

Marx Hardy Machiavelli Joyce Austen
Defoe Abbot Melville Montaigne Cooper Emerson Hugo
Stoker Wilde Christie Maupassant Haggard Chesterton Molière Eliot Grimm
Garnett Engels Byron Schiller
Goethe Hawthorne Smith Kafka
Cotton Dostoyevsky Hall
Baum Henry Kipling Doyle Willis
Leslie Dumas Flaubert Nietzsche Turgenev Balzac
Stockton Vatsyayana Crane
Burroughs Verne
Curtis Tocqueville Gogol Busch
Homer Tolstoy Whitman
Darwin Thoreau Twain
Potter Zola Lawrence Dickens Plato
Kant Freud Jowett Stevenson Andersen Burton Harte
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Poe Aristotle Wells Bunner Shakespeare Cooke
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Ernst Heinrich Philipp August Haeckel

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FREEDOM IN SCIENCE AND TEACHING.

FREEDOM

IN

SCIENCE AND TEACHING.

FROM THE GERMAN OF

ERNST HAECKEL.

WITH A PREFATORY NOTE

By T. H. HUXLEY, F.R.S.

Der Teleolog

"Welche Verehrung verdient der Weltenschöpfer der gnädig.
Als er den Korkbaum schuf, gleich auch die Stöpfel erfand."
Xenien.

NEW YORK:

D. APPLETON AND COMPANY,
549 AND 551 BROADWAY.

1879.

PREFATORY NOTE.

In complying with the wish of the publishers of Professor Haeckel's [v] reply to Professor Virchow, that I should furnish a prefatory note expressing my own opinion in respect of the subject-matter of the controversy, Gay's homely lines, prophetic of the fate of those "who in quarrels interpose," emerge from some brain-cupboard in which they have been hidden since my childish days. In fact, the hard-hitting with which both the attack and the defence abound, makes me think with a shudder upon the probable sufferings of the unhappy man whose intervention should lead two such gladiators to turn their weapons from one another upon him. In my youth, I once attempted to stop a street fight, and I have never forgotten the brief but impressive lesson on the value of the policy of non-intervention which I then received.

But there is, happily, no need for me to place myself in a position which, besides being fraught with danger, would savour of presumption: [vi] Careful study of both the attack and the reply leaves me without the inclination to become either a partisan or a peacemaker: not a partisan, for there is a great deal with which I fully agree said on both sides; not a peacemaker, because I think it is highly desirable that the important questions which underlie the discussion, apart from the more personal phases of the dispute, should be thoroughly discussed. And if it were possible to have controversy without bitterness in human affairs, I should be disposed, for the general good, to use to both of the eminent antagonists the famous phrase of a late President of the French Chamber—"*Tape dessus.*"

No profound acquaintance with the history of science is needed to produce the conviction, that the advancement of natural knowledge has been effected by the successive or concurrent efforts of men, whose minds are characterised by tendencies so opposite that they are forced into conflict with one another. The one intellect is imaginative and synthetic; its chief aim is to arrive at a broad and coherent conception of the relations of phenomena; the other is

positive, critical, analytic, and sets the highest value upon the exact determination and statement of the phenomena themselves.

If the man of the critical school takes the pithy aphorism "*Melius [vii] autem est naturam secare quam abstrahere*" [1] for his motto, the champion of free speculation may retort with another from the same hand, "*Citius enim emergit veritas e falsitate quam e confusione*;" [2] and each may adduce abundant historical proof that his method has contributed as much to the progress of knowledge as that of his rival. Every science has been largely indebted to bold, nay, even to wild hypotheses, for the power of ordering and grasping the endless details of natural fact which they confer; for the moral stimulus which arises out of the desire to confirm or to confute them; and last, but not least, for the suggestion of paths of fruitful inquiry, which, without them, would never have been followed. From the days of Columbus and Kepler to those of Oken, Lamarck, and Boucher de Perthes, Saul, who, seeking his father's asses, found a kingdom, is the prototype of many a renowned discoverer who has lighted upon verities while following illusions, which, had they deluded lesser men, might possibly have been considered more or less asinine.

On the other hand, there is no branch of science which does not owe at least an equal obligation to those cool heads, which are not to be seduced into the acceptance of symmetrical formulæ and bold generalisations for solid truths because of their brilliancy [viii] and grandeur; to the men who cannot overlook those small exceptions and insignificant residual phenomena which, when tracked to their causes, are so often the death of brilliant hypotheses; to the men, finally, who, by demonstrating the limits to human knowledge which are set by the very conditions of thought, have warned mankind against fruitless efforts to overstep those limits.

