

Session 8 : A Liberal Education

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What is education? Above all things, what is our ideal of a **thoroughly**(完全, 彻底) liberal education? – 何谓教育? 特别是在我们心中, 真正的通识教育理想是什么?

of the education which, if we could **mold**(塑造) the fates to our own will, we would give our children? 如若命运能够掌握在自己手中, 我们会让自己的孩子接受这样的教育吗?

Well, I know not what may be your **conceptions**(想法) upon this matter but I will tell you mine, and I hope I shall find that our views are not very **discrepant**(有差异的, 不同的).

我不了解你们对此有何看法, 但是我想吐露自己的想法, 并希望我们的观点不要有太大分歧。

Don't you think we should all consider it to be a primary duty to learn at least the names and the moves of the pieces; to have a notion of a gambit, and a **keen**(敏锐的) eye for all the means of giving and getting out of check?

比如, 至少要学习每个棋子的名称和走法、掌握开局棋法、谙熟各种“将军”及“被将军”和策略等。

Do you not think that we should look with a **disapprobation**(不赞成, 反对) amounting to scorn upon the father who allowed his son, or the state which allowed its members, to grow up without knowing a pawn from a knight?

另外, 如果一个父亲或一个国家放任他的儿子或人民, 在长大或成熟后竟不分卒马, 那么, 你们不认为我们应当对这样的父亲和国家嗤之以鼻吗?

Yet, it is a plain and **elementary**(基本的) truth that the life, the fortune, and the happiness of every one of us, and more or less, of those who are connected with us, do depend upon our knowing something of the rules of a game infinitely more difficult and complicated than chess.

然而, 一个基本的事实显而易见, 即我们及与我们相关的每个人的生命、财产和幸福, 都取决于我们对某个游戏规则的了解程度, 这些规则比象棋规则更难、更复杂。

The player on the other side is hidden from us. We know that his play is always fair, **just**, and patient.

游戏中我们虽然看不见对方, 但我们知道, 对方是秉着公平、公正以及耐心来对弈的。

But also we know, to our cost, that he never overlooks a mistake, or **makes the smallest allowance for**(考虑到, 估计到) ignorance.

但是, 在付出代价之后, 我们才知道对方从不放过我们的丝毫过错, 对我们的疏漏也不做点滴宽容。

To the man who plays well, the highest stakes are paid, with that sort of overflowing generosity in strength. And one who plays ill is checkmated – **without haste**(仓促, 匆忙), but without **remorse**(懊悔, 自责).

游戏中, 强者会被慷慨地授予最高奖励, 从而使强者愉悦万分, 而弱者只有慢慢地被将死, 无人同情。

My metaphor will **remind** some of you the famous picture in which Retzsch has **depicted**(描绘, 描画) Satan playing at chess with man for his soul.

我所做的这番比喻, 会让你们想起雷茨施的那幅名画, 画中将人生描述为人类与撒旦的一场象棋博弈。

Substitute for(替换成) the **mocking fiend** in that picture a calm, strong angel who is playing for love, as we say, and would rather lose than win – and I should accept it as an image of human life.

将这幅画中**阴险的恶魔**替换成镇定自若、坚强无比的天使, 他只为爱而战, 宁愿输的是自己 – 我认为这正是对人类生活的真实描绘。

In other words, education is the instruction of the intellect in the laws of nature, under which name I include not merely things and their forces, but men and their ways; and the **fashioning(制作, 塑造)** of the affections and of the will into an earnest and loving desire to move in harmony with those laws.

换句话说, 我认为教育就是对自然法则智慧的展现, 这种展现不仅仅指各种事物及其蕴含的力量, 而且也包括人类和他们的各个方面, 以及热切希望和这些自然法则和谐相处的情感与意志的塑造。

Anything which **professes(自命, 自称)** to call itself education must be tried by this standard, and if it fails to stand the test, I will not call it education, whatever may be the force of authority or of numbers upon the other side.

任何自命为“教育”之物都必须符合这一标准。否则, 无论面临多大的权威和势力, 我都不会称其为教育。

Take an extreme case. Suppose that an adult man, in the full vigor of his **faculties(官能)**, could be suddenly born in the world, as Adam is said to have been, and then left to do as he best might.

