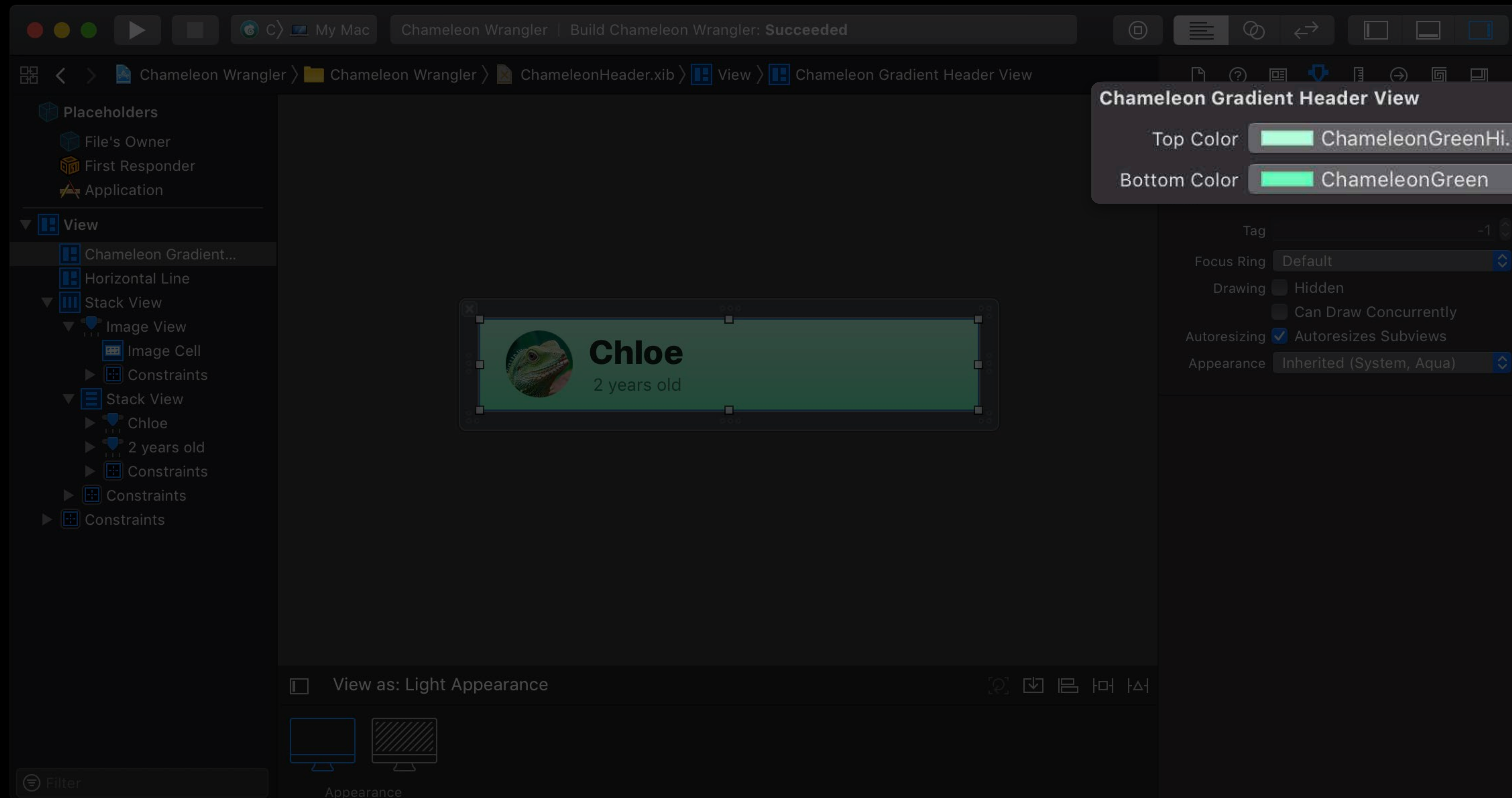
NEW





# Designing in Interface Builder

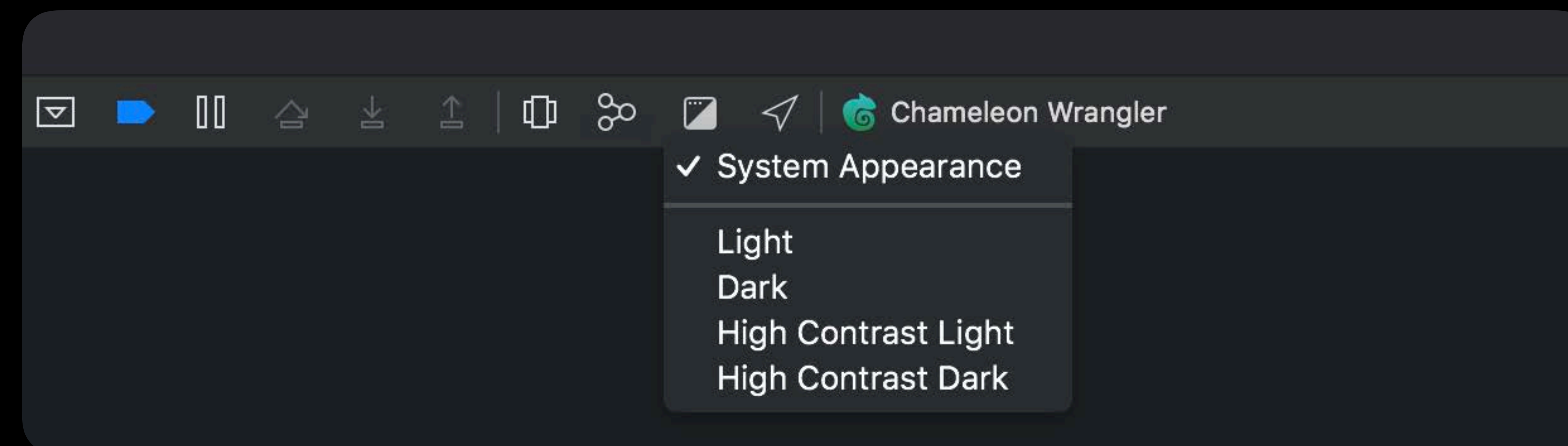
NEW



# Testing Appearances

NEW

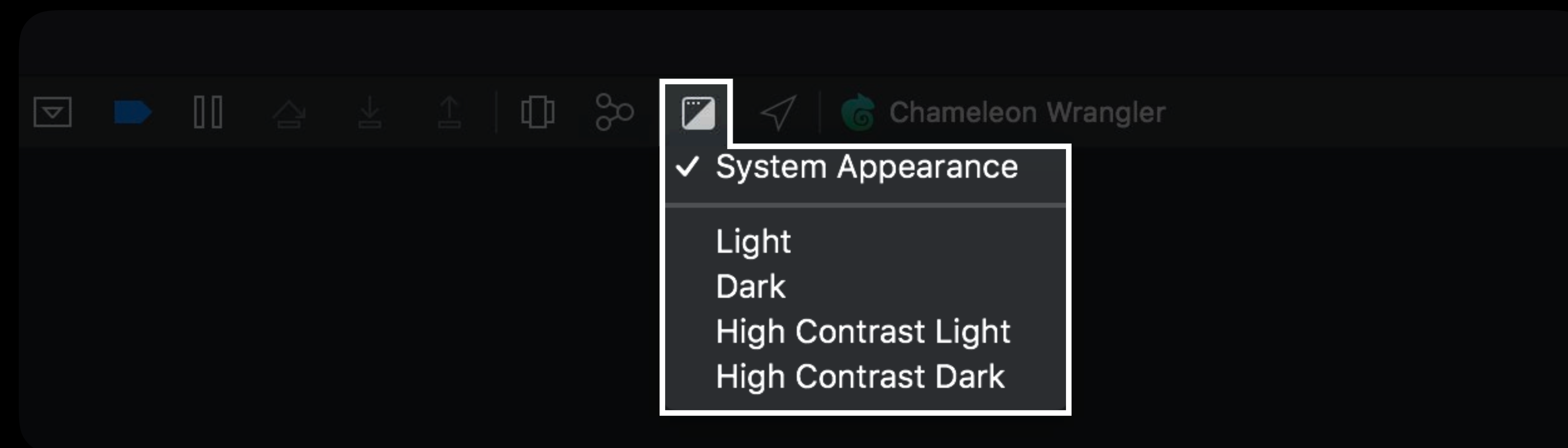
Switch appearances from the Debug Bar and Touch Bar



# Testing Appearances

NEW

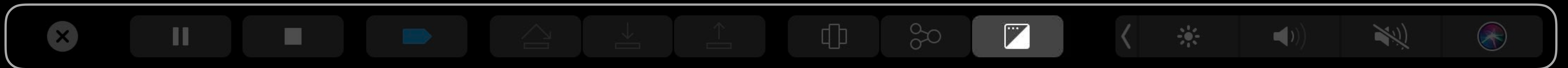
