# 9货币作为一种内容类型

**Money as a Content Type**

Bitcoin South Conference; Queenstown, New Zealand; November 2014

Video Link: <https://www.youtube.com/watch?v=6vFgBGdmDgs>

Good morning, everyone. What I want to talk about today is a new topic I’ve been working on: money as a content type. Bitcoin has introduced a fundamental transformation in how money is going to be viewed in the future by making money completely independent of the underlying transport medium and turning it into a stand-alone content type.

大家早上好。今天我想说的是我一直在研究的一个新主题：金钱是一种内容类型。

比特币已经引入了一个根本性的转变，即未来如何看待货币，通过把货币完全独立于底层传输媒介，将其转变成一种独立的内容类型。

What do I mean by that? A bitcoin transaction is a signed data structure that can be executed anywhere in the world. A lot of people think that a bitcoin transaction has to be transmitted on the bitcoin network. That’s not true. A bitcoin transaction has to reach the miners and be included in a block, but it doesn’t need to be transmitted over the bitcoin network. There’s nothing special about the bitcoin network. It just forwards transactions and blocks. A transaction can be transmitted over any form of communication medium.

那是什么意思？比特币交易是一种签名的数据结构，它可以在世界任何地方执行。

很多人认为比特币交易必须在比特币网络上传播。并不是这样。

一个比特币交易必须到达矿工，并被包括在一个区块中，但它不需要通过比特币网络传输。

比特币网络没有什么特别之处。它只是转发事务和区块。一个交易可以在任何形式的通信媒介上传输。

One of the magic things about bitcoin is that the transaction doesn’t incorporate security mechanisms itself. The security is in the proof of work provided by the miners, and the digital signature on the transaction is put there by end users with keys that they store. There’s nothing sensitive or secret in the bitcoin transaction. Let me explain what I mean by that.

比特币的一个神奇之处在于，交易本身不包含安全机制。

矿工通过工作量证明来提供安全，最终用户使用他们存储的密钥把数字签名放在交易上。

比特币交易中没有任何敏感或秘密。我解释一下我的意思。

## 9.1信用卡：设计上的不安全

**Credit Cards: Insecure by Design**

If I go to a merchant today using a point-of-sale system and a credit card, what I am transmitting to the merchant (through a long series of intermediaries) is the credit card number, expiry date, and CCV2 code on the back of the card. I’m actually transmitting the secret keys. I’m transmitting the access codes to my account. That information is sensitive. If that information is captured, my account can be compromised. I can be charged again and again, either by the merchant or one of the intermediaries, or any hacker who has taken this information from any of the intermediaries. My credit card information needs to be very carefully protected.

如果我今天到一个商人那儿，他使用一种销售点系统和一种信用卡，我传送给商人的信息（通过一系列的中间人）是信用卡号码、到期日和信用卡背面的CCV2代码。

我实际上是在传送了密钥。我传送了我的账户的访问代码。这些信息是敏感的。如果这些信息被捕获，我的帐户可能会受到损害。我可以一次又一次地被收钱，被商人或中间人，或者任何黑客，他从任何中间人那里获取这些信息。我的信用卡信息需要非常小心地保护。

From the moment the credit card comes out of my pocket until the money is in the merchant’s account, it is transported across the network in a series of virtual armored cars. There’s encryption from the point of sale to the merchant’s back end. From the merchant’s back end, encryption through to Visa for batch processing. From Visa, encryption through to the originating bank and to the destination bank, encrypting this token at every step of the way because it is the secret key. If that encryption fails at any point in the chain, the security of my credit card is compromised.

从信用卡从我口袋里出来那时起，直到钱在商家账户中，它就通过一系列虚拟装甲车在网络上传送。

从销售点到商家的后端都有加密。从商家的后端，加密通过到达Visa进行批量处理。

从Visa、加密通过到达发起银行和目的银行，在每个步骤都加密这个令牌，因为它是秘密密钥。

如果在链中的任何一点加密失败，我的信用卡的安全性就会受到损害。

That credit card is also stored at many of the points of transit. It’s stored for historical purposes. Which is a terrible idea because that creates a centralized treasure trove, a stash for hackers to attack. We’ve seen this happen again and again. In the US, Target and Home Depot, two very large retailers, have had incidents where they’ve had 50 to 60 million credit cards stolen. JPMorgan Chase had 75 million accounts compromised recently. All of these things are not happening because these companies are delinquent in protecting credit cards.

那个信用卡也存储在许多传送点上。它是为了历史目的而储存。

这是一个可怕的想法，因为这创造了一个集中式的宝库，一个黑客攻击的藏身之处。

我们看到这种情况一次又一次地发生。在美国，Target和Home Depot，两个非常大的零售商，曾发生过5000到6000万张信用卡被盗的事件。摩根大通最近有7500万个账户受到损害。所有这些事情都没有发生，因为这些公司在保护信用卡方面违法的。

There are really two types of companies out there: those that have failed to take the necessary action to secure the credit cards that you entrusted them with; and those that will soon fail to take the necessary security action to protect the credit cards you’ve entrusted them with. You’ve either been hacked or you will be hacked—those are the two categories. Nobody’s immune to this. No one can invent a way to protect millions of secure access tokens from motivated attackers. It’s impossible to do. We don’t know how to do it. There is no information security trick that can protect for all possible types of attacks. Credit cards are broken by design because the token itself is the secret key. If you transmit that token, you expose your entire account to risk.

