

Session 02

Money - Current limitations

Blockchain Protocols and Decentralized Applications

Metal Money



Bronze Spade - China

Image by [Mary Harrsch](#) on flickr. License CC BY-NC-SA



Bronze Aes Rude - Rome

© Chuy1530 on Wikipedia. All rights reserved. This content is excluded from our Creative Commons license. For more information, see <https://ocw.mit.edu/help/faq-fair-use/>.



Cooper Plate - Sweden

© StAnselm on Wikipedia. All rights reserved. This content is excluded from our Creative Commons license. For more information, see <https://ocw.mit.edu/help/faq-fair-use/>



Image is in the [public domain](#).

Gold Aureus - Rome

Image is in the [public domain](#).



Image by [Scott Semans World Coins](#). License: CC BY.

Bronze Yuan - China



Image by [Daderot](#) on Wikimedia. License: CC0.

Silver Dekadrachm - Greece

Minted Money



Bronze Spade - China

Image by [Mary Harrsch](#) on flickr. License CC BY-NC-SA



Bronze Aes Rude - Rome

© Chuy1530 on Wikipedia. All rights reserved. This content is excluded from our Creative Commons license. For more information, see <https://ocw.mit.edu/help/faq-fair-use/>.



Cooper Plate - Sweden

© StAnselm on Wikipedia. All rights reserved. This content is excluded from our Creative Commons license. For more information, see <https://ocw.mit.edu/help/faq-fair-use/>



Image is in the [public domain](#).

Gold Aureus - Rome

Image is in the [public domain](#).



Image by [Scott Semans World Coins](#). License: CC BY.

Bronze Yuan - China



Image by [Daderot](#) on Wikimedia. License: CC0.

Silver Dekadrachm - Greece

Paper Money



Jiaozi Promissory Note - China



5 Pound Note - England



Continental Note – U.S.

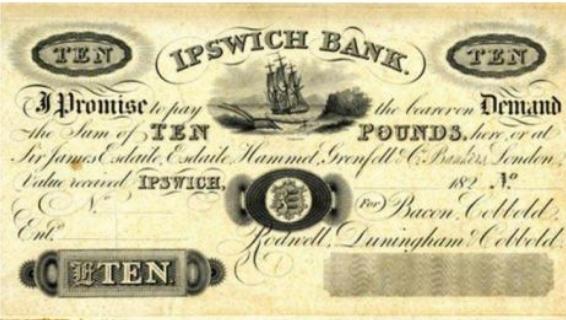
Private Bank Notes



Australia



Canada



United States



England

Ledgers



Proto Cuneiform
Uruk, ca 3000 B.C

1747		Mr. Baily Washington Dr		1747		Per Contra Cr £ \$ D	
July 10	To two Books	2/6	4	2	6	10/10	By 2 two fish Gunter
	To one Dr. Scromberg	2/6	4	2	6	Jan 11	By bank paid Robert Washington
July 10	To Cash P. & B. Lewis for 500; Nails	1		1	0	July 10	By cash paid
1747	2 Dozen of upper letters 2. Pives. 100 letters					Sept 10	2/6
Aug 10	1 pound of thread & 50 ballantes					Nov 10	By Dr. Baily show

Personal Ledger
George Washington
1747

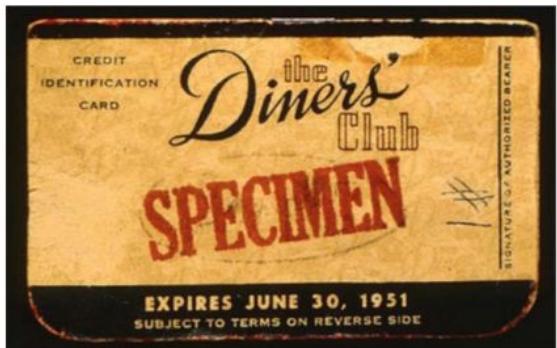
Ledgers - characteristics

- Immutable
- Consistent
- Timestamp
- Ownership
- Accuracy
- Details of Transaction

Fiat currency

- Social consensus for trading
- Issued by Central Banks
- Used by Commercial Banks & population
- Relies upon system of Ledgers
- Accepted for transactions and taxes