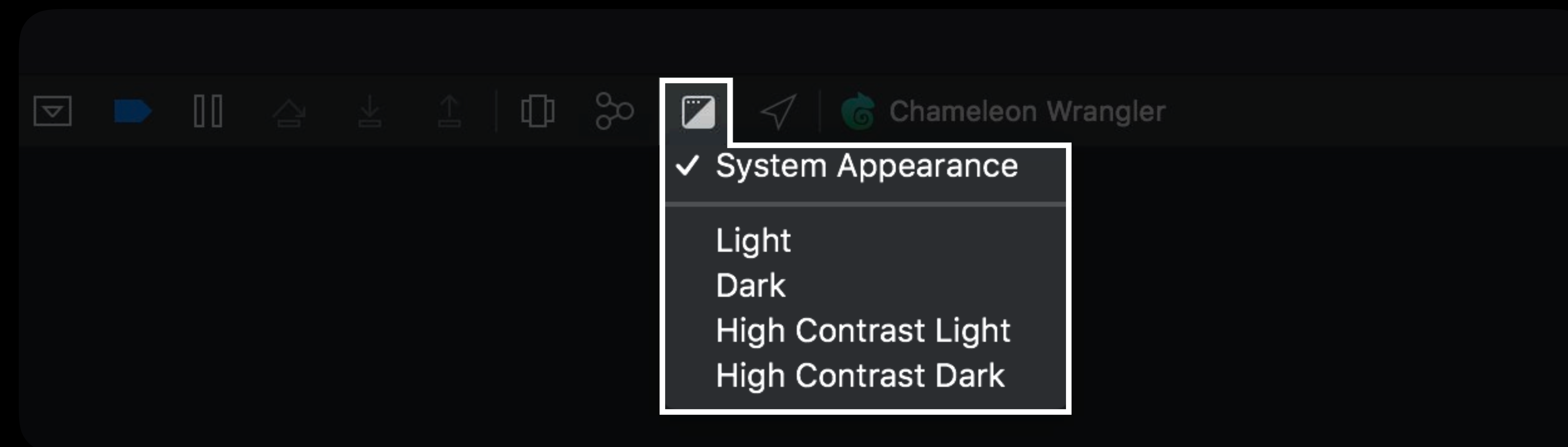
Switch appearances from the Debug Bar and Touch Bar



# Testing Appearances

NEW

Switch appearances from the Debug Bar and Touch Bar





Chameleons

- Chadwick
- Chloe**
- Chuy
- Chelsey
- Chevy
- Chiwetel
- Chester
- Chubs
- Cleopatra
- Charlotte