实际上有两种类型的公司：那些没有采取必要行动来保证你的信用卡安全的公司，你委托他们使用你的信用卡；那些很快就无法采取必要的安全措施来保护你的信用卡安全的公司，你委托他们使用你的信用卡。

你要么被黑客攻击，要么将被黑客攻击，只有这两类。没有人对此有免疫力。

没有人能发明一种方法来保护数百万的安全访问令牌，防止有目的的攻击者。这是不可能做到的。

我们不知道怎么做。没有信息安全诀窍可以保护所有可能类型的攻击。

信用卡在设计上就是有问题的，因为令牌本身是秘密密钥。

如果您发送该令牌，你就将整个帐户暴露于风险之中。

## 9.2比特币交易：设计上的安全

**Bitcoin Transactions: Secure by Design**

Bitcoin is fundamentally different. What I’m transmitting is not the key, but simply a signed message. It is an authorization. That authorization has two external references: (1) to where the money’s coming from by referencing an unspent output on the blockchain, and (2) a reference to where I want to send the money — by creating a new encumbrance, a new limitation on who can spend the money, usually a public key or bitcoin address. That transaction contains no sensitive data. If you steal the information in the transaction, all you know is which address the money came from, which address the money’s going to, and how much. That’s it. The signature reveals nothing. The addresses reveal nothing. There are no identifiers. You could take the transaction and print it out. You could post it on a billboard. You could shout it from the rooftop. A bitcoin transaction can be transmitted over completely unsecured Wi-Fi. By smoke signal. By light signal. With carrier pigeons. It doesn’t matter. Nothing in that message can be compromised.

比特币是根本不同的。我传送的不是密钥，而是一个签名的消息。它是一项授权。

该授权有两个外部引用：

（1）钱从哪里来，引用的是区块链上的一个为花费输出。

（2）引用我想把钱发到哪里，通过创建一个新的阻碍，限制谁能花这个钱，通常是一个公钥或比特币地址。

这个交易不包含敏感数据。如果你窃取交易中的信息，你所知道的是钱来自哪个地址，要到哪个地址，以及金额。就是这些。签名没有透露任何内容。地址什么也没有透露任何内容。没有标识符。你可以把这笔交易打印出来。你可以把它贴在广告牌上。你可以从屋顶上喊出来。比特币交易可以通过完全不安全的WiFi传输。通过烟雾信号、通过光信号、用信鸽传送，都没关系。那个消息不会泄露什么内容。

## 9.3货币作为一种内容类型

**Money as a Content Type**

Most people don’t realize what it means to convert money into a content type. We’ve taken the transaction, which is just 250 bytes, and we’ve separated it from the transport medium, so it doesn’t depend on any underlying security. We’ve made it stand alone so that it can be independently verified by any node that has a full copy of the blockchain. Independently verified as spendable, authentic, and properly signed by any system that has a full copy of the blockchain—in fact, even by systems that only have a partial copy of the blockchain. That transaction can be verified in seconds. All it has to do is reach one node in the network that can talk to miners. That’s it. Once it’s injected into the bitcoin network and once it propagates, you can be almost certain that the transaction will be included eventually and will become valid. If I look at any transaction, I can calculate if it has sufficient fees, and then I can make certain assumptions about how miners are going to treat that transaction because I know the rules by which they operate on a consensus network. I know that once the transaction is propagated enough, it will appear in a block near you, soon.

大多数人没有意识到，把钱转换成一个内容类型意味着什么。

我们得到了这个交易，它有250字节，我们将它与传输介质分离，所以它不依赖于任何底层的安全性。

我们已经使它独立，这样，它就可以被任何有完整区块链链副本的节点独立验证。

被任何有完整区块链拷贝验证为可花费的、真实的、正确签名的交易，实际上，即使系统只有区块链的一部分，也可以验证。

这个交易可以在几秒钟内被验证。它所要做的是到达网络上一个可以与矿工通信的节点。就是这样。

一旦它被注入比特币网络，一旦它被传播，你几乎可以肯定交易最终会被包括在区块链中，将变得有效。

如果我查看任何交易，我可以计算它是否有足够的交易费，然后我做某些假设“矿工如何处理这个交易”，因为我知道他们在共识网络上的运作规则。我知道，一旦交易被充分传播，它很快就会出现在一个区块中。

## 9.4阻止比特币交易是不可能的

**Stopping Bitcoin Transactions Is Impossible**

There’s nothing magical in a bitcoin transaction. Let’s think about this for a second. How can you encode 250 bytes and transmit them across the network?