Neither of the eminent men of science, whose opinions are at present under consideration, can be said to be a one-sided representative either of the synthetic or of the analytic school. Haeckel, no less than Virchow, is distinguished by the number, variety, and laborious accuracy of his contributions to positive knowledge; while Virchow, no less than Haeckel, has dealt in wide generalisations, and, until the obscurantists thought they could turn his recent utterances

to account, no one was better abused by them as a typical free-thinker and materialist. But, as happened to the two women grinding at the same mill, one has been taken and the other left. Since the publication of his famous oration, Virchow has been received into the bosom of orthodoxy and respectability, while Haeckel remains an outcast!

To those who pay attention to the actual facts of the case, this is a very surprising event; and I confess that nothing has ever perplexed me more than the reception [ix] which Professor Virchow's oration has met with, in his own and in this country; for it owes that reception, not to the undoubted literary and scientific merits which it possesses, but to an imputed righteousness for which, so far as I can discern, it offers no foundation. It is supposed to be a recantation; I can find no word in it which, if strictly construed, is inconsistent with the most extreme of those opinions which are commonly attributed to its author. It is supposed to be a deadly blow to the doctrine of evolution; but, though I certainly hold by that doctrine with some tenacity, I am able, *ex animo*, to subscribe to every important general proposition which its author lays down.

In commencing his address, Virchow adverts to the complete freedom of investigation and publication in regard to scientific questions which obtains in Germany; he points out the obligation which lies upon men of science, even if for no better reason than the maintenance of this state of things, to exhibit a due sense of the responsibility which attaches to their speaking and writing, and he dwells on the necessity of drawing a clear line of demarcation between those propositions which they have a fair right to regard as established truths, and those which they know to be only more or less well-founded speculations. Is any one prepared to deny that this is the first great commandment of the [x] ethics of teaching? Would any responsible scientific teacher like to admit that he had not done his best to separate facts from hypotheses in the minds of his hearers; and that he had not made it his chief business to enable those whom he instructs to judge the latter by their knowledge of the former?

More particularly does this obligation weigh upon those who address the general public. It is indubitable, as Professor Virchow

observes, that "he who speaks to, or writes for, the public is doubly bound to test the objective truth of that which he says." There is a sect of scientific pharisees who thank God that they are not as those publicans who address the public. If this sect includes anybody who has attempted the business without failing in it, I suspect that he must have given up keeping a conscience. For assuredly if a man of science, addressing the public, bethinks him, as he ought to do, that the obligation to be accurate—to say no more than he has warranty for, without clearly marking off so much as is hypothetical—is far heavier than if he were dealing with experts, he will find his task a very admirable mental exercise. For my own part, I am inclined to doubt whether there is any method of self-discipline better calculated to clear up one's own ideas about a difficult subject, than that which arises out of the effort to put them forth, with fulness and precision, in language [xi] which all the world can understand. Sheridan is said to have replied to some one who remarked on the easy flow of his style, "Easy reading, sir, is—hard writing;" and any one who is above the level of a scientific charlatan will know that easy speaking is "—hard thinking."

Again, when Professor Virchow enlarges on the extreme incompleteness of every man's knowledge beyond those provinces which he has made his own (and he might well have added within these also), and when he dilates on the inexpediency, in the interests of science, of putting forth as ascertained truths propositions which the progress of knowledge soon upsets—who will be disposed to gainsay him? Nor have I, for one, anything but cordial assent to give to his declaration, that the modern development of science is essentially due to the constant encroachment of experiment and observation on the domain of hypothetical dogma; and that the most difficult, as well as the most important, object of every honest worker is "*sich ent-subjectiviren*"—to get rid of his preconceived notions, and to keep his hypotheses well in hand, as the good servants and bad masters that they are.

I do not think I have omitted any one of Professor Virchow's main theses in this brief enumeration. I do not find that they are disputed by Haeckel, and [xii] I should be profoundly astonished if they were. What, then, is all the coil about, if we leave aside various irritating sarcasms, which need not concern peaceable Englishmen?

Certainly about nothing that touches the present main issues of scientific thought. The "plastidule-soul" and the potentialities of carbon may be sound scientific conceptions, or they may be the reverse, but they are no necessary part of the doctrine of evolution, and I leave their defence to Professor Haeckel.