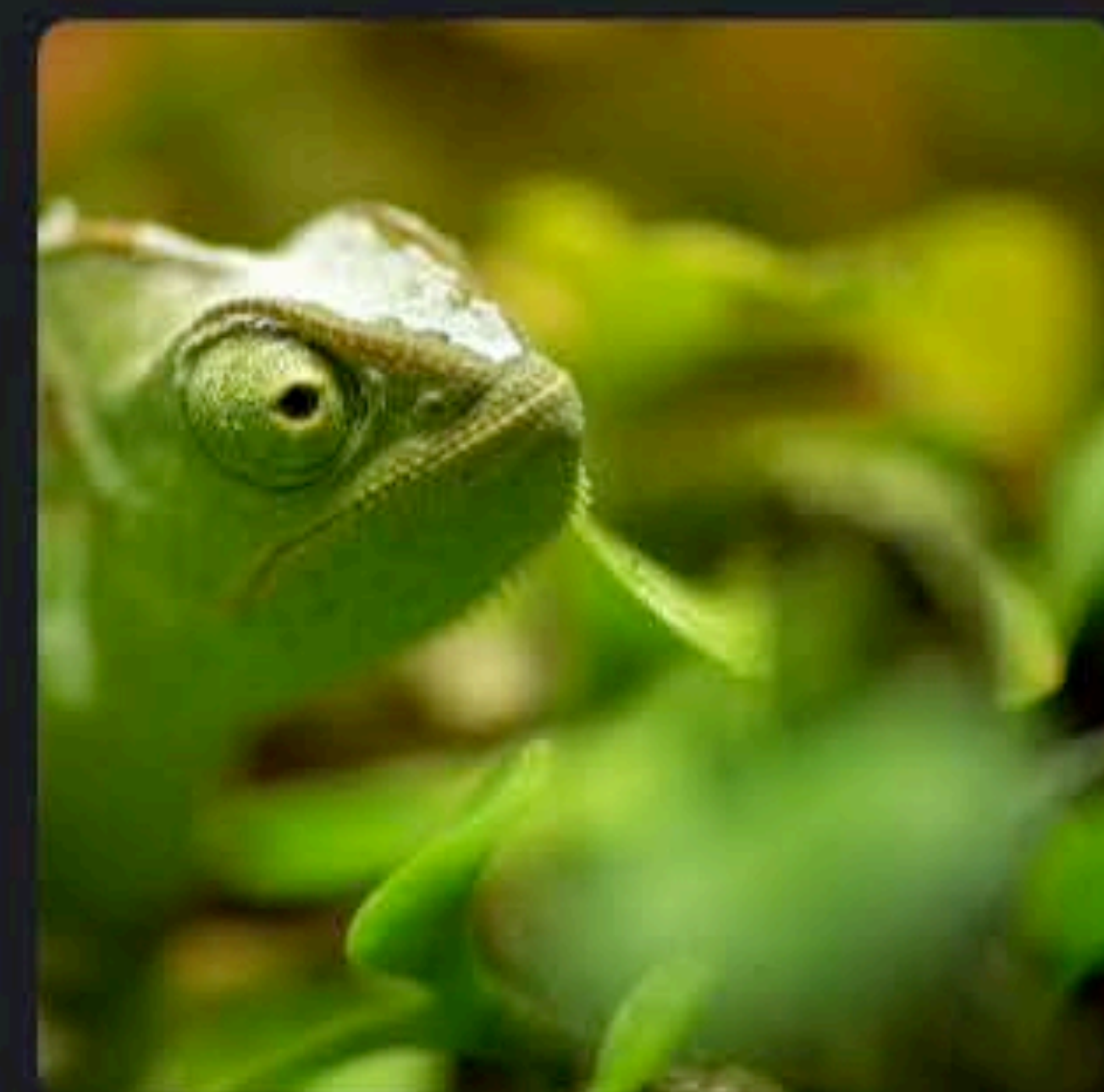
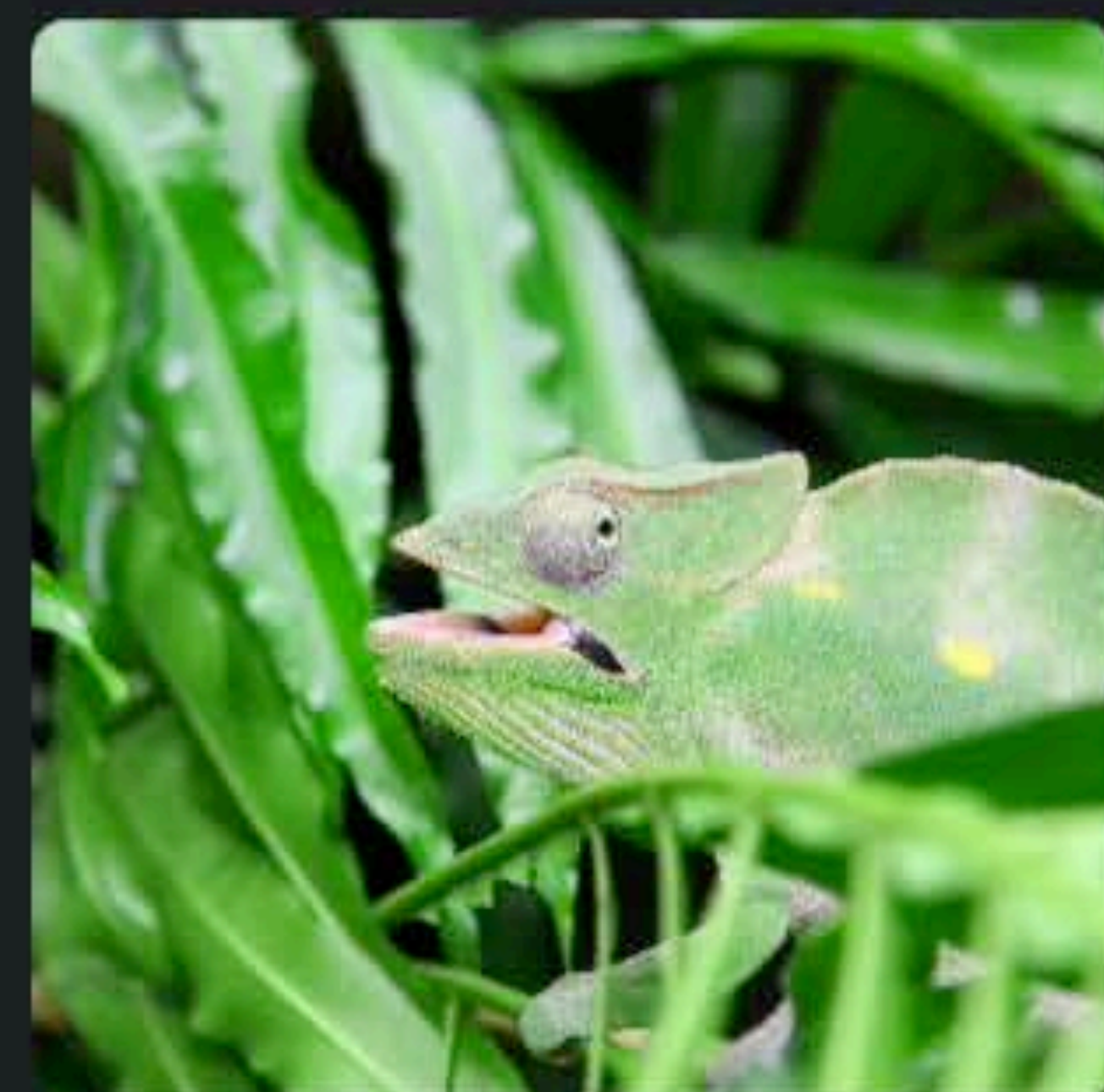