比特币交易中没有什么神奇之处。

让我们先考虑一下这个。你如何编码250字节，并通过网络传输它们？

Someone recently asked me, and I get this question a lot, “Can’t tyrannical governments block or ban the transmission of bitcoin transactions?” The answer is no, but I don’t think people quite understand why the answer is no. I’ll give you a couple of theoretical examples to show what I mean.

最近有人问我，我经常问这个问题：“暴政政府不能阻止或禁止比特币交易的传播吗？”

答案是不能，但我认为人们不很明白为什么答案是不能。

我会给你几个理论例子，来说明我的意思。

### 9.4.1通过Skype的笑容符传输比特币

**Transmitting Bitcoin Transactions via Skype as Smileys**

My first ridiculous example is the encoding of bitcoin transactions as emoticons or smileys in Skype. Skype has a 128-character emoji alphabet which allows you to send various frowny faces, smiley faces, thumbs up, thumbs down, sunny days, beating hearts, birthday cakes—you know, all of those kinds of things. Now, let’s look at that from an information-content perspective. That’s a character set, right? If I’m a computer scientist, I’m going to look at that and say, okay, I now have an encoding scheme. This would allow me to send a 250-byte transaction in about 500 characters. 500 smileys. A bitcoin transaction is smileys.

我第一个可笑的例子是，把比特币交易编码为Skype中的表情符号。

Skype有一个128表情符号，允许你发送各种表情，例如笑脸、太阳等，你知道，所有这些类型的东西。

现在，让我们从信息内容的角度来看待这一点。这是字符集，对吧？

如果我是一个计算机科学家，我会去看看它，然后说，OK，我现在有一个编码方案。

我能用大约500个字符发送一个250字节的交易。500个微笑。一个比特币交易是一些笑脸。

I can literally mathematically write a little script, it’s two lines of Python probably. If you’re really efficient, it’s probably one line. No libraries needed. In the script, I can take the hexadecimal representation of a bitcoin transaction and encode it in emoticons. I can then copy that into a Skype window anywhere in the world. As long as the recipient who receives that string smileys types it into a decoder script and then simply injects it into the bitcoin network, that transaction will go through. The recipient could be a robot. The recipient could be an automated listening station that is designed to decode smileys into transactions and transmit them onto the bitcoin network.

我可以在数学上写一个小脚本，大概是两行Python。

如果你真的很有效率，它很可能是一行，不需要库。

在这个脚本中，我可以采用比特币交易的十六进制表示形式，并将用表情符号进行编码。

然后我可以把它复制到世界各地的Skype窗口中。只要接收到该字符串笑脸的接收者，将其放入解码器脚本中，就能将其注入比特币网络，该交易将通过。接受者可以是机器人。接收方可以是一个自动侦听站，其设计为将笑脸解码为交易，并将其发送到比特币网络。

Now, explain to me how anyone can make that stop, other than by shutting down Skype. If they shut down Skype, I’ll use Facebook. If they shut down Facebook, I’ll use Craigslist. If they shut down Craigslist, I’ll put my transaction in a TripAdvisor review. If they shut down TripAdvisor, I’ll post it as a comment in the history of a Wikipedia article. If they shut that down, I’ll post it as the background of a JPEG image in my holiday snapshots.

现在，给我解释一下，除了关闭Skype，任何人怎么阻止这个。

如果他们关闭Skype，我就使用Facebook。如果他们关闭Facebook，我就使用Craigslist。

如果他们关闭Craigslist，我就把交易放到TripAdvisor评论中。

如果他们关闭TripAdvisor，我会把它作为评论放在维基百科文章的历史中。

如果他们关闭维基百科，我会把它作为背景放在我假日照片的JPEG图像中。

Money is now completely disconnected information content. There is absolutely nothing you can do to stop information from traveling from anywhere in the world to anywhere in the world when you have an we do today.

货币现在完全与信息内容断开了。

当你有了我们今天所能的事情时，你绝对没有办法阻止信息从世界上任何地方到达到世界上另一个地方。

### 9.4.2通过短波传输比特币交易

**Transmitting Bitcoin Transactions via Short Wave Radio**

Let’s say we didn’t have the internet. I came up with an even more ridiculous harebrained scheme, which is the transmission of bitcoin transactions over shortwave, frequency-hopping, burst radio. This is if you want to go completely guerrilla-style.

假设我们没有互联网。我想出了一个更荒唐可笑的方案，那就是用短波传送交易。

如果你想完全游击式的话。

During the Second World War, in occupied France, the Allies dropped thousands of shortwave radios — complete kits with little parachutes — from airplanes, so that Partisans on the ground could hide these in barns, in tree hollows, in abandoned buildings, under bridges, and use them to communicate with various Allied command centers around Europe, from right under the nose of the occupying Nazi force. One of the things about shortwave radio is that not only do you have enormous range, but you can also, in certain frequencies, bounce off the stratosphere. At the time, they used this for voice communication or coded numbers communication, Morse code and various one-time pad encryption schemes.

