

Evolution of Economic Behavior

TSE M1 – Semester 1

September 2022

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Week 1

Natural selection, optimization and economic exchange

- Optimal economic behavior without exchange.
 - Exchange among strangers – a human achievement.
 - Our psychological talents for exchange.
 - Natural selection and the trade-off among our talents
 - Trust between strangers – a challenge through prehistory.
 - The balance between cognition and the emotions.
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Remember this picture....?



What does that scene have in common with this one?



...and this?



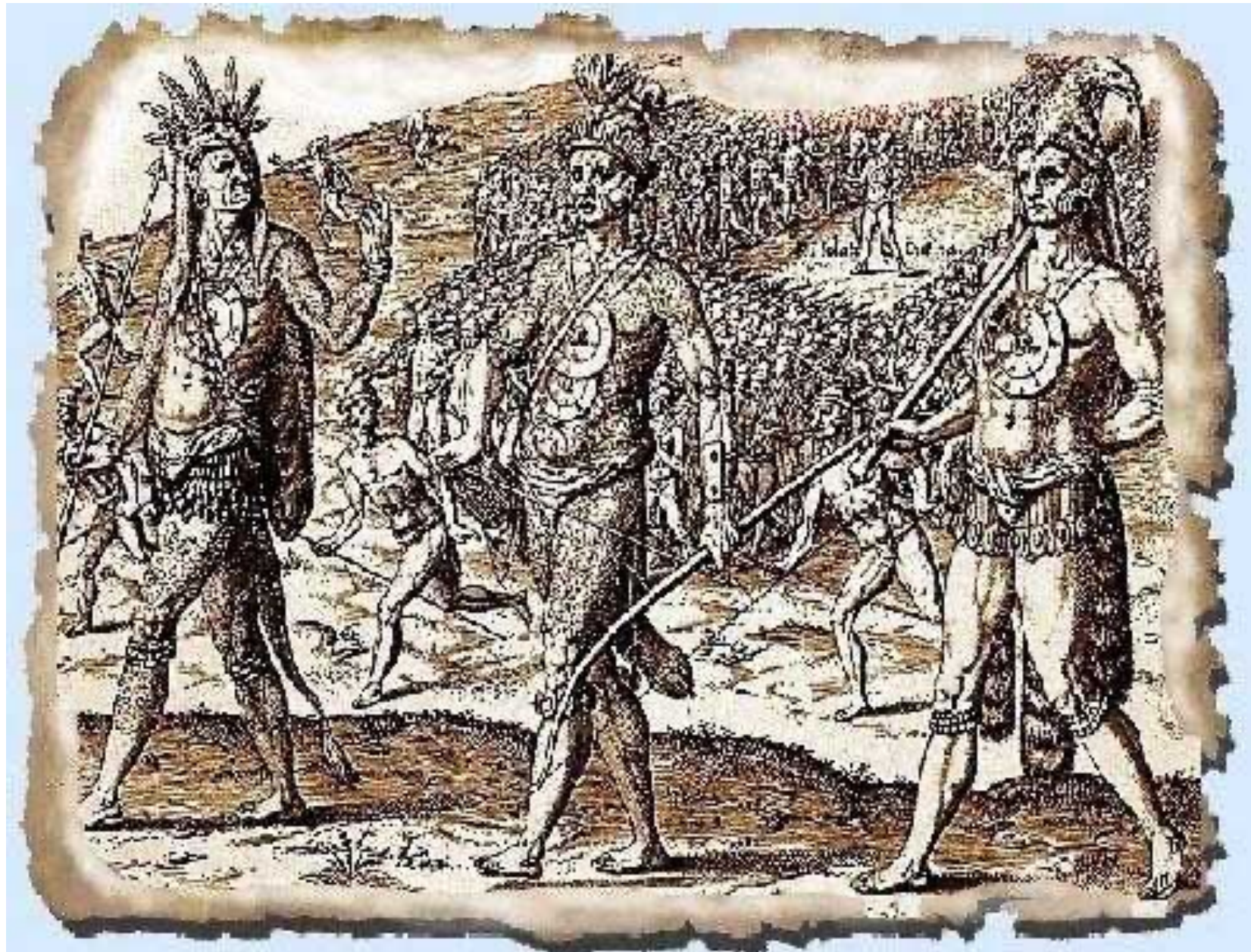
...and this?