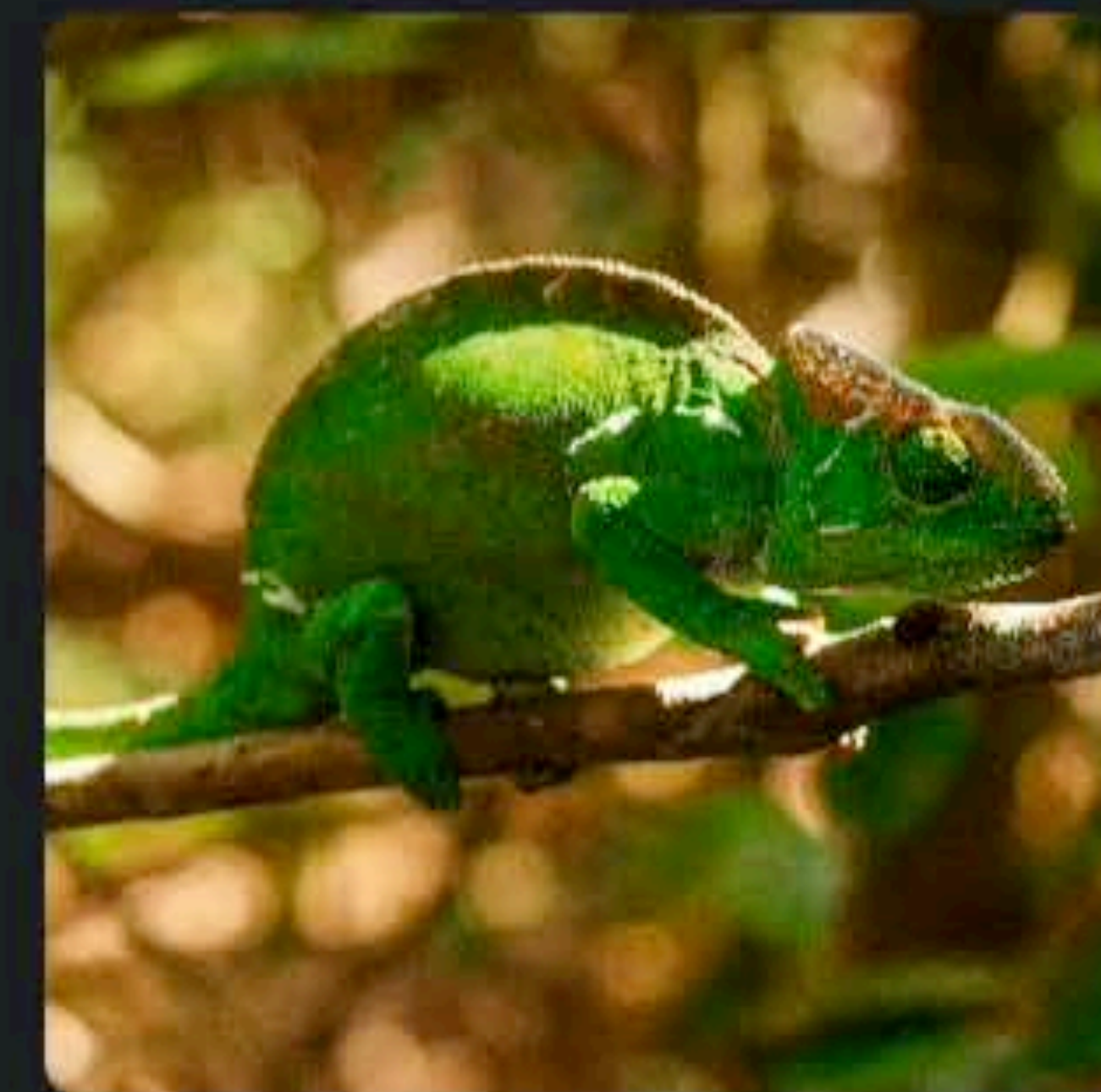