On the question of equivocal generation, I have been compelled, more conspicuously and frequently than I could wish, during the last ten years, to enunciate exactly the same views as those put forward by Professor Virchow; so that, to my mind, at any rate, the denial that any such process has as yet been proved to take place in the existing state of nature, as little affects the general doctrine. [3]

With respect to another side issue, raised by Professor Virchow, he appears to me to be entirely in the wrong. He is careful to say that he has no [xiii] unwillingness to accept the descent of man from some lower form of vertebrate life; but, reminding us of the special attention which, of late years, he has given to anthropology, he affirms that such evidence as exists is not only insufficient to support that hypothesis, but is contrary to it. "Every positive progress which we have made in the region of prehistoric anthropology has removed us further from the demonstration of this relation."

Well, I also have studied anthropological questions in my time; and I feel bound to remark, that this assertion of Professor Virchow's appears to me to be a typical example of the kind of incautious over-statement which he so justly reprehends.

For, unless I greatly err, all the real knowledge which we possess of the fossil remains of man goes no farther back than the Quaternary epoch; and the most that can be asserted on Professor Virchow's side respecting these remains is, that none of them present us with more marked pithecoïd characters than such as are to be found among the existing races of mankind. [4] But, if this be so, then the only just conclusion to be drawn from the evidence as it stands is, that the men of the Quaternary epoch may have proceeded [xiv] from a lower type of humanity, though their remains hitherto discovered show no definite approach towards that type. The evidence is not inconsistent with the doctrine of evolution, though it does not help it. If Professor Virchow had paid as much attention to comparative anatomy and palæontology as he has to anthropology,

he would, I doubt not, be aware that the equine quadrupeds of the Quaternary period do not differ from existing *Equidæ* in any more important respect than these last differ from one another; and he would know that it is, nevertheless, a well-established fact that, in the course of the Tertiary period, the equine quadrupeds have undergone a series of changes exactly such as the doctrine of evolution requires. Hence sound analogical reasoning justifies the expectation that, when we obtain the remains of Pliocene, Miocene, and Eocene *Anthropidæ*, they will present us with the like series of gradations, notwithstanding the fact, if it be a fact, that the Quaternary men, like the Quaternary horses, differ in no essential respect from those which now live.

I believe that the state of our knowledge on this question is still justly summed up in words written some seventeen years ago:—

"In conclusion, I may say, that the fossil remains of man hitherto discovered do not seem to me to take us appreciably nearer to that lower pithecoïd form by [xv] the modification of which he has probably become what he is. And considering what is now known of the most ancient races of men; seeing that they fashioned flint axes, and flint knives, and bone skewers of much the same pattern as those fabricated by the lowest savages at the present day, and that we have every reason to believe the habits and modes of living of such people to have remained the same from the time of the mammoth and the tichorhine rhinoceros till now, I do not know that the result is other than might be expected." [5]

I have seen no reason to change the opinion here expressed, and so far from the fact being in the slightest degree opposed to a belief in the evolution of man, all that has been learned of late years respecting the relation of the Recent and Quaternary to the Tertiary mammalia appears to me to be in striking harmony with what we know respecting Quaternary man, supposing man to have followed the general law of evolution.

The only other collateral question of importance raised by Professor Virchow is, whether the doctrine of evolution should be generally taught in schools or not. Now I cannot find that Professor Virchow anywhere distinctly repudiates the doctrine; all that he distinctly says is that it is not proven, and that things which [xvi] are

not proven should not be authoritatively instilled into the minds of young people.

If Professor Virchow will agree to make this excellent rule absolute, and applicable to all subjects that are taught in schools, I should be disposed heartily to concur with him.

But what will his orthodox allies say to this? If "not provenness" is susceptible of the comparative degree, by what factor must we multiply the imperfection of the evidence for evolution in order to express that of the evidence for special creation; or to what fraction must the value of the evidence in favour of the uninterrupted succession of life be reduced in order to express that in support of the deluge? Nay, surely even Professor Virchow's "dearest foes," the "plastidule soul" and "Carbon & Co.," have more to say for themselves, than the linguistic accomplishments of Balaam's ass and the obedience of the sun and moon to the commander of a horde of bloodthirsty Hebrews! But the high principles of which Professor Virchow is so admirable an exponent do not admit of the application of two weights and two measures in education; and it is surely to be regretted that a man of science of great eminence should advocate the stern bridling of that teaching which, at any rate, never outrages common sense, nor refuses to submit to criticism, while he has no whisper of remonstrance [xvii] to offer to the authoritative propagation of the preposterous fables by which the minds of children are dazed and their sense of truth and falsehood perverted. Professor Virchow solemnly warns us against the danger of attempting to displace the Church by the religion of evolution. What this last confession of faith may be I do not know, but it must be bad indeed if it inculcates more falsities than are at present foisted upon the young in the name of the Church.