在第二次世界大战期间，在被占领的法国，盟军从飞机上用降落伞投下了数千个短波无线电设备，这样，地面上的游击队员可以把它藏在谷仓、树洞、桥下，用它们与欧洲各地的各个盟军指挥中心进行通信，就在纳粹占领军的鼻子底下。

短波收音机的一个特点是，它不仅有很大的范围，而且你可以通过平流层反射某些频率。

当时，他们使用这种方式进行语音通信或密码通信、莫尔斯电码和各种一次性填充加密方法。

Today, I can get a kit that allows me to connect a very simplistic shortwave radio transmitter to my laptop via USB. Now all I need is an antenna. The nice thing about that is that with shortwave radio, an antenna consists of a sufficiently long piece of metal — a railway line, a clothesline, a broken down electricity line, a fence line, a razor-wire fence. Which, I’ve noticed here in New Zealand you have lots of. It’s right around those fuzzy white things that are everywhere — the sheep.

今天，我可以有一个工具，能让我我通过USB把一个非常简单的短波无线电发射机连接我的笔记本电脑。

现在我只需要一个天线。不错的是，在短波无线电中，天线是一条足够长的金属线 —— 一条晾衣绳、一条断电线、一条篱笆线、一条铁丝网。我在新西兰看到你能得到很多。它就在那些到处都是绵羊的模糊白色的东西周围。

Now, the transmission of a bitcoin transaction involves plugging in a laptop, attaching it to a fence post, pressing “enter,” and transmitting a burst transaction for 25 seconds. As long as there’s a receiving station somewhere within the surrounding thousand miles that is connected to the bitcoin network — and you can hide the receiving station anywhere you want, it’s a passive listener, it can’t be triangulated — that listening device can inject the transaction into the network. If I’m the guerrilla and I want to buy something, I construct the transaction offline, and when I’m ready, run out into the middle of the field, clamp my transmitter onto a clothesline, press “enter,” transmit for 25 seconds, pack up my gear, and disappear into the forest. How the hell do you stop that? You don’t. That’s the simple answer, you don’t. But that’s just the beginning.

现在，比特币交易的传播涉及到一个笔记本电脑，把它连到一个篱笆上，按下“enter”，用25秒发送一个交易。只要周围数千里内有一个接收站，它连接到了比特币网络，你可以在任何地方隐藏接收站，它是一个接收器，它不能被三角定位，这个接收器可以把交易注入到网络中。

如果我是游击队员，想买一些东西，就离线构造交易，当我准备好的时候，跑到田野里，把我的发射器夹在晾衣绳上，按“enter”，传送25秒钟，收拾好我的装备，然后消失在森林里。

你能怎么阻止呢？你没办法。这就是简单的回答，你没办法。但这仅仅是个开始。

## 9.5分开媒介和消息

**Separating the Medium and the Message**

Once you realize that money has become a content type, that transactions have been disconnected from the medium, some really important secondary characteristics emerge. You see, the medium is the message, as someone famous once said. The primary reason the medium is the message is because the medium constrains, transforms, and in many cases, distorts the message.

一旦你意识到，货币已经成为一种内容类型，交易已经脱离了媒介，一些真正重要的第二特征出现了。

你看，媒介就是消息，一位著名任务曾经这样说过的。

媒介是消息的主要原因是，介质在许多情况下约束、变形、扭曲了消息。

When your medium is TV, your message is 18 minutes long, interrupted by advertising slots. That is your message; there is no other format you can fit there. So, you make a message that fits that medium. And you start assigning the value of your message based on the mistaken assumption that it is equivalent to the cost of production. TV, for example, imposes a certain cost to producing video. People who are in that business make the mistaken assumption that the cost of producing TV is the same as the value of that show. The more you spend on it, the more valuable it is.

当你的媒体是电视时，你的消息是18分钟长，被广告插播打断。

这是你的消息，没有其它格式可以适合那里。所以，你制作了一个适合这个媒介的消息。

你开始根据错误的假设来分配你的消息的价值，假设它等于生产成本。

例如，电视制作视频需要一定的成本。从事这一行业的人误以为，电视的制作成本与那部电视剧的价值是一样的。你花在上面的钱越多，它就越有价值。

You can imagine their horror when something like YouTube comes along and drops the cost of production to zero. What do you think is the immediate assumption that people make in that industry? If the cost is zero, then the content is worthless. That is a fundamental misunderstanding of what happens when you separate the content from the medium. By separating the message from the medium, your perception of value shifts from the cost of production to the value it has to the consumer when they consume it.

你可以想象当YouTube出现的时候，他们会感到多么可怕，因为生产成本降到了零。

你的直接假设是人们们在这个行业里制作？如果成本是零，那么内容是毫无价值。

当你把内容和媒介分开时，这是一个根本性的误解。

通过将信息与媒介分离，你的价值观念从生产成本，变为它对消费者的价值。

Let me give you an even older example. When the cost of printing is astronomical and the means of printing are available only to a select few, the only thing you print is Gutenberg Bibles. The medium defines the range of expression of the message, and constrains it only to the most grandiose and important messages that society has. It limits the range of expression by imposing enormous costs of production.