**Chloe**  
2 years old

Photos

Vitals

Notes





Chameleons

- Chadwick
- Chloe**
- Chuy
- Chelsey
- Chevy
- Chiwetel
- Chester
- Chubs
- Cleopatra
- Charlotte

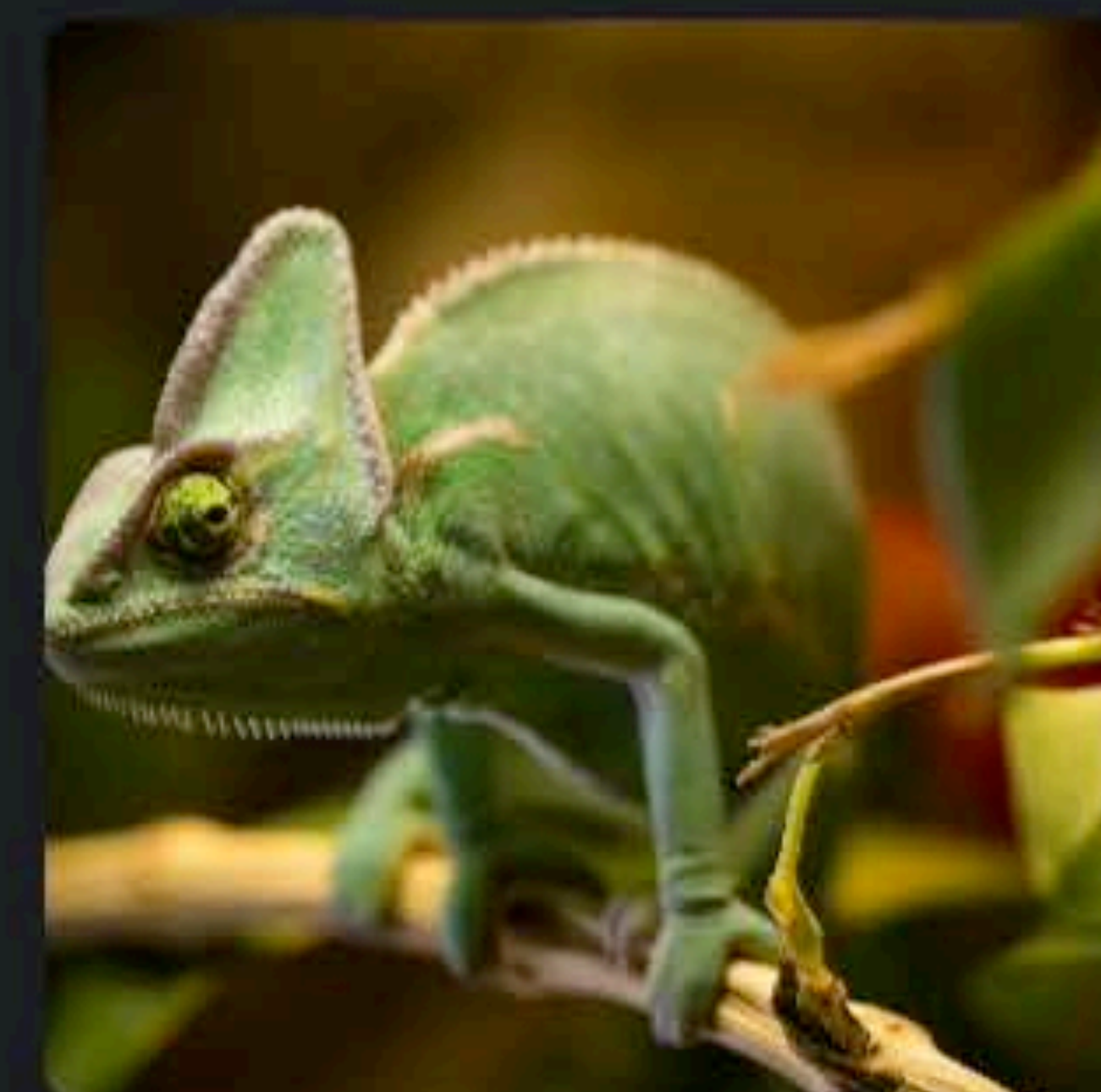
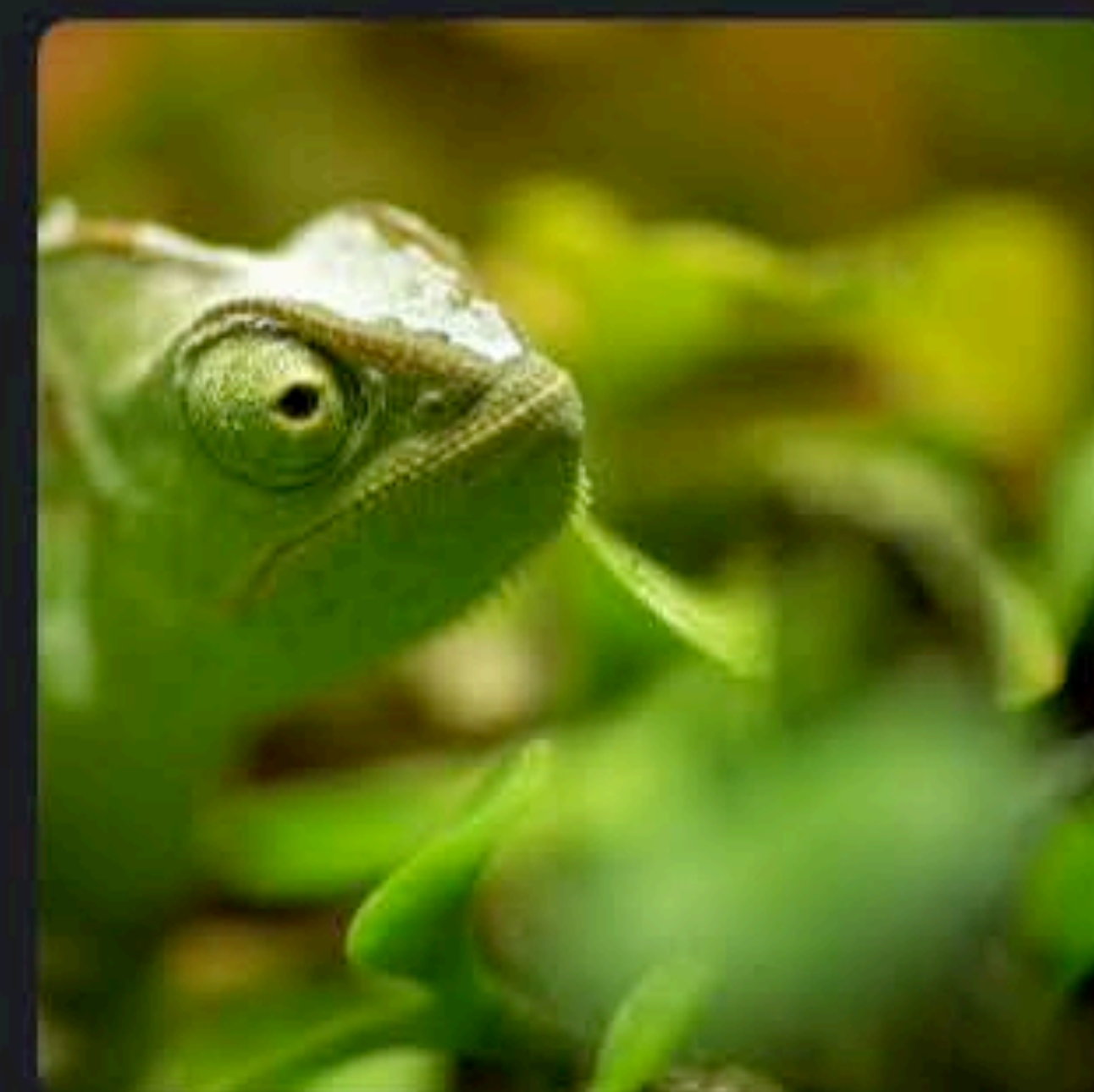
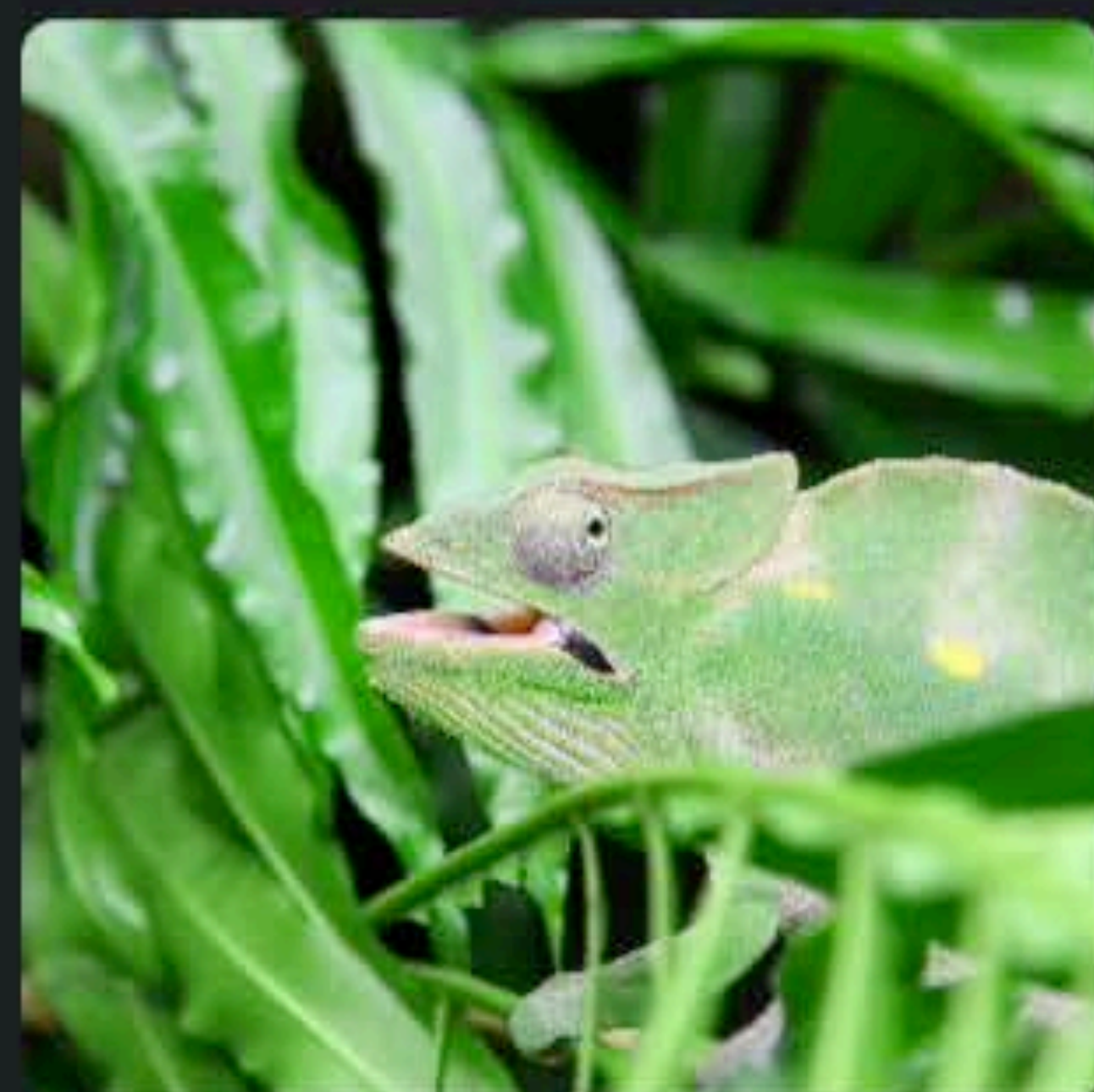
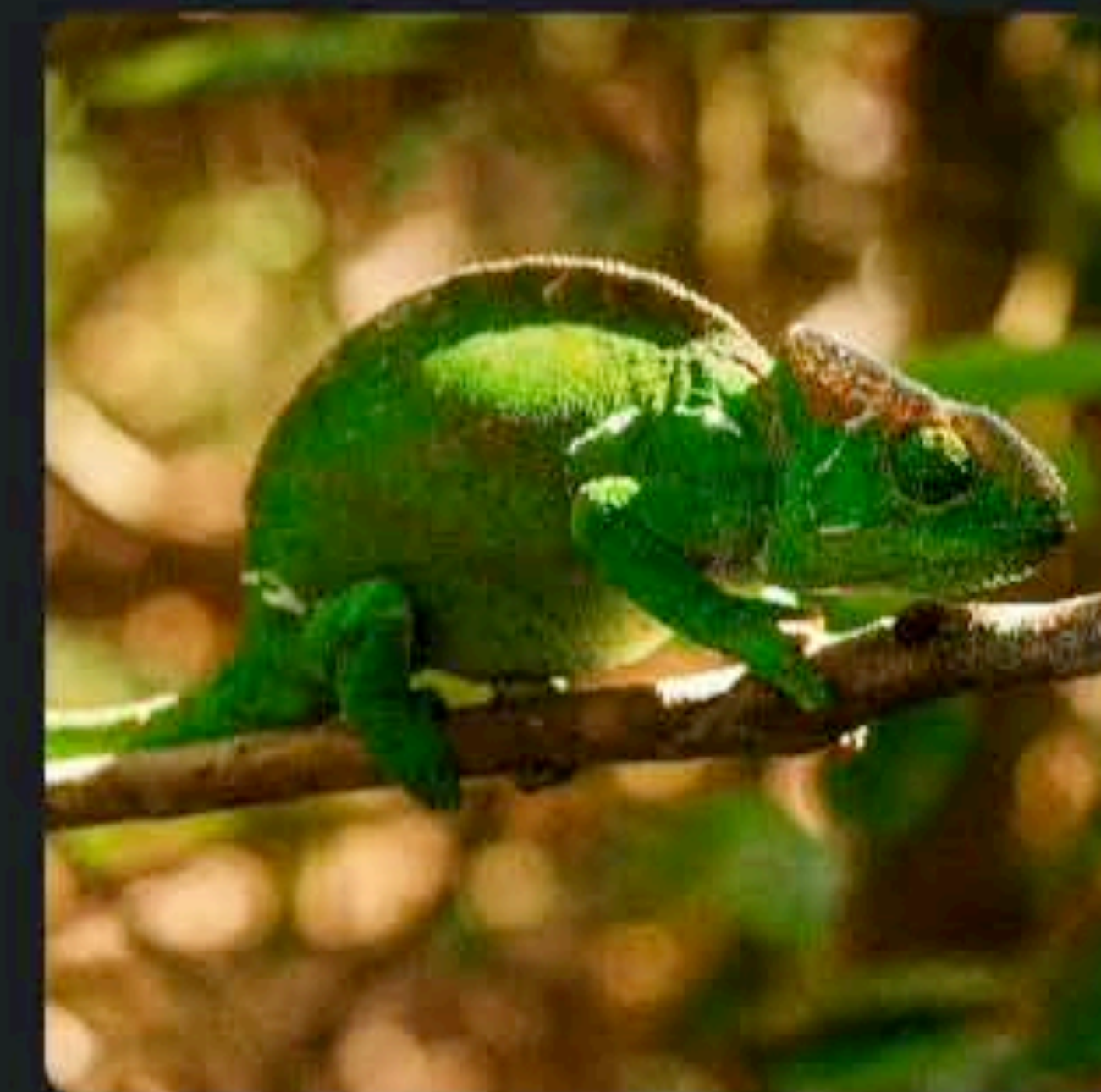