举一个极端的例子吧。假设一个成人如同亚当一样在他的各种官能最佳时突然降生到这个世界, 然后尽其所能去做事。

Nature would begin to teach him, through the eye, the ear, the touch, the properties of objects. Pain and pleasure would be at his **elbow(肘)** telling him to do this and avoid that;

因为大自然会随时通过他的眼睛、耳朵、触觉来告诉他周围事物的特征, 他所感知到的疼痛和舒适会告诉他什么该做, 什么不该做。

And if to this **solitary(孤独的)** man entered a second Adam, or better still, an Eve, a new and greater world, that of social and moral phenomena, would be revealed.

而且, 对于这个孤独而生的亚当来说, 如果他遇到了另一个“亚当”, 或者如果更幸运的话, 遇见了夏娃, 那么, 一个更大更新、具有社会性质且包罗道德现象的世界就会出现。

Joys and **woes(悲伤)**, compared with which all others might seem but **faint(暗淡)** shadows, would **spring(突然出现)** from the new relations.

从这种新的人际关系中引发的欢乐和悲伤都会使世上所有其他事物黯然失色。

Happiness and sorrow would take the place of the **coarse(粗糙的) monitors**, pleasure and pain; 幸福和悲伤会取代快感和痛感这种粗浅的表达。

And then, long before we **were susceptible of(容易受……影响)** any other mode of instruction, nature took us in hand, and every minute of waking life brought its educational influence, shaping our actions into **rough accordance with(大体相同)** nature's laws, so that we might not be ended untimely by too **gross(严重的)** disobedience.

并且, 早在我们受到其他任何教育影响之前, 大自然就支配着我们, 对我们的生活无时无刻不进行教育并施加影响, 使我们的行为大致遵循自然法则, 从而避免我们可能因为过分地逆反自然而被其淘汰。

The great mass of mankind are the “Poll,” who pick up just enough to get through without much **discredit(丢脸)**. 相比之下, 大部分人只是鹦鹉学舌, 他们所学知识只是保证他们能够通过考试。

Nature's pluck means **extermination(灭亡)**. 被大自然所淘汰就意味着灭亡。

Thus the question of **compulsory education(强制义务教育)** is settled so far as nature is concerned. 因此, 从大自然角度而言, 强制义务教育并不是个难题。

Her bill on that question was **framed(制定)** and passed long ago. 关于这个问题的议案早已制定完成并获得通过。

But, like all compulsory legislation, that of nature is **harsh(残酷的, 严厉的)** and **wasteful(付出代价巨大的)** in its operation.

但是像其他强制性立法一样，自然的立法是残酷的，一旦违反则需要付出巨大代价。

Ignorance is **visited** as sharply as **willful** disobedience – incapacity meets with the same punishment as crime.

无知就像故意逆反一样要受到严厉的惩罚，无能则如同犯罪一般要付出相同的代价。

Nature's **discipline** is not even a word and a blow, and the blow first; but the blow without the word.

大自然的惩罚方式甚至不是先予以打击，再以理相劝，而是直接予以无言的打击。

The object of what we commonly call education – that education in which man **intervenes(介入)** and which I shall distinguish as artificial education – is to make good these **defects(缺陷)** in nature's methods;

我们通常所称的教育（因为这种教育有人为介入，我在此将其称为“人为教育”以示区分），其目的在于弥补自然教育在方法上的缺陷；

And a liberal education has not only prepared a man to escape the great evils of disobedience to natural laws, but has trained him to appreciate and to seize upon the rewards which nature **scatters(散开, 播撒)** with as free a hand as her penalties.