What does this....



...have in common with this?



.....and this...?



What does this....



...have in
common
with this?

☒ Free search

Pull

Vintage

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☒ Include only 1988

Average

Date	USD	Qty	Bottle	Vinta	Description
01/00	55.00	2	BT	1977	HEITZ CABERNET SAUVIGNON, BELLA OAKS
01/00	90.00	1	BT	1977	HEITZ CABERNET SAUVIGNON, MARTHA'S VINEYARD,
01/00	110.00	2	BT	1979	HEITZ CABERNET SAUVIGNON, MARTHA'S VINEYARD,
07/00	60.00	2	BT	1980	HEITZ C.S., BELLA OAKS, NAPA VALLEY
06/00	55.00	2	BT	1980	HEITZ CAB SAUV, BELLA OAKS, NAPA VALLEY
01/00	45.00	4	BT	1980	HEITZ C.S., MARTHA'S VINEYARD, NAPA (1-v slt lb
06/00	80.00	1	BT	1981	HEITZ CAB SAUV, MARTHA'S VINEYARD, NAPA
01/00	63.00	3	BT	1981	HEITZ CABERNET SAUVIGNON, MARTHA'S VINEYARD,
05/00	100.00	2	BT	1982	HEITZ CABERNET SAUVIGNON, MARTHA'S VINEYARD,
01/00	65.00	2	BT	1982	HEITZ CABERNET SAUVIGNON, BELLA OAKS, NAPA
11/00	620.00	1	BT	1983	HEITZ C.S., MARTHA'S VINEYARD NAPA VALLEY
12/00	60.00	1	BT	1985	HEITZ, BELLA OAKS CABERNET SAUVIGNON (Slightly
11/00	280.00	1	BT	1985	HEITZ C.S., BELLA OAKS, NAPA VALLEY
05/00	72.00	5	BT	1986	HEITZ CABERNET SAUVIGNON, BELLA OAKS, NAPA
11/00	200.00	1	BT	1987	HEITZ C.S., BELLA OAKS, NAPA VALLEY (SLC.)
09/00	55.00	2	BT	1988	HEITZ C.S. MARTHA'S VINEYARD (One very slight
11/00	70.00	3	BT	1989	HEITZ C.S., BELLA OAKS, NAPA VALLEY
11/00	170.00	8	BT	1989	HEITZ C.S., BELLA OAKS, NAPA VALLEY (Two have
11/00	200.00	2	BT	1990	HEITZ C.S., BELLA OAKS, NAPA VALLEY
11/00	130.00	2	BT	1990	HEITZ C.S., MARTHA'S VINEYARD, NAPA VALLEY

...and this?



...and this?



What does this....

Ba Daily News

Sunday, August 30, 2006

Brawl Leaves One Dead, One

Last night at the Teacup and Otters Bar & Lounge a fight broke out leaving one man dead and one man half blind and "retarded for life."

Though details are unclear, witnesses say the fight broke out when two of the drunk regulars assaulted a rather large patron. Two men were injured in the brawl. One was treated for minor cuts and bruises. The other, Pang Du, is in stable condition at Kuai Tian Memorial Hospital after suffering serious injuries.

"One of these out-of-towners threw a hot rock at Pang's eye," a witness said. Other witnesses claim that Pang,

half-blinded, began stumbling about when another man using a fire poker struck Pang "so hard he was retarded for life."