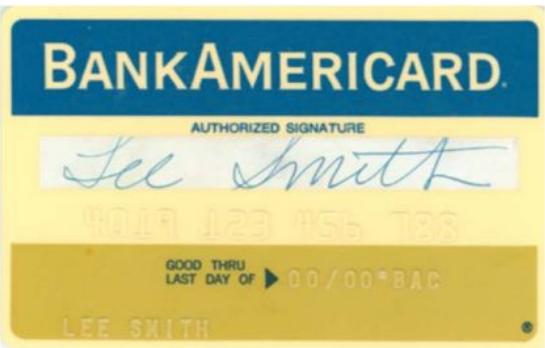
Credit cards



First General Merchant Card
Diners' Club
1949



American Express
First Plastic Card
1959

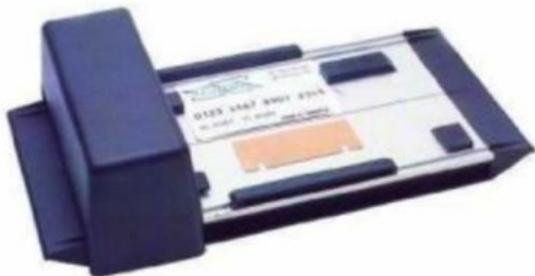


Bank of America
First General Purpose
Credit Card
1966

Credit card processing



Slide Card Imprinter
1950s



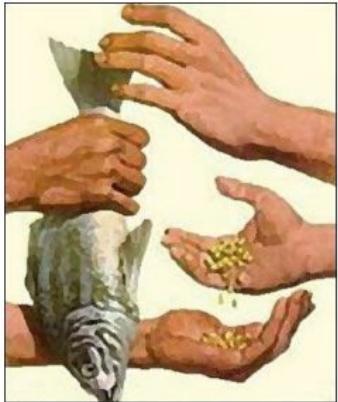
Visa Imprinter
1979



Payment Terminal
2018

V_{TPE}

Role of Money



© Source Unknown. All rights reserved. This content is excluded from our Creative Commons license. For more information, see <https://ocw.mit.edu/help/faq-fair-use/>

Medium of Exchange



Image by [Rob Pongsajapan](#) on flickr. CC BY.

Store of Value

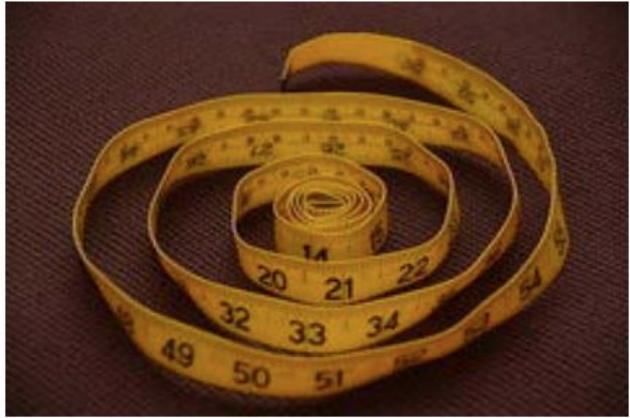


Image by [ajalfaro](#) on flickr. CC BY-NC-SA

Unit of Account

Characteristics of Money

- Durable
- Portable
- Divisible
- Fungible
- Acceptable
- Stable
- Hard to counterfeit

Early digital currencies

- DigiCash (David Chaum) – 1989
- Mondex (National Westminster Bank) - 1993
- CyberCash (Lynch, Melton, Crocker & Wilson) – 1994
- E-gold (Gold & Silver Reserve) – 1996
- Hashcash (Adam Back) – 1997
- Bit Gold (Nick Szabo) – 1998
- B-Money (Wei Dai) - 1998
- Lucre (Ben Laurie) – 1999

Why did Early Digital Currencies Fail?

- Merchant adoption
- Centralization
- Double spending
- Consensus

Digital & Mobile Payments



1998



1999



2003



2007



Mobile App

2011



Google Wallet

2011



微信支付
WeChat Pay

2013



2014

But still something is missing...

- Centralized
- Single point of failure
- System prone to failure

How to move value using peer-to-peer without any trusted central intermediary?

Bitcoin: A Peer-to-Peer Electronic Cash System

- From: Satoshi Nakamoto vistomail.com> Subject: Bitcoin P2P e-cash paper
Newsgroups: gmane.comp.encryption.general Date: Friday 31st October
2008 18:10:00 UTC
- “I've been working on a new electronic cash system that's fully peer-to-peer,
with no trusted third party.”

Software Stack - Programmable transactions



- 2009

???

SSL / TLS - 1996



HTTP- 1990



TCP/IP - 1974



Ethernet - 1974



Finance today

- Moving - How are you moving money?
- Trading - How are you making digital payments?
- Pricing - Who decides the rates of exchange?
- Investments (Store of Value)
- Credit (Borrow)

Conclusions

- Money is a Social & Economic Consensus
- Fiat Money is but the Current Lead in a long Evolution of Money
- Fiat Currency has had Challenges & Instabilities as well
- Ledgers are a method for Recording Economic Activity & Financial Relationships
- Central Banking and Financial Sector are built upon a series of Ledgers
- We now Live in an Electronic Currency Age
- Many Efforts have been made at Cryptographic Digital Currencies
- Nakamoto's 'Bitcoin: A Peer to Peer Electronic Cash System' paper & related Blockchain