通识教育不仅教导人们避免逆反自然规律这样的罪恶行为，还教导人们利用并感恩于自然的赏赐，因为大自然用她的自由之手散播赏赐，就如同散播各种惩罚一样。

That man, I think, has had a liberal education who has been so trained in youth that his body is the **ready(聪明的, 机敏的)** servant of his will, and does with ease and pleasure all the work that, as a mechanism, it is capable of;

我认为，一个接受过通识教育的人应该是这样的：他年轻时受到的训练可以使其身体服从自己的意志，就像一台机器一样轻松而愉悦地从事一切工作；

one who, no stunted ascetic, is full of life and fire, but whose passions are trained to **come to heel(臣服)** by a vigorous will, the servant of a tender conscience;

他并不是一个不正常的苦行人，他的生活中总是充满生机和热情，但他的激情永远受制于强大的意志力和敏感的良知；

He will make the best of her, and she of him. They will get on together rarely; she as his ever **beneficent(慈善的)** mother; he as her **mouthpiece(喉舌)**, her conscious self, her minister and interpreter.

他们将会相处得很好，自然界永远是他的慈母，而他也会成为慈母的喉舌，化身为她的意识，变为她的代理人 and 传声筒。

Session 7 : Hidden Intellectualism(重心)

What doesn't occur to(被想到) us, though, is that schools and colleges might be at fault(有错误, 应有责任) for missing the opportunity to tap into(利用) such **street smarts** and channel(引导) them into good academic work.

We assume that it's possible to wax(变得) intellectual about Plato, Shakespeare, the French Revolution, and nuclear fission, but not about cars, dating, fashion, sports, TV, or video games.

Real intellectuals turn any subject, however **lightweight** it may seem, into grist for their mill through the thoughtful questions they bring to it, whereas a **dullard**(笨蛋) will find a way to drain(使流出) the interest out of the richest subject. That's why a George Orwell writing on the cultural meanings of penny postcards is infinitely more **substantial**(重要的) than the cogitations(沉思, 深思) of many professors on Shakespeare or globalization.

I offer my own **adolescent**(青春期的) experience as a case **in point**(恰当). Until I entered college, I hated books and cared only for sports.

The only reading I cared to do or could do was sports magazines, on which I became hooked(上瘾).

In the Chicago neighborhood I grew up in, which had become a **melting pot**(熔炉) after World War II, our block was **solidly**(一致的) middle class, but just a block away—doubtless concentrated there by the real estate companies—were African Americans, Native Americans, and “hillbilly” whites who had recently fled postwar joblessness in the South and Appalachia.

Negotiating(成功越过) this class boundary was a tricky matter. On the one hand, it was necessary to maintain the boundary between “clean-cut” boys like me and working-class “hoods,” as we called them, which meant that it was good to be openly smart in a bookish sort of way.

On the other hand, I was **desperate for**(渴望, 急需) the approval of the hoods, whom I encountered daily on the playing field and in the neighborhood, and for this purpose it was not at all good to be book-smart.

The hoods would **turn on**(突然袭击或申斥) you if they sensed you were **putting on airs**(摆架子) over them: “Who you lookin’ at, smart ass?” as a leather-jacketed youth once said to me as he relieved me of my pocket change along with my self-respect.

I grew up torn, then, between the need to prove I was smart and the fear of a beating if I proved it too well; between the need not to **jeopardize**(危害, 危及) my respectable future and the need to impress the hoods. As I lived(承受, 经受) it, the conflict came down to(归根结底) a choice between being physically tough and being **verbal**(与文字有关的).

For a boy in my neighborhood and elementary school, only being “tough” earned you complete legitimacy(正当性).

I still recall endless, complicated debates in this period with my closest pals over who was “the toughest guy in the school.” If you were less than **negligible**(微不足道的) as a fighter, as I was, you **settled for**(勉强接受) the next best thing, which was to be **inarticulate**(口齿不清的), carefully hiding **telltale**(暴露事情的) marks of **literacy**(读写能力) like correct grammar and pronunciation.

Yet in retrospect, I see that it's more complicated, that I and the 1950s themselves were not simply hostile toward intellectualism, but **divided**(意见有分歧的) and **ambivalent**(矛盾的).

When Marilyn Monroe married the playwright Arthur Miller in 1956 after divorcing the retired baseball star Joe DiMaggio, the symbolic **triumph(模范, 巨大胜利)** of geek(智力超群人) over jock(运动员) suggested the way the wind was blowing.