Another man was found dead at the scene by multiple knife wounds. Police are currently searching for a man referred to as the Man Mountain in connection with the killing.

Locals are claiming that the Claws of the White Tiger are responsible for the violence. "They burn our crops and villages and then they come here acting like they own the place," said Lao Tse, a local merchant. "They're nothing but a bunch of drunken louts!"

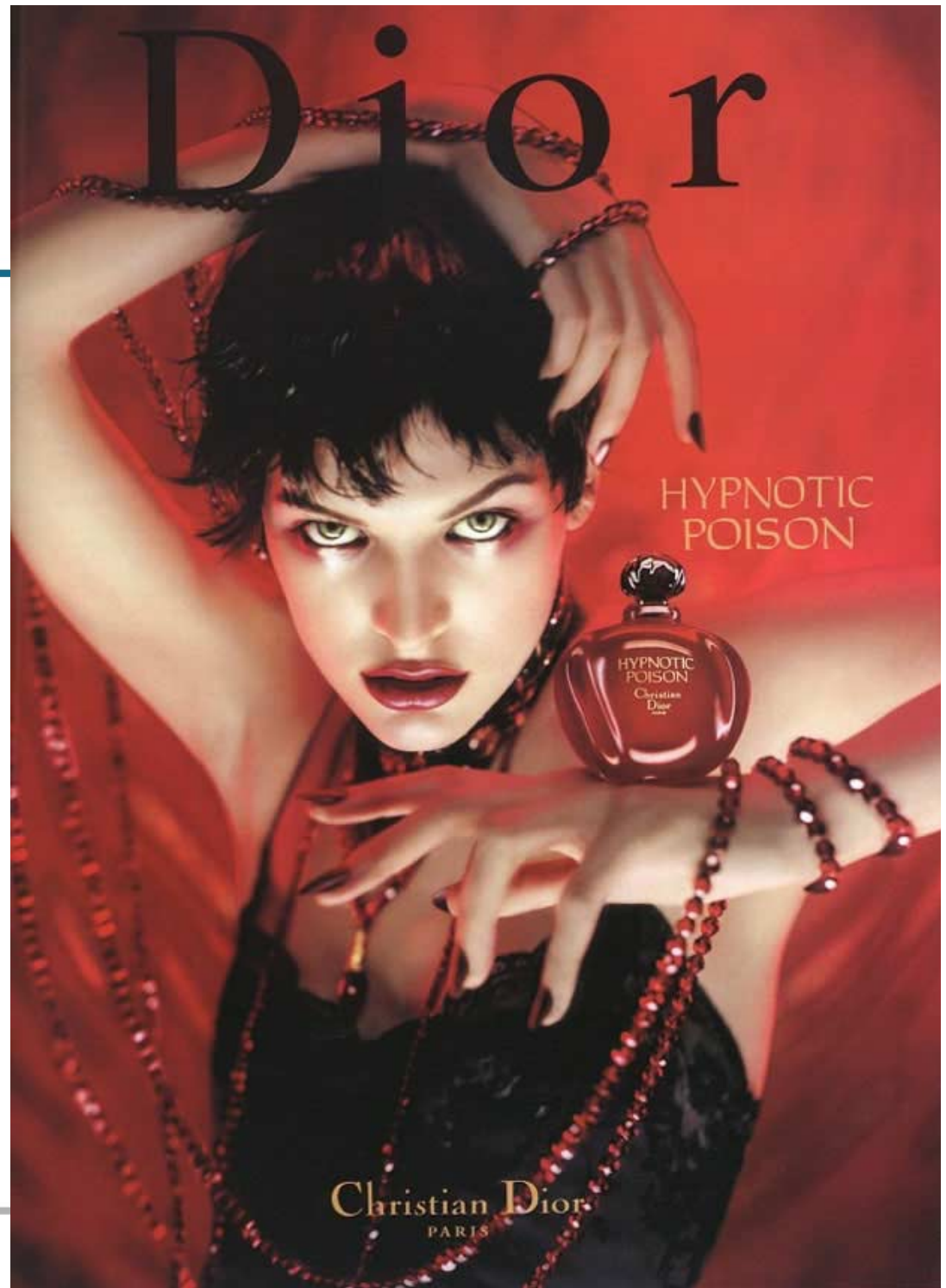
...have in common with this?