I make these remarks simply in the interests of fair play. Far be it from me to suggest that it is desirable that the inculcation of the doctrine of evolution should be made a prominent feature of general education. I agree with Professor Virchow so far, but for very different reasons. It is not that I think the evidence of that doctrine insufficient, but that I doubt whether it is the business of a teacher to plunge the young mind into difficult problems concerning the origin of the existing condition of things. I am disposed to think that

the brief period of school-life would be better spent in obtaining an acquaintance with nature, as it is; in fact, in laying a firm foundation for the further knowledge Which is needed for the critical examination of the dogmas, whether scientific or anti-scientific, which are presented to the adult mind. At present, education proceeds in the reverse way; the teacher makes the most confident assertions on precisely those subjects [xviii] of which he knows least; while the habit of weighing evidence is discouraged, and the means of forming a sound judgment are carefully withheld from the pupil.

Professor Virchow is known to me only as he is known to the world in general—by his high and well-earned scientific reputation. With Professor Haeckel, on the other hand, I have the good fortune to be on terms of personal friendship. But in making the preceding observations, I should be sorry to have it supposed that I am holding a brief for my friend, or that I am disposed to adopt all the opinions which he has expressed in his reply. Nevertheless, I do desire to express my hearty sympathy with his vigorous defence of the freedom of learning and teaching; and I think I shall have all fair-minded men with me when I also give vent to my reprobation of the introduction of the sinister arts of unscrupulous political warfare into scientific controversy, manifested in the attempt to connect the doctrines he advocates with those of a political party which is, at present, the object of hatred and persecution in his native land. The one blot, so far as I know, on the fair fame of Edmund Burke is his attempt to involve Price and Priestley in the furious hatred of the English masses against the authors and favourers of the revolution of [xix] 1789. Burke, however, was too great a man to be absurd, even in his errors; and it is not upon record that he asked uninformed persons to consider what might be the effect of such an innovation as the discovery of oxygen on the minds of members of the Jacobin Club.

Professor Virchow is a politician—maybe a German Burke, for anything that I know to the contrary; at any rate, he knows the political value of words; and, as a man of science, he is devoid of the excuses that might be made for Burke. Nevertheless, he gravely charges his hearers to "imagine what shape the theory of descent takes in the head of a Socialist."

I have tried to comply with this request, but I have utterly failed to call up the dread image; I suppose because I do not sufficiently sympathise with Socialists. All the greater is my regret that Professor Virchow did not himself unfold the links of the hidden bonds which unite evolution with revolution, and bind together the community of descent with the community of goods.

Professor Virchow is, I doubt not, an accomplished English scholar. Let me commend the "Rejected Addresses" to his attention. For since the brothers Smith sang—

"Who makes the quartern loaf and Luddites rise,"—
Who fills the butchers' shops with large blue flies,

there has been nothing in literature at all comparable [xx] to the attempt to frighten sober people by the suggestion that evolutionary speculations generate revolutionary schemes in Socialist brains. But then the authors of the "Rejected Addresses" were joking, while Professor Virchow is in grim earnest; and that makes a great difference in the moral aspect of the two achievements.

[1] *Novum Organon*, li.

[2] *Partis instaurationis secundæ delineatio*.

[3] I may remark parenthetically that Professor Virchow's statement of the attitude of Harvey towards equivocal generation is strangely misleading. For Harvey, as every student of his works knows, believed in equivocal generation; and, in the sense in which he uses the word *ovum*, "*nempe substantiam quandam corpoream vitam habentem potentia*," the truth of the axiom "*omne vivum ex ovo*," popularly ascribed to him, has in no wise been affected by the discoveries of later days in the manner asserted by Professor Virchow.

[4] I do not admit that so much can be said; for the like of the Neanderthal skull has yet to be produced from among the crania of existing men.

[5] *Man's Place in Nature*, p. 159.

[xxi]

PREFACE.

When the address delivered by Rudolph Virchow on the 22d of September last year, at the fiftieth meeting of German Naturalists and Physicians at Munich, on "Freedom of Science in the Modern State," appeared in print in the following October, I was called upon, on many sides, to prepare a reply. And such a reply on my part seemed, in fact, justified by the severe strictures which Virchow in his discourse had directed against one delivered by me only four days previously, before the same meeting, on "The Modern Doctrine of Evolution in its Relation to General Science." The general views which Virchow then unfolded proved such a fundamental opposition in our principles, and touched our dearest moral convictions so nearly, that any reconciliation of such antagonistic views was no longer to be thought of. Nevertheless I forbore publishing the ready reply for two reasons: one relating to the matter itself, the other a personal one.