Even Elvis, according to his biographer Peter Guralnick, turns out to have supported Adlai over Ike in the presidential election of 1956. “I don’t **dig(赞成, 喜欢)** the **intellectual bit(观念, 做派)**,” he told reporters. “But I’m telling you, man, he knows the most”.

Though I too thought I did not “dig the intellectual bit,” I see now that I was **unwittingly(不知不觉)** in training for it.

I see now that in the interminable analysis of sports teams, movies, and toughness that my friends and I engaged in—a type of analysis, needless to say, that the real toughs would never have **stooped to(屈尊, 屈就)**—**I was already betraying an allegiance(忠诚, 效忠) to the egghead world.**

Only much later did it **dawn on(被明白, 被意识到)** me that the sports world was more **compelling(扣人心弦的)** than school because it was more intellectual than school, not less. Sports after all was full of challenging arguments, debates, problems for analysis, and **intricate(错综复杂的)** statistics that you could care about, as school **conspicuously(明显地)** was not.

Sports introduced you not only to a culture **steeped in(饱含)** argument, but to a public argument culture that transcended the personal.

I can’t blame my schools for failing to make intellectual culture **resemble(看起来像)** the Super Bowl, but I do **fault(vt. 找出错误)** them for failing to learn anything from the sports and entertainment worlds about how to organize and represent intellectual culture, how to exploit its gamelike element and turn it into **arresting(吸引人的)** public **spectacle(精彩表演)** that might have competed more successfully for my youthful attention.

For here is another thing that never dawned on me and is still kept hidden from students, with **tragic(悲剧的)** results: that the real intellectual world, the one that existed in the big world beyond school, is organized very much like the world of team sports, with rival texts, rival interpretations and evaluations of texts, rival theories of why they should be read and taught, and **elaborate(复杂的, 详尽的)** team competitions in which “fans” of writers, intellectual systems, methodologies, and -isms **contend(竞争, 争夺)** against each other.

To be sure, school contained plenty of competition, which became more **invidious(令人讨厌的)** as one moved up the ladder (and has become even more so today with the **advent(到来, 出现)** of high-stakes testing). In this competition, points were scored not by making arguments, but by a show of information or vast reading, by grade-grubbing, or other forms of **one-upmanship(高人一等)**. School competition, in short, reproduced the less attractive features of sports culture without those that create close bonds and community.

And in distancing themselves from anything as enjoyable as and absorbing as sports, my schools missed the opportunity to **capitalize on(利用)** an element of drama and conflict that the intellectual world shares with sports. Consequently, I failed to see the **parallels(相似点)** between the sports and academic worlds that could have helped me cross more readily from one argument culture to the other.

But if this argument suggests why it is a good idea to assign readings and topics that are close to students’ existing interests, it also suggests the limits of this **tactic(策略)**.

Making students' nonacademic interests an object of academic study is useful, then, for getting students' attention and overcoming their boredom and **alienation(疏远)**, but this tactic won't in itself necessarily move them closer to an academically **rigorous(严格的, 一丝不苟的)** treatment of those interests.

On the other hand, inviting students to write about cars, sports, or clothing fashions does not have to be **a pedagogical cop-out(教学上的逃避)** as long as students are required to see these interests "through academic eyes," that is, to think and write about cars, sports, and fashions in a reflective, analytical way, one that sees them as microcosms of what is going on in the wider culture.

If I am right, then schools and colleges are missing an opportunity when they do not encourage students to take their nonacademic interests as objects of academic study. It is **self-defeating** to decline to introduce any text or subject that **figures(起重要作用)** to **engage(吸引)** students who will otherwise **tune out(不听, 不注意)** academic work entirely. If a student cannot get interested in Mill's *On Liberty* but will read *Sports Illustrated* or *Vogue* or the hip-hop magazine *Source* with absorption, this is a strong argument for assigning the magazines over the classic.

Give me the student anytime who writes a sharply argued, sociologically **acute(敏锐的, 有洞察力的)** analysis of an issue in *Source* over the student who writes a lifeless **explication(详细解释)** of Hamlet or Socrates' *Apology*.

Session 6 : Four Laws of Ecology

Each species is suited to its particular environmental **niche(生态位)**, and each, through its life processes, affects the physical and chemical **properties(性质)** of its immediate environment.