...and this?



What does this....



..have in common with this...?



marlin '05

They're all examples of economic exchange....

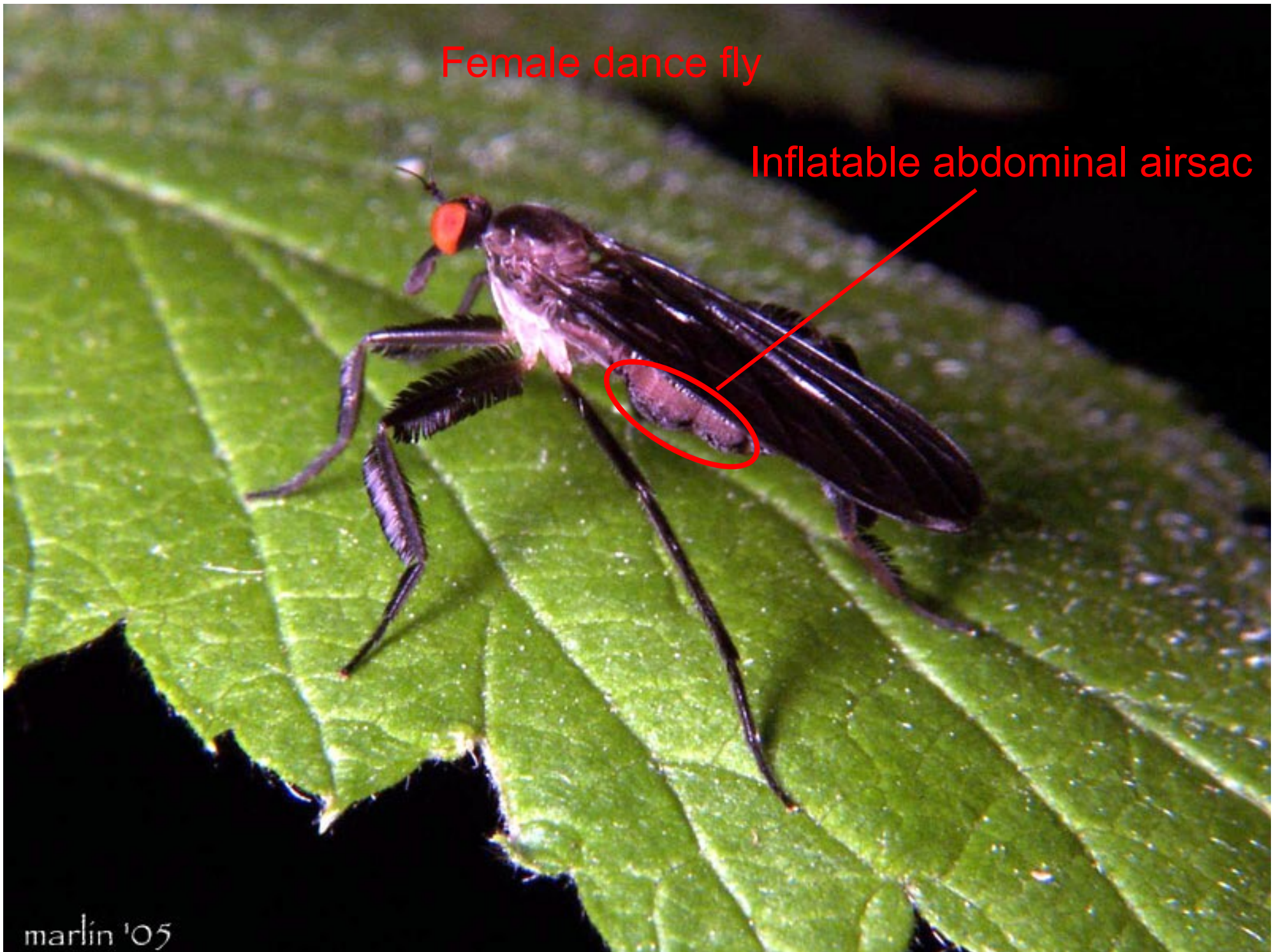


Male dance fly



Female dance fly

Inflatable abdominal airsac



Optimum economic behavior without exchange:

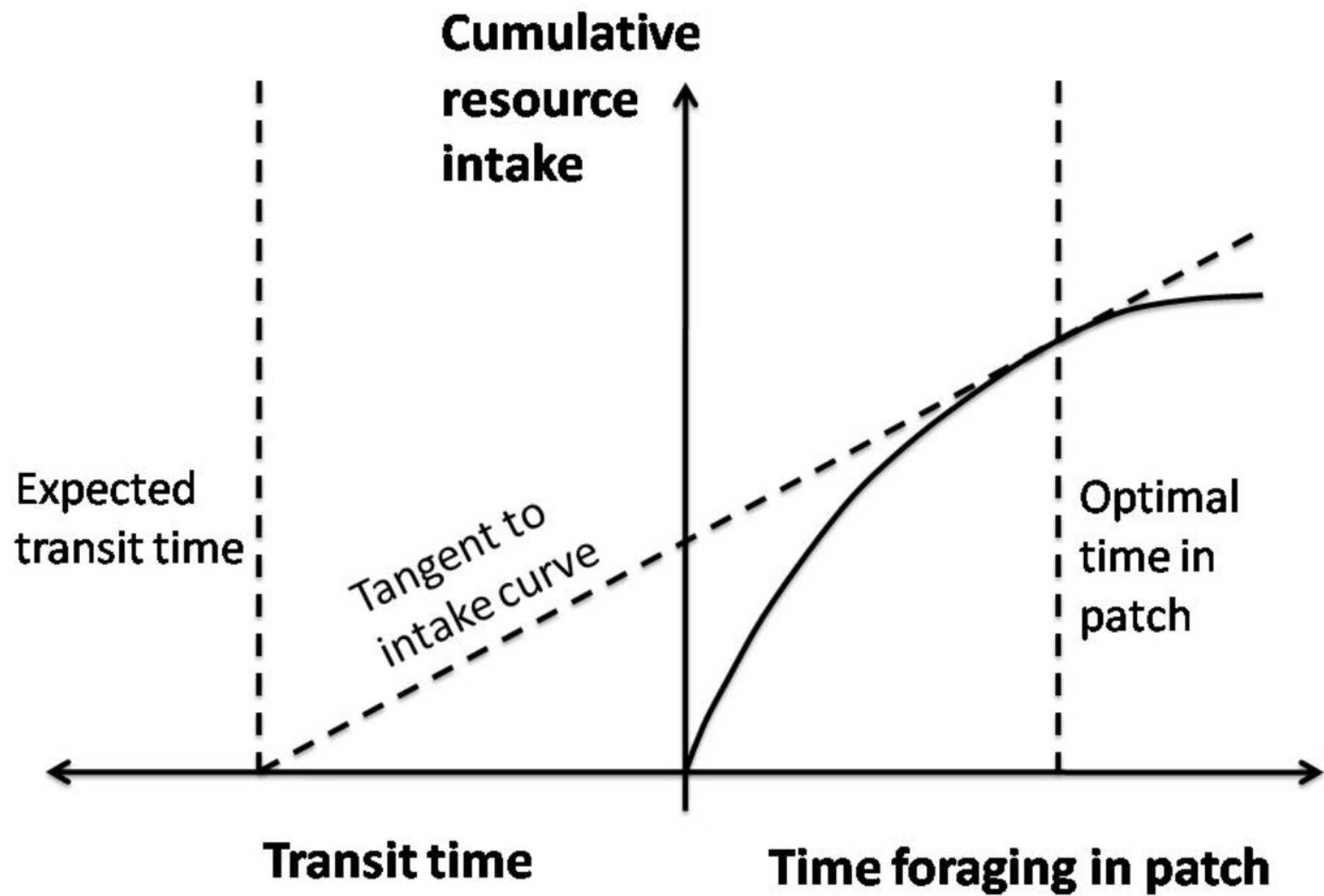
- All living organisms engage in some form of apparently purposive behavior.
 - An example is homeostasis – but much more complex forms are observed everywhere in nature.
 - Darwin's theory of evolution by natural selection showed that such apparently purposive behavior could be the result of differential selection of heritable variations in organism traits.
 - It can be a useful shorthand to treat such traits as the result of the organism acting "as if" to maximize its fitness (offspring in future generations), subject to physiological and environmental constraints.
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Optimal foraging theory:

- In practice it is often useful to consider the organism acting to maximize other, intermediate quantities (such as net energy gain per unit of time in some activity, such as foraging).
- Optimal foraging theory is an example of this, and makes predictions about choice of food size/type, time use, locational strategies etc.
- It has spawned a large empirical literature testing its predictions (eg Watanabe et al, Proc. Roy. Soc. B 2014 on penguins and krill).
- Such models have been extended to copy with learning about the parameters of the organism's environment (McNamara & Houston, *Journal of Theoretical Biology* 1985), including stochastic environments (Bartumeus et al, "Stochastic Optimal Foraging" 2013).

An example of optimal foraging theory: the marginal value theorem (Charnov 1976)

- An organism is searching for food in an environment with distinct patches.
 - Within each patch the organism experiences diminishing returns.
 - It must spend discrete time moving between patches.
 - It needs a rule to decide when to stop searching on a patch.
 - Eric Charnov (*Theoretical Population Biology* 1976) showed that under reasonable assumptions the organism would leave each patch when “the marginal capture rate in the patch drops to the average capture rate for the habitat”.
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A more specifically human talent: economic exchange

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- In modern societies even the simplest elements of our daily lives (food, clothes) depend on the collaboration of others, most of whom we never see – and to whom we are not related.
 - This is extremely unusual in the animal kingdom: the well known examples of large scale cooperation in the social insects take place among (very) close relatives.
 - Such collaboration usually requires high levels of trust.
 - Because transactions are not simultaneous.
 - Because the value of what we exchange is not transparent.
 - How do we know whom to trust? Mistakes can be costly, even deadly.
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We have some remarkable talents for exchange

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- Remember the photograph and how quickly you could interpret what was going on..
 - We have many skills that help us to size up social situations, without knowing explicitly how we are doing so.
 - They evolved in prehistoric conditions but are now applied in quite different settings in modern societies.
 - Gaining insight from evolutionary psychology is about understanding the trade-offs among our talents that were adaptive in prehistoric conditions, and the constraints these impose on us today.
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Natural selection: why is there a trade-off among our talents?

- Brain tissue is particularly expensive for the body to build and maintain.
- So natural selection has had to build in some trade-offs: we are good at some cognitive challenges and bad at others
- We are particularly prone to *attention blindness*.
- So what can be said about natural selection's priorities?
- Next session: the Wason selection task



Natural selection, optimization, exchange: A summary

- Natural selection has enabled purposive behavior in all living organisms.
 - We share with them the capacity to exploit our environment in ways that while not absolutely optimal, are at least in a reasonable neighborhood of (local) optima.
 - Explaining our uniquely human capacity for exchange with strangers is much harder to do.
 - In particular since exchanging with strangers on a large scale arrived very late in our evolutionary history.
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