我再举个更古老的例子。

当印刷成本是天文数字时，印刷手段只供少数人选择时，你印刷的唯一东西就是Gutenberg Bibles。

媒介定义了消息的表达范围，将其限制为社会所具有的最宏大和重要的信息。

巨大的生产成本限制了表达的范围。

What do you think Gutenberg would have thought of Twitter, which takes the cost of production to zero, makes it available universally, ubiquitously, and for free. You go from printing the Gutenberg Bible to responding to a tweet with one of my favorite expressions, the three-character opinion “SMH” —  which means “shaking my head.” When “Professor Bitcorn" says, "Bitcoin is going to zero,” I can express my entire range of opinion and thoughtful analysis as shakes head with facepalm. Three characters, and I have expressed my opinion to the world. If you look at that from an objective perspective, surely that message is worthless. When you make the mistaken assumption that if the cost of production is zero, and the message appears trivial on its face, then the entire combination of medium plus message must be worthless, must be trivial, must have no value — that’s a mistake that people have made at every turn in history.

你认为古腾堡会怎么看Twitter，Twitter将生产成本降到零，使得它可以普遍、无处不在、免费地使用。你可以从印刷古腾堡圣经开始，走到用一个我喜欢的表达方式（SMH）发出一条推特。

当Bitcorn教授说“比特币将要变为零”时，我可以表达我的整个观点和分析，带着面罩摇摇头。

我用三个字向世界表达了我的观点。如果你从客观的角度看待这个，那这个消息肯定是毫无价值的。

当你错误地假设：如果生产成本是零，这个消息就毫无脚趾，那么媒介加消息都是毫无价值的。这是人们在历史上每一个转折点都会犯的错误。

When Twitter first came out, people assumed it would only be used for the trivial. And yet, a year ago I was watching CNN International covering the Egyptian revolution, and they were live-streaming tweets from Egyptian revolutionaries on the streets of Cairo, giving live reports about what is happening minute-by-minute. CNN anchors are doing nothing. They’re pointing at the screen and saying, "Look, we have another tweet. And here’s another tweet from someone we don’t know. Here’s another tweet." They’ve been reduced to the role of a TV show model saying, "And this wonderful refrigerator will be yours if you win the prize behind door number one.” I find it extremely gratifying to watch one of these talking heads, like Anderson Cooper, basically reduced to reading tweets off a screen.

当Twitter首次问世时，人们认为它只会用于微不足道的事情。

然而，一年前，我在看CNN国际频道报道埃及革命，他们从开罗街头的埃及革命现场发出tweets，现场报道正在发生的事情。

CNN主持人什么也不做，他们指着屏幕说：“看，我们又有了一条tweet。这是另一个我们不认识的人的tweet。又有了一条tweet。”

他们已经沦为电视节目模特的角色：“如果你赢得了第一扇门后的奖赏，这个奇妙的冰箱将是你的。”

我发现看到像Anderson Cooper这样的谈话者，主要是上减少了阅读屏幕上的tweets。

Because they mocked it. They made the mistaken assumption that if the cost of production is zero, the value of the message is zero. They confused the medium for the message. They made the mistaken assumption that their control over the medium was the source of quality. And long after quality disappeared, they clung to control and thought that control was the only way to achieve quality, and if you removed control, you removed quality. That is stinky, unabashed elitism at its absolute worst. It assumes that the gatekeepers are the source of quality, when all they are is gatekeepers. They assume that the fact that they have the expensive medium means that the message is worth listening to.

因为他们嘲笑它。他们错误地认为，如果生产成本为零，则该消息的价值为零。

他们混淆了媒介和消息。他们错误地认为，他们对媒介的控制是质量的源泉。

在质量消失很久之后，他们紧紧抓住控制，认为控制是实现质量的唯一途径，如果你失去控制，你就失去了质量。这绝对是最坏的精英主义。它假设把看门人是质量的源泉，当他们都是看门人时。他们认为，拥有昂贵媒介就意味着这个消息值得听。

The moment you tear that message away from the medium and you open it rup to an entire range of expression, yes, it will express the most trivial messages of your culture, including “SMH.” But it will also express the most interesting messages of your culture, eventually.

当你把那条信息从媒体上撕下来时，你给它打开了整个表达范围，是的，它会表达你文化中毫无价值的消息，包括“SMH”。但它最终也会表达你文化中最有趣的消息。

Today in US schools, children read The Federalist Papers, which are letters rof correspondence exchanged between Thomas Jefferson, John Adams, rBenjamin Franklin, and many of the other founding fathers. In 100 years, people will be reading The Federalist Tweets of the Cairo Revolution. That’s not an insane idea. That is the path of human civilization. We’ve seen this rhappen again and again.