These links are **bewildering(使……困惑)** in their variety and marvelous in their intricate detail.

Ecology has not yet **explicitly(明确地, 明白地)** developed the kind of **cohesive(一个整体的)**, simplifying **generalizations(概括)** **exemplified** by, say, the laws of physics.

We owe the basic concept, and the word itself, to the **inventive(善于创新的)** mind of the **late** Norbert Wiener.

The word “cybernetics” **derives(源于)** from the Greek word for helmsman; it is concerned with cycles of events that **steer(操控, 控制)**, or govern, the behavior of a system.

If the ship **veers(偏离)** off the chosen compass course, the change shows up in the movement of the compass needle.

This **depletes(大量减少)** the supply of inorganic nutrients so that two sectors of the cycle, algae and nutrients, are out of balance, but in opposite directions.

If the nutrient level of the water becomes so high as to stimulate the rapid growth of algae, the dense algal population cannot be long sustained because of the **intrinsic(本质的, 固有的)** limitations of photosynthetic efficiency.

The dynamic behavior of a cybernetic system—for example, the frequency of its natural oscillations, the speed with which it responds to external changes, and its over-all rate of operation—depends on the relative rates of its **constituent(成分)** steps.

The metabolic rates of these organisms—that is, the rates at which they use nutrients, consume oxygen, or produce waste—is **inversely(相反地)** related to their size.

Suppose that the rate at which organic waste enters the cycle is increased **artificially(人为的)**, for example, by **dumping sewage(排放污水)** into the water.

Thus, an acre of richly **populated(有生物生存的)** marine shoreline or an acre of fish pond produces about seven times as much organic material as an acre of alfalfa annually.

The feedback characteristics of ecosystems result in **amplification(扩大)** and **intensification(强化)** processes of **considerable magnitude(相当大的量级)**.

A **persistent(持续的)** effort to answer the question “Where does it go?” can **yield(生产)** a surprising amount of valuable information about an ecosystem.

Here the mercury is heated; this produces **mercury(汞)** vapor which is emitted by the incinerator stack, and mercury vapor is **toxic(有毒的)**.

It is also an excellent way to **counteract(抵消)** the **prevalent(流行的, 普遍的)** notion that something which is regarded as useless simply “goes away” when it is discarded.

Session 5 : ILLINOIS JOURNEY

The roads are wide, hard, perfect, sometimes of a shallow depth in the far distance but so nearly **level(平坦的)** as to make you feel that the earth really is flat.

Giant skies, giant clouds, an eternal nearly **featureless** sameness.

Miles and miles of **prairie(大草原)**, slowly rising and falling, sometimes give you a sense that something is in the process of becoming, or that the liberation of a great force is **imminent(即将发生的)**, some power, like Michelangelo's slave only half released from the block of stone.

Conceivably(可以想象的是) the mound-building Indians believed their resurrection would **coincide with(与……一致)** some such liberation, and built their graves in imitation of the low moraines **deposited** by the departing glaciers.

After spring **plowing(耕犁, 或作 plough)** it looks oil-blackened or colored by the soft coal which occurs in great veins throughout the state.

Along the roads, with **intervals(间隔)** between them as neat and even as buttons on the cuff, sit steel storage bins, in form like the tents of Mongolia.

And the elevators and tanks, trucks and machines that **crawl(爬行)** over the fields and **blunder(跌跌撞撞的走)** over the highways -- whatever you see is productive. It creates wealth, it stores wealth, it is wealth.

As you pass the fields, you see signs the farmers have **posted(张贴)** telling in short code what sort of seed they have planted.

Then, when you have gone ten or twenty miles through cornfields without having seen a living thing, no cow, no dog, scarcely even a bird under the hot sky, suddenly you come upon a noisy contraption at the roadside, a system of contraptions, rather, for husking the corn and **stripping(去掉……的外壳)** the grain. It burns and bangs away, and the **conveyor belts rattle(传送带发出咔哒咔哒的声音)...**

When you force your mind to **summon(召唤, 召集)** them, the Indians appear rather doll-like in the radiance of the present moment.