With regard to the matter itself, I believed I might confidently leave it to futurity to decide in the contention [xxii] that has declared itself between us. For on one hand the doctrine of evolution which Virchow attacks has already so far become a sure basis of biological science and part of the most precious mental-stock of cultivated humanity, that neither the anathemas of the Church nor the contradiction of the greatest scientific authority—and such an one is Virchow—can prevail against it; and on the other hand most of the arguments which he specially adduces against the theory of descent have been so often discussed and so thoroughly refuted that any renewed discussion seems in fact superfluous.

Personally, it was in the highest degree repugnant to me to come forward as the opponent of a man whom I learned, a quarter of a century ago, to acknowledge and to honour as the reformer of medical science; a man whose most ardent disciple and most enthusiastic follower I at that time was, with whom I subsequently stood in the closest relation as his assistant, and with whom I long after continued in the most friendly intercourse. The more keenly I lamented Virchow's position, for some years past, as the antagonist of our modern doctrine of evolution, and the more I felt myself challenged to a reply by his repeated attacks upon it, the less inclination I felt,

nevertheless, to come forward publicly as the opponent of this distinguished and highly-honoured man. [xxiii]

And if I find myself, after all, forced to reply, it is in the persuasion that a longer silence will add to the erroneous conclusions which my hitherto resigned attitude has already given rise to; at the same time I believe that, precisely by reason of the peculiar interest with which I have throughout followed Virchow's scientific achievements, I am specially qualified to answer the question, a hundred times repeated by letter or by word of mouth—"How is it possible that a man who so long stood at the head of a party of progress in science as in politics, who in political life indeed, has outwardly maintained this position, has in science become an instrument of the most perilous reaction?"

A verbal answer, which I incidentally gave in March of last year at the Concordia Banquet at Vienna, was reported in the daily papers in such a different sense, and was in part so misunderstood or so intentionally misrepresented, that I am forced at last, on that account, to publish a clear and unambiguous reply. The "Augsburger Allgemeine Zeitung," which eagerly seizes every opportunity of expressing its unconquerable aversion to the evolution theory, accused me, in one of its hostile articles, of a virulent and undignified attack on Virchow. In contradiction of this misrepresentation in the Augsburg paper—which was copied by other journals—I must expressly assert that not Virchow but I myself am the person attacked, and [xxiv] that, therefore, the matter in question is not an unjustifiable attack by me on a formerly revered friend, but a defence to which I am compelled by repeated and sharp attacks on his part.

Another reason which urges me at last to break silence consists in the continual and ample advantage that all the clerical and reactionary organs have been taking of Virchow's address, during the last three-quarters of a year, in favour of mental retrogression. The shouts of triumph with which they at once hailed Virchow's "grand moral action," that is to say, his perversion from a Free-thinker to the side of mental darkness, was the first signal for that persistent utilisation of his authority of which the pernicious consequences can by no means be escaped. Friedrich von Hellwald, in his discus-

sion on the speeches made at Munich, has already strikingly pointed out [6] the grave danger that exists when just such an one as Virchow, standing under the banner of political liberalism and wrapped in the mantle of severe science, decisively combats against the freedom of science and of its doctrines. This serious danger has never shown so threatening an aspect as at the present moment, when our political and religious life appears to be encountering such a reaction as has not occurred for a long time. The two insane attempts which, within a few [xxv] weeks, have been made by Social-democracy against the revered and reverend person of the German Emperor have raised a storm of righteous indignation of such violence that calm judgment is entirely overthrown, and that many even of the most liberal of liberal politicians not only impetuously urge us to the severest measures against the Utopian doctrines of social democracy but, far over-shooting the mark, demand that free-doctrine and free-thought, that freedom of the press and even freedom of conscience shall be thrown into the narrowest fetters. Can this reaction, lurking in the background, find any more welcome support than is afforded by the mere demand of such a man as Virchow for restriction of liberty in teaching? And if he makes our present doctrines of evolution in general and the theory of descent in particular responsible for the mad doctrines of social-democracy, it is but a natural and just consequence when the famous New-Prussian "Kreuz-Zeitung" throws all the blame of these treasonable attempts of the democrats Hödel and Nobiling—as in fact it quite lately did—directly on the theory of descent, and especially on the hated doctrine of the "descent of man from apes." And the danger which threatens us shows a still graver aspect when we consider how great an influence Virchow has at the present day as an advanced liberal, and how he is regarded in the [xxvi] Prussian diet as the highest practical authority, and at the same time as the most liberal critic when educational questions are under consideration. Now it is well known that one of the most important problems lying before the Prussian parliament is the consideration of a new education-law, which will probably exercise its restricting influence for a long time to come, not in Prussia only, but throughout Germany; what can we expect of such an education-law if in the course of the deliberations, among the small number of those specialists who are generally listened to, Virchow raises his voice as a leading au-