今天在美国的学校里，孩子们阅读联邦党人的文献，这是托马斯-杰斐逊、约翰-亚当斯，本杰明-富兰克林和许多其他创始人之间的信件。

100年后，人们将阅读联邦党人的开罗革命tweets。这不是一个疯狂的想法。那是人类文明的道路。

我们一次又一次地看到了这种情况。

Now, they mock Twitter as trivial because they don’t understand the distinction between message and medium. TV was once mocked as a trivial pastime because it obscured the art of cinematography. Cinematography was ra trivial pastime because it cheapened and vulgarized the art of the theater. rThe theater was a vulgar and cheap pastime of Victorians because it trivialized the great dramatic plays of the Romans and the Ancient Greeks. You keep going down this path and you’ll eventually arrive at Aristotle saying that philosophy is dead because nowadays the kids all want to watch dramatic presentations instead of reading their philosophy books. He probably complained about their long hair, too. Every generation mistakes the medium for value and considers the next iteration of the medium—that widens access, that opens availability, that broadens the range of expression—they consider that medium trivial, vulgar, cheapening the message.

现在，他们嘲笑Twitter毫无价值，因为他们不理解消息和媒体之间的区别。

电视曾经被嘲笑为毫无价值的消遣，因为它模糊了电影艺术。

电影是一种毫无价值的消遣，因为它使剧院的艺术贬值和庸俗化。

剧院是维多利亚时代人的庸俗和廉价的消遣，因为它使罗马人和古希腊人的伟大戏剧变得贬值。

继续沿着这条路走下去，你最终会到达亚里士多德，他说认为哲学已经死了，因为那时的孩子们都想看戏剧表演，而不是阅读他们的哲学书籍。他也有可能抱怨他们的长发。

每一代人都错误地认为媒介就是价值，认为下一代媒介毫无价值，会庸俗化和贬低信息，而实际这些新媒介开阔了访问，打开了可用性，扩展了表达的范围。

What they don’t understand is when you cheapen the medium, you release the message and you elevate it. You are able now to express a broad range of messages. Yes, the first ones will be trivial. The reason they’ll be trivial is rbecause the previous medium didn’t allow for that expression. It didn’t have within it the ability to have that expression. Yes, you will have the “SMH.” You’ll also have live tweets from the Cairo revolution. By the time they figure that out, the new medium is the quality message. Then, we can turn around and call the next one vulgar and cheap.

他们不明白的是，当你贬低媒介时，你会发布消息，提升消息。

你现在可以表达广泛的消息。 是的，第一个会是毫无价值的。 他们之所以毫无价值，是因为之前的媒体不允许这种表达。它没有能够拥有这种表达的能力。

是的，你将有“SMH”。你还可以获得开罗革命的现场tweets。当他们想出那个时，新媒体就是有质量消息。 然后，我们可能转圈，称下一代媒体粗俗和便宜。

## 9.6货币是消息，现在要从媒介中解放出来

**Money is the Message, Now Freed from the Medium**

Money is a content type, and we just wrenched it free from the medium. The medium has been a series of interconnected networks that segregate money by size and recipient. We have payment networks for small money. We have payment networks for large money. We have payment networks for fast money. We have payment networks for slow money. Payment networks for businesses to pay businesses. Payment networks for governments to pay rgovernments. Payment networks for consumers to pay businesses. Payment rnetworks for consumers to pay consumers. Oh wait, we don’t really have those. We don’t have payment networks for consumers to pay consumers. We don’t have payment networks to do small payments because the traditional medium does not allow that range of expression.

货币是一种内容类型，我们只是把它从媒体中解脱出来。

这个媒介是一系列互联的网络，它们通过大小和接收人将货币分开。

我们有小额资金支付网络。我们有大额资金支付网络。我们有快速支付网络。我们有慢速支付网络。

我们有企业对企业的支付网络。我们有政府对政府的支付网络。

我们有消费者对企业的支付业务。 我们有消费者对消费者的支付网络。

哦，等等，我们真的没有这个。 我们没有消费者对消费者的支付网络。

我们没有支付网络进行小额支付，因为传统的媒介不允许表达这个范围。

I cannot send you 20 cents across the world, from one individual to another individual, because the medium constrains the message. The cost of production does not allow me to express that range of transactional expression. But now we have separated the message from the medium. We have created money as a content type. That money is now able, at near zero production cost, to express the entire range of transactional expression—from the tiny to the enormous, from consumer to consumer, from government to rgovernment.

我不能给世界上另一端的人支付20美分，因为这个媒介限制了这个信息。

生产成本不允许我表达这种交易表达的范围。但现在我们将消息与媒介分开了。我们把货币作为一种内容类型。 这笔资金现在能够以接近零成本来表达交易表达的整个范围，从微小到巨大，从消费者到消费者，从政府到政府。

What happens next? The gatekeepers tell you that this network is not serious. rThe gatekeepers confuse their payment-network cost for the value of their service. The gatekeepers of the old payment networks will tell you that this rnew form of payment is vulgar and cheap. It is something that is only used rfor trivialities. All of the very serious people will remain on the solid, quality rpayment networks of the past. Because if they can control and restrict the range of expression, they think that means it’s quality. It’s not. It’s just an inflated cost of production. It’s bare naked elitism at its worst. They cling to the medium and fail to see that now the message can be transported over any rmedium at zero cost, instantaneously.