**Chloe**  
2 years old

Photos

Vitals

Notes



# Using the View Debugger

The screenshot displays the Xcode interface with the View Debugger active. The main window shows a chameleon-themed application with a header for "Chloe, 2 years old" and a photo gallery with tabs for "Photos", "Vitals", and "Notes". The left sidebar shows the hierarchy of views, with the focused view being an `NSScrollView`. The right sidebar shows the properties for the selected `NSScrollView` object, including class name, address, scroll view settings, and view properties.

**Object**

- Class Name: `NSScrollView`
- Address: `0x600003d0ca50`

**Scroll View**

- Border Type: None
- Scroller Knobs: Default Style
- Find Bar: Position Above Content
- Background:  White:1 Alpha:1
- Draw Background On
- Horizontal: Automatic Elasticity
- Vertical: Automatic Elasticity
- Predominant Axis Scrolling: Off
- Line Scroll X: 10
- Y: 10
- Page Scroll X: 10
- Y: 10
- Behavior: Copies On Scroll
- Doesn't Show Horizontal Scroller
- Shows Vertical Scroller
- Automatically Hides Scroller
- Magnification Not Allowed
- Minimum: 0.25
- Maximum: 4

**View**

- Wants Layer: Yes
- Layer: `<_NSViewBackingLayer: 0x600000c5d860>`
- Focus Ring: Default
- Visibility: Is Opaque
- Not Hidden
- Alpha: 1

# Using the View Debugger

The screenshot displays the Xcode interface with the View Debugger active. The main window shows a chameleon-themed application with a header for 'Chloe, 2 years old' and a photo gallery. The debugger's left sidebar shows the hierarchy of views, with the focused view being an `UIScrollView`. The right sidebar provides detailed inspection of this `UIScrollView` object, including its class name, address, and various scroll view properties.

**Object**

- Class Name: `UIScrollView`
- Address: `0x600003d0ca50`

**Scroll View**

- Border Type: None
- Scroller Knobs: Default Style
- Find Bar: Position Above Content
- Background:  White:1 Alpha:1
- Draw Background On:
- Horizontal: Automatic Elasticity
- Vertical: Automatic Elasticity
- Predominant Axis Scrolling: Off
- Line Scroll X: 10, Y: 10
- Page Scroll X: 10, Y: 10
- Behavior: Copies On Scroll
- Doesn't Show Horizontal Scroller:
- Shows Vertical Scroller:
- Automatically Hides Scroller:
- Magnification Not Allowed:
- Minimum: 0.25, Maximum: 4

**View**

- Wants Layer: Yes
- Layer: `<_NSViewBackingLayer: 0x600000c5d860>`
- Focus Ring: Default
- Visibility: Is Opaque
- Not Hidden:
- Alpha: 1



# Using the View Debugger

The screenshot displays the Xcode View Debugger interface for a macOS application named "Chameleon Wrangler". The main window shows a 3D perspective view of the application's UI hierarchy. A photo gallery is visible, featuring a header with a profile picture and the name "Chloe" (2 years old), a "Photos" section, and a "Vitals" section. The gallery contains several photo thumbnails, each labeled as a "PhotoCollectionViewItem". A "Notes" section is also visible on the right side of the gallery.

The left sidebar shows the "Focused" view hierarchy, starting with "\_NSSplitViewItemViewWrapper", followed by "NSViewController", "NSView", "NSStackView", and another "NSView". The selected view is an "NSScrollView".

The right sidebar shows the "Object" and "View" inspectors for the selected "NSScrollView".