thority, and brings forward the principles that he proclaimed in his speech at Munich as the surest guarantees for the freedom of science in the modern polity? Article XX. of the Prussian Charter, and § 152 of the Code of the German Empire, say, "Science and its doctrines are free." And Virchow's first step, according to the principles he now declares, must be a motion to abrogate this paragraph.

In the face of this imminent danger, I dare no longer hesitate about my answer. *Amicus Socrates, amicus Plato, magis amica Veritas.* An unreserved and public opposition can be no longer postponed. As a matter of fact, at the Munich meeting, neither did Virchow hear my speech nor I his. I read my paper, as it is printed, on the 18th September 1877, and left [xxvii] on the 19th. Virchow came to Munich only on the 20th, and delivered his speech on the 22d.

Bearing in mind the gratitude which I owe to Virchow as my former master and friend at Würzburg—a gratitude which I have at all times striven to prove by the further development of his mechanical theory—I shall confine myself, as far as possible, to an objective and special confutation of his assertions. Certainly the temptation on this occasion was a strong one to pay the debt in like kind. In my Munich lecture, among the few names to which I alluded, I particularly mentioned that of Virchow as the distinguished founder of cellular-pathology (p. 12). [7] Virchow's return for this was to heap scorn and ridicule on the doctrine of evolution in his usual manner. The critic in the "National-Zeitung," Herr Isidor Kastan, says of this with particular satisfaction, "The ridicule with which Herr Virchow treated this side of Haeckel's visions was indeed caustic enough, but this is ever Virchow's way; only in this case, if in any, he was fully justified."

I could less easily ignore Virchow's denunciation of me than his satire—a denunciation which gibbeted me as a confederate in the social-democratic cause, and which made the theory of descent answerable for the horrors of the Paris Commune. The opinion is now widely spread that by this intentional connection of [xxviii] the theory of descent with Social Democracy he has hit the hardest blow at that theory, and that he aimed at nothing less than the removal of all "Darwinists" from their academic chairs and professorships. This is the inevitable consequence of his demands; for if Virchow insists

with the utmost determination that the theory of descent must not be taught (because he does not regard it as true), what is to become of the supporters of that theory who, like myself, regard it as incontrovertibly true, and teach it as a perfectly sound theory? And at least nine-tenths of all the teachers of zoology and botany in Europe are among its supporters from immutable conviction of its truth, as well as all morphologists without exception. Virchow cannot expect that these teachers should collectively renounce that which they believe to be immutable truth, and in its place set up the dogma of the Church as the basis of their teaching, in accordance with his wish! Nothing remains for them but to vacate their professors' chairs, and—according to Virchow and the "Germania"—the "Modern Polity" would be in duty bound to deprive them of their liberty of teaching if they did not voluntarily renounce it.

If this be indeed Virchow's purpose, as it is generally supposed to be, with regard to me, at least, he may spare himself the trouble. Amongst us in Jena quite [xxix] other ideas prevail as to the "Freedom of science in the modern Polity" than those which obtain in the capital, Berlin. And among us the Berlin students' rhyme has no meaning,

"Who knows the truth and freely speaks,
On him the law its vengeance wreaks." [8]

The Jena students, on the contrary, sing the rhyme in its original form—

"Who knows the truth and speaks it not,
A feeble wretch is he, God wot." [9]

The Rector Magnificentissimus of the University of Jena, the Grand Duke of Saxony, who has proved himself the protector of the arts and sciences, has besides far more liberal views as to the liberty of scientific investigation and teaching than the illustrious head of the party of progress at Berlin. The enlightened and liberal Prince at Weimar, under whose particular protection we in Jena find ourselves, has never conceived it necessary to limit in any way the unbounded freedom of my teaching and my writing; not even when in 1866 my "General Morphology," and 1868 my "History of Creation"