接下来发生什么？ 看门人告诉你这个网络并不严肃。看门人混淆了支付网络成本和它们的服务价值。

旧支付网络的看门人会告诉你，这种新支付形式是粗俗和廉价的。它只是用于琐事。所有认真的人都会留在过去坚实、优质的支付网络上。因为如果他们可以控制和限制表达的范围，他们就认为这意味着它的质量。 不是的。这只是一个夸大的生产成本。在最坏的情况下，这是赤裸裸的精英主义。他们依附于这个媒体，并且没有看出：现在消息可以立即以零成本在任何媒介上传输。

What is the first use of this new model? What is the first use of this new messaging medium? Now we can send trivial payments. I get tips on Twitter. That’s a demonstration I can make that clearly shows people the difference. I rcan do something I could not do before. But to most people, that’s trivial. To rmost people, the fact that I’m showing them the bottom of the range of rexpression simply reinforces the idea that this is a cheap and vulgar medium. What they fail to grasp is that this medium is not just for the trivial; it spans rthe entire range of transactional expression from the trivial to the enormous.

这个新模型的首次使用是什么？ 这种新的消息媒介的首次使用是什么？

现在我们可以发送很小的付款。我在推特上得到了提示。

这是我可以做的一个演示，清楚地向人们展示了差异。

我做了以前做不到的事情。 但对大多数人来说，这是微不足道的。

对于多数人来说，我向他们展示这个表达范围的最低部分，只会强化他们认为这是一种廉价而粗俗的媒介。

他们没有意识到的是，这种媒介不仅仅是为了琐事; 它涵盖了从琐碎到巨大的整个交易表达范围。

One day, a country will pay its oil bill on the blockchain. One day, you might buy a multinational company on the blockchain. One day, you might sell an aircraft carrier, hopefully for scrap metal, on the blockchain. The blockchain can encompass the entire range, from the 10-cent tweet to the $100 billion debt settlement. We just haven’t noticed yet. It can do so without any constraint imposed by the underlying medium. This isn’t just a matter of the fact that the transaction as a content type can be transported over Skype smileys. That’s simply a symptom of the fact that we have released all of the constraints of the underlying transport medium. We have made content king.

有一天，一个国家将在区块链上支付它的石油账单。

有一天，你可能会在区块链上收购一家跨国公司。

有一天，你可能会在区块链上出售一个航空母舰。

区块链可以涵盖整个范围，从10美分的tweet，到1000亿美元的债务结算。

我们还没有注意到。它可以在没有任何基础媒介的约束下这样做。

这不仅仅是因为交易作为一种内容类型可以通过Skype表情传输。

这是一个标志：我们已经释放了底层传输介质的所有约束。

我们已经让内容为王。

## 9.7技术的大圆弧

**Grand Arc of Technology**

When content begins as the domain of exclusivity, elitism, and limited access, it is used by grandmasters to create masterpieces. The Gutenberg Bible. The first photographs. The landing on the moon, televised for the first time. The great movies of the past. Masterpieces made by grandmasters.

当内容开始作为排它性、精英主义、限制访问的领域时，大师们使用它来创建杰作。

古腾堡圣经、第一张照片、登陆月球、第一次电视转播、 过去的伟大电影。由大师制作的杰作。

Then the medium changes because the technology becomes more available. People start using it for a broader range of expression, but the gatekeepers still cling to the old ideas. They still try to do the grandiose with their medium. They print hardback, heavy, leather-bound books—Principia Mathematica. Then the medium opens up again and things become softcover, and photographs become available to the everyday person in 24 exposures. The gatekeepers of the past still cling to the past, but now they can’t really pretend that it’s grandiose, so they just do grandstanding. They say, “There’s a certain je ne sais quoi to film.” “There’s a certain quality to vinyl that CDs will never capture.” “A TV anchor really has authority. Don’t you remember Walter Cronkite?” “A newspaper is the source of authoritative opinion, and it really is worth the paper it’s printed on." Grandstanding. The grandiosity is gone. The quality is gone. Now, it’s just a matter of clinging to the control and pretending that control is still quality.