There are monuments to them...throughout the state, but they are only historical **ornaments(点缀)** to the pride of the present...

Session 3 : Growing Brighter

But step in, through a large airlock designed to keep out the bugs, and a **kaleidoscopic**(万花筒似的, 千变万化的) scene emerges.

A central aisle is **flanked**(在……侧面) by two pairs of towers.

Each tower **is stacked with**(装满了) a dozen or so trays on which are growing strawberries, kale, red lettuce and coriander.

Douglas Elder, who is in charge of this **artificial** Eden, **taps**(输入) some instructions **into** an app on his mobile phone and, with a short whirr of machinery, a tray of lush, green basil **slides**(滑行) out for his **inspection**(检查).

The app can also control the temperature, **humidity**(湿度) and **ventilation**(通气量), and the hydroponic system that supplies the plants, growing on various non-soil substrates, with water and nutrients.

Armed with his trusty phone, Mr. Elder says he can run the farm almost **single-handedly**(单枪匹马).

But the business is now **taking off**(快速发展). SoftBank, a Japanese firm, Google's former boss Eric Schmidt and Amazon's founder Jeff Bezos have between them **ploughed**(投资) more than \$200m into Plenty, a vertical-farming company based in San Francisco.

And in June Ocado, a British online grocery, **splashed out**(投入) £17m (\$21.3m) on vertical-farming businesses to grow fresh produce within its automated distribution depots.

The high-tech LEDs in IGS's demonstration unit are **optimized**(最优化) so that nary photon is wasted. The hydroponics, and the **recycling** that supports them, mean the only water lost from the system is that which ends up as part of one of the plants themselves.

And towers mean the system is **modular**(模块化的), and so can be **scaled up**(=stack).

And modern greenhouses can also use solar-powered **supplementary**(补充性的) LED lighting to **extend** their growing seasons and hydroponic systems to save water, says Viraji Puri, co-founder.

This has meant that production has been commercially **viable**(可行的) for high-value, **perishable**(易腐烂的) produce only, such as salad leaves and herbs.

That, nevertheless, is a market not to be **sniffed at**(嗤之以鼻).

Plants are green because their leaves contain chlorophyll, a pigment that reflects the green light in the middle of the **spectrum**(光谱) while absorbing and using for **photosynthesis**(光合作用) the blue and red wavelengths at either end of it.

It uses LEDs that are highly **tuneable**(可调整的).

This, says Mr. Farquhar, can cut energy costs to about half of those **incurred**(引起, 带来) by existing vertical farms.

This, the company claims, is between two and three times more than a **conventional**(传统的) greenhouse with an equivalent but horizontal growing area, and **equipped with supplementary** lighting and heating, could manage.

Another is to develop algorithms to control, in an equally **bespoke**(定做的) way, the **climatic**(气候的) conditions preferred by different crops.

All the processes involved are **engineered**(设计制造) to be efficient.

Bulk field crops, such as wheat and rice, may never make sense for a vertical farm, and larger, heavier vegetables would be **tricky**(难办的) to raise.

In the controlled environment of a vertical farm, from which both pests and diseases can be **excluded**(排除在外), seed potatoes could be **propagated**(繁殖) more efficiently than in the big, bad outdoor world.

The institute's researchers are also looking at plant varieties that might do particularly well indoors, including old varieties passed over in the search for crops which can **withstand**(忍受) the **rigors**(艰苦, 严酷) of intensive farming systems.

By **dipping into**(稍加研究) the institute's gene banks, Dr Campbell thinks it may find some long-forgotten fruits and vegetables that would **thrive**(繁荣) in the security of a vertical farm.

Shoppers might even find some **exotic**(异国风情的) varieties growing in supermarket aisles.

Herbs and salad leaves, including **exotics**(异国的植物或者动物) such as Genovese basil and Peruvian mint, are resupplied with seedlings from the company's nursery as the mature plants are picked.

Vertical farming then will not feed the world, but it will help provide more fresh **produce**(生长) to more people.

It may even be that, as vertical-farming systems improve further, **miniature**(微缩的) versions will be designed for people to put in their kitchens.