**Object**

- Class Name: NSScrollView
- Address: 0x600003d0ca50

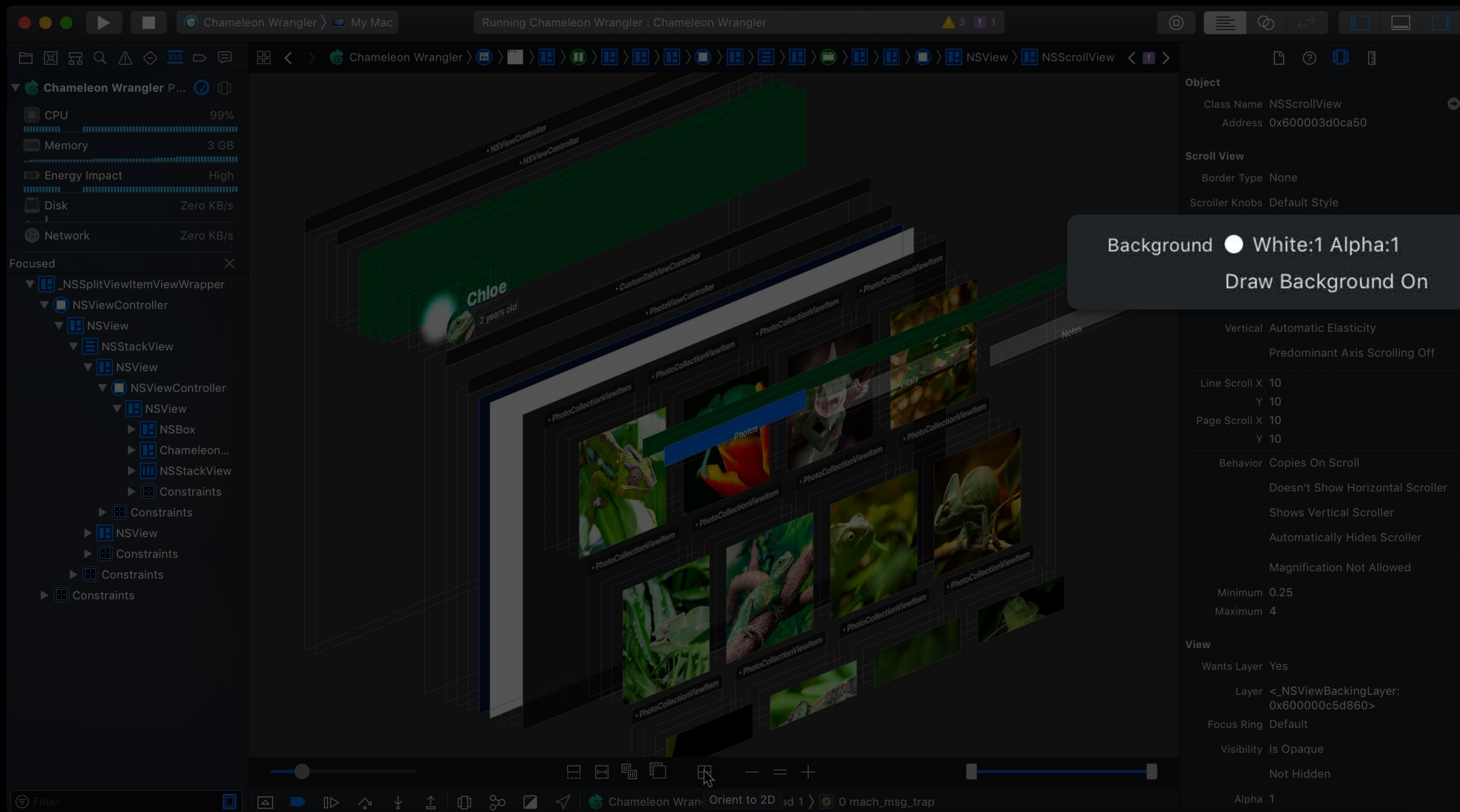
**Scroll View**

- Border Type: None
- Scroller Knobs: Default Style
- Find Bar: Position Above Content
- Background:  White:1 Alpha:1
- Draw Background On
- Horizontal: Automatic Elasticity
- Vertical: Automatic Elasticity
- Predominant Axis Scrolling: Off
- Line Scroll X: 10
- Y: 10
- Page Scroll X: 10
- Y: 10
- Behavior: Copies On Scroll
- Doesn't Show Horizontal Scroller
- Shows Vertical Scroller
- Automatically Hides Scroller
- Magnification Not Allowed
- Minimum: 0.25
- Maximum: 4

**View**

- Wants Layer: Yes
- Layer: <\_NSViewBackingLayer: 0x600000c5d860>
- Focus Ring: Default
- Visibility: Is Opaque
- Not Hidden
- Alpha: 1

# Using the View Debugger



# Using the View Debugger

NEW

## Enhancements in Xcode 10

- System color names
- Asset Catalog color names
- NSAppearance configuration

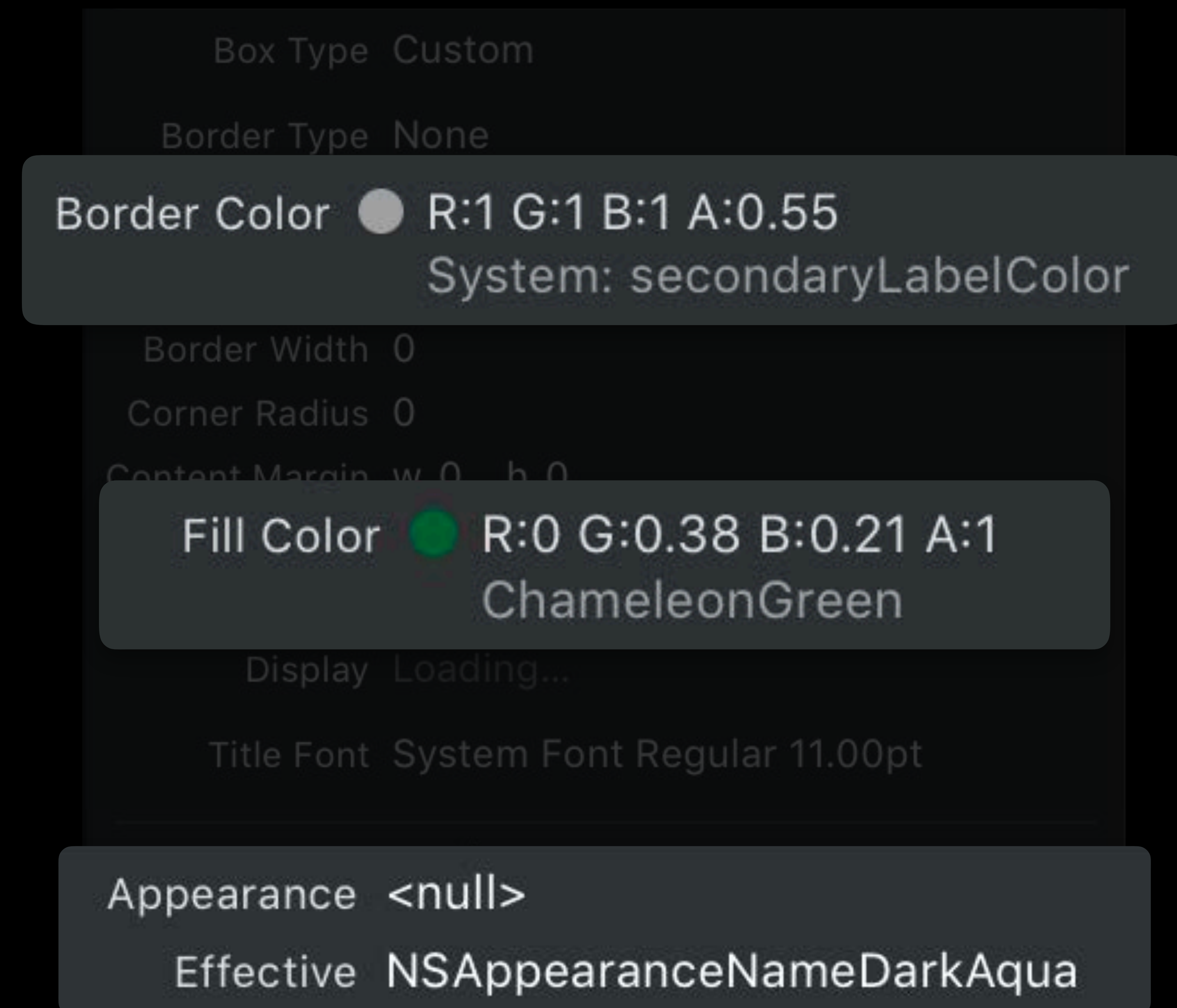
Box Type	Custom
Border Type	None
Border Color	● R:1 G:1 B:1 A:0.55 System: secondaryLabelColor
Border Width	0
Corner Radius	0
Content Margin	w 0 h 0
Fill Color	● R:0 G:0.38 B:0.21 A:1 ChameleonGreen
Display	Loading...
Title Font	System Font Regular 11.00pt
Appearance	<null>
Effective	NSAppearanceNameDarkAqua

# Using the View Debugger

NEW

## Enhancements in Xcode 10

- System color names
- Asset Catalog color names
- NSAppearance configuration



# Summary

Work with NSAppearance to adapt automatically

Add depth with new visual effect materials

Adapt drawing for vibrancy and selections

Take advantage of Xcode design and debugging tools

# More Information

<https://developer.apple.com/wwdc18/218>

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Cocoa and Dark Mode Lab

Technology Lab 9

Wednesday 2:00PM

---

Cocoa Lab

Technology Lab 7

Friday 11:00AM

---

 **WWDC18**