然后介质发生变化，因为技术变得更加可用。

人们开始使用它来进行更广泛的表达，但看门人仍然坚持旧观念。他们仍然试图用他们的媒介来做宏伟的事情。他们印刷精装书、皮革书籍 -《数学原理》。

然后媒介再次打开，这些东西变成了软包装，照片在24次曝光中可供日常用户使用。

过去的看门人仍然坚持过去，但现在他们不能真正假装它是宏伟的，所以他们只是哗众取宠。

他们说：“胶片还是有一些特色。”“乙烯基有一些品质，CD是不会赶上的。”“电视主播确实有权威。难道你不记得Walter Cronkite吗？“”报纸是权威意见的来源，它有价值所以报纸才印它。”

哗众取宠。宏伟的感觉已经消失。质量已经消失。现在只是这个问题：坚持控制，并假装控制仍然是质量。

Finally, in this grand arc of technology, the technology reaches the final stage. In that final stage, the only people who still believe it’s grand are grandparents. In the grand arc of technology, what started out as a masterpiece is now only consumed by those in the last stages of their lives. The first checks written out were used by royalty to fund great ventures like the East India Company to open the spice roads and trade routes to the East. In those days, only royals had checkbooks. Today, if you go into a supermarket and the grandmother, bless her heart, in front of you in the line opens up her purse and pulls out the checkbook, 15 people in line are going to groan audibly as they realize it’s going to take 15 minutes to write out that transaction. There’s nothing left of the grandiosity of funding the East India Company when you’re buying beans and toast with a checkbook in a supermarket. It’s the final stage.

最后，在这个技术的大圆弧中，技术达到了最后阶段。在最后阶段，仍然相信的人是祖父母。

在科技的大圆弧中，最初作为杰作的东西，现在被它们生命的最后阶段的东西消耗殆尽。

第一笔支票被皇室使用，以资助像东印度公司这样的大企业打开到东部的香料道路和贸易路线。

那时，只有皇室有支票簿。今天，如果你走进一家超市，遇到一位奶奶，在你的队列前打开她的钱包，拿出支票簿，15人排队要哀嚎，因为他们意识到要花费15分钟来写这笔交易。

当你在超市用支票簿买一份菜豆和烤肉时，资助东印度公司的壮观已经没有什么了。这是最后阶段。

The only people watching Fox News now are grandparents, because we all get our news on the internet. What was once trivial is now our source of authoritative news and information. You can’t explain that to the old guard. We read our books electronically. Some people say, "There’s something about the feel of paper." Yes. It’s too heavy to carry 20 books in your bag, and I read 20 books in four or five weeks, so I need to carry that many. There’s nothing about the feel of paper; that’s clinging to the past.

现在还看福克斯新闻的人是祖父母，因为我们都在网上看新闻。

曾经是微不足道的东西，现在是我们权威新闻和信息的来源。

你无法向老看门人解释这一点。我们用电子书阅读。有些人说：“有点儿纸的感觉。”是的。在书中里带20本书太重了，我要在四五周内读20本书，所以，我需要带那么多。没有纸的感觉么，那是紧紧抓着过去。

As we move into this world where money is a content type, the gatekeepers of the old payment systems will cling to the illusion that traditional banking is quality. That the gatekeepers are the quality. That the quality is inherent in the gatekeeping—in the control, in the censorship, in the limitations. But that’s not where the quality is. We’re moving on and opening up the range of expression that is possible with money to unimaginable levels, to things that have never happened before. They’ll still cling to their ideas of grandiosity: the great old banks with the vaulted ceilings and the chromed vaults that are empty, where you can get guided tours on Sundays, to look at what banks used to be like. You can go into cities around the world and the great vaults of the great old banks are now bars where you can get a cocktail in the vault, because banks can’t even afford to have those buildings anymore. They serve no purpose other than grandiosity. They’ll still try to persuade you that through their control, they protect you from evil, from terrorists, from money launderers. All they’re doing is protecting their own incumbency from competition.

当我们进入一个货币是内容类型的世界时，旧支付系统的看门人会坚持传统银行业是质量的幻觉。

看门人就是质量。质量是内固在看门中：控制、审查、限制。

但这不是质量的所在。我们正在前进，打开了表达的范围，货币可能达到无法想象的水平，出现从未发生的事情。

他们仍然会坚持他们的宏伟想法：有拱形天花板和镀金拱顶的空荡荡的老银行，在周日可以跟着导游去看银行过去的样子。你可以进入世界各地的城市，老银行的大金库现在是酒吧，在那里你可以在地下室里喝鸡尾酒，因为银行再也买不起那些建筑了。除了宏伟之外，他们没有别的目的。他们仍然试图说服你，通过他们的控制，他们保护你免受邪恶、恐怖分子、洗钱者。他们所做的一切就是保护自己职位，防止竞争。

We have now separated the message from the medium. Money is now a content type, and we’re never going back.

我们现在已经把消息和媒介分开了。

货币现在是一种内容类型，我们永远也回不去了。

**Thank you.**

Note from Andreas to the reader: In this talk I foolishly attempted to improvise math in my head while delivering the talk. I am not very good at math. Turns out I am even worse at improv-math. None of my bad math changes the point I was making, but it’s been edited out for accuracy and to protect my ego. Ssssh! Don’t tell anyone I suck at improv-math.

Andreas给读者的说明：

在这次演讲中，我愚蠢地试图在发表演讲的同时即兴说明数学。

我不擅长数学，结果我在即兴数学方面更糟糕。

我的糟糕数学没有改变我的观点，但为了精确性，已经做了编辑修改。

给我留点儿面子，不要告诉任何人我做了即